Andrew S. Marcaccio
Senior Counsel

June 24, 2021

VIA ELECTRONIC MAIL

Luly E. Massaro, Division Clerk
Rhode Island Division of Public Utilities and Carriers
89 Jefferson Boulevard
Warwick, RI 02888

RE: Notification of Combined Heat and Power Project in Exeter
Rhode Island Grows

Dear Ms. Massaro:

On behalf of The Narragansett Electric Company d/b/a National Grid ("National Grid" or the "Company"), we write to notify you that the Company is preparing to offer energy efficiency incentives to Rhode Island Grows ("RI Grows" or "Customer") in connection with the utilization of a combined heat and power project with a net output of one megawatt ("MW") or greater to be located in Exeter, RI ("CHP Project"). Per the Authorized CHP Process[1], the Division of Public Utilities and Carriers ("Division") is to review the attached exhibits and provide its opinion of support of or opposition to the CHP Project to the Company no later than **August 13, 2021**.

Following receipt of the Division's opinion, or if no opinion is provided by the referenced due date, the Company may advance the matter by submitting an offer letter to the Customer and making a filing with the Public Utilities Commission ("Commission") seeking approval of the CHP Project.

Consistent with the Authorized CHP Process, the Company has attached the following exhibits for the Division's review:

- **Exhibit A** – Memorandum from the Customer to the Company dated August 24, 2020. This memorandum represents a letter signed by a senior executive or site operations manager stating that the CHP Project would not move forward without the energy efficacy technical assistance and incentive.

[1] The "Authorized CHP Process" is detailed within Bates Pages 393-395 of the Company's Combined 2021-2023 Energy Efficiency and Conservation Procurement Plan ("Three-Year Plan") and 2021 Annual Energy Efficiency and Conservation Procurement Program Plan ("Annual Plan") that was approved by the Public Utilities Commission in Docket No. 5076 and the Settlement Agreement, entered into on June 18, 2020, by and between the Company and the Division of Public Utilities and Carriers, that was approved by the Commission in Docket No. 4755. See Open Meeting on December 22, 2020 for approval of Combined Three-Year Plan and Annual Plan. See Open Meeting on September 1, 2020 for approval of the Settlement Agreement.

280 Melrose Street, Providence, RI 02907
T: 401-784-4263 ■ andrew.marcaccio@nationalgrid.com ■ www.nationalgrid.com

- **Exhibit B** – Purchase and Sales Agreement between the Customer and an entity (Contract No. H19-1963) dated September 20, 2019 and First Amendment to Contract No. H19-1963 dated August 17, 2020. This contract and first amendment represent documentation from the Customer on all relevant leases, agreements or commitments related to the CHP Project.

- **Exhibit C** – Project Costing Summary dated August 13, 2020. This summary represents an estimated budget for the CHP Project.

- **Exhibit D** – CHP Project BCR Screening dated April 22, 2021. This analysis represents a complete benefit cost analysis for the CHP Project using the Rhode Island Test.[2]

- **Exhibit D1** – Application of CHP Project BCR Screening that applies sensitivities related to the removal of economic benefits.

- **Exhibit E** – Natural Gas Capacity Analysis Report for CHP Project, Exeter RI and Natural Gas Capacity Report for CHP Project, Exeter, RI. These documents represent a report including a natural gas capacity analysis that addresses the impact of the CHP Project on gas reliability; the potential cost of any necessary incremental gas capacity and distribution system reinforcements; and the possible acceleration of the date by which new pipeline capacity would be needed for the relevant area.[3]

- **Exhibit F** – Combined Heat and Power Study Report by outside vendor, Draft, Revision 3, dated April 22, 2021. This reports represent a description of the CHP Project, including all the pertinent details relating to the CHP Project.

- **Exhibit G** – CHP Project Economic Impacts (2020-2039) dated March 27, 2021. This document represents a REMI analysis which is required to be run by the Company for CHP projects greater than 3 MW.

- **Exhibit H** – REMI Analysis of CHP Project dated November 9, 2020. This document represents a written and well-supported justification explaining why the economic benefits are reasonably likely to be obtained.

- **Exhibit I** – Pipeline Notification. This document updates the table on Bates Page 395 of 396 of the Combined Three-Year Plan and 2022 Annual Energy Efficiency Plan.

[2] The Company anticipates providing the Division with an updated BCR Screening consistent with the screening that will be conducted for the 2022 Annual Plan. That screening will apply a new set of avoided costs from the AESC 2021 Study. An initial screening applying the AESC 2021 Study resulted in 1.98. That number will be further checked through the 2022 planning process.

[3] The Company anticipates providing the Division with an updated gas capacity report and analysis report once the updated June 2021 forecast is available and following the filing of the Company's Annual Gas Long Range Plan.

In addition, the Company is notifying the Division of the following potential waiver requests that may be made as part of a filing with the Commission:

- **Interconnection Waiver** – The Company anticipates filing a petition with the Commission requesting a waiver from interconnection. Additional details will be provided to the Division prior to any filing with the Commission.

- **Minimum Demand Charge Waiver** – The Company is reviewing a potential filing of a petition with the Commission requesting a waiver from minimum demand charge. Additional details will be provided to the Division prior to any filing with the Commission.

Thank you for your attention to this matter. If you have any questions or concerns, please do not hesitate to contact me at 401-784-4263.

Sincerely,

Andrew S. Marcaccio

Attachments

cc: Linda D. George, Administrator, Division
John Spirito, Esq., Division
Nicholas S. Ucci, Commissioner, OER
Becca Trietch, Administrator of Energy Efficiency Programs, OER
Anthony L. Hubbard, Acting Chairperson, EERMC
Mike Guerard, EERMC Consultant
Thomas Kogut, Associate Administrator (CATV)/ Chief of Information, Division
Joel Munoz, Public Utility Rate Analyst, Division
John Bell, Chief Public Utilities Accountant, Division
Jon Hagopian, Deputy Chief of Legal Services, Division
Margaret Hogan, Implementation Director - Policy and Programs, Division
Christy Hetherington, Chief of Legal Services, Division
Al Mancini, Chief Regulatory Analyst, Division

RHODE ISLAND GROWS LLC
"The future grows here"

Date: Monday, August 24, 2020

To: Chandra Bilsky, National Grid
John Karlin, National Grid
Nicholas Wojcik, National Grid

From: Timothy Schartner CMO, Rhode Island Grows LLC

cc: John Rizzo COO, Rhode Island Grows LLC

Subject: **Rhode Island Grows Viability Without Incentive**

MEMORANDUM

Messrs.,

Rhode Island Grows (" RI Grows")and National Grid have been working together for the last year on developing the best available energy plant for our 1 million square foot tomato greenhouse (Controlled Environment Agriculture) in Exeter RI. This greenhouse is designed with the highest level of efficiency with respect to energy and water consumed. We have designed the greenhouse with consultation with other design, construction and operation experts in the automated, hydroponic greenhouse world.

The CHP incentive from National Grid is critical for this project to come to fruition. The CHP project reduces not only our greenhouse gas footprint but also reduces and stabilizes our costs for greenhouse heating and electricity. Without the National Grid incentive for the Combined Heat and Power Plant, we cannot build this project that will produce over 16 million pounds of tomatoes annually in RI and employ 105 people in the State.

This plant emulates present systems in the Netherlands; this is not an exercise in speculation and innovation. Also noteworthy, once we are in production and phase I is complete with the biodigesters, this project may be one of the greenest business systems globally, competing with Resource Park in Iceland. We hope you'll find it both desirable and appropriate to consider this project eligible for assistance.

ONE ARNOLD PLACE EXETER, RHODE ISLAND 02822
(401) 862-7437 PHONE (401) 294-6996 FAX
RIGROWS.COM

RHODE ISLAND GROWS LLC
"The future grows here"

Our collective project team consisting of National Grid, Havecon Horticultural Projects in the Netherlands (expert Design and builder of CEAs), Mastronardi Produce Ltd in Canada (Largest Tomato producer in North America), many State of Rhode Island departments, and the University of Rhode Island have been working on this project concept for over two years. In fact, our project will create a URI curriculum in CEA operations.

We look forward to working with you. Best Regards,

Tim Schartner

Timothy A. Schartner, CMO
RHODE ISLAND GROWS, LLC
One Arnold Place
Exeter RI, 02822
Tim@rigrows.com
(401) 862-7437

www.rigrows.com

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PURCHASE & SALES AGREEMENT

Rhode Island Grows, LLC
One Arnold Place
Exeter, Rhode Island 02822
USA

Tel : 001 – 401 294 2044
Mob : 001 - 203-223-4450 (Mr. Laist)
E-mail : f.laist@rigrows.com
tim@rigrows.com

Contract number : H19 – 1963
Quotation number : A19 – 05 – 2728
Project Information : Rhode Island Grows, LLC

Bleiswijk, September 20th 2019

Dear Mr. Schartner and Mr. Laist,

Herewith we confirm the order for the delivery and assembly of a greenhouse, corridor and service area, a screening installation, a climate installation, grow gutters, internal logistics, an electrical and computer installation, a grow lighting installation, an irrigation system and a roof washer, in accordance with the following specifications.

Havecon is a flexible and customer-minded organization with a lot of experience in the field of development, construction and the complete realization of horticultural projects. Innovating, unburdening and keeping appointments keep our people busy every day. We enjoy doing so and we always want to share that passion with our customers.
Together with the Voorwinden Group we can make a tight construction schedule so we won't be in your way very long.
We'd be happy to mean something to you, if you so wish.

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1 – Greenhouse construction

1.1 – Project description

Building site location	:	One Arnold Place, Exeter, Rhode Island 02822, USA	
Start Building	:	Spring 2020	
Total area	:	111.106 m²	(outside wall dimensions)
Bay size	:	4.0 mtr.	
Trellis length	:	8.0 mtr. / 16.0 mtr.	
Section length :			
Standard section	:	4.50 mtr.	
End section	:	4.82 mtr.	
Gutter height :			
Internal columns	:	6.95 mtr.	(Top of foundation post – underside gutter).
Gable columns	:	7.00 mtr.	(Top of foundation wall – underside gutter).
Above soil level	:	7.30 mtr.	(Soil level – underside gutter).

Greenhouse :

Area	:	100.122 m²	(outside wall dimensions)
Total width			
72 bays of 4.0 mtr. =		304 mtr.	(36x trellis 8.0 mtr.)
Total Length			
72 bays of 4.0 mtr. are		347.14 mtr. long	(77x 4.50 mtr. section)
Roof type	:	22° Glass roof	
Roof glass size	:	±2120 x 1125 mm.	

Corridor :

Area	:	5.554 m² (outside wall dimensions)	
Total width			
4 bays of 4.0 mtr. =		16 mtr.	(1x trellis 16.0 mtr.)
Total Length			
4 bays of 4.0 mtr. are		347.14 mtr. long	(77x 4.50 mtr. section)
Roof type	:	22° Glass roof.	
Roof glass size	:	±2120 x 1125 mm.	

Service areas :

Area	:	5.430 m² (outside wall dimensions)	
Total width			
8 bays of 4.0 mtr. =		32 mtr.	(2x trellis 16.0 mtr.)
Total Length			
4 bays of 4.0 mtr. are		23.10 mtr. long	(5x 4.50 mtr. section)
4 bays of 4.0 mtr. are		158.10 mtr. long	(5x 4.50 mtr. section)
Roof type	:	22° Insulated panel roof.	

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1.2 – Constructive design criteria

The following greenhouse, corridor & service area are conform :

- 10 rules to improve the storm durability of greenhouses cladding systems in accordance with : WSL / TNO rapport BI-91-097
- Roof & Gable cladding systems in accordance with : TNO Glazenstad, version 2017.1
- Gutter-Ridge-Gutter connection in accordance with : TNO rapport Nr. B-90-817
- Vent rail mechanism in accordance with : TNO rapport Nr. B-84- 86

Foundation, steel-structure and gables in accordance with CASTA kassenbouw 3.01 (SP1) and the NEN 3859 2012 - IBC - 2015 ASCE7-10 and the following loadings :

- Type of soil : Clay soil, slightly sandy, moderately heavy
- Installation load : 70 N/m²
- Transport load
  - Incidental : 1250 N
  - Permanent : 0 N
- Gutter loading : Roof washer = 600 kg., wheelbase c.t.c. 150 cm.
- Loading End Gable
  - Gable Heating : dead load piping +content = 250 N/m.
    Bracket mounting, 200 cm. under the gutter, projection 150 mm.
  - Irrigation : Not applicable.
  - Assimilation lights : Not applicable.
- Loading Side Wall
  - Gable Heating : Dead load piping +content = 250 N/m.
    Bracket mounting, 200 cm. under the gutter, projection 150 mm.

Greenhouse :

For the greenhouse IBC -2015 ASCE7-10 : wind region 125 mph, risk category 1; snow load 30Psf

- Basic wind speed : V50 = 55.9 m/s reference V25 = 53.5 m/s.
- Basic wind velocity : 1544 N / m².
- Snow load : Sk = 724 N/m², reduced to 615.4 N/m² .
- Reference period : Rf = 25 year
- Seismic response : User input
- Seismic acceleration : Ag = 0.051 x g m/sec²
- Seismic acceleration : Sd = 0.051 x g m/sec²
- Seismic design factor : gs = 2.50
- Type of soil : Clay soil, slightly sandy, moderately heavy
- Crop load : 200 N/m²
- Hanging crop-gutter load : 150 N/m²
- Loading End Gable
  - Screening Wires : Double screen at top & bottom section of trellis.
    1st screen at trellis top section:
    * Mechanism wire after reverse wheel : 1.5 x 3300 N
    * Plastic support wire : 15 x 150 N
    * Steel support wire : 2 x 1000 N
    2nd screen at trellis bottom section:
    * Mechanism wire after reverse wheel : 1.5 x 3300 N
    * Plastic support wire : 15 x 150 N
    * Steel support wire : 2 x 1000 N
  - Crop wires : ±800 mm. c.t.c., minimum dip 25 cm.
    Crop-brace mounted 280 cm. under the gutter.
  - Hoist heating : Suspension wires for hoist heating.

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Corridor :

For the corridor IBC -2015 ASCE7-10 : wind region 136 mph, risk category 2; snow load 30Psf

- Basic wind speed : V50 = 60.8 m/s reference V25 = 58.2 m/s.
- Basic wind velocity : 1828 N / m².
- Snow load : Sk = 1232 N/m², reduced to 718.3 N/m².
- Reference period : Rf = 25 year
- Seismic response : User input
- Seismic acceleration : Ag = 0.051 x g m/sec²
- Seismic acceleration : Sd = 0.051 x g m/sec²
- Seismic design factor : gs = 2.50
- Type of soil : Clay soil, slightly sandy, moderately heavy
- Crop load : 0 N/m²
- Hanging crop-gutter load : 0 N/m²
- Loading End Gable
  Screening Wires : Single screen at top section of trellis.
  1st screen at trellis top section:
  * Mechanism wire after reverse wheel : 1.5 x 3300 N
  * Plastic support wire : 15 x 150 N
  * Steel support wire : 2 x 1000 N

Service area :

For the service area IBC -2015 ASCE7-10 : wind region 136 mph, risk category 2; snow load 30Psf

- Basic wind speed : V50 = 60.8 m/s reference V25 = 58.2 m/s.
- Basic wind velocity : 1828 N / m².
- Snow load : Sk = 1232 N/m².
- Reference period : Rf = 25 year
- Seismic response : User input
- Seismic acceleration : Ag = 0.051 x g m/sec²
- Seismic acceleration : Sd = 0.051 x g m/sec²
- Seismic design factor : gs = 2.50
- Type of soil : Clay soil, strong sandy, moderately heavy
- Crop load : 0 N/m²
- Hanging crop-gutter load : 0 N/m²

Note The greenhouse and corridor has been calculated with a snow-melt factor of 0.6, based upon:
- a minimum temperature of +12ºC under the glass roof & above the screening cloth.
- that the screen must be open during and after snow-fall, in order to prevent a build-up of snow on the roof.

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1.3 – Foundation

The project will be installed on a specialized foundation with the use of specialized machines.
Before we start with the foundation works, the buyer ensures the project site is levelled and equalised on the normal fall, and the project site has to be clear of all obstacles above as well as under the ground.

We assume that the surface is free of obstacles for drilling the holes and that the holes can easily be drilled, any additional costs will be charged to the client.
The normal fall on a glasshouse is 7 mm. per section, but site levels may dictate a different fall.
Concrete for the foundation post will be 20Mpa plain concrete.
Concrete for the foundation wall will be 25Mpa Air trained.

When it is necessary to make the concrete wall higher than specified, then an extra charge of USD 8.00 per meter foundation wall, per 5 cm. increase in height.
If the foundation wall will be made higher it may be done in multiple sessions on top of each other.

All concrete required for the contract will be arranged by Havecon (±1200 m³ concrete) and delivered by a local supplier.

Note	The foundation has been calculated based on an assumption for the type of soil. Once the geo-technical report has been made we can finalize our foundation calculation. If the foundation have to be deeper or bigger due to ground conditions, soil consistency or frost depth, this will be carried out as an additional. The additional costs will then be invoiced.

1.3.1 Concrete foundation wall

The concrete foundation wall will be made on concrete foundation pads connected to the foundation wall reinforcement hairpins ø10 mm.

±784 mtr. End gable fixed foundation wall :

- Height : 30 cm.
- Width : 30 cm.
- Upper reinforcement rods : 2x ø10 mm.
- Lower reinforcement rods : 2x ø10 mm.
- Concrete foundation pads : ø60 cm. & 160 cm. deep (±452 ltr. concrete)
- C.t.c. foundation pads : every 2.0 mtr.

±891 mtr. Side wall fixed foundation wall :

- Height : 30 cm.
- Width : 30 cm.
- Upper reinforcement rods : 2x ø10 mm.
- Lower reinforcement rods : 2x ø10 mm.
- Concrete foundation pads : ø60 cm. & 123 cm. deep (±348 ltr. concrete), for the greenhouse.
- Concrete foundation pads : ø70 cm. & 129 cm. deep (±496 ltr. concrete), for the corridor.
- Concrete foundation pads : ø90 cm. & 122 cm. deep (±776 ltr. concrete), for the service area.
- C.t.c. foundation pads : every 2.25 mtr.

The foundation wall will be equipped with:

- Drilled in anchors for gable posts and aluminium foundation wall rail.
- Straight expansion pieces, 20 mm. thick polystyrene plate, every ±50 mtr.
- In the end gables (at the rainwater discharge sides), next to the end gable posts, a PVC pipe ø90 mm. through the foundation wall, for the condensation water discharge pipes.

Note	The delivery and processing of filling sand has not been included in this contract.

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1.3.2 Steel foundation posts
All steel foundation posts to be hot dip galvanised and powder coated grey, RAL 7040.

Note	Havecon cannot be held responsible for damage on the steel foundation posts by soil composition, steaming etc.

For the internal posts :

- Steel foundation posts : tubular steel 160 x 60 x 3 mm., length 1000 mm., S235J0
  - Reinforcement rod : 1x ø10 mm.
- Mounting height : 5 cm. above top of foundation wall
- Concrete pad : ø80 cm. & 40 cm. long (±200 ltr. concrete).
- Concrete pad Depth : 40 cm. below ground level.

For the internal cross-braceposts :

- Steel foundation posts : tubular steel 160 x 60 x 3 mm., length 1000 mm., S235J0
  - Reinforcement rod : 1x ø12 mm.
- Mounting height : 5 cm. above top of foundation wall
- Concrete pad : ø90 cm. & 59 cm. long (±375 ltr. concrete).
- Concrete pad Depth : 40 cm. below ground level.

Each steel foundation post is equipped with :

- Column anchor strips with hole for M20 bolt.
- Holes for mounting of cross-brace spacer beam.
- Holes for reinforcement rod through bottom of post in the concrete pad.

Specially cast foundation post :

- PVC pipe : ø500 mm., length 1.0 mtr. (filled with ±196 ltr. concrete)
  - Reinforcement + anchor : 4 rods ø10 mm. + anchor bolt M16
- Mounting height : Level with top of foundation wall
- Concrete pad : vk160 cm. & 96 cm. long (±2460 ltr. concrete).
- Concrete pad Depth : 40 cm. below ground level.

1.3.3 Concrete pathway / concrete floor
Not applicable.

1.4 – Annex construction
The greenhouse, corridor and service area will not be built against another building.

1.5 – Greenhouse main construction
All the Steel construction will be hot dip galvanised, in compliance with NEN-EN-ISO 1461

1.5.1 White coated parts
There will not be any steel coated white.

1.5.2 Trellis
Greenhouse :
Trellis, length 8.0 mtr.

- Location : 1st and 2nd row from side wall.
- Lowering under gutter : 180 mm.
- Trellis height : 520 mm.
- Upper profile : tubular steel 60 x 30 x 3.0 mm., S275J0.
- Lower profile : tubular steel 60 x 30 x 3.0 mm., S275J0.
  - Equipped with : 5 holes ø10 mm. for hanging crop gutters
- Compression and tension diagonals : tubular steel 25 x 25 x 2.0 mm., S235J0.
  - Number diagonals per bay : 8, cut & welded 3 sides.
  - Position 1st diagonal : Compression.
- Gutter vertical : tubular steel 60 x 30 x 2.5 mm., S275J0.
- Column connection strip : 60 x 12 mm., S235J0
  - Gusset : angle 70 x 70 x 7 mm. + angle 50 x 50 x 5 mm.

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Trellis, length 8.0 mtr.

- Location : Middle rows.
- Lowering under gutter : 180 mm.
- Trellis height : 520 mm.
- Upper profile : tubular steel 60 x 30 x 2.5 mm., S275J0.
- Lower profile : tubular steel 60 x 30 x 2.5 mm., S275J0.
  - Equipped with : 5 holes ø10 mm. for hanging crop gutters
- Compression and tension diagonals : tubular steel 25 x 25 x 1.5 mm., S235J0.
  - Number diagonals per bay : 8, cut & welded 3 sides.
  - Position 1st diagonal : Compression.
- Gutter vertical : tubular steel 60 x 30 x 2.5 mm., S275J0.
- Column connection strip : 60 x 10 mm., S235J0
  - Gusset : angle 70 x 70 x 7 mm. + angle 50 x 50 x 5 mm.

Corridor :

Trellis, length 16.0 mtr. made from 2x 8.0 mtr. with connection in the middle.

- Lowering under gutter : 180 mm.
- Trellis height : 750 mm.
- Upper profile : tubular steel 120 x 80 x 4 mm., S275J0.
- Lower profile : tubular steel 120 x 80 x 4 mm., S275J0.
- Compression and tension diagonals : tubular steel 60 x 60 x 2 mm., S235J0.
  - Number diagonals per bay : 8, cut & welded 3 sides.
  - Position 1st diagonal : Compression.
- Gutter vertical : tubular steel 120 x 80 x 4 mm., S235J0.
- Column connection strip : 120 x 15 mm., S235J0
  - Gusset : 2x angle 80 x 80 x 8 mm.
- Trellis connection strip : 120 x 15 mm., S235J0
  - Gusset : angle 80 x 80 x 8 mm.
- Trellis to trellis connection rod : lower profiles connected at location of gutter.

Service area :

Trellis, length 16.0 mtr. made from 2x 8.0 mtr. with connection in the middle.

- Lowering under gutter : 180 mm.
- Trellis height : 950 mm.
- Upper profile : tubular steel 140 x 80 x 5 mm., S275J0.
- Lower profile : tubular steel 140 x 80 x 5 mm., S275J0.
- Compression and tension diagonals : tubular steel 60 x 60 x 3 mm., S235J0.
  - Number diagonals per bay : 8, cut & welded 3 sides.
  - Position 1st diagonal : Compression.
- Gutter vertical : tubular steel 140 x 80 x 5 mm., S235J0.
- Column connection strip : 140 x 15 mm., S235J0
  - Gusset : angle 100 x 100 x 10 mm.
- Trellis connection strip : 140 x 15 mm., S235J0
  - Gusset : angle 80 x 80 x 8 mm.
- Trellis to trellis connection rod : lower profiles connected at location of gutter.

Trellis under the gutter, length 9.00 / 13.5.0 mtr.

- Lowering under gutter : 325 mm.
- Trellis height : 1150 mm.
- Upper profile : tubular steel 200 x 120 x 6 mm., S275J0.
- Lower profile : tubular steel 200 x 120 x 6 mm., S275J0.
- Compression and tension diagonals : tubular steel 140 x 140 x 4 mm., S235J0.
  - Number diagonals per bay : 6, cut & welded 3 sides.
  - Position 1st diagonal : Compression.
- Gutter vertical : tubular steel 250 x 150 x 5 mm., S275J0.
- Column connection strip : 200 x 15 mm., S235J0
  - Gusset : angle 100 x 100 x 10 mm.
- Trellis connection strip 13.5 mtr. : 200 x 15 mm., S235J0
  - Gusset : angle 100 x 100 x 10 mm.

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1.5.3 Internal construction

• Internal column	:	tubular steel 160 x 60 x 6 mm., S275J0
• Column for trellis under gutter	:	HE300B, S235J0

Cross-brace sections :

• Cross-brace column	:	tubular steel 160 x 60 x 6 mm., S235J0
• Number of cross-brace sections	:	6x per column row, double cross-brace above each other.
• Cross-brace	:	4x steel rod ø16 mm.
• Upper spacer beam	:	tubular steel 50 x 50 x 2 mm., mounted 80 cm. under the gutter.
• Mid spacer beam	:	tubular steel 60 x 60 x 2 mm.
• Lower spacer beam	:	tubular steel 120 x 60 x 2.5 mm., mounted between the foundation posts.
- Lowering	:	36 cm. from top of foundation post.
• Wind braces	:	2x steel rod ø10 mm.
- Number of rows	:	2x mounted above 2 cross-brace rows.

1.5.4 End gable construction

Each End gable consists of :

• End gable column	:	tubular steel 220 x 120 x 6 mm., S275J0.
• Purlins	:	3x U-profile 100 x 50 x 4 mm., rigidly joined.
- Type	:	for glass gables with recess for gable screening.
• Purlins	:	4x U-profile 100 x 50 x 4 mm., rigidly joined.
- Type	:	for insulated panel gables.
• Strips for screen installation	:	4x welded to column, for 2 screen installations.
• Heating console	:	1x per column, tubular steel 100 x 50 x 2 mm., 150 mm. long,
- Lowering	:	height to be determined later.
• Crop brace	:	1x ø16 mm. steel reinforcing rod.
- Installation	:	on a fixed strip, 280 cm. under the gutter.
• Crop-brace spacer beams	:	2x in each corner of the greenhouse.
• Water discharge	:	Condensation discharge through the column, with discharge pipe ø75 mm. at wall level.
• Heating column	:	Total 8x, tubular steel 120 x 50 x 2.5 mm
- Location	:	mounted in the corners of the greenhouse. between the vent compartments.

1.5.5 Side wall construction

Each side wall consists of :

• Side wall column	:	tubular steel 180 x 80 x 5 mm., S235J0.
• Side wall column	:	tubular steel 250 x 150 x 5 mm., S235J0, for the corridor and service area.
• Side wall middle column	:	tubular steel 180 x 80 x 5 mm., S235J0, for the greenhouse.
• Side wall middle column	:	tubular steel 180 x 100 x 5 mm., S235J0, for the corridor and service area.
• Purlins	:	3x U-profile 80 x 40 x 3.0 mm.
- Type	:	for glass gables with recess for gable screening.
• Purlins	:	4x U-profile 80 x 40 x 3.0 mm.
- Type	:	for insulated panel gables.
• Heating console	:	1x per column, tubular steel 100 x 50 x 2 mm., 150 mm. long,
- Lowering	:	height to be determined later.
• Fixation 2nd gutter.		
- Tension rod	:	ø10 mm. mounted under the gutter in the outer 2 bays.
- Spacer beam	:	tubular steel 50 x 50 x 2 mm., mounted in outer bay, in middle of

1.5.6 Internal gable construction

Each internal end gable consists of :

• Internal end gable column	:	tubular steel 220 x 120 x 6 mm., S275J0.
• Purlins	:	3x U-profile 100 x 50 x 4 mm., rigidly joined.
- Type	:	for glass gables with recess for gable screening.
• Purlins	:	4x U-profile 100 x 50 x 4 mm., rigidly joined.
- Type	:	for insulated panel gables.
• Strips for screen installation	:	2x welded to column, for 1 screen installation.
• Heating console	:	1x per column, tubular steel 100 x 50 x 2 mm., 150 mm. long,
- Lowering	:	height to be determined later.

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Each internal side wall consists of :

- Internal side wall column : tubular steel 250 x 150 x 5 mm., S235J0.
- Purlins : 3x U-profile 80 x 40 x 3.0 mm.
  - Type : for glass gables with recess for gable screening.
- Purlins : 4x U-profile 80 x 40 x 3.0 mm.
  - Type : for insulated panel gables.
- Heating console : 1x per column, tubular steel 100 x 50 x 2 mm., 150 mm. long,
  - Lowering : height to be determined later.

1.5.7 Havecon aluminium gutter

Havecon aluminium tubular section gutter with integrated condensation water evacuation..

- Width : 104 mm.
- Height : 165 mm.
- All gutter joints are sealed with a gutter joint cement.
- The gutters in the side gables are provided with a rainwater retaining profile.
- The gutters at the discharge end gables will be equipped with rainwater discharge bins, with a discharge pipe ø140 mm.
- The gutters at the discharge end gables will have condensation water discharge through the end gable columns.
- The gutters at the non-discharge end gables will have a rainwater retaining profiles.
- On the top of the gutter will be mounted a white HPVC strip, which ensures gutter/glass sealing.

Greenhouse and corridor :

Havecon will deliver and install a tubular beam underneath the gutter in the end section at both end gables.

Service area :

Havecon will deliver and install a tubular beam underneath each gutter.

1.5.8 Roof cleaner support

The gutters, at one end gable, over 76 bays, will be equipped with :

- a roof washer gutter support mounted in the gutter.
- an upper roof washer rail, of tubular steel 140 x 60 x 4 mm.
- a roof washer foundation wall console, mounted with 2 anchors every 2.0 mtr.
- a lower roof washer rail, of tubular steel 50 x 30 x 2 mm.
- a stop for the roof washer, mounted at the other end of each gutter.

The gutters, at other end gable over 76 bays, will be equipped with :

- a small gutter support mounted in the gutter and equipped with a vertical tube, as stop for the roof washer.

1.5.9 Piping supports

Not applicable.

1.5.10 Other steel construction parts

Not applicable.

1.6 – Roof cladding

The roof will be clad as follows :

- The roof of greenhouse will be equipped with Havecon aluminium roof system and glazed with diffuse tempered glass.
- The roof of the corridor will be equipped with Havecon aluminium roof system and glazed with white tempered glass.
- The roof of the service area will be equipped with insulated roof panels, thickness 60 mm.

1.6.1 Havecon aluminium roof system

Roof – 22° : (rigidly joined)

The roof aluminium consisting of:

- Ridges and ridge connectors.
- Hollow (wedge) roof glazing bars, covered with Havecon ER system.
- The glazing bars are fixed at the gutter and a ridge/glazing bar bracket fixes opposing glazing bars to the ridge to provide roof storm protection.
- 2 roof cables, per end gable, for fixation of the ridge.
- The glass is effectively supported on all four sides.

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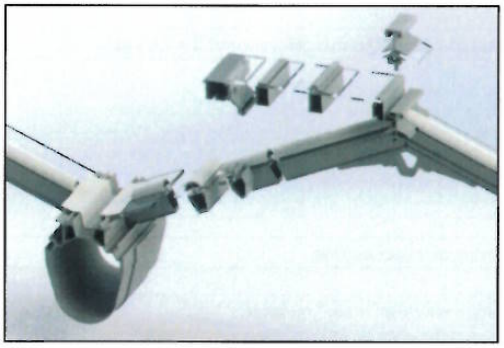

Ventilation windows :

- on the mid-sections a 3 pane ventilation window.
- on the outer bays/sections a 6 pane ventilation widow.
- on both end gables an end gable a 2 pane end gable ventilation widow.

The dimensions of the ventilation windows are:

• 1200 mm. deep & 3 x 1125 mm. wide.	For the mid-sections.	Total 5507 no.
• 1200 mm. deep & 6 x 562.5 mm. wide.	For the outer bays/sections.	Total 265 no.
• 1200 mm. deep & 2 x 562.5 mm. wide.	For the end gables.	Total 142 no.

All ventilation windows will be :

- mounted with slam rails between the roof glazing bars.
- mounted alternately at both sides of the ridge
- secured against axial displacement.

Note	The ventilation windows are not suitable for the mounting of integrated insect netting.

1.6.2 Delivery and installation of insect mesh harmonica integrated system
Not applicable.

1.6.3 Roof glass
Glass specification :

- Tempered diffuse glass, (tempered glass conform EN 12150).
  - Perpendicular light transmission 92% (±1%)
  - Hemispherical light transmission 80% (±1%)
  - Haze factor 70% (±5%)
- Tempered white glass, (tempered glass conform EN 12150).

Note	The mentioned tolerances are exclusive the tolerances of the measuring institute.

Roofing glass of ±2120 x 1125 mm., thickness 3.8 - 4.2 mm.
Ventilation window glass of ±1200 x 1125 mm., thickness 3.8 - 4.2 mm.

- The roof end gables will be glazed with ½ panes over ±7.0 mtr.
- Both roof side walls will be glazed with ½ panes at each side of the ridge.
- Upon the corner-sections ¼ panes.

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1.6.4 Roof ventilation mechanism

Note:	The ventilation is calculated for a wind speed of V50 = 29.5 m/s reference V15 = 27.2 m/s.

Ventilation : Standard open ±44°

The ventilation is divided into 16 zones.
- 12 zones in greenhouse.
- 4 zones in corridor.

Note	The ventilation is not suitable for the mounting of insect netting.

Note	The opening and closing time of the ventilation windows is ±6.7 minutes. There can be ventilation window opening gap difference of ±4 mm. if we mount 5 rack and pinion sets at one side of the motor.

Motors :
Supplier Ridder.
- 24 Motors type RW-605 greenhouse
- 8 Motors type RW-243 corridor

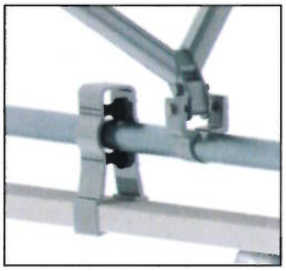
The motors are equipped with (incl. electrical installation)
- Emergency stop.
- RPU.

Note	The adjustment of the motors by the electrician has to take place in consultation with the supervisor of Havecon Projects BV.

Rack and pinion sets :
Supplier Ridder.
- 228 Rack and pinions type RRD720-1305+ mounted against the column.
- 75 Rack and pinions type RRD710-523 mounted against the column.
- 6 Rack and pinions type TRN-1000-3 for the end gable ventilation.

Rack and pinion sets with 5/4" driving shaft, 2.5 mm. thick.

Ventilation push/pull piping & Vent arms :
Rail ventilation mechanism with :
- 4 aluminium vent arms, ±ø25 mm. per window.
- 2 aluminium vent arms, ±ø25 mm. per end gable window.



- Vent arms fixed to push/pull pipe ø27 x 1.5 mm. with aluminium pipe clamps & anti-roll blocks
- The push/pull pipe will be guided with 3 aluminium clamp rail-brackets per bay
  - Height of rail-bracket is 60 cm. above trellis upper profile.

End gable ventilation mechanism :
The end gable ventilation window will be equipped with a specially adapted mechanism in a U-profile mounted under the gutter, at the location of the end gable window.

1.6.5 Insulated roof panels
The insulated roof panels :
- Thickness : 60 mm.
- Type filling : PIR
- Coating outside : standard HPS colour Gooswing Grey.
- Coating inside : standard internal coating, white.
- Flashing : gutter- and a ridge profile in colour.
- Roof pitch : 22°
- Mounting : with special aluminium profile mounted on the gutter.

Note	The construction is calculated according to Casta with a snow load of 200 kg. The client is obliged to a put a heating pipe, filled with anti-freeze, in the gutter in order to prevent snow building up on the roof in case of extreme snowfall. Havecon Projects BV cannot be held responsible in case of any damage due to snow building up on the roof.

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1.7 – Gable cladding

The gables will be clad as follows :

- 154 End gables will be equipped with Havecon aluminium gable system and single glazed with 16 mm. thick, polycarbonate sheets.
- 4 Internal end gables will be equipped with Havecon aluminium gable system and single glazed with tempered clear glass.
- 24 End gables will be equipped with 60 mm. thick, insulated gable panels.
- 8 Internal end gables will be equipped with 60 mm. thick, insulated gable panels.
- 8 Internal end gables will be equipped with 60 minutes, flame retardant insulated gable panels.
- ±513 mtr. side wall will be equipped with Havecon aluminium gable system and glazed with 16 mm. thick, polycarbonate sheets.
- ±346.5 mtr. Internal side wall, will be equipped with Havecon aluminium gable system and single glazed with tempered clear glass.
- ±180 mtr. side wall will be equipped with 60 mm. thick, insulated gable panels
- ±175.5 mtr. internal side wall will be equipped with 60 mm. thick, insulated gable panels
- ±22.5 mtr. internal side wall will be equipped with 60 minutes, flame retardant insulated gable panels

1.7.1 Havecon aluminium gable system

Havecon aluminium gable system consisting of :

- Foundation wall rail with in-built rubber sealing.
- Glazing bars with full length HPVC sealing.
- End gable caps with white HPVC / rubber.
- Side gutter top rail, with rubber sealing against the gutter and the side wall glass.
- Glazed with aluminium stacking profiles.
- Corners equipped with aluminium corner glazing bar.

1.7.2 Gable glass

Glass specification :

- Tempered, clear glass, (tempered glass conform EN 12150).
  - light transmission 89%.

Gable glass in the internal end gables :	±2260 x 800 mm. 3.8 - 4.2 mm. thick.
Gable glass in the internal side walls :	±2260 x 900 mm. 3.8 - 4.2 mm. thick.

1.7.3 Polycarbonate sheets

Polycarbonate sheets, 16 mm thick :

• Thickness	:	16 mm.
• Clear.		
• Profile type	:	5 walled profile
• UV protection	:	2 sided
• Sheet width	:	980 mm. with closed sides
• Top side sheet	:	Taped with breather tape.
• Bottom side sheet	:	Taped with breather tape.
• Light transmission	:	67%
• ISO - U value	:	2.0 W/m²K
• Fire classification	:	B1/10

Dimensions polycarbonate sheets :

• End gable	:	±8000 mm. long x 980 mm. width
• Side wall	:	±7000 mm. long x 980 mm. width

1.7.4 Insulated gable panels

The insulated gable panels :

• Thickness	:	60 mm.
• Type filling	:	PIR
• Coating outside	:	standard HPS colour
• Coating inside	:	standard internal coating, Hamlet, RAL9002.
• Mounting	:	From foundation wall up to gutter/ roof line.
• Fixation	:	Blind.
• Flashing	:	same colour as panels.

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Flame retardant insulated gable panels :

- Flame retardant : 60 minutes.
- Thickness : 100 mm.
- Type filling : Rockwool
- Coating outside : standard HPS colour
- Coating inside : standard internal coating, Hamlet, RAL9002.
- Mounting : From foundation wall up to gutter/ roof line.
- Fixation : Blind.
- Flashing : same colour as panels.

1.7.5 Doors / window frames
The following doors will be supplied and installed :

The following doors will be supplied and installed :

- 4 PVC speed roll-up doors, 400 x 420 cm. (w x h), made of toughened PVC curtain, in a standard colours and equipped with 1 clear stroke of 400 x 3800 mm. Operated by means of 2 pull switches and a photocell into the day opening (incl. electrical installation) (nr. 1 on the drawing).

- 1 Aluminium sliding door, 120 cm. x 240 cm. (w x h), fitted with bearing-mounted upper rollers in C-profiles, sealed with draught brushes and equipped with a lower guidance. The doors will be glazed with Plexiglas (nr. 2 on the drawing).

- 9 Aluminium purling doors, ±100 x 226 cm. (w x h), to be mounted onto the fixed foundation and between the glazing bars (nr. 3 on the drawing).

- 18 Aluminium swing doors, 110 cm. x 220 cm. (w x h) (nr. 4 on the drawing).

- 4 Aluminium sectional "overhead" doors of 300 x 300 cm. (w x h) (nr. 5 on the drawing).
- 3 Aluminium sectional "overhead" doors of 360 x 420 cm. (w x h) (nr. 6 on the drawing).
- 5 Aluminium sectional "overhead" doors of 400 x 420 cm. (w x h) (nr. 7 on the drawing).
  All aluminium sectional "overhead" doors electrically operated, too opened by means of an electric motor 480V and operation box for open-stop-closed (incl. power connection), provided with steel profile plates and with a single transparent section in a standard colour.

- 1 Fire retardant (30 minutes) sliding door, 300 cm. x 300 cm. (w x h) (out 2 pieces), fitted with bearing-mounted upper rollers in C-profiles, sealed with draught brushes and equipped with a lower guidance. (nr. 8 on the drawing).

- 14 Aluminium window frames, 100 x 420 cm. (w x h), with clear insulated glass (nr. 9 on the drawing).

- 6 Aluminium window frames, 300 x 100 cm. (w x h), with 1 hinged window, with clear insulated glass (nr. 10 on the drawing).

- 3 Access holes in the wall, 200 x 140 cm. (w x h) (nr. 11 on the drawing).

1.8 – Water evacuation
All water drainage materials will be PVC class SN4

1.8.1 Rain water discharge
At both end gables of the greenhouse, at the outside, will be mounted :

- white downpipes ø160 mm.
  - fitted with 2x white coated steel oversized pipe brackets fixed to the gable glazing bar.
- A central drainpipe, installed in the ground with PVC saddles, sealed with rubber for downpipe connection.

Rainwater central drainpipe 1 (4x) :
Over 30 bays of ±173,25 mtr. long, with 1 no. central drainpipes :

- 5 bays = ±20 mtr. : pipe ø250 mm.
- 5 bays = ±20 mtr. : pipe ø315 mm.
- 9 bays = ±36 mtr. : pipe ø400 mm.
- 11 bays = ±44 mtr. : pipe ø500 mm.

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Rainwater central drainpipe 2 (1x) (incl service area) :
Over 16 bays of ±173,25 mtr. long and 16 bays of ±78.75 mtr. long, with 1 no. central drainpipes :

- 5 bays = ±20 mtr. : pipe ø250 mm.
- 5 bays = ±20 mtr. : pipe ø315 mm.
- 14 bays = ±56 mtr. : pipe ø400 mm.
- 8 bays = ±32 mtr. : pipe ø500 mm.

Rainwater central drainpipe 3 (1x) :
Over 16 bays of ±173,25 mtr. long and 4 bays of ±22,5 mtr. long, with 1 no. central drainpipes :

- 5 bays = ±20 mtr. : pipe ø250 mm.
- 5 bays = ±20 mtr. : pipe ø315 mm.
- 10 bays = ±56 mtr. : pipe ø400 mm.

The central drain pipes :

- Calculated with a rainfall of 35 mm. / hour.
- Equipped with a vent pipe at every change in pipe diameter.
- Installed in to the rainwater water pond (no dyke) (distance from corner of greenhouse to water pond, ±130 mtr.)

Note	Rainfall exceeding this average figure may result in overflowing of the discharge pipes.

Note	The delivery and processing of filling sand is not included.

Note	The surplus of rainwater will run over the end gable to the ground.

Note	If the basin is not present at the time the rainwater discharge is being mounted, or the discharge is to be changed from the location identified on the plans, it is the responsibility of the client to inform Havecon and determine a mutually acceptable new discharge plan. If this is neglected or done otherwise any consequential damages are beyond the responsibility of Havecon.

The total of transporting piping to basin is ±414 mtr. transport piping ø400 mm. and ±1360 mtr. transport piping ø500 mm.

1.8.2 Condensation water discharge
The condensation water will be discharged, at both end gable ends of the greenhouse, through the end gable posts (inside coated with "Bowramastic") and through an oversized pipe in the foundation wall.
It is then connected to a PVC pipe ascending from ø160 mm. to ø315 mm. in the ground, to the water pond (no dyke) with ±640 mtr. transport pipe ø400 mm.

1.8.3 Excavation work
All excavation works, for the rain water discharge and the condensation water, with a maximal digging depth of 1.35 mtr. (at the lowest point), will be at the expense of Havecon Projects BV.

Note	If it is necessary that drainage of the groundwater should be carried out, then this is done at the expense of the client.

Note	We assume the soil is in good condition and that the surface is free of obstacles for excavation works and that the works can easily be carried out. If the soil is in bad condition or drainage of the soil is needed, e.g. due to ground water levels, then the costs for extra materials or machinery required for this are for the client.

1.9 – Various other items

1.9.1 Crop fixation materials
Havecon Projects BV is not responsible for crop wires that are connected too taught or incorrectly.

- Delivery, with assembly (without tensioning), of 20 wires air-craft cable per 8.0 mtr. trellis.
- Delivery of tigtheners for the connecting of the crop wires to the crop braces.
- Delivery of galvanized wire-holders, round 5 mm., single bended, total length 212 cm., 20 pcs. per trellis, to be suspended by Havecon Projects BV.

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1.9.2 Assembly materials

- Hot dip galvanised bolts and nuts (quality 8.8)
- Stainless steel bolts and nuts for the aluminium.
- All coupling nuts and clamp bolts are with closed eyes.
- Aluminium glazing materials.
- Rubber and HPVC sealing strips.

1.9.3 Ground cover

- Delivery and laying of :
  - 72 rolls of white woven ground cover (3.2oz), 8.3 mtr. wide and ±173 mtr. long.
  - 72 rolls of black underlay, 8.3 mtr. wide and ±173 mtr. long.

1.9.4 Facilities

In this contract we have allowed for :

- Openings in the gable, for cables & piping : 5x
  - Extra openings will be charged at : USD 130,00 per opening for cables & piping.

1.9.5 Reparation materials

The following reparation materials have been included in this contract :

- Tempered roof glass ±2120 x 1125 mm : 3 boxes (30 sheets)
- Tempered roof glass ±1200 x 1125 mm : 2 boxes (30 sheets)
- Tempered roof glass ±920 x 1125 mm : 2 boxes (30 sheets)
- Tempered gable glass ±2260 x 900 mm : 1 box (45 sheets)
- 10 reparation sets.
- 10 plexiglas panes, ±300 x 1125 mm.
- 10 Poly carbonate sheets, ±980 x 8000 mm.

1.9.6 General note

- The used steel profiles can deviate if the concerning profiles or material thickness are not available. The steel profiles will comply with the requirements of the Casta standards.
- Havecon may substitute other steel profiles than specified, provided they will still comply with Casta standards.
- The dimensions of the steel profiles can be in metrical or imperial equivalent.
- There can be a difference in colour in the production of white enamelled tempered glass. Havecon cannot be held responsible for this.
- Havecon is responsible for the approval, signing, sealing and stamps on the drawings by a certified American engineer. If the engineer has additional changes due to his approval the additional costs will be discussed.
- In case the wind chill factor drops to or below -15ºC we will charge an extra USD 70,00 per labour hour (per person).
- Glass :
  - The inspection and evaluation of glass pieces from the total delivery happens according to a procedure provided for in NEN 2674.
  - Measuring and calculation methods for determining the light transmission are based on NEN 2675.
  - Would the client like to investigate the light transmittance of the glass, then this should be carried out, before the glass is transported in to the greenhouse by an approved body, such as DLV.
  - The costs to have the glass measured are for the client. Havecon recommend to test 4 pieces of glass.
  - Optical measurements performed by a measuring institute do have tolerances. These may be added or subtracted by comparison with data sheets value. The same applies to the production tolerances specified in the data sheet. If the range of measured values and tolerances and the range of datasheet values and tolerances overlaps, the glass is inside specification.

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2 – Screening installation

2.1 – Greenhouse dimensions

Area 1 =2 = 3 = 7 = 8 = 9 = 10 = 11 = 12 :

Width	12 trellis	of	8.00 mtr.	=	96.0 mtr.	
Length	19 sections	of	4.50 mtr.	=	85.5 mtr.	Area 8.208,0 m²

Area 4 = 5 = 6 :

Width	12 trellis	of	8.00 mtr.	=	96.0 mtr.	
Length	20 sections	of	4.50 mtr.	=	90.0 mtr.	Area 8.640,0 m²

Corridor 1 = 2 = 3 :

Width	1 trellis	of	16.00 mtr.	=	16.0 mtr.	
Length	20 sections	of	4.50 mtr.	=	90.0 mtr.	Area 1.440,0 m²

Corridor 4 :

Width	1 trellis	of	16.00 mtr.	=	16.0 mtr.	
Length	17 sections	of	4.50 mtr.	=	76.5 mtr.	Area 1.224,0 m²

Total greenhouse	99.792 m²	=	199.584 m² (double system)
Total corridor	5.544 m²	=	5.544 m² (single system)
		Total	205.128 m²

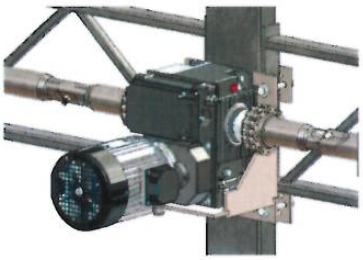
2.2 – Horizontal screen installation - Type pull-cable

2.2.1 Screen system

Type:	Pullwire system	
Application :	Greenhouse top :	energy saving
	Greenhouse bottom :	light emission
	Corridor :	shading / energy saving
Number:	28 screen systems in total	
Operation:	From trellis girder to trellis girder	
Closing :	Against the top and bottom member of the trellis	

2.2.2 Motor drive and drive shaft

Description:	24 pieces RW2000-3S-200 400-480V 4 piece RW6043-55 400-480V
Manufacturer:	Ridder Drive Systems B.V.
Power supply:	60Hz 3 phase
Motor color:	Standard grey
Motor plate:	Galvasnised steel
Positioning unit :	Including, RPU
Excluded :	Controil box, electricalwiring and connections
Drive shaft :	Galvanized tube ø2" wall thickness 3,65 mm ø60,3 mm
Fixation :	The shaft is swaged and coupled with bolt and nut at the end closed with a pvc sealing cap



2.2.3 Bearing plates

Description:	Clamping bearing plate strips
Type:	Galvanized 2", with 4 pcs dustproof ball bearings ø30 mm
Cable bracing:	Stainless steel ø3 mm 7x7

2.2.4 Cable drum and pull wire

Description:	Ultra-groove cable drum
Pull-wire :	Stainless steel ø3 mm 7x7
Quantity:	3 pcs pull wires per trellis
Extra:	At the outsides one extra pull wire

The newly developed cable drum has a helical groove in which the pull wire is fed in and rolled out. Because of this guide the wire makes no lateral contact, retains its original shape and is always in the right place, resulting in virtually no wear.

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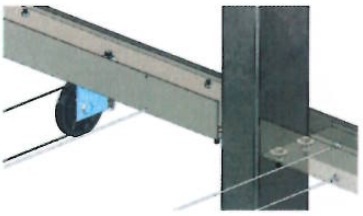
2.2.5 Wire carrier / mounting plate (greenhouse top and corridor)

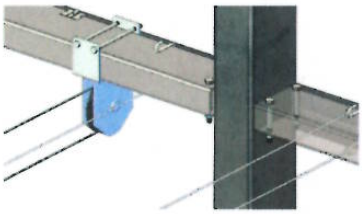
Description:	Sendzimir ultrafix plates
Material:	Galvanized steel
Apply:	2 x 304 meter
Wheel:	Reinforced layered ø4" reverse wheel pulleys



Mounted onto the gable posts, to support the polyester wires and the reverse wheel pulleys.

2.2.6 Wire carrier / mounting plate (greenhouse bottom)

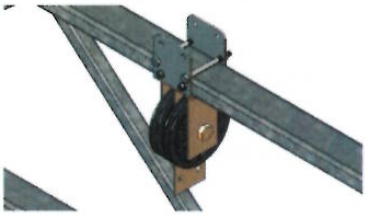
Description:	Box sections 100x50
Material:	Galvanized steel
Apply:	2 x 288,00 meter
Wheel:	Reinforced layered ø4" reverse wheel pulleys



Mounted onto the gable posts, to support the polyester wires and the reverse wheel pulleys.

2.2.7 Double wheels

Description:	reinforced layered ø4" reverse wheel pulleys
Apply:	between separation departments
Cable bracing:	Stainless steel ø3mm 7x7
Tensioning:	Turnbuckles



At the separation between the installations double 4"reverse pulleys will be mounted on the trellis girders.

2.2.8 Support wires and truss clips

Description:	black wires
Material:	ø ±2.2 mm polyester
Apply:	40 cm apart wire bed
	80 cm apart against wind
Truss clips:	Stainless steel multi clamp, cloth stopper every 40 cm
Position:	on the member of the trellis

Stainless steel truss clips including a screen cloth stopper every 40 cm. A reduced contact surface area between the clamp and the girder also means that bacteria and viruses have less opportunity to take hold and multiply.

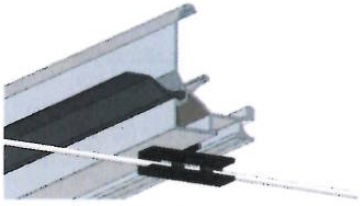
2.2.9 Screen profile and slip block

Description:	Ultra-lock 29 screen profile
Material:	Aluminium
Sealing:	Diffuse / black silicone closing strip 15 mm
Slip block:	Ultra-delay slip block

Because of the smart concept of this Ultra Delay slip block there is an optimal balance between the block and the pull wire cable so tilting is not possible anymore, gaps between the closing profiles and greenhouse structure are now belonging to the past.

2.2.10 Ultra slide wire guide

Description:	Ultra-slide wire guide
Apply:	Every 40 cm



The Ultra Slide block has been developed in order to prevent the wear of the support wires due to contact with the screen profile. By using the Ultra Slide block, the technical life of the screen system is extended and the risk of wire breakage is limited.

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2.2.11 Cloth

The mentioned values of light transmission and energy saving of the cloth are directly taken of the datasheet of the screen cloth manufacturer. Although the information has been carefully composed, we accept no liability for its accuracy.

Luxous 1347 FR	**Top screen (greenhouse)**
Manufacturer:	Ludvig Svensson
Shading level in direct light:	13%
Shading level in diffused light:	20%
Energy saving:	47%
Flame retardant:	yes

Obscura 9950 FR W	**Bottom screen (greenhouse)**
Manufacturer:	Ludvig Svensson
Shading level in direct light:	±99%
Shading level in diffused light:	±99%
Energy saving:	50%
Flame retardant:	yes

When using a double layer screen system, the above mentioned values will change.

Harmony 5747 FR	**Top screen (corridor)**
Manufacturer:	Ludvig Svensson
Shading level in direct light:	57%
Shading level in diffused light:	62%
Energy saving:	47%
Flame retardant:	yes

2.2.12 Cloth overhang

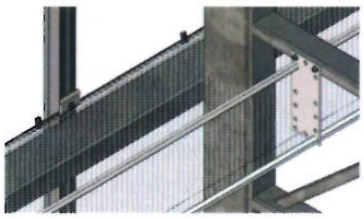
Type:	Semi folded back for the top and bottom installation
Confection:	Yes to reduce / prevent damage and twisted strips at the cloth drop
Cloth type:	42FR for top screen greenhouse and corridor 98FR for bottom screen greenhouse
Weight:	Nylon hooks
Sliding:	Around the white PVC clip tube ø14x1 mm.

2.2.13 Sealing (greenhouse top and corridor)

Type:	Transparent fire retardent cloth
Side walls:	Along the side walls
Front walls	No sealing because the use of sendzimir plates.

2.2.14 Sealing (greenhouse bottom)

Type:	Blackout fire retardent cloth
Side walls:	Along the side walls
Front walls	Along the front walls.



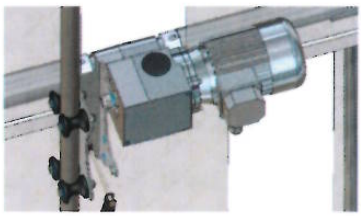
2.3 – Vertical integrated roll gable screen

2.3.1 Number and dimensions

6 pcs	roll gable screens in the end gables, length 96,0 mtr., 2 pcs purlin sections ±2.26 mtr.
2 pcs	roll gable screens in the side walls, length 171,0 mtr., 3 pcs purlin sections ±2.26 mtr.
2 pcs	roll gable screens in the side walls, length 175,5 mtr., 3 pcs purlin sections ±2.26 mtr.

2.3.2 Motor drive

Description:	30 pieces RPR 100-5
Manufacturer:	Ridder Drive Systems B.V.
Power supply:	3f 480V 60Hz
Position:	In the middle of the gable screen
Cable carrier:	Flexatec chain motor cable
Closing:	Sealed of with sendzimir plating and dibond plates w/b/w
Roll tube:	Aluminium ø50 mm (double tracks)
Mounting:	External



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2.3.3 Cloth
The mentioned values of light transmission and energy saving of the cloth are directly taken of the datasheet of the screen cloth manufacturer. Although the information has been carefully composed, we accept no liability for its accuracy.

Obscura 10070 R FR W

Manufacturer:	Ludvig Svensson
Shading level in direct light:	±99,9%
Shading level in diffused light:	±99,9%
Energy saving:	70%
Flame retardant:	yes


2.3.4 Cloth attachment

On top:	The stitched-in steel cable with reinforcement band will be fixed with stainless steel clips into the purlin, 2 per section
At the bottom:	The stitched-in tendon with reinforcement band will be fixed into the integrated extruded chamber of the roll tube.

2.3.5 Sealing

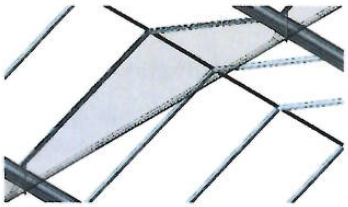
Seal material:	DiBond plates w/b/w.
Closing set:	aluminium arm set.

On the ends of each gable two glazing bars will be mounted against the purlins and closed with the sealing material and sealed with a white PVC strip. The closing set will be installed at the back of each end of the gable cloth. This set will fall forwards against the back of the cloth in closed position of the roll screen to the aluminum glazing bar.

Attention :
- Only one motor per single switch.
- Make sure that the fluctuation in voltage is no less/more than -4%/+4%.

2.4 – Baffle screens :
Baffle screens prevent cool air from pooling.

2.4.1 Description :
These vertical buffers are created by using an additional vertical seal cloth in the greenhouse that minimizes the temperature differences between zones. This cloth then prevents all of the cool air above the cloth from pooling in the same spot above the crop, dividing it into zones above the horizontal cloth.



2.4.2 Dimensions greenhouse :
504 pcs from ridge till gutter in a 4,00 mtr. bay. with a slope of approx. 22º (7 rows of 72 pcs)
Height from ridge to trellis 1140 mm.

2.4.3 Assembling :
The cloth will be fixed with prefabricated aluminium strips against the roof bars and will be fixed under the gutter with a steel coated wire and an aluminium bracket coming from the roof bar as a support of this cable
We are assuming that the baffle screens are running from side wall to side wall and that there will be no intermediate glass gable partition is in between this. In case there will be an intermediate wall in between than we need to recalculate our pricing due to extra brackets and materials.

2.4.4 Cloth :

SOLARWOVEN ULTRA	Ludvig Svensson
Shading level in direct light	15%
Shading level in diffused light	22%
Energy saving	50%
Flame retardant	no

We will prefabricate the peaks at our facilities on the correct dimensions.

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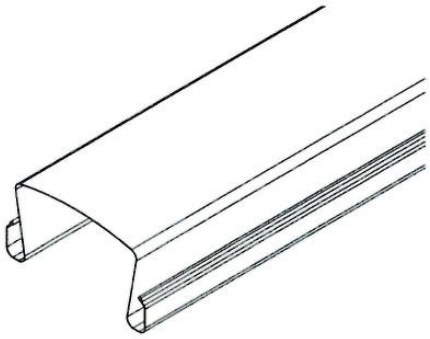
3 – Grow gutters

3.1 – The gutter

3.1.1 Specifications

Brand name :	AG® - Plateau gutter
Model :	AG250-XL
Material :	Steel S280GD+Z275,0.6 mm thick, galvanized on both sides (275 g/m²), underside painted, outside provided with a Polyester coating. Polyester is a standard coating based on polyester, build from a 12 micron primer and a 15 micron polyester top coating.
Colour :	Outside, white; underside, off white
Max. load :	For the mentioned gutter, the maximum load is 25 kg per m¹
Span :	We recommend a span no greater than 5 mtr.
Free span :	From the last or first suspension to the end of the gutter, a free span of 1 metre is allowed



Gutter size	Gutter width	250 mm.
	Gutter height	120 mm.
	Drain channels depth	60 mm.
	Drain channels width	30 mm.

3.1.2 Basic greenhouse information

Houses	36 x 8.00	=	288 m¹
Sections	77 x 4.5	=	346.5 m¹
Walkway	4.5		m¹
Section size	4.5		m¹
Truss size	60x30		mm. x mm.
Post size	TBD		mm. x mm.
Gutters	5		pieces per house
Gutter length	61.902		m¹
Suspensions	13.756 (38 per gutter)		Pieces

3.1.3 Offered grow gutter

362 gutters	x	171 m¹	=	61.902 m¹
		Total to supply		61.902 m¹

The gutters will be produced in your greenhouse by our mobile roll forming machine, in order to supply the gutter lengths desired by you. This will enable FormFlex to keep the numer of couplings to a minimum.

The gutters will be rolled on supports. These supports should be assembled and disassembled by the grower on instruction of FormFlex staff.

If by circumstances, this is not possible, an alternative method will be chosen after consulting with you.

FormFlex will furnish two engineers to roll the gutters. You should have your own personnel available for guiding and installing the gutters in the greenhouse. These activities should take place in consultation with our foreman.

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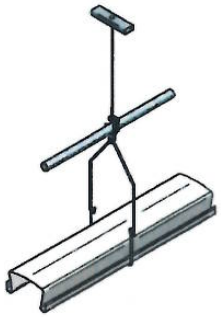
3.2 – Suspension

The following materials will be supplied and installed for this suspension:

13.756 pieces	Steel cable ø2,5 mm, length approx. 5160 mm Exact length to be determined at a later stage
13.756 pieces	Grow-pipe hook ø10 mm for a pipe ø38 mm
13.756 pieces	V-bracket ø8 mm, with a length of 700 mm
82.898 pieces	Under-hook ø5 mm (6 pieces per 4.5 m^1) Irrigation lines and CO^2 line can be placed on top of the clamping brackets, under the gutter roof

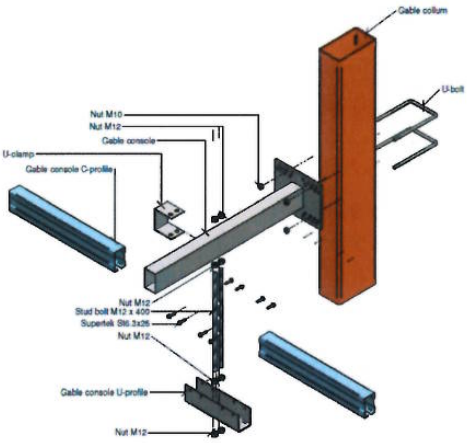


3.2.1 Gable construction

To support the gutters in the last section and to stabilize the gutter, gable constructions will be supplied. By using this construction, in which the gutters are fixed on the tube profile, no stabilizer suspensions are necessary.

The following materials will be supplied and intalled for this construction :

146 Pieces	Gable console for the gable gutter, for a column size of 220 x 120 mm.
144 Pieces	Tube profiles 80x50x2 mm., with a length of 3950 mm. (incl. installation material)
16 Pieces	Side gable consoles for the side gable gutter. These are supplied to extra stabilize the gutter, which is necessary because all the plants are lowered in the same direction.

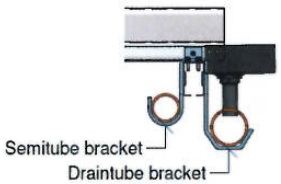


3.3 – Water handling

3.3.1 Drain cisterns

For drainage at the end of the gutters a drain cistern will be supplied for each gutter.

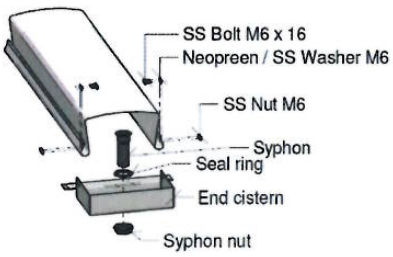
362 pieces	Coated aluminium drain cistern, with an extension of 70 mm
724 pieces	Hooks for PVC drain tube
724 pieces	Hooks for distribution lines for irrigation and CO^2



3.3.2 End caps

To waterproof the gutter, an end cap will be supplied for each gutter.

362 pieces	Powder coated steel end cap with laser cut company logo



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3.4 – Crop support

3.4.1 Turn around brackets

To guide the stems at the front of the gutter, turn around brackets will be supplied as per the attached drawing.

362 pieces Turn around bracket ø10 mm., with a length of 700 mm.

3.4.2 Turn sets

To guide the stems at the gable end of the gutters, turn sets will be supplied as per the attached drawing.

362 pieces Turn sets c/w integrated grow tube support.

Turn around brackets

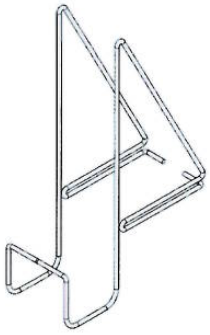
To guide the stems at the front of the gutter, turn around brackets will be supplied as per the attached drawing.

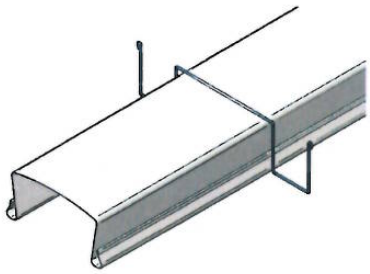
302 pieces Turn around bracket Ø10 mm, with a length of 700 mm

3.4.3 Stem supports

To support the stems after lowering the plants, stem supports will be supplied as per the attached drawing.

5478 pieces Stem supports ø6 mm, galv ctc 1300 mm





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4 – Climate installation

4.1 – General Project Information

Greenhouse zone 1 till 6:

Width:	36 trusses	of	8.00 m. = 288.00 m.
Length:	77 bays	of	4.50 m. = 346.50 m.

Corridor:

Width:	1 truss	of	16.00 m. = 16.00 m.
Length:	57 bays	of	4.50 m. = 256.50 m.

Water technical area:

Width:	1 truss	of	16.00 m. = 16.00 m.
Length:	20 bays	of	4.50 m. = 90.00 m.

Packing area:

Width:	2 trusses	of	16.00 m. = 32.00 m.
Length:	30 bays	of	4.50 m. = 135.00 m.

All dimensions are measured from centre to centre of the foundation.

Total heated project surface:

Total surface greenhouse including path	= 99,792.00 m²
Corridor	= 4,104.00 m²
Water technical area	= 1,440.00 m²
Service area	= 4,320.00 m²
Total project heated surface	= 109,656.00 m²

Design calculation and selection :

Desired greenhouse temperature	: 18°C
Desired temperature corridor, service- and Water technical area	: 15°C
Winter outdoor design temperature	: -18°C
Stanchion height	: 7.30 mtr.
Elevation of the project	: sea level.
Roof cover – greenhouse	: single glass (K=5.93Kcal/m²/°K)
Perimeter cover – side and gable wall	: single glass (K=4.90Kcal/m²/°K)
Centre walks	: 4.00 mtr.
Thermal curtain compensation	: 45% (double screen)
Thermal compensation side and gable walls	: screen selected
Roof cover – corridor and water technical area	: single glass (K=5.93Kcal/m²/°K)
Perimeter cover – gable and side wall	: single glass (K=4.90Kcal/m²/°K)
Thermal curtain compensation	: 35% (single screen)
Roof cover – packing area	: sandwich panels (K=0.4Kcal/m²/°K)
Perimeter cover – gable and side wall	: sandwich panels (K=0.4Kcal/m²/°K)
Thermal curtain compensation	: no screen selected
Flow – return water temp. – transport lines	: 90°C – 49°C ΔT=41
Flow – return water temp. – top heating	: 83°C – 68°C ΔT=15
Flow – return water temp. – tube rail heating	: 67°C – 52°C ΔT=15
Flow – return water temp. – crop heating	: 50°C – 40°C ΔT=10
Total heat loss – all heating installations	: 19.356kW

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4.2 – Boiler installation with flue gas condenser and connections

Boiler specification: 2x Pieces hot water boiler, type CLW 220 with ASME approval

Technical Data boiler, per boiler :

Type	: CLW 220 ASME
Medium	: hot water
Boiler principle	: 3-pass wet back fire tube boiler
Capacity	: 8400 kW (@ sea level)
Design pressure	: 2.1 bar
Design temperature	: 120°C
Heating surface	: 220 m²
Water capacity	: 15240 l
Empty weight	: 18100 kg
Gas sided resistance	: 0,9 kPa
Gas sided contents	: 15,8 m³
Design code	: ASME, Section IV

Measurement per boiler incl. insulation :

Shell diameter	: 2640 mm
Shell length	: 5890 mm
Furnace diameter	: 1600 mm
Total length	: 7255 mm
Total width	: 2840 mm
Total height	: 3301 mm
Height top of connections	: 3251 mm

2x Flue gas Condenser, per condenser :

Type	: Excellent, L 84C
Heating surface	: 660 m²
Weight	: 2117 kg
Gas sided resistance	: 0,5 kPa
Max. working pressure	: 3 bar
Max. operating temperature	: 95°C
Chimney connection	: ø700 mm
Water sided connections	: DN 150

Including, per boiler :

- 100 mm insulation to be covered with plastisol plates. This complete package will be delivered separately. The boiler to insulated on location.
- Pressure gauge and thermometer
- Inspection glass
- 6x Safety valves, type WATTS 740
- Aluminium Chimney: Length=6 mtr, diameter= ø700 mm incl.: roof passing plate, guide band, guide wires and CO_2 connection.
- Platform with stairs

2x Boiler connections, per boiler :

- 1x butterfly valve DN200
- 1x motor valve 220v DN200
- Steel pipe and welding elbows ø219.1 mm
- Thermometers
- Automatic air vents

2x Open buffer system, per boiler :

- 1x butterfly valve DN200
- 1x 3-way mixing valve DN200
- 1x servo motor 24V
- Steel pipe and welding elbows ø219.1 mm
- 1x Circulation pump 5,5kW – 3x 480V 60Hz

2x Condenser connections, per condenser:

- 2x Butterfly valves DN125
- Steel pipe and welding elbows ø139.7 mm
- Automatic air vents
- 1x Circulation pump 2.2kW – 3x 480V 60Hz

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2x Shunt connections, per boiler:
- 2x Butterfly valves DN100
- Steel pipe and welding elbows ø114.3 mm
- Automatic air vents
- 1x Circulation pump 1.5kW – 3x 480V 60Hz

4.3 – Burner installation

Zantingh gas/oil burner	Specification
Burner type	: RKB 7.0 ND MM G/O
Number of burners	: 2
Approval	: CE, the approval for the switch panel is CSA
Elevation	: sea level

Technical specification, per burner :

Boiler capacity (output)	: 7.000 Mcal / 8.140 kW @ boiler efficiency of 92%.
Boiler output	: 830 BHP / 7.000 Mcal / 8.140 kW
Burner input	: 8.848 kW / 29.886.526 BTU
Burner load control	: Natural gas: modulating, Autoflame. Oil: low/high control.
Fuel/air ratio control type Zantingh Autoflame.	: Natural gas: an electronic modulating gas/air controller, : Oil: Mechanically, combustion system for light fuel oil, for emergency operation only (2x 24 hours), with a maximum load of 80%. (80% of the maximum capacity on gas firing).
Boiler type	: 3-Pass Crone CLW220.
Boiler back pressure max.	: 12,5 mbar.
Gas supply pressure	: 3 PSI, pmax 4 PSI on the gas train inlet. Minimum gas temperature 0ºC.
Natural gas	: Hi: 10,3 kW/nm³ (nett value).
Gas consumption max load	: 29.887 cu ft / 850 nm³/h.
Oil caloric value	: H_i = 42.60 MJ/Kg.
Control voltage	: 115V, 1 phase + 0 + earth
Motor voltage	: 3 phase 460 V + 0 + earth / 60 Hz.
Motor capacity (air fan)	: 18,5 kW.
Air fan control	: The fan rpm is variable controlled by a frequency controller.
Min. Height midpoint boiler furnace	: 1746 mm.
Altitude	: max 300 meter above sea level.

Burner part :
- steel housing with air shutter assembly and movable flaps to control the swirl, with servomotor (24V/60Hz).
- gas shutter with servomotor (24V/60Hz).
- 2 pcs. of air pressure switch
- ignition transformer
- combustion system NOx Down (gas)
- 1 pc. of nozzle lance with 2 (or 3) pcs. of nozzle (oil)
- 4 pcs. of oil solenoid valve (double)
- UV scanner
- prewiring to European standards

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Fan part :
- combustion air fan, directly driven by AC motor suitable for frequency controlled operation
- plate silencer on inlet and flexible sleeve on outlet (cylindrical silencer at extra charge).

Gas train part :
- 1 pc. of filter
- 2 pcs. of main gas valve body
- 1 pc. of actuator SKP 75
- 1 pc. of actuator SKP 15
- 2 pcs. of pressure switch
- 1 pc. of pilot gas valve ½"
- 1 pc. of pressure regulator for pilot ½"
- 1 pc. of pressure gauge with push button
- mounted together as package, prewiring included
- no vent valve; leakage control mounted
- Test firing valve (A2) type Ebro butterfly valve

Switch panel part :
- Steel plate panel, CSA/UL wired, equipped with all necessary, such as:
- main control relais
- fuses
- hand switches
- control lights
- junctions
- burner control
- alarm connections for economiser
- low-water cut/off relays Omron
- computer interface the so called FIDUFACE

Separate delivery :
- 1 pc. of oil pump unit
- 1 pc. of temperature sensor
- 1 pc. of limit thermostat
- 1 pc. of frequency controller with RFI filters
- 2 pcs. of electrodes for low water cut-off Omron

Including :
- Main gas pipe
- Zantingh CO detector with flue gas pump
- Boiler-flue gas valve control circuit.
- Oil buffer system
- Start-up and commissioning
- Gas line from the burner to the outside wall of the boiler house with a length of 20 mtr.

4.4 – Magnetic bag filter

Magnetic bag filter units are used where there is a need for a complete solution for removal of magnetic particles and combine the advantages of magnetic and bag filtration. Efficient removal of dirt and magnetic particles from the liquid reduces the number of breakdowns in the system and increase the life of measuring equipment, heat exchangers, pumps, valves and other components significantly.

Technical specification per magnetic bag filter :

Filter make	: Sotex
Number of bags	: 1
Capacity	: 20 m³/h
Max. working pressure	: 6 Bar
Max. temperature	: 120°C
Circulation Pump	: 0.55kW - 3x480V 60Hz
Main line	: ø88.9 mm
2 valves	: DN80

The filters are manufactured in carbon steel or stainless acid-proof AISI 316L steel.

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4.5 – Oil tank and connections
Delivery of 1 piece horizontal/double wall storage tank

Content	: 24,000 L
Diameter	: 1,900 mm
Cylindrical length	: 8,500 mm
Total length	: 9,400 mm
Design code	: UL142 / EN12285-02
Design pressure	: Atmospheric
Test pressure	: 0.3 bar air
Design temperature	: -10°C / 50°C
Material	: ASTM A36
Supports	: 2x welded consoles

Including :
- Oil line with a length of 20 mtr. from the tank to the burner in the boiler house
- Leak detection
- Over-fill protection
- Connection materials

Note	The tank to be placed on a concrete foundation. This concrete foundation is excluding in this contract. We have assumed that the oil tank will be placed near the outside wall of the boiler house.

4.6 – Distributor and transport groups
In conjunction with the temperature regulation and supply of hot water to different sections, a factory manufactured distributor will be delivered and mounted.

Distributor :

Diameter of the header	: ø457 mm (suitable for 109.656 m²)
Length of the header	: 2x 4000 mm
Make shut-off valves	: Butterfly-type
Make three-way mixing valve	: Honeywell
Make circulators	: SPX Johnson/Lowara
Included	: thermometers, air pots, sockets, drain cocks

1x transport group zone 1 till 6 :

Main line	: ø273.0/219.1 mm
2x Head valves	: DN200
2x Circulator valves	: DN200
2x non return valves	: DN200
1x Head valve - Return	: DN250
2x Circulation pumps	: 7.5kW – 3x480V 60Hz

1x mixing group top heating corridor :

Main line	: ø114.3 mm
2x Head valves	: DN100
2x Circulator valves	: DN100
1x Three-way mixing valve	: DN100
1x Servomotor	: 24 Volt
1x Circulation pump	: 1.5kW - 3x 480V 60Hz

1x mixing group top heating packing area :

Main line	: ø63.5 mm
2x Head valves	: DN50
2x Circulator valves	: DN50
1x Three-way mixing valve	: DN50
1x Servomotor	: 24 Volt
1x Circulation pump	: 0.37kW - 3x 480V 60Hz

Reserve connection distributor :

2x set (S/R) reserve connection	: DN100

All the reserve outlets are closed with blind flanges.

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4.7 – Expansion installation
Type : VP 8.0/2000 3x 480v 60Hz

Project specifications :

Content vertical tank	: 2.500 m³
Surface greenhouse	: 99,792.00 m²
Max. heat load	: 179 W/m²
Empty time tank	: +/- 9 hours

Working expansion installation :
The control-unit is mounted on a stainless-steel frame. Placed on a frost free spot in the boiler-house.
The working is as follows:
The water is heated up and stored in the vertical hot water storage tank. The water-level in the hot water storage tank will rise and the pressure of the nitrogen will rise too. If the pressure reached 20 mbar, the release valve will open. The maximum working pressure is 25 mbar. When the stored water is used to heat up the greenhouse, the water-level will be going down. The pressure of the nitrogen will also go down. When the pressure reaches 10 mbar, nitrogen will be produced and let in by the control-unit.

Included :
- One screw compressor 4kW incl. compressed air boiler
- Pressure sensors including 2x sensor cap and shielded cable.
- 1pcs of mounting set.
- 1x Safety valve DN200 PN10 for the heat storage tank
- 1x HD storage vessel 200ltr. with ASME approval
- Potential free contacts for signals and alarms.
- Manual in English.

4.8 – Heat storage tank and connection

Execution	: vertical
Contents circa	: 2.500 m³
Diameter	: 15,100 mm
Cylindrical height	: 14,000 mm
Total height circa	: 15,476 mm
Bottom	: plate thickness 6 and 7 mm
Cylinder	: plate thickness 7 and 6 mm

Conical roof slope 1:5 – plate thickness 5 mm. The roof plates will be supported by an internal lattice construction, made of IPE 180 profiles, assembled on a ridge rib UNP 200. The top of the cylinder wall shall be executed with a curved reinforcement profile L120.120.11.

Material	: steel S235JRG2 inclusive 3.1B Certificate
Dry weight	: 59.113 kg.
Design temperature	: 95 °C
Design pressure	: hydro-static pressure, max. permitted overpressure 28 mbar, under pressure 6 mbar.
Design code	: None, the tank is designed according the "horticultural standard" that applies in the Netherlands. The plate thicknesses are determined by means of a static calculation, which is partial derived from the EN14015 code. If the tank must fully comply with code EN14015 / API see

additional prices.

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Tank specification and connections :

- Manhole diameter ø600 mm
- Roof-hole diameter ø600 mm
- Filling connection DN80 mm
- Venting connection diameter DN200 mm
- 15x welding sockets ½" for sensors
- Nitrogen line 1" or 2"
- external cage ladder (aluminium) with cage closure
- including intermediate platform
- 21x anchor consoles (anchoring to the concrete foundation)
- Cylinder and top insulation consoles
- 1x earth ridge
- Star plates and pens
- Tank spray pipes with holes
- Spiro vent air vents on the pipe work

Including :

- Foam glass frame 50 mm
- oil for oil sand bed (Sand excluding)
- priming of the lower two meters of the tank

Note	The tank will be delivered in half-rings. The tank should be welded and built at the site on a concrete foundation.
Note	The building site of the tank should be easy reachable by trucks and a mobile crane may be necessary to build up the whole tank.

Tank connection :

- 44.8mtr steel pipe (supply and return) ø323 mm and 8 welding elbows
- 1 x Butterfly valve DN300 mm - flow
- 1 x Butterfly valve DN300 mm – 220Volt – return
- 2x Suspension brackets – galvanized heavy model (excl. foundation).

Future connection CHP :
For the future connection of an CHP with an capacity of 3MW, two butterfly valves DN200 will be placed on the heat storage connection line in the boiler house.

4.9 – Transport lines and mixing groups
From the transport group in the boiler house the hot water will be distribute towards the greenhouse with underground pre-insulated transport lines.

Transport line greenhouse zone 1 till 6 and water technical area :

From the distributor to the greenhouse	: ø273x400 mm
Main lines to zones 1, 3 and 5	: ø219x315 mm
Main lines to zones 3 and 5	: ø168x250 mm
Main lines to zone 5	: ø139x225 mm
Main lines to zones 2, 4, 6 and water technical	: ø219x315 mm
Connection water technical area	: ø76x140 mm
Main lines to zones 2, 4 and 6	: ø219x315 mm
Main lines to zones 4 and 6	: ø168x250 mm
Main lines to zone 6	: ø139x225 mm
Connection to the mixing groups zones 1 till 6	: ø139x225 mm

Including (underground) :

- pre-insulated bends, T-pieces and reducers
- expansion loops
- sealing kit and leak detection wires
- end-sleeves and cuffs

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Mixing groups inside the greenhouse :

Make shut-off valves	: Butterfly-type
Make three-way mixing valve	: Honeywell
Make circulators	: SPX Johnson/Lowara
Included	: Pipeline thermometers, air pots, sockets and drain cocks

6x mixing group tube rail heating zone 1 till 6; per mixing group :

Main line	: ø168.3 mm
2x Head valves	: DN150
2x Circulator valves	: DN150
1x Three-way mixing valve	: DN150
1x Servomotor	: 24 Volt
1x Circulation pump	: 3kW - 3x 480V 60Hz

6x mixing group crop heating zone 1 till 6; per mixing group :

Main line	: ø139.7/76.1 mm
2x Head valves	: DN65
2x Circulator valves	: DN125
1x By-pass valve	: DN100
1x Three-way mixing valve	: DN65
1x Servomotor	: 24 Volt
1x Circulation pump	: 1.1kW - 3x 480V 60Hz

1x mixing group top heating water technical area :

Main line	: ø76.1 mm
2x Head valves	: DN65
2x Circulator valves	: DN65
1x Three-way mixing valve	: DN65
1x Servomotor	: 24 Volt
1x Circulation pump	: 0.25kW - 3x 480V 60Hz

4.10 – Top heating installation

Distributing lines :

All the distributing lines will be positioned at a high level on the gables and shall be design for a Reverse Return Circulation. Pipes will be installed with air pots, end caps and to be supported upon substantial factory-made rings, which have been hot dip galvanized. The mixing group corridor will be positioned on the distributor in the boiler house. The mixing group water technical area will be positioned in the corner of the area.

Top heating installation corridor:

Pipe diameter and wall-thickness	: ø51 mm x 2.25 mm
Number of heating pipes per truss	: 18x ø51 mm / 16 mtr.
Heating pipe connection distribution lines	: 1,00 mtr Steel pipe 1¼"
Heating pipe suspension	: Hooks.
Supply and return line	: ø114.3 mm
Distributing line 1	: ø121 mm – ø95 mm
Return	: ø114.3 mm
Perimeter heating – side walls	: none
Perimeter heating – gable walls	: none

Top heating installation water technical area :

Pipe diameter and wall-thickness	: ø51 mm x 2.25 mm
Number of heating pipes per truss	: 18x ø51 mm / 16 mtr.
Heating pipe connection distribution lines	: 1,00 mtr Steel pipe 1"
Heating pipe suspension	: Hooks.
Supply and return line	: ø76.1 mm
Distributing line 1	: ø82.5 mm – ø57 mm
Return	: ø76.1 mm
Perimeter heating – side walls	: none
Perimeter heating – gable walls	: none

Note	Sufficient air-vents and drains will be delivered, and the thermometers will be in degrees Celsius. Automatic air vents will be placed at all high places. The tubes will be placed in the hooks. The final assembly is included.

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4.11 – Tube rail heating installation

Distributing lines :

All the distributing lines will be positioned at a low level on the gables and shall be design for a Reverse Return Circulation. Pipes will be installed with air pots, end caps and will be supported upon substantial factory-made rings, which have been hot dip galvanized. The mixing groups will be positioned in the middle of the zone.

Tube rail heating installation zone 1, 2, 5 and 6; per zone:

Pipe diameter and wall-thickness	: ø51 mm x 2.25 mm
Number of heating pipes per truss	: 10x ø51 mm / 8 mtr.
Heating pipe connection distribution lines	: 1,25 mtr Flexible hoses 1"
Heating pipe suspension	: On trolley brackets
End stop	: welded plate
Supply and return line	: ø168.3 mm
Distributing line 1	: ø152.4 mm – ø76.1 mm
Return	: ø133 mm
Distributing line 2	: ø152.4 mm – ø70 mm
Return	: ø127 mm
Perimeter heating – side walls	: 6x ø51 mm closable
Perimeter heating – gable walls	: distribution and return lines

Tube rail heating installation zone 3 and 4; per zone:

Pipe diameter and wall-thickness	: ø51 mm x 2.25 mm
Number of heating pipes per truss	: 10x ø51 mm / 8 mtr.
Heating pipe connection distribution lines	: 1,25 mtr Flexible hoses 1"
Heating pipe suspension	: On trolley brackets
End stop	: welded plate
Supply and return line	: ø168.3 mm
Distributing line 1	: ø152.4 mm – ø70 mm
Return	: ø127 mm
Distributing line 2	: ø152.4 mm – ø70 mm
Return	: ø127 mm
Perimeter heating – side walls	: none
Perimeter heating – gable walls	: distribution and return lines

Note	Sufficient air-vents and drains will be delivered, and the thermometers will be in degrees Celsius. Automatic air vents will be placed at all high places. The welding racks will be places by the contractor and the tubes will be placed by the contractor in the welding racks. The assembly of the tubes in to the trolley brackets will be done by the contractor. The final assembly will be done by the contractor.

Floor Trolley Brackets :

Trolley floor brackets will be supplied with a distance of 1,125 meter centres along the tracks.
The trolley brackets are manufactured in accordance with the following description:

Total number of individual brackets	: 50.400 pcs
Ground plate	: 700 mm x 115 mm x 1.5 mm
Total number of interconnected brackets	: 936 pcs; every 13.5 mtr
Length interconnected brackets	: 7860 mm
Trolley bracket height	: 150 mm
Pipe distance	: 550 mm
Execution	: Sendzimir galvanized click system - KLEM™

4.12 – Crop heating installation

Distributing lines :

All the distributing lines will be positioned at a low level on the gables and shall be design for a Reverse Return Circulation. Pipes will be installed with air pots, end caps and will be supported upon substantial factory-made rings, which have been hot dip galvanized. The mixing groups will be positioned in the middle of the zone.

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Crop heating installation zone 1 till 6; per zone :

Pipe diameter and wall-thickness	: ø38 mm x 2.00 mm
Number of heating pipes per truss	: 5x ø38 mm / 8 mtr.
Heating pipe connection distribution lines	: 2,00 mtr Flexible hoses 1"
Heating pipe connection headpiece	: 3,00 mtr Flexible hoses 1"
Heating pipe suspension	: delivered with the Grow Gutters.
Supply and return line	: ø121 mm
Distributing line 1	: ø101.6 mm – ø51 mm
Return	: ø95 mm
Distributing line 2	: ø101.6 mm – ø51 mm
Return	: ø95 mm
Perimeter heating – side walls	: none
Perimeter heating – gable walls	: distribution and return lines

Note	Sufficient air-vents and drains will be delivered, and the thermometers will be in degrees Celsius. Automatic air vents will be placed at all high places. We will place the welding racks and the tubes will be placed in the welding racks. The assembly of the tubes in to the gutter supports will be done by us. The final assembly will be done by us.

4.13 – CO_2 dosing ventilator and collector

Dosing capacity	: 130 m^3 gas/h/Ha (231kg CO_2/h/Ha)
Design principles distribution system	: Gas fired boilers with condenser
Type	: Central CO_2 dosing ventilator
Max. flue gas inlet temperature	: 40 ºC before fan inlet
Motor voltage	: 3 x 480V 60Hz.

Amount of ventilators :
1x 15kW ventilator for zones 1, 3 and 5
1x 15kW ventilator for zones 2, 4 and 6

Description ventilator :
- Stainless steel air fan with AC motor and directly coupled impeller;
- specially constructed, build-on stainless steel inlet mixing valve, for optimum mixing of flue gasses and fresh air. An open/close servo motor on the inlet combination valve is included;
- a pressure switch for flow control;
- a thermostat for maximum temperature safety.
- a flexible sleeve for the connection of piping on the suctioned outside of the fan.

Including :
- control panel in STAR/DELTA
- 3-way valve modulating on temperature

Collector :
To connect the 2x boilers and 2x CO_2 units with each other, an aluminium collector will be delivered and installed. The chimneys of the boilers will be connected with and aluminium canal. This canal will be connected with the collector.

4.14 – CO_2 distribution system

Material	: Class SN2
Greenhouse surface	: 99,792.00 m^2

Distribution lines zone 1, 3 and 5 :

Supply line from the boiler room to the greenhouse	: Underground 1x ø500 mm
Distributing line	: Underground ø500 – ø125
CO_2 outlets	: 5x connections each 8 mtr in the middle of the zone

Distribution lines zone 2, 4 and 6 :

Supply line from the boiler room to the greenhouse	: Underground 1x ø500 mm
Distributing line	: Underground ø500 – ø160
CO_2 outlets	: 5x connections each 8 mtr in the middle of the zone

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Included :
- Tees for main lines and branching.
- Reducers.
- End caps.
- Elbows.
- Connections for the distributing lines with nipples, tees throttle plates, CO_2 film and connector with rubber ring
- Custom perforated CO_2 distributing film ø65 mm
- Sufficient condensate siphons
- Sufficient condense clearing pits without pumps

4.15 – Heating in packing area

Air heating installation :

To heat the packing area there will be 6x pieces air heating unit supplied. The units will be connected with supply and return lines on a mixing group that will be poisoned on the distributor.

Technical specification, per unit :

Heating capacity	: 26 kW
Water temperature supply/return	: 80/60 °C
Air capacity	: 3400 m^3/h
Motor power per unit	: kW
Electrical	: 3x 480V 60Hz
Type	: LH 40-2
Pitch length	: 22.5 mtr
Connection supply/return line	: 1x ball vale and 1x adjustment valve

4.16 – Thermal insulation materials

There will be insulation materials delivered and mounted for the following:

a. 2x 100 mm rock wool for the heat storage tank 2500 m^3 to be covered with plastisol.

b. 50 mm rock wool for the insulation of the following materials, to be covered with aluminium plate:
- the supply and return line of the heat storage tank
- distributor in the boiler house

c. 30 mm rock wool for the insulation of the following materials, to be covered with aluminium plate:
- 2x Boiler-, open buffer-, condenser- and shunt lines in the boiler house
- 1x transport group on the distributor
- 2x mixing groups on the distributor
- 6x mixing groups tube rail heating inside the greenhouse
- 6x mixing groups crop heating inside the greenhouse
- 1x mixing groups top heating inside the water technical area

4.17 – Paint

Pre-painting of tubes :

Before delivery of the tubes (ø51, ø38, distribution and return lines) on the building site, the tubes will be degreased, phosphated, rinsed and dried, preheated and then sprayed with grey primer.

Delivery of primer :

The delivery of primer is for the welding joints of the ø51 tube rails, the delivery consists:
140 ltr. primer grey

Delivery of paint :

Delivery of painting materials for all grey pre-painted pipes (ø38, ø51 side wall, distribution lines and the return lines excl. ø51 tube rails) in the greenhouse. The delivery of primer is for the welding joints and the finish in broken white is for the second layer, the delivery consists:
80 ltr. primer grey
1,300 ltr. finish broken white (RAL 9002)

Including :

Painting gloves and disposable hand gloves for the paint to be delivered

Note	Labour excluded for final coat of paint and will be at the expense of client

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4.18 – Digging works

Digging works for the following:

- 875 mtr trace underground transport line including expansion and stands to the mixing groups based on 70 mtr per day in a slot of 120 cm
- 790 mtr trace underground CO_2 line based on 100 mtr per day in a slot of 70 cm

Including :

- filling the slot for the TPL and CO_2 line with about 10 cm sand under and above the tubes
- hiring of machines for digging and moving sand
- discharge of ground that is left over after the slot is closed

Note	The price is based on continuously digging works without any obstructions (rocks, etc.)

4.19 – Various works

Labour for the following items will be supplied:

- placing the trolley and interconnected trolley brackets in the greenhouse
- placing the ø51 mm tube rail on the trolleys
- placing the ø38 mm in the grown hooks
- picking up the welding clamps in the greenhouse
- connection risers and distribution film CO_2
- filling of the installation
- unloading of containers on the site

4.20 – Gutter heating installation

Flow – return water temp. – gutter heating : 89°C – 74°C ΔT=15

2x mixing group gutter heating zone 1 till 6; per mixing group :

Main line	: ø168.3 mm
2x Head valves	: DN150
2x Circulator valves	: DN150
1x Three-way mixing valve	: DN150
1x Servomotor	: 24 Volt
1x Circulation pump	: 5.5kW - 3x 480V 60Hz

Connection :

The two mixing groups will be directly placed an connected on one boiler.

Distribution lines :

All the distributing lines will be positioned at a high level on the gables and shall be design for a Reverse Return Circulation. Pipes will be installed with air pots, end caps and will be supported upon substantial factory-made rings, which have been hot dip galvanized. There will be two departments for the gutter heating. Department one is zone 1, 3 and 5, department two is zone 2, 4 and 6.

2x Gutter heating installation zone 1 till 6; per zone :

Pipe diameter and wall-thickness	: ø51 mm x 2.25 mm
Number of heating pipes	: 1x ø51 per gutter
Heating pipe connection distribution lines	: 1,00 mtr Flexible hoses 1 1¼"
Heating pipe suspension	: in the column
Supply and return line	: ø168.1 mm
Distributing line 1	: ø219.1 mm – ø51 mm
Return line	: ø168.1 mm
Perimeter heating – side walls	: none
Perimeter heating – gable walls	: distribution and return lines

Note	Sufficient air-vents and drains will be delivered, and the thermometers will be in degrees Celsius. Automatic air vents will be placed at all high places. The tubes will be placed by the contractor in the column. The final assembly will be done by the contractor. The holes in the column have to be arranged by the greenhouse builder.

Thermal insulation materials :

There will be insulation materials delivered and mounted for the following:

d. 30 mm rock wool for the insulation of the following materials, to be covered with aluminium plate:

- 2x mixing groups gutter heating inside the boiler house

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Pre-painting of tubes :
Before delivery of the tubes (ø51, distribution and return lines) on the building site, the tubes will be degreased, phosphated, rinsed and dried, preheated and then sprayed with grey primer.

Delivery of primer :
The delivery of primer is for the welding joints of the ø51, the delivery consists:
20 ltr. primer grey

4.21 – Water softener

Series	:	Senior High Flow DWZ
Model	:	SRHF-800-DWZ
Capacity	:	10.0 m^3/h minimal required flow for each softener tank: 1,250 liter/hour
Pressure loss	:	1.1 bar at given capacity
Resin content each softener tank	:	250 liter (delivered separately in 25 kg sacks)
Cap. between 2 regenerations	:	63 m^3 for each softener tank at 10 °dH and min. salt usage. 96 m^3 for each softener tank at 10 °dH and min. salt usage
Salt Usage	:	minimal 25 kg for regeneration of one softener tank maximum 63 kg for regeneration of one softener tank
Water consumption	:	1,514 liter for regeneration of one softener tank
Power consumption	:	15 Watt during operation (maximal 150 Watt shortly during re-generation)
Maximum hardness reduction	:	≤ 0.1 °dH (or 2 ppm $CaCO_3$) depending on flow, hardness and salt usage)
Type of regeneration salt	:	granulated for at least 99.8% pure salt, size 25x25 mm.
Water pressure	:	minimal required 2.0 bar max. 7 bar (use a pressure regulator and water hammer absorber from 6 bar)
Water temperature	:	maximal allowable 40 °C
Electric connections	:	240 V, 60 Hz
Weight empty	:	5208 kg (incl. separately delivered resin, salt excluded)
Weight during operation	:	1,495 kg (a fully filled salt vessel included)
Dimensions minimum floor area	:	84 x 206 cm (needed space for options excluded)
Height	:	191 cm (minimum needed free space of 30 cm for filling of the softener tanks with resin and for maintenance excluded)

Including :
- Connection materials
- 2 pallets regeneration salt, total 80 sacks of 25 kg
- installation mounted on an RVS frame

Exclusions :
Our contract consists of the specified items only.

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5 – Electrical and computer installation

5.1 – General

All our calculations are based on the following information, which originates from the client and our own data bases. In case of any other requests or changes during preparing-, delivery- and installing process, this contract will be recalculated.

Greenhouse

Type of greenhouse	:	Venlo
Surface greenhouse	:	99.792 m²
Dimensions	:	36 bays of 8m length 346,5 m
Post height	:	7,3 m
Roof cover	:	Glass
Wall cover	:	Polycarbonate

Crop and growing method
Tomatoes on gutter system

Technical area and warehouse

Dimensions	:	5.544 m
Post height	:	7,3 m
Roof cover	:	Sandwich
Wall cover	:	Sandwich

Irrigation installation

Installation capacity	:	2,5L/m²/hr
Departments	:	1-12
Maximum water gift	:	10L/m²/day
Maximum drain	:	50%/hr
Crop	:	Tomatoes, 1/3 beef, 1/3 compari and 1/3 Grape.

Electric installation

Voltage	:	480V / 110V
Frequency	:	60Hz
Power supply	:	3phases 480V + neutral + ground

5.2 – Electrical installation

Important!
All electrical systems and equipment will be delivered according UL regulations. Not included is the supply of a ground wire and/or neutral conductor. All electrical materials used in switch panels are supplied with the "UL" conformity.

5.2.1 Main connection

Power distribution
Included is the main distribution panel which will be located in the boiler room, excluded is the supply cable from the transformer/ generator to this main distribution panel.
The main panel is 1.200Amp and is provided with the below listed power groups and a connection by automatic switch for the power generator.

The main panel is provided with the following groups:

8	MCB Group 160 Amp
12	MCB Group 63 Amp
12	MCB Group 25 Amp
12	MCB Group 16 Amp

Excluded in this list are offices, break rooms, wash rooms and other items supplied/installed by third parties.

Emergency power generator
In the boiler room an emergency power generator will be delivered and installed with an output of 500KW. This will be installed to the automatic 1-0-2 switch of the main distributor.

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Cabling
Our contract includes all cabling to equipment as described in this item. These cables are of tropical design and of the type YMvK or similar. Only the supply cables from main distribution panel to switch panels are type aluminium. Underground cables should be dug in at a minimum depth of 1m and have to be laid in a clean rock free sand bed. Any mechanical impact of a shovel or machinery needs to be avoided at any time! Cables coming out of a cable channel and going downwards to equipment, as for example an outlet, will be protected through a hostalit pipe fixed with pipe clips. Loss of Voltage on power cables will normally not exceed 5%, starting from main distribution panel to all electrical equipment.

We will supply the following underground power distribution cables to:

3	pc.	Greenhouse panels;
4	pc.	Irrigation unit and panel in irrigation room;
1	pc.	Pump panel in boiler room;
2	pc.	Burner panels in boiler room;
2	pc.	CO_2 fan control panels in boiler room.

Cable channels
For installation of the cabling in a quick and efficient manner, cable channels will be delivered as agreed. Cable channels will be used, where 3 or more cables are concentrated. The channels are powder coated white. Channels will be supported in a proper way to prevent bending. At places were the channels are connected to each other, or where channels change directions, prefab help pieces will be used. Channels will be considered full at 80% capacity.
Horizontal channels on a lower level than 1,6 m from soil level will be provided with a cover and cover clamps. Vertical cable ducts will be equipped with a lid.

Specifications cable tray

Make	Schneider
Material	galvanised
Perforation	Side- / bottom perforation
Height	60 mm
Maximum spam	5 m

5.2.2 Electrical installation in the greenhouse
For the electrical installation in the greenhouse we supply or/and install the items described below.

Switch panels
For the electrical installation in the greenhouse, we supply 3 switch panels with a powder coated steel housing. All equipment in the greenhouse is connected to this panel, which has the necessary power protections, manual and automatic selectors and 24VAC relays for the computer control.
All switches are inside the panel, the main switch and alarm lights are placed on the outside of the panel.
We supply 1 switch panels, per 4 compartments, installed near the main path in the centre of the compartments.

The 3 powder coated steel sheet panel(s) each contains

1	pc.	Main switch 4 poles, main off, 100 Ampere;
16	pc.	Switchgear for top ventilation motor 24 Vac;
8	pc.	Switchgear for top screen motor 24 Vac;
6	pc.	Switchgear for roller screen motor 24 Vac;
1	pc.	Switchgear for recirculation fans;
1	pc.	Switch gear for Sulphur 220V incl. transformer;
1	pc.	Switchgear for path lighting 10 Ampere, switched by pulse button;
2	pc.	Breaker 16 Ampere for ventilation motors 480V;
2	pc.	Breaker 16 Ampere for top screen motors 480V;
2	pc.	Breaker 16 Ampere for rolling screen motors 480V;
1	pc.	Breaker 16 Ampere for heating pumps 480V;
1	pc.	Breaker 16 Ampere for condensation pumps CO_2 220V;
1	pc.	Breaker 16 Ampere for Priva cion 220V;
1	pc.	Breaker 32 Ampere for roof washer 480V.

The switchgear, where necessary, consists of a motor protector, a contactor, a manual/automatic' switch and alarm-/run pilot lights.

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Greenhouse / corridor switch boxes
In the greenhouse control panels will be supplied, including the necessary switch boxes which will be suitable as working "on/off" switch.

48	pc.	Motor switch boxes for ventilation motors;
24	pc.	Motor switch boxes for top screen motors;
6	pc.	Motor switch boxes for rolling screen motors;
12	pc.	Motor switch boxes each for 2 heating pumps and mixing valves.

Greenhouse / corridor lighting and wall sockets 208V

30	pc.	Connection for LED armatures;
30	pc.	Fluorescing lights fixture LED 2x 37W;
30	pc.	Wall socket 115V;
20	pc.	Wall socket 480V.

Including necessary cabling in the greenhouse and corridor.

5.2.3 Sulphur evaporators
To deal with mildew effectively, a correct amount of evaporated Sulphur and a good distribution of the vapors are necessary. Therefore we supply Sulphur pots. For your greenhouse we calculated 1 Sulphur pot per 450 m² including 4 m chain per pc. The outlets will be mounted on the post. The Sulphur pots can be controlled manually or automatically using a climate computer.

220	pc.	Sulphur evaporators 220V including roof and element;
220	pc.	Wall socket 220V.

Including necessary UL cabling with plug and support material.

5.2.4 Recirculation fans

Total No.	180
Air movement at 0 PA	6525 m³/hr
Range	40 m
Speed motor	1545 Rpm
Voltage	220V
Frequency	60 Hz
Current draw	1,74 Amp
Power consumption	396 W

Including necessary cabling and support material in the greenhouse.

Protection grid
Including

5.2.5 Irrigation room & boiler room
Irrigation room
Lighting and wall sockets

20	pc.	Fluorescing lights fixture LED 2x 37W;
5	pc.	Wall socket 115V;
3	pc.	Wall socket 480V.

Including necessary cabling in the irrigation room.

Boiler room
In the boiler room, we supply the following electrical installations and components.
The pump panel which will be installed in the boiler room has all the protections, manual/automatic selectors and 24VAC relays for the following equipment:

4	pc.	Transport pumps, manifold;
2	pc.	Filling pump, boiler;
2	pc.	Boiler shock pump, boiler;
2	pc.	Shunt pump, boiler;
2	pc.	Automated boiler valve;
2	pc.	Condenser pump, boiler;
1	pc.	Expansion installation;
2	pc.	CO_2 -dosing unit.

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Lighting and wall sockets

20	pc.	Fluorescing lights fixture LED 2x 37W;
4	pc.	Wall socket 115V;
2	pc.	Wall socket 480V.

Including necessary cabling in the boiler room.

Packing house
Excluded, will be quotated after packing process plan is ready.

5.2.6 Priva Connext process computer
For controlling the climate- and irrigation conditions in the greenhouse we supply a Priva Connext computer system. Priva Connext connects and controls all processes in your company and enables you to optimize them even further. What the Priva Connext process computer does is to help you create the most optimal growing conditions for your crop, enabling you to take control of your energy facility, including your boilers, heat-power installations, heat pumps, storage tanks, CO_2 and irrigation. Controls have a large number of optimized options including air treatment, ventilation, heating, CO_2 quantity management screens and lighting. From the same process computer, you also have control over your water supplies including fertilizer dosage.

With Priva Connext, Priva offers a reliable platform that is tailored to all the advanced technology in your company. The process computer communicates with modern peripheral equipment, such as intelligent motors, screening and all sorts of different sensors. Using the latest technology, the Priva Connext process computer is set up aimed at controlling future innovations. For customers using a Priva Intégro process computer, installing a Priva Connext into the existing automation environment is simplicity itself.

The Priva Connext computer will be delivered in wall enclosures that is divided in a connection-, processor- and supply section. The decentralized system exists of 1 CPC/CION panel in the working area and 3 CION panels for greenhouse, placed in the compartment switch panels.

Note	We advise to install the PC in an office in the irrigation room.

Office Direct
Priva Office Direct is the user interface for the Priva process computers. The interface has a well-organised appearance and is very user-friendly thanks to the graphical interface screens.

Priva Office Direct allows you to get the best from your process computer. The extremely user-friendly interface gives you access to all of the solutions that the Priva Connext process computers offer for optimising crop and climate, making water and energy management more efficient and increasing profits. You can configure the programme entirely to your personal preferences and business environment. Priva Office Direct also provides more options for monitoring and modifying processes.
This allows alarm screens to appear in prominent positions when deviations are detected. In addition, you can add personal notes on what occurred and what solutions were used. These appear automatically on screen if you have a similar malfunction in the future.

Graphical and intuitive ease-of-use
Priva Office Direct has everything you expect from operating software. Clear icons ensure easy navigation to desired modules such as climate or water. Clear use of colour makes it immediately clear which module you are in. You can easily set the greenhouse temperature in a graphical manner. With one mouse movement, you can drag the points within a graph to the desired temperature curve, and the settings are automatically adjusted for all the desired ventilation and heating controls.

Focus on useful settings
Not every grower needs the same information. The Priva Office Direct user interface contains all the settings that allow many different customer requirements to be achieved. As a result, in addition to the settings that are often used, some settings that are (almost) never used will also be visible on the interface. The possibility has now been added of hiding controls by simply unchecking the lines that are not of interest. This ensures focus on the settings that are actually used, thus increasing clarity and reducing the risk of settings errors.

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Combining screens into personal screens

Setting the right strategy for the process controls requires more than just setting individual sub-strategies. Coordinating the various sub-strategies, such as heating, ventilation and the energy screen, is crucial for achieving the optimum climate. Priva Office Direct gives you the opportunity to create your own screens from the existing control screens. By simply selecting a number of screens, they can be placed together on a single overview screen.
This gives you, at a glance, a total overview of the various strategies. You can navigate to the underlying detailed strategies quickly and easily using the automatically generated shortcuts.

Report Generator

You can easily present historical data in a well-organised manner with the Report Generator module. This module replaces many manual registrations. The reports generated by the Report Generator module are immediately suitable to be used in study groups for comparison purposes. The data also provides information about the operating processes in the climate, energy and water areas.

The Report Generator module can generate the following reports:

- General: for comparisons with the most important aspects of outside conditions, climate, energy and water for the selected compartment.
- Energy: the total gas consumption, the consumption per compartment (total and per m^2) and energy information per source. This includes hourly registration of the gas consumption and the production, import and export of electricity.
- Water: the water dosage, such as water consumption per water system, water consumption per valve group, number of starts per start program, consumption per dosing channel and drain measurements.
- Valves: the historical data per valve, such as water consumption, water consumption per m^2 and EC/pH value per valve.
- Climate: the climate conditions of the selected compartment.
- Lighting: operating hours per lighting string.
- Company: detailed information about all compartments, such as climate and gas consumption data, intended for comparing compartments.

Report types

- The Report Generator module can generate the following types of reports:
- Weekly report, with the days of the week per column and a weekly total column.
- Period report, with the four weeks of the period per column and a Period total column.
- Quarterly report, with the three months of the quarter per column and a Quarterly total column.

Annual report, with the four quarters of the year per column and an annual total column.
You can choose which week, period, quarter and year you want to retrieve. The data presented in the reports can be retrieved from the date on which the Report Generator was installed.

Hardware

The necessary components will be mounted into a panel, the computer will be provided with the necessary hard- and software in order to monitor the climate.

CION panel mounted in the irrigation room

1	pc.	Connext Process Controller, CPC02;
1	pc.	Module trans-router, Unmanaged Ethernet switch 8 TX, alarm board connection and configurable RS485 connections;
1	pc.	Wall enclosure 120 x 80 x 30 cm;
2	pc.	Module 9540 for realizing of 3 separate alarm outputs, Incl. Ups;
2	pc.	Module 9540 for realizing of 3 separate alarm outputs, Excl. Ups;
2	pc.	System power supply 100W;
2	pc.	Power supply 225VA/24VAC for IO modules;
2	pc.	Power supply 24VDC/100W for external sensors;
4	pc.	Module 16xan.in/4xdig.in/32xdig.out AC;
1	pc.	Module for meteorological station;
2	pc.	Network repeater 9551 with protection circuits to increase the number of segments of the I/O-network. With screw terminals to connect external cabling on the I/O-network;
2	pc.	Terminator board 9552 with protection circuit for connection of external cabling on the I/O-network.

CION panel integrated in mixing-tank irrigation units (2x)

1	pc.	Power supply 225VA/24VAC for IO modules;
1	pc.	Module 16xan.in/4xdig.in/32xdig.out AC;
2	pc.	Module EC/pH;
1	pc.	Terminator board 9552 with protection circuit for connection of external cabling on the I/O-network.

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CION panel integrated in MP-UV

2	pc.	Power supply 225VA/24VAC for IO modules;
2	pc.	Module 16xan.in/4xdig.in/32xdig.out AC;
2	pc.	Terminator board 9552 with protection circuit for connection of external cabling on the I/O-network.

CION panel mounted in each climate compartment panel (total 3x)

1	pc.	Module trans-router, Unmanaged Ethernet switch 8 TX, alarm board connection and configurable RS485 connections;
1	pc.	System power supply 100W;
1	pc.	Power supply 225VA/24VAC for IO modules;
1	pc.	Power supply 24VDC/100W for external sensors;
3	pc.	Module 16xan.in/4xdig.in/32xdig.out AC;
1	pc.	Terminator board 9552 with protection circuit for connection of external cabling on the I/O-network;
1	pc.	Internal terminator board 9550 for end of I/O-network.

Sensors and equipment
We supply the following sensors and equipment.

Priva Meteorological Station
Understanding and controlling the climate contributes to the success of your crop. The correct timing of a response to changes in that climate is crucial. The Priva Meteorological Station is an indispensable tool for this, with sensors that faultlessly measure radiation, wind speed, wind direction, rainfall, RH and temperature.

Centrally controlled
The Priva Meteorological Station forwards the data to the Priva process computer, together with all details such as the quantity of sunlight for plant growth, energy and heat. All of this centrally stored current data allows you to take quick and targeted action. The Meteorological Station can be extended with various sensors.

Rainfall and snow
The Priva Meteorological Station monitors the full range of weather conditions. This allows you to combine the Priva Rainfall Intensity Sensor and the rainfall sensor. Based on the messages from the rainfall sensor, indicating the presence of rain, the Priva Precipitation intensity sensor then controls your vent position via the process computer. This allows you to make quick decisions based on up-to-date data. The Priva Snow Detector registers the quantity of snow in the gutter. At the correct moment the process computer ensures an adjustment in the heating, screens or growing lights to melt the snow cover. The result: almost no loss of light and you prevent the roof collapsing.

Priva Solarimeter
The Solarimeter consists of a smart component, the output Voltage of which is dependent on the quantity of radiation collected. The Solarimeter can be mounted on a universal mounting support. The Solarimeter is connected to the Priva computer.

Settings Manager
The module settings management in Priva Office Direct allows climate settings to be saved and reused. It is also possible to view saved settings and to copy them to other compartments. In this way, the differences between the current settings and the previously saved settings can easily be viewed, past experiences can be used, errors can be prevented and time can be saved.

We will supply the following measuring equipment:

34	pc.	Water temperature sensor for heating water, length 80mm;
24	pc.	Measuring box T + RH,
3	pc.	Measuring box T
1	pc.	Measuring box electronic above screening;
2	pc.	CO_2 monitor 0-3000ppm, including water separator, dust filter and manual;
2	pc.	CO_2 calibration set and 2 cans with calibration gas for CO_2 -monitor;
25	pc.	Hygrowick, length 20 cm;
25	pc.	Aquanex concentrated liquid for measuring box, 0,25L;
2	pc.	Groscale slag weighing system;
2	pc.	Priva drain sensor system DSS consisting of stainless steel drain through 280 x 20 cm and drainwater collecting tank with filter, spoon with reed relay and drain EC sensor with thermistor 3kΩ/25°C. Suited to measure drain water quantities up to 3,5 L/hr;
12	pc.	Hot water temperature sensor in stainless steel body with 150 mm shaft;
5	pc.	Level sensor 5WC-9m with pressure gauge, 9 m connection cable with integrated aspiration; Tube and linear analogue output 4-20mA, suited for measuring of water column in a water silo or water tank up to 5mwc. Supply Voltage 24VDC;

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1	pc.	Priva meteorological station with contains: - Kip radiation sensor CM3P; - Linear light sensor; - Wind speed sensor; - Wind direction sensor; - Outside temperature sensor; - Outside rain intensity sensor; - Outside humidity sensor; - Snow sensor.

Including necessary cabling from the computer to all delivered equipment as sensors and switch panels.

Note	During start-up of the project our technician will give user training to the growers.

Software
The climate computer will be equipped with the below described compartment related software.

General programs Connext software version 909

1	pc.	Communication in the English language;
1	pc.	Measurement of outside humidity suited for electronic humidity sensor;
1	pc.	Heat management for co-ordination of heat demand and production;
2	pc.	Heat transport line control with on/off switch for circulation pumps and modulating valves;
1	pc.	Heat buffer control with fill, empty and disconnected phases and on/off control of a buffer valve, supporting the control of a conventional heat buffer system;
2	pc.	Boiler with modulating burner control;
1	pc.	CO_2 management program for co-ordination of CO_2 demand and production;
2	pc.	CO_2 transport with on/off switch of CO_2 distribution fan;
2	pc.	CO_2 control on burner;
2	pc.	CO_2 measurement program 0-5000 ppm;
12	pc.	Temperature measurement in heat storage tank to realize layers of equal water content;
2	pc.	Modulating filling circuit with measurement of filling-return temperature (water temperature into the return of the boiler based on the mixture of the return of the manifold and the return of the heat storage tank), control of the shunt/filling mixing valve with modulating three-point control of a frequency controlled filling pump (with feedback signal of the realised pump capacity) and an on/off filling valve, with integrated universal servo control function;
2	pc.	Emptying circuit with modulating control of the off-take mixing valve and on/off control of an emptying valve.

Climate related programs

Compartment no.	**1-12**	**13-15**
Measuring box	2	1
Heating control	2	1
Heating net	2	1
Ventilation control	4	-
Ventilation motor 0-100%	8	-
Air circulation fan control	1	-
CO_2 control	0-1	-
Curtain control shading/energy	1	-
Curtain control slave or side-wall	1	-
Curtain motor control via potentiometer	1	-
Crop protection	1	-
Grow lighting	2	-

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Irrigation system	Mixing tank unit 1	Mixing tank unit 2	Vialux 1
Flow counter measurement	1	1	1
Flow control program depending on measured UV dose	-	-	1
EC pre-control without level measurement	1	1	-
Backwashing of 1 filter	1	1	1
EC/pH measurement and control	1	1	-
Fertilizer stock solution	4	4	-
Dosing channel control	2	2	-
Control program for Vialux MP-UV system	1	1	1
Water treatment recipe	2	2	1

Water tanks	Waste water	Fresh water 1	Fresh water 2	Untreated drain water	Treated drain water
Tank number	1	2	2	3	4
Tank with analogue 0-100% level measurement	1	1	1	1	1
Control of filling valve	-	1	1	-	-

User interface

The PC network consists of 1 server/client PC and 2 additional client PCs.
The server/client PC is equipped with Priva Office and Supervision for extended colour operator functions, using the server/client functions of Windows 10, via the client PCs it is possible to present settings, measurements and calculations of the Connext computer in alphanumerical and graphical form via the Priva Office program and Supervision. Furthermore Priva Office collects and stores the historical data of the Connext computer system, for this server/client PC configuration we have included the following hardware, software and manuals.

1x CD-ROM with Priva Office DIRECT

- Supervision;
- Communication with 2 Connext CPC for Supervision;
- Operator software for 2 client PCs;
- Operator software for 3 users simultaneously;
- Report generator;
- Continuous export of 5 min values;
- Save and restore settings;
- Alarm server connection;
- User's manual.

5.2.7 Priva FS labor registration system

A dedicated PrivAssist PC will be placed at the office, at the lunchroom or at the entrance of the greenhouse, there will be 5 Terminal Uploaders. These Terminals are used for sending the data that is stored in the Reader. Every morning, an employee takes a Reader, so he can scan his activity, location and trolley (depending on the job) throughout the day.
Based on the drawing of the greenhouse, we made a calculation for:

- 50 employees
- 25 trolleys
- 5 activities for the greenhouse, divided over different job boards.
- 362 row tags

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The Smartline system is very reliable. Even in case of power failure, employees can keep on registering data. The PrivAssist Smartline system works with Readers (scanners) and RFID tags. Our labour and production registration system is simple in use and not prone to errors.

Solution

PrivAssist is a system for total greenhouse data management and consists of several modules. The Local-Assist module is intended to record labour at any work location within the greenhouse and production facilities.
Within the software of PrivAssist, Priva developed the Notes-Assist module in addition to Local-Assist. Notes-Assist offers the possibility of recording independent observations such as diseases in crops and defects to the greenhouse, such as broken drippers.

Total concept

PrivAssist is a unique concept which is composed of hardware, implementation, training and support. The concept and combination of those components allow you to get the returns you might expect from the system and your company. This means the following:

- Updated and reliable information is always available.
- User friendly use of the hardware and software.
- An operational safe solution based on the implementation of horticultural specific and reliable high tech (not sensitive for dirt, humidity, etc.).
- Tailor made: hardware, software, guiding and support.
- A total solution with optimum return is guaranteed.
- Continuance and warranty.

Insights

You get an insight in

- Production per path/compartment/variety; this way you can discover production differences and use it for short term planning.
- Quality control; giving feedback to employees on quality of work. Advantage is that the quality of production increases, in order to generate more income for better produce.
- Labour productivity; compare the productivity of employees. Time will be used more efficiently by employees, because they register everything they do.
- Cost price per activity; insight into the cost price of employees per job. This way you can put employees at jobs they are good at (personal qualities).
- Observations; act directly when diseases or technical defects are registered in order to limit spreading of diseases.
- To be paid hours of employees.
- Long term planning of personnel. After registering for a year, you get an insight into number of employees needed during certain periods.

In general, a percentage between 5 – 10% in saved on labour costs when greenhouse companies use PrivAssist and when the incoming data is used to analyse and act.

Advantages of the PrivAssist Smartline system

PrivAssist Smartline offers the following advantages:

- The reader reads electronic labels up to a distance of 10cm and it stores the data into its memory. The data is then sent to the pc through a Smartline Terminal.
- Flexible use of the Smartline system, because tags can be programmed and reprogrammed using the Smartline Writer.
- Smartline is language independent, because Smartline is a 'point and click' scanning system using easily identifiable tags.
- Improved speed of data entry, because walking time to a terminal and waiting time at a terminal is eliminated.
- Simple in use, therefore input mistakes are reduced to a minimum. Information is more reliable.
- Less correction work on the pc is needed, so time saving.
- Cabling and installation work is reduced to a minimum due to the minimum use of terminals.
- Ability to registering both labour, production and diseases/technical defects.

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Hardware

The PrivAssist system is built up from a certain amount of accessories. Those accomplish different quality marks as for example CE and IP ratings for the Smartline tags. All PrivAssist hardware components characterize themselves by a user friendly interface, robustness and reliability.
The following items will be included into the PrivAssist system:

1	pc.	USB interface box: Interface between the PrivAssist server and the PrivAssist network provider;
1	pc.	PrivAssist network provider: the provider takes care of the link between the PC and the network;
50	pc.	Readers: used to scan tags. The reader stores all the data;
10	pc.	Terminal with uploader: transfers all the data from the Reader to the PC;
400	pc.	Tags: RFID identification of every employee, job, location and observation;
5	pc.	Charger: charges 10 readers per piece, to be used every end of each working day;
1	pc.	CD-ROM: PrivAssist software version 19 in the English Language (suitable for the latest windows versions).

Software

The software contains a Local Assist (registration of production and labour) and the license for 55 users (employees). The PrivAssist software will also be installed on a client PC, which means 10 people can work in the software at the same time.

Including necessary cabling from the computer to all delivered equipment.

Note	During start-up of the project our technician will give user training for 2 days.

5.2.8 Excavation work for ground cables

Included, we will provide a sand layer below and on top of the cables of 10 cm.

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6 – Grow lighting installation

6.1 – Grow light installation

For the greenhouse we supply a grow light installation based on the following descriptions.

Important!
All electrical systems and equipment will be delivered according UL regulations. Not included is the supply of a ground wire and/or neutral conductor. All electrical materials used in switch panels are supplied with the "UL" conformity.

Specifications

Brand fixtures	Mega Pothon
Type fixtures	Electronic 1000W / 400V
Bay width	8,00 m
To be mounted at	Trellis and at end cable with C-profile 45 mm x 45 mm
Control lights	50% - 100%
Fixture distance	2,00 m
Total quantity of fixtures	11.088 pcs.
Light level	Approx 180 µmol
Quantity of transformers	6 pcs.

6.1.1 Main connection

Power distribution
Excluded is the main distribution panel which will be located in the Transformer rooms which are installed at the side at t a distance of maximum 5 mtr. from the head gables.
Included is the supply cable from these panels to the grow light switch panels in the greenhouse.
Excluded is the connection of our cables to the transformer panels

Power supply cables
The power supply cables are calculated.
- Switch panels will be mounted between Greenhouse posts under the grow gutter.
- The minimum thickness of a power supply cable is 150 mm².

Specification power supply cables

Type supply cables	E-AYY-J SM aluminium core (Class 2)
Type supply cables	Aluminium conductors
Diameter	To be specified later on

Cable lugs
The conductors of the power cables are equipped with cable lugs, which are suitable for aluminium-copper connections (aluminium cable on a copper connection). For the connection between the aluminium wires of the power cable and the copper rails in the distributor, it is essential to apply the right materials. Aluminium does not only corrode with oxygen and moisture, but also when it comes into contact with copper; that is why we use special connectors for the benefit of the connection of aluminium wires.

Norm	DIN 46329
Aluminium connection	Aluminium core with moisture-resistant grease pneumatically fitted according DIN 48085.
Copper connection	Retaining ring tightened with a torque wrench.

Strain relief
The ground under the compact station could sag. Power cables sink along, but the compact station does not. As a result, power cables can be effected with mechanical stress. Power cables are attached with clamps for relieving the stress to the connection of the cable to the copper rails.

Mounting method	Open C-bracket
Material	Galvanised steel
	Polypropylene, halogen-free

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6.1.2 Transformer stations
The power supply for the grow light installation will be realized by 6 pieces 400 Volt transformer stations.

General

Delivery and installation	Excluded, to be provided by a third party
Distance from greenhouse wall	Maximum 5 mtr.
Installation fuses	We assume the transformer is provided with fuses
Connection panel feeds	Excluded
Quantity outgoing fields Tr. 1	14 pieces per power station
Quantity outgoing fields Tr. 2	14 pieces per power station
Quantity outgoing fields Tr. 3	14 pieces per power station
Quantity outgoing fields Tr. 4	14 pieces per power station
Quantity outgoing fields Tr. 5	14 pieces per power station
Quantity outgoing fields Tr. 6	14 pieces per power station

Note	If the transformer is protected with breakers we need to add fuses in our panels which will result in extra costs.

6.1.3 Switch panels
To switch the grow light fixtures, we supply steel sheet switch panels. The panels need to be mounted between the posts under the growing gutter. The switch gear and safety equipment (brand ABB) will be installed in the switch panels. Switch panels will be executed with phase protection (brand ABB).
The phase protection will be activated during a Voltage difference between phases.

Assembly method

Frame	Powder coated white
Location switch panels	Under growing gutter
Mounting power cables	White tube

Specifications

Quantity switch panels	84 pcs.
Material switch panels	E-galvanised steel sheet
Dimensions switch panels	2000 x 380 x 210
Main switch	315 A in panel integrated (brand ABB) / earth leakage circuit breaker
Safety	Phase protection (brand ABB) under and over Voltage protection timer for reset of phase protection
Switch equipment	Fixture starter combination existing of: motor protection switch (MBS) contactor ABB
Safety class	IP 55
Finishing	Structure, epoxy-polyester coating, RAL 7035
Colour	RAL 7035

6.1.4 Computer cabling
The switch panels will be equipped with a so called 50/100% switching, so the lighting will be controllable alternately.

6.1.5 Cable tray (installed under the growing gutter)
Specifications

Make	Schneider
Type	KG 281
Material	Steel
Treatment	powder coated white
Height of tray	60mm
Material thickness	1mm

6.1.6 C-profile gable fixtures
The fixtures at the gable will be hung on C-profiles which will be mounted with lowering hooks on the steel structure of the greenhouse.

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6.1.7 Fixture cabling

From the first till the last fixture per row the fixture cable will be pre-manufactured at our shop in Holland.
For each fixture a connection will be made according the "SLS" principle, also known as the "Stolze Las System" the length from the switch panel to the first fixture, the feed cable, will be connected at our shop in Holland as well. The connection for each fixture will be made by a tap-connector, so the main cable will not be cut and will stay intact. The connection itself will be covered with heat shrink to create a solid watertight connection.

Specification connections

Quantity connections	11.088 pcs.
Type	SLS
Brand heat shrink	Hongshang H-5@F (UL-listed)
Connections	Tab-connectors
Brand tab-connectors	Klemko (UL-listed)

Specification cabling (including main feeds)

Type cabling	MTW 0,6kV TC ER (UL-listed)
Diameters	4x 2,5 mm² / AWG 14
	4x 4 mm² / AWG 12

6.1.8 Fixtures and equipment

Fixtures

We supply the fixtures, reflectors, bulbs, lugs, cords and brackets. In the grow light installation 1000 Watt / 400V fittings are installed.

Specifications

Quantity fixtures	11.088 pcs.
Brand	Mega Pothon
Connection	SLS
Voltage	400V / 60Hz
Bulb	1000 W EL
Warranty	Warranty conditions manufacturer
Warranty fixture	3 years
Warranty light source	10.000 hours or 4 years (what comes first)

Spare parts

50	Complete armatures 400v / 60Hz.
100	Bulbs 1000W
10	SLS repair kits.

Equipment

Platform

We assume that the work will be carried out with the help of a platform. We assume that there is a flat and workable surface, on which we can work with a platform with wheels. If we have to use tube rail trolleys than additional costs will be charged.

6.1.9 Excavation work

Included, we will provide a sand layer below and on top of the cables of 10 cm.

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7 – Irrigation system

7.1 – Irrigation installation

The calculation of the irrigation installation is based on the figures described in chapter General 5.1.

7.1.1 Water storage

Fresh water storage tanks (well water, city water)

For the storage of fresh water we supply 2 galvanised corrugated plate water storage tanks.
The tanks will be placed at a depth of 50 cm.
The content of each tank is 510 m³.

2	pc.	Galvanised corrugated plate water tank with the following dimensions: diameter 11,83 m height 4,64 m
2	pc.	Black liner, type EX, thickness 0,5 mm, for aforementioned tank dimensions;
2	pc.	Wall protection blanket 300 gr/m², for aforementioned tank dimensions;
2	pc.	Ground protection blanket 500 gr/m², for aforementioned tank dimensions;
2	pc.	PVC black anti-algae cover, mounted on top of the tank;
4	pc.	Liner passage 200 mm.

Water storage tanks for treated and untreated drain water

For the storage of drainage water we supply galvanised corrugated plate water storage tanks.
The tanks will be placed at a depth of 50 cm.
The content of each tank is 510 m³.

2	pc.	Galvanised corrugated plate water tank with the following dimensions: diameter 11,83 m height 4,64 m
2	pc.	Black liner, type EX, thickness 0,5 mm, for aforementioned tank dimensions;
2	pc.	Wall protection blanket 300 gr/m², for aforementioned tank dimensions;
2	pc.	Ground protection blanket 500 gr/m², for aforementioned tank dimensions;
2	pc.	PVC black anti-algae cover, mounted on top of the tank;
4	pc.	Liner passage 160 mm.

Water storage tanks for overflow/ flush water

For the storage of overflow / flush water we supply galvanised corrugated plate water storage tank.
The tank will be placed at a depth of 90 cm.
The content of each tank is 510 m³.

1	pc.	Galvanised corrugated plate water tank with the following dimensions: diameter 11,83 m height 4,64 m
1	pc.	Black liner, type EX, thickness 0,5 mm, for aforementioned tank dimensions;
1	pc.	Wall protection blanket 300 gr/m², for aforementioned tank dimensions;
1	pc.	Ground protection blanket 500 gr/m², for aforementioned tank dimensions;
1	pc.	PVC black anti-algae cover, mounted on top of the tank;
2	pc.	Liner passage 160 mm.

Note	The lowest ring of the tank is provided with a duplex Polyurethane coating, micron at both sides. The spot of the tank will be levelled and also be provided with a bed of 10cm clean sand.These preparations are needed for a good tank foundation and protection of the tank liner. Immediately after mounting the tank liner, water should be pumped into the tank, the tank should never be empty and at least 50 cm water should always be present in the tank.

For filling and suction of the water storage tanks we supply the following material:

- All suction lines Ø 200 mm, Ø 160 mm and Ø 125 mm to the mixing tank irrigation units, hand taps/roof irrigation unit and fogging unit over a max length of 30 m;
- All interconnection lines Ø 160 mm between tanks with valves;
- All necessary PVC appendages and fastening materials;
- Overflow line of Ø 160 mm.

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7.1.2 Greenhouse Tomatoes (dept 1-12)
The greenhouse will be equipped with drip irrigation system according to the specifications below.
The installation will be fed from the 2 sides and can be flushed at the pathway.
We will install double mainlines for two recipes.

Drip irrigation

Bay width	8,00 m
Path width	4 m
Crop rows per bay	5 per 8,00 m bay
Number of irrigation hoses per bay	10
Dripper capacity	2,2 L/hr
Dripper distance	20 cm
Plant density	3 plants/m^2
Irrigation sections	2x12
Max. Irrigation valves at same time	2x2
Diameter and location of main line	2x PVC 200 in middle greenhouse (2 recipes)
Diameter and location semi-line	PVC 90 mm, at pathway and gable end
Location and type of irrigation unit	2x in irrigation room 140 m^3/hr mixing tank unit

Mainlines (2x)

-	m	PE 200 mm class 10 Bar;
-	m	PE 125 mm 10Ato;
-	pc.	PE connections 200/125 mm.

Valve sets(2x)

24	pc.	Selection valve unit 1 or unit 2
12	pc.	Butterfly valve 90 mm, 24VAC, 3 sec;
12	pc.	Bypass valve 125 mm
12	pc.	Connection for hand water hose;
12	pc.	Pressure gauge glycerine filled 0-6 Bar.

Semi-lines (2x)

-	m	PVC 90 mm class 10 Bar;
-	pc.	PVC connections 90 mm;
362	pc.	T-piece 90 mm – PE 25 mm.

Drip hoses

-	m	PE Drip hose white 25 mm punched each 16,7 cm
-	m	Drip hose 25 mm sun block PN4;
-	pc.	Supertiff dripper set 2,2 L/hr length 80 cm complete with plant spike color blue/black;
-	pc.	Knee 90° PE 25 mm;
5.000	pc.	Extra dripper set 2,2 L/hr 80 cm spike 90°

Automatical flushing of the semilines
For the automatic flushing of the irrigation installation we connect a PVC flush semi line for each irrigation valve sector. which will be placed along the gable side. For flushing we supply 2 extra check valves in the semi flush line and a central flush collector line that takes the water to the untreated drain tank in the technical room.

-	m	PVC 160 mm central flush collector line;
48	pc.	PVC check valve for manual flushing;
2	pc.	Manual butterfly valve 160 mm
1	pc.	Automatic butterfly valve 160 mm

Including all necessary fittings and connection materials.

7.1.3 Drain water
For recollecting the drain water, we supply a drain collection system with drain pits which pump the drain water to the untreated drain tank.

We offer 2 Lowara pumps (one for back-up) on a stainless steel frame which will be placed near the drain pit. The pump capacity is based on a maximum of 50% drain water.

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Specifications can be find below, to each pump a PVC pressure line will be connected, the pressure line is provided with a measuring circuit for EC, pH and flow. The butterfly valves make it possible to choose between transporting the drain water to the cloth filter above the untreated drain water tank or the sewer tank.

Drain pit set

10	m	PVC 125mm class 10 Bar;
1	pc.	PVC connections 125 mm;
2	pc.	Polyester drain collection tank, capacity 5.000 L, including re-enforced;
2	pc.	Filter tube, PVC 315 mm;
2	pc.	Butterfly valve 125 mm;
2	pc.	Non-return valve 125 mm;
2	pc.	Drain pump, make LOWARA (stainless steel), capacity 50m3/hr;
2	pc.	Fine filter 4" - 500 micron;
4	pc.	Float switch for ON/OFF switching of the drain pump;
1	pc.	Stainless steel pump support;
4	pc.	Pressure gauge glycerine filled;
2	pc.	Pump safety thermostat;
2	pc.	Panel with 2 soft starters.
1	pc.	Cloth filter with a capacity of 75M3/h

Including all necessary PVC accessories for connection of the drain pit.

EC measurement for drain pit

1	pc.	EC +pH sensor for 1 drain pit in the greenhouse;
1	pc.	Flow counter with pulse head, 1 pulse per 10 L, capacity 50 m^3/hr;
1	pc.	Priva measuring program in computer

Priva Vialux MP-UV disinfection

To disinfect the return drain water from the greenhouse we supply a Priva MP-UV disinfection system.
The Priva Vialux MP-UV is a water disinfection system specially developed for the horticulture industry. It offers growers a total solution for the disinfection by UV-C light using a UV lamp. The disinfector ensures that, besides fungi, bacteria and eelworms, viruses can also be made harmless.

The water to be disinfected that flows through the UV chamber is turbulent. As a result, an equal average dose of UV-C is administered to the water. To determine the dose of UV-C, the T10 value is measured automatically at the start of each production cycle. This means correct regulation and monitoring of the dose of UV-C is guaranteed. To monitor the dose of UV-C, the UV chamber is equipped with a UV sensor.

To clean the quartz tube, an acid injection (pH 3) is performed periodically. The injection of acid is essential for ensuring the deposit on the quartz tube and the UV sensor can be removed. At the end of a production cycle, a small amount of acid is also injected, causing deposits on the quartz tube to dissolve and preventing new deposits from forming. In this way, it is ensured that the next production cycle starts with a clean quartz tube. The pH of the water to be disinfected is preventively regulated between pH 5 and pH 5.8.

The disinfection process cannot begin until after a certain start-up time. The UV lamps have to warm up to produce a guaranteed amount of UV-C radiation. This takes about 15 minutes. During this start-up time, a three-way valve is used to return the water to be disinfected to the drain water tank. After the start-up period, the disinfected water is led to the disinfected water tank.

The main characteristics of the Vialux MP-UV are:
- High level of reliability for control and monitoring.
- The UV lamp, quartz tube and UV sensor can be personally replaced by the user.
- Combining low capital costs with low operating costs.
- The water to be disinfected is not or not significantly increased in temperature.
- The Vialux M-Line contains 2 to 8 quartz tubes. They are cleaned with acid; the system can remain in production during cleaning.
- A UV-C sensor developed especially for this purpose continuously measures and monitors the UV-C dose.
- The UV permeability (T10 value) of the water being disinfected is determined automatically upon starting.
- Safe and sterile sample-taking from a sampling tap mounted directly to the UV chamber.
- Suitable for the disinfection of undiluted drain water, provided that this water has a certain UV permeability.

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1x Priva Vialux MP-UV disinfector
Specifications

Type	Priva MP-UV
Number of lamps	24
Max. disinfection capacity	22,0 m^3/hr
Transmission value T10	20%
Average UV radiation	250 mJ/cm^2 (total disinfection)
Power supply power module	480Volt / 60Hz
Power supply pumps	480Volt / 60Hz

(The return drain in percentage and the T10 are estimated. If this changes we have to re-calculate)

The MP-UV disinfection unit needs to be integrated in a Priva Connext network, will be built-up on a stainless steel frame and consists of the following main parts:

8	pc.	Radiation chambers, complete with UV lamp;
1	pc.	High Voltage power module to feed the lamps;
1	pc.	Lowara system pump, 35 m^3/hr 3,2 Bar;
1	pc.	Freq. drive for system pump, including pressure sensor;
1	pc.	6 matic automatic filter 25 m^3/hr 25 micron;
1	pc.	Paddle wheel sensor DN100;
1	pc.	Acid dosing system for automatic cleaning of the quartz tubes;
1	pc.	PE acid vessel 200 L, including lid;
1	pc.	Electric motor valve 50 mm for Vialux active;
1	pc.	Electric valve 90 mm, for product water lines;
1	pc.	Switch panel.

7.1.4 Irrigation units

Drip installation

2 x Mixing tank irrigation unit 140 m^3/hr

The two mixing unit works as a premix system and the fertilizer pump transports the fertilizer A and B solutions in the mixing tank. The capacity of the units is based on 3 dripper/m^2 and irrigation of 2 valves at the same time.

The pump units are built-up on a stainless steel frame and each consists of:

2	pc.	Fresh water pump, nominal capacity 70 m^3/hour at 2.7 Bar, complete with check valve and butterfly valve;
2	pc.	Drip irrigation pump, nominal capacity 70 m^3/hour at 4.4 Bar, complete with check valve and butterfly valve;
4	pc.	Pump thermostat for running-dry protection;
2	pc.	Fresh water filling valve 3", complete with mechanical level switch;
1	pc.	PE mixing tank 1.000 L, including drain- valve, provided with lid, placed within the stainless steel frame;
4	pc.	Venturies to dilute the fertilizers with the water;
4	pc.	Dosing valves, for dosing of "A"- and "B"-fertilizer;
4	pc.	PVC flow meter, for an optimal control of the dosing of "A"- and "B" fertilizer;
1	pc.	Dosing valve, with Viton diaphragm, for dosing acid;
1	pc.	EC sensor, used for the EC pre-control;
2	pc.	EC sensor, used to measure and control of the EC value;
2	pc.	pH sensor, used to measure and control of the pH value;
1	pc.	6 matic automatic filter filtration 130 micron;
2	pc.	Pressure-gauge 0-6 Bar, glycerin filled;
1	pc.	Flow counter with pulse head, 1 pulse per 10L, capacity 140 m^3/hr;
1	pc.	PVC double butterfly valve 160 mm, provided with a servomotor 24Vac, for mixing fresh water and drain water on a basis of EC value;
2	pc.	PVC check valve 160 mm;
2	pc.	PVC butterfly valve 160 mm;
2	pc.	Freq. drive for drip irrigation pumps, including pressure sensor;
1	pc.	Injection pump for pesticides installed on the irrigation unit;
2	pc.	Soft starter for supply / fresh water pump, build in switch panel;
1	pc.	Switch panel, for control of pumps, level switches, etc.

Including necessary PVC fittings and connection materials between the unit and the mixing tank and the necessary internal cabling in the unit.

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Fertilizer tanks

8	pc.	A/B-tank made of PE content 5.000 L complete with cover and mechanical mixers;
1	pc.	Acid tank made of PE content 2.000 L complete with cover;
9	pc.	PVC 32 mm suction lines including filter to unit;

1x Hand watering pump unit (hydrofor) and hand taps

We supply a frequency controlled pump on a stainless steel frame for a hand watering installation in the greenhouse and a roof washer installation.
In the greenhouse, along the middle path, a main line 125 mm will be installed. The main line is provided with 20 risers in white PVC with a hand valve and a GK connector for hand watering.
The mainline of the hand watering installation is 2x provided with a sideway 63mm to the gable end.
This line will be provided with a hand watering connection for the roof washer.

The pump units is built-up on a stainless steel frame and each consists of:

1	pc.	Supply pump, cap. 50 m^3/hr, at 4 Bar;
2	pc.	Pressure gauge, 0-6 Bar, glycerine filled;
1	pc.	Coated steel fine filter 4", filtration 130 micron;
1	pc.	Non-return valve 125 mm;
2	pc.	Butterfly valve 125 mm;
1	pc.	Pump safety thermostat;
1	pc.	Pressure vessel, 24 L, coated steel;
1	pc.	Freq. controller with pressure switch;

Safety

In the irrigation room we supply 2 emergency showers, 1 eye wash units, which should be connected (not included) to the local tap water connection close to the irrigation units and 2 sets of safety gloves.

Complete installation will be supplied with safety boards at units and water tanks.

7.1.5 Drain water

Included, we will provide a sand layer below and on top of the irrigation pipes of 10 cm.

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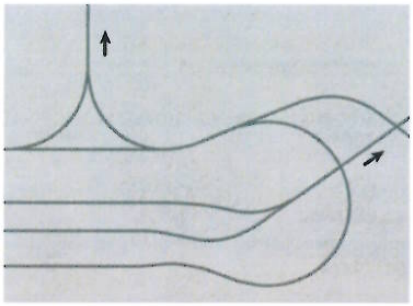
8 – Internal logistics

8.1 – Induction trajectory



Induction cable complete installed
Length: 868 meter

Stop position for unloading- loading unit with steering
Amount: 6 pcs

Automatic door opener complete installed
Amount: 2 pcs
Including
- 2 detection coils
- 2 stop coils

PLC L-link in concrete
Amount: 2 pcs

Extra detection coil complete installed
Amount: 2 pcs

Extra stop coil complete installed
Amount: 2 pcs

Generator for control induction cable steering type I
Amount: 2 pcs

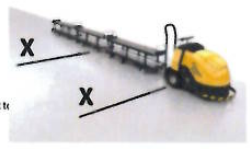
8.2 – Power-Bee

Electric tug Power-Bee automatic 400 Ah
Amount: 2 pcs

Technical info:
- Length excl. bumper and pull bar = 1.7 meter
- Length incl. bumper and pull bar = 1.9 meter
- Width = 0.83 meter (bumper width = 0.88 meter)
- Height = 1,38 m
- Full traction batteries 400Ah
- Exclusive Pull bar

Towbar Power Bee symmetrical
Amount: 2 pcs
Diameter pin: 16 mm
Adjustable in height
- Minimum height 85 mm
- Maximum height 210 mm
- Tolerance 5 mm

Battery charger
Internal batterycharger 400 Ah, 110 V, with plug for PowerBee
Amount: 2 pcs
Technical info:
- built-in battery charger
- with maintenance charging
- battery load curve in 13 hours
- supply voltage 90 - 130 V 60 Hz adjustable
- detection of incompatible battery voltage, battery failure, ...
- Waterproof case IP 66
- Very shock resistant
- LED indication
- IEC 320 c13 power outlet in chassis console
- Output = 24 V - 50 A
- Input = 115 Vac - 14 A
- Power consumption = 1400 VA



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Interval steering installed on Power-Bee
Amount: 2 pcs
Technical info:
- Plug stops automatic on distance X
- Plug starts automatic on signal
- from remote or system

Stop cart with box for stopping the carts on the induction line
Amount: 1 pcs

8.3 – Qii-Lift
8.3.1 Qii-Lift H352
Electric pipe rail trolley Qii-Lift H352 CTC 550 TD 51
Amount: 25 pcs

Work platform
- water resistant stainless steel footpedal, integrated
- Activation footpedal = gas function
- two self-closing doors with a wide entrance at front and back side of the cart
- 24 V plug connection
- solid operating switches and battery indicator integrated in the entrance door
- toolbox integrated in the entrance door
- rounded edges to prevent plant damage

Hydraulic scissors
- very stable double hydraulic scissors
- powered by one hydraulic cylinder
- joints with bearings and grease nipples
- high speed movement up and down, soft start/stop independent of the load
- guide mechanism integrated in the bottom of the chassis
- maximum driving speed will automatically be reduced when the platform rises above 2500 mm
- minimum height 490 mm (step height), maximum height 3500 mm
- maximum load 250 kg
- rounded edges to prevent plant damage

Wheel driving
- rubber wheels with wide tread to protect the concrete path
- maintenance free gearbox driving (no chain)
- cruise control speed regulator which guarantees a 100 % constant speed
- activation of the boost button allows to reach an extra high speed up to 110 m/min on the pipe rails

Push up wheels
- large wheels with bearings to facilitate the movement of the cart
- two fixed wheels and two swivel casters
- up and down movement is hydraulically powered
- push up operating is not possible when the work platform is raised
- fast push up cycle by 1 short pulse

Chassis
- four solid corners with rubber buffer
- very smooth finish and no protruding fasteners
- easy access to the batteries, two full traction batteries 118 Ah
- extra operating panel integrated in the chassis (battery charging plug/scissor up and down/head switch)
- height of chassis 260 mm
- width of chassis 740 mm, including rubber corners 755 mm
- length of chassis 2010 mm, including rubber corners 2025 mm
- tilt sensor with acoustic alarm included

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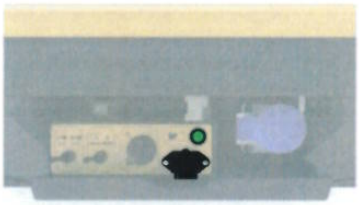
On board battery charger



On board high frequency battery charger 110 Volt for Qii-Lift
Total amount: 25 pcs
Technical info:

- start charging from 0 Volt
- waterproof case IP67
- very shockproof
- indication LED
- IEC 320 c13 connector built in chassis
- output = 24 Volt – 15 Amp
- input = 115 Volt AC – 7.5 Amp
- max residual current = 3.5 mAmp (use an RCD suitable for HF supplies)
- power consumption = 800 VA

Power cable

Power cable, length 2 m for internal charger and American plug 110
Total amount: 25 pcs
Technical info:

- IEC320-c13
- meter cable
- straight nema 5-15 plug

Security/safety support

Security/safety support for keeping the Qii-Lift H351 open
Total amount: 1 pcs
Technical info:

- obligatory during maintenance

8.3.2 Qii-Lift H502

Electric pipe rail trolley Qii-Lift H502 CTC 550 TD 51
Total amount: 2 pcs

Work platform

- water resistant stainless steel footpedal, integrated
- activation footpedal = gas function
- two self-closing doors with a wide entrance at front and back side of the cart
- 24 V plug connection
- solid operating switches and battery indicator integrated in the entrance door
- toolbox integrated in the entrance door
- rounded edges to prevent plant damage

Hydraulic scissors

- very stable triple hydraulic scissors
- powered by one hydraulic cylinder
- joints with bearings and grease nipples
- high speed movement up and down, soft start/stop independent of the load
- guide mechanism integrated in the bottom of the chassis
- maximum driving speed will automatically be reduced when the platform rises above 2500 mm
- minimum height 590 mm (step height)
- maximum height 5000 mm
- maximum load 100 kg
- rounded edges to prevent plant damage

Wheel driving

- rubber wheels with wide tread to protect the concrete path
- maintenance free gearbox driving (no chain)
- cruise control speed regulator which guarantees a 100 % constant speed
- activation of the boost button allows to reach an extra high speed up to 110 m/min on the pipe rails

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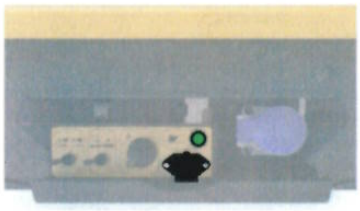
Push up wheels
- large wheels with bearings to facilitate the movement of the cart
- two fixed wheels and two swivel casters
- up and down movement is hydraulically powered
- push up operating is not possible when the work platform is raised
- fast push up cycle by 1 short pulse

Chassis
- four solid corners with rubber buffer
- very smooth finish and no protruding fasteners
- easy access to the batteries, two full traction batteries 118 Ah
- extra operating panel integrated in the chassis (battery charging plug/scissor up and down/headswitch)
- height of chassis 260 mm
- width of chassis 740 mm, including rubber corners 755 mm
- length of chassis 2010 mm, including rubber corners 2025 mm
- tilt sensor with acoustic alarm included

On board battery charger
On board high frequency battery charger 110 Volt for Qii-Lift
Total amount: 2 pcs
Technical info:
- start charging from 0 Volt
- waterproof case IP67
- very shockproof
- indication LED
- IEC 320 c13 connector built in chassis
- output = 24 Volt – 15 Amp
- input = 115 Volt AC – 7.5 Amp
- max residual current = 3.5 mAmp (use an RCD suitable for HF supplies)
- power consumption = 800 VA



Power cable
Power cable, length 2 m for internal charger and American plug 110
Total amount: 2 pcs
Technical info:
- IEC320-c13
- meter cable
- straight nema 5-15 plug

Mechanical supports for Qii-lift
Set of 4 mechanical supports for Qii-lift
Total amount: 2 pcs
Technical info:
- 2 front and 2 rear supports
- easy mountable and dismountable
- quickly adjustable in height
- position of the supporting surface: 100 mm outside the chassis
- bottom supporting surface is max. 230 mm lower than top of the pipes

Security/safety support
Security/safety supports for keeping scissors open Qii-lift 500, Qii-lift 650
Total amount: 2 pcs
Technical info:
- required during maintenance

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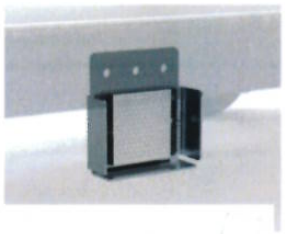
8.4 – Bo Cart 5 2500
Undercarriage Bo Cart 5 2500 CTC 550 TD 51
Amount: 133 pcs

Technical info
- for tube rail with a CTC of 550 mm
- for TD of 51 mm
- special wheels for a smooth transition path/tube
- equipped with 4 nylon flange rollers with bracket
- 4 Vulkollan swivel castors with bearing turntable
- 2 rubber center wheels with low friction
- folding drawbar
- tow bar at the back of the cart
- possibility to assemble pushbars at each end
- numbering at front and back of the cart incorporated
- width of chassis 600 mm
- length of chassis 2526 mm
- colour Ral 7016

Reflector
Holder with reflector for automatic transport for Bo Cart 5
Position: on the right side when standing behind the cart
Amount: 133 pcs
Technical info: detection of the correct position harvest cart for the purpose of automation

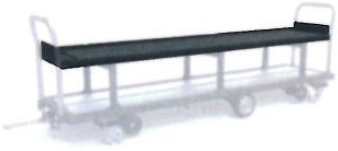


Bottom Plate
Bottom plate galvanized for undercarriage Bo Cart 5 2520 mm
Amount: 133 pcs

Push bar
Galvanized push bar complete for Bo Cart standard
Amount: 133 pcs
For lateral discharging

Set of supports
Set of supports (3 pieces) for roller track Bo Cart 5
Amount: 133 pcs
Suitable for: chassis 600, Roller track 400, height 560

Roller track
Roller track for Bo Cart 5 2520 mm x 400 mm without supports mounted
Amount: 133 pcs
PVC rollers with diameter 30 mm
Suitable for emptying sideways
Plate for the full width at the front and rear



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8.5 – Qii-Jet HAV
Automatic spray machine Qii-Jet TA-342 550-51
Amount: 2 pcs

Use
- programming via separate touch screen panel
  - automatically outward and return function
  - automatic calculation of the correct spraying velocity in accordance with the desired release rate per hectare
- control console with
  - program selector switch, 10 positions
  - 3 position switch, automatic / manual - spray direction
- able to treat a part of a path

Wheel driving
- powered car based on pipe rails and the concrete path with max. speed 110 m/min
- cruise control speed regulator
- plastic wheels to protect the concrete path, metal wheels on pipe rails
- equipped with the unique Combi drive system (speed on concrete road and pipe rails equals)
- self-centering castors
- full-traction batteries 24 Volt 400 Ah
- autonomy about 8 hours (depending on the spray pressure, type and number of nozzles)

Chassis
- width of chassis 758 mm
- width of chassis saftey bumper included 793 mm
- length of chassis safety bumper included 2120 mm
- safety bumper in front and rear (detection end of pipe rail)
- waterproof electrical cabinet
- additional pressure rollers for better weight distribution

Tank
- 300 liter tank with 275 liter usable volume
- max. operating pressure: 15 bar
- filling system with flow meter and check valve
- drain valve

Pump unit
Pump unit 30 l / 30 bar with variable speed control
Amount: 2 pcs
Technical info:
- electric motor with direct driven piston pump
- pump data:
  - working pressure: 30 bar
  - capacity : 30 l/min
  - electric motor 24 V DC
  - driving pump unit with variable speed control

  Suitable for spraying with max 19 (yellow) 020 nozzles at 10bar.
  Data for other nozzle types and different pressure levels on request.

Boom holder
Spraying boom holder Qii-Jet TAV
Amount: 2 pcs
Technical info:
- manometer, suction and pressure filter
- 8 till 12 bar working pressure at the height of the spraying boom holder
- height boom holder 2200 mm
- spraying booms (not included) easily adjustable in height

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Touch Screen
Touch screen with box
Amount: 1 pcs
Technical info:
- separate touch screen control panel with adjustable path length and desired litre per hectare including protection / storage case

Battery Charger
Internal battery charger 400 Ah,110 V with plug for Qii-Jet TA-342
Amount: 2 pcs

Technical info:
- charger is built-in
- maintenance charging
- battery load curve in 13 hours
- supply voltage 90 - 130 V 60 Hz adjustable
- detection of incompatible battery voltage, battery failure, ...
- waterproof case IP 67
- very shock resistant
- LED indication
- IEC 320 c 13 power outlet in chassis console
- output = 24 V - 50 A
- input = 115 Vac - 14 A
- power consumption = 1400 VA

Power cable
Power cable, length 2m for internal charger and American plug
Amount: 2 pcs
Technical info :
- IEC320-c13
- 2 meter cable
- straight nema 5-15 plug

Spraying beam (14 nozzles)
spraying beam Stainless Steel with 14 position nozzles
Amount: 2 pcs

Technical info:
- 14x position nozzles without manometer 0-25 bar
- Anti-drip nozzles
- adjustable nozzles
- nozzles can be closed
- length 2166 mm
- CTC nozzles 350 mm

Spraying beam (7 double swivel nozzles)
spraying beam front with 7 double swivel nozzles
Amount: 2 pcs

Technical info:
- 7 x double swivel head without manometer 0-25 bar
- adjustable nozzles
- nozzles can be closed
- length 2166 mm
- CTC nozzles 350 mm

Spraying beam expansion
Spraying beam expansion for Qii-Jet
Amount: 1 pcs
Technical info: length: 1 meter

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9 – Top cleaner roof washer

9.1 – Top cleaner roof washer

9.1.1 Top Cleaner roof washer standard edition

- Extremely reliable hydraulics that guarantees optimum performance, also at very low temperatures (0.5°C) and at gutter lengths of > 300 metres
- A separated hydraulic reel arrangement that enables the user to arrange the hose and reel independently, so there will be as few reel interruptions as possible
- UV-resistant 450 mm Ø brush rollers
- Steps in the frame so the machine can be climbed safely
- Watertight LED lights so the machine is also visible in the dark
- Protective covers of the drive shaft's joints
- Optical interruption notification
- Several means of protection:
  - Sensors in front of the wheels stop the machine at the end of the greenhouse
  - Sensors at the reels that check if the reels are rolling
  - Emergency stop switch

9.1.2 Adjustable disk brush set

These disk brushes (2 pieces), as you desire against the bottom of the windows or against the gutter rim, are set for extra cleaning.

9.1.3 Gutter brush, extra wide model

This electrically driven, high speed gutter brush cleans the lower part from the glass on each side of gutter too. It automatically turns in the right revolution direction, taking the slope of the roof into account.

Recommended for aluminum gutters.

9.1.4 Hose and cable guides on reels roof washer

With a set of guides on the reels, the chance for any reel interruptions is limited to a minimum. This prevents an uneven distribution of the hose or cable on the reels due to wind blowing against the hose or reel. A very useful option.

9.1.5 Open window safety protection

We recommend this option to prevent expensive repairs of the roof construction.
This protection detects a (partially) opened window effortlessly and stops the roof cleaner immediately, after which it will drive backwards so the window will be available again, and can be closed.

9.1.6 Lightweight roller brush splash guards

By equipping the brushes with lightweight, polycarbonate covers, the recently washed glass will not be become filthy due to splashing dirt any more. The roof cleaner itself will also be a lot cleaner.

9.2 – Top cleaner platform

9.2.1 Top Cleaner platform, standard edition, manual control

Both the roof cleaner as the platform are controlled manually by means of a remote control, and will therefore always need someone attending. The platform is positioned in front of the greenhouse gutters, after which the ramps are controlled until they are positioned in the gutters. When the roof cleaner is back on the platform again, you can simply push the remote control to move it sideward to the next peak where it automatically stops. Every platform comes including;

- Approved caged ladder including lockable anti climb barrier
- Certified hoisting and attaching points
- Fencing on 3 sides, at the side of the ladder a self-closing swing gate
- Platform fully covered with profiled aluminum floorboards
- Automatic stop when the platform is in line with the gutters
- Remote control

In this edition the windows must be closed and locked manually before starting the roof washer.

9.2.2 Electric folding platform undercarriage

- Easy to transport on trailer. Roof washer can stay on platform
- Easy to exchange platform including the roof washer at same time, between different greenhouses, even with different column heights
- Easy to remove from a greenhouse for maintenance or storage during cold winters
- Comes including an approved hoisting sling
- An approved slide ladder will replace the cage Ladder

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9.2.3 Pressure water pump on platform
This powerful pressure booster pump delivers a high work pressure of 70 bars, to ensure a large amount of water at the brushes. The pump is placed on top of the platform.

9.3 – Automation

9.3.1 Automatic control
This edition fully automatically moves and positions the platform in front of the greenhouse gutters, after which the roof cleaner receives a manually given start signal. The controls are expanded with a touchscreen display to program and read the status. You can choose the number of peaks to be washed, or determine when the system is to start/stop by means of a timer. The display is fully menu-controlled and available in several languages.
In this edition the windows must be closed and locked manually before starting the roof washer

9.4 – Spraying of coatings and cleansing agents

Light is important to an optimum growth, but too much light could damage the crops. You can use a coating to direct the light in the greenhouse. For even light distribution, it is important that an even layer of coating is applied. The Top Cleaner guarantees a perfectly even result, irrespective of the circumstances. You can use it to apply a chalk layer or coatings of all well-known brands.
All parts have been carefully selected. The technique has been tested over and over again, which leads to an optimum result, proven reliability and sustainability. Safety when also a top priority when designing the machine, so you won't find anything better on this area. All acknowledged contracting companies and many leading growers all over the world work with the Top Cleaner, and that's not without reason.

9.4.1 Spray booms (three peaks) for coating application
The Top Cleaner can be equipped with a set of spray masts that cover 3 peaks. You will get a great white wash machine that is automatic operated. There is no need to ride on the machine, you can stay safely on the platform, the spray masts close/open automatically. The riding speed can be increased up to 25 metres per minute.

When you are not sure going to white wash your greenhouse at the moment of purchasing, we offer you the possibility to buy only the preparation for it. This means we mount the electric drive, VFD, and all wiring of factory. In a later stage you can purchase the control box and spray masts, which are very easy to mount yourself.

9.4.2 Dosatron® dose pump assembly, 10% max, acid proof
This dose pump automatically doses any cleansing agents or coating remover with the water. You can therefore remove a shading or coating layer, or stubborn dirt. The pump unit is assembled on a surface that can be easily placed and connected to the roof cleaner.

9.5 – Pump units to apply coatings

Van der Waay built its own pump units, fully customized for use with her chalking machines, and only with first class diaphragm pumps from the brand Comet. These pumps are fully suitable for all shading and coating agents (e.g. Redusystems, Hermadix, and Sudlac). Also, good to know, Comet has a worldwide service and dealer network.
Every pump unit comes including:

- High quality Comet IDS series, diaphragm pump 40/ 57L per minute – max pressure 50 bar,
- 400/480V – 50/60Hz
- Single or double mixing container including stainless steel mechanical mixer(s), 400/480V – 50/60Hz
- Steel powder coated frame, including forklift holes or all terrain wheels
- Hand winded hose reel including 100 m ½" high pressure hose
- 10 m supply cable with plug and 1" filling hose

Chalk pump trailer 2 x 1,000 L 400/480V - 50/60Hz

9.6 – Safety provisions

Van der Waay equips its Top Cleaner with expanded safety devices by default. And that's a bare necessity because greenhouses are getting higher and higher. We limit the risks to an absolute minimum and warn for the residual risks. Besides that, we go one or more steps further than others. We study all guidelines and standards, and apply these.

9.6.1 Legal requirements
The Top Cleaner complies with the European legal (CE) requirements as a minimum. Additional requirements apply in some countries (such as Australia, America and Canada). In that case, we adjust the Top Cleaner to the local requirements so you can start working with it immediately.

9.6.2 2x Fall arrester according EN360:2002
Prevent falling from heights during climbing the platform ladder.
Only on platforms with an electric folding undercarriage
2x Personal harness & lanyard, double hook

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10 – Terms and conditions

Havecon always wants to achieve an excellent end result in good cooperation with the client. Therefore, we ask the cooperation of the client in noting the responsibilities agreed upon. Together with the client will be determined who will take care of which aspects at the required time, in order to achieve the desired end result together.

We therefore want to make clear agreements with the client about :
What we require the client to do.
What are the responsibilities of Havecon Projects BV.
What is not included in the agreements.

Where no arrangements have been agreed then the general terms and conditions shall apply.
The client declares that he has received and accepted them.

10.1 – Responsibilities of the client

From the signing of the contract up to the start of works on site.

a. The supply of the following administrations.
   i. Granted permits, to be handed to Havecon Projects 1 month before the works commence.
   ii. Financial documents, including bank confirmation for financing the complete project, to be handed to Havecon Projects prior to Havecon ordering any materials.
   iii. Granted exceptions.
   iv. That on building site, all underground piping, cables etc. are known before the start of works.
   v. Carry out soil probing (if required) and send the results to Havecon Projects BV.
   vi. Situation drawings.
   vii. All required engineering documents for concrete works outside of Havecon's scope of work shall be submitted six weeks prior to execution for internal review and acceptance.
   viii. Insurance.
      * All materials and installations, which will be brought onto the building site, by Havecon Projects BV are from the moment they are on site for the risk of the client.
      * The client has to be correctly insured for prementioned risk (preferably by means of a Builders risk insurance).
      * Before the start of the project, the insurance policy is required, as well as a proof of payment of the premium.

b. Technical.
   i. The building site is clear of obstacles, both above ground and underground.
   ii. Levelling of the building site.
   iii. To make the site accessible, also for the heavy equipment of Havecon or its subcontractors.
   iv. Providing gravel for accessibility if Havecon says this is required. (costs are for the client).
   v. The provision of sufficient space for unloading and storing the supplied materials.
   vi. Provide canteen and toilet facilities for the workers of Havecon Projects BV during construction.

During the building phase.

a. Technical (costs are for the client).
   i. The closure of the building site (with fences).
   ii. Security of the building site (site guard).
   iii. That there is a sufficient supply of electricity (220 V and 380 V) and water for the builders to use in order to perform their work. The location of such supplies is to be arranged in agreement with the site manager of Havecon Projects BV.
   iv. Supply of sufficient waste containers.
   v. If the client arranges tools/ aids for the building works, he must vouch for the soundness of them; If there is damage caused by inferiorly of these tools/aids, the client shall be liable for this.
   vi. It's the responsibility of the client to arrange and follow up all necessary health and safety regulations (such as forms, inspections, correspondence with authorities, etc.)

b. Labour
   i. The coordination of all (sub) contractors.
   ii. If several (sub) contractors are present simultaneously on the construction site, the client is the principal coordinator for health and safety during the building phase.

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10.2 – Responsibilities of Havecon Projects BV

From the signing of the contract up to the start of works on site.

a. Administrative work
   i. Making the necessary construction drawings.
   ii. A complete final Casta will be presented at a future agreement.
   iii. Creating and delivering a health and safety plan for our work.
b. Labour
   i. For his work Havecon Projects BV will make a health and safety project plan.

During the building phase.

a. Technical
   i. Havecon Projects BV will ensure that all concrete works are kept wet and/or covered during curing if this is considered necessary.
   ii. Havecon Projects BV will ensure that water and soil is removed out if the drilled holes in the ground.
   iii. Havecon Projects BV will ensure that the supplied roof glass is covered, before being used.
   iv. Havecon Projects BV will provide lockable container(s) for its own materials.
   v. The subcontractors of Havecon Projects BV will keep the site clean during the building period. All packaging materials and refuse will be put into waste containers (excluding glass splinters etc.).
b. Labour
   i. The installation works as defined in this contract.
   ii. Havecon Projects BV will arrange a first aider on the building site.
   iii. Havecon Projects BV builds with VCA certified workers.
   iv. Compliance with the health and safety regulations.

10.3 – Not included in the above agreements

The following points have not been included in this contract

a. Extra provisions regarding local authority requirements not mentioned above such as fire precautions, etc.
b. Safety signs (road signs) such as emergency exits, etc.
c. The planning for the completion date has been based on good working conditions.
d. Postponement of the completion date is dependent on causes which are not within our responsibility and/or blame, such as bad weather, poor site conditions or (pre) works carried out by third parties, at the discretion of the contractor.
e. Provision, inspection and use of necessary drawings and other data by third parties to enable them to carry out their work is entirely on responsibility of the third parties
   i. Drawings and other data provided to third parties in connection with the work are only confirmed upon completion of the pre-engineering works.
   ii. In carrying out their work, third parties must turn to Havecon Projects BV for the final drawings and other data required.
   iii. Havecon Projects BV cannot be held responsible for any changes to previously provided drawings and other data. The overall responsibility for this lies with the client.
f. All excavation works for basins, etc.

10.4 – Guarantees

a. Havecon Projects BV gives one year guarantee, starting from the contract date, on the materials delivered as specified, when the materials have been installed as instructed. The guarantee excludes damage (causes) which are not within our responsibility and/or blame and also exclude all forms of snow and storm damage.

   Excluded from the guarantee is damage that is not caused by faults of the (sub) contractor of Havecon Projects BV, such as defects due to weather influences (including snow, storm and wind) and destruction by parties other than the (sub) contractor of Havecon Projects BV

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11 – Price (exclusive VAT)

Price for the delivery and installation of :

Greenhouses and service area (111.106 m²), screening installation, grow gutter system, internal logistics, climate installation, electrical and computer installation, grow lighting installation, irrigation system and a roof washer.

Total Price **USD 28.239.000,00**

Excluding V.A.T., import duties, taxes, insurance, custom clearance costs and local costs.
The general terms and conditions apply to this contract and are attached.

The production of the materials will start after the first down-payment is on the account of Havecon Projects BV and we received a bank confirmation for financing the complete project and granted permits.

Note	Within 4 weeks after signing the contract an engineering kick-off meeting will have to take place between all relevant engineering companies and Havecon's technical engineer.

Terms of payment (payment due on receiving invoice within 6 days)
See document – H19-1963 – Payment terms.pdf

Note	Havecon Projects BV requires an independent payment certifier to work on behalf of Rhode Island Grows LLC and Havecon Projects BV to follow up on the payments terms.

Havecon Projects BV account

Havecon Projects BV	Rabobank Nederland	IBAN : NL23RABO0141894830
Lorentzstraat 8	Croeselaan 18	Swift : RABONL2U
2665 JH Bleiswijk	3521 CB Utrecht	
The Netherlands	The Netherlands	

Included in the price

- All travel and lodging costs.
- All transport costs for materials to project site (DAP).
- Unloading of the containers and placing materials in the designated area (provided by the client).
- Digging, drilling of holes for concrete piles.
- All concrete required for the foundation (±1200 m³) (We have calculated a provisional sum for the delivery of concrete for the foundation wall of CAD 130,00 per m³ (25 MPA (N) and for the concrete in the ground CAD 120,00 per m³ (20 MPA (N)) on base of after calculation). The concrete will have a heat surcharge of CAD 20,00 per m³ between November 1st 2019 and April 1st 2020, the extra costs will be charged. All concrete required will be arranged by Havecon Projects and delivered by a local supplier.

Not included in the price

- Import duties (Chinese glass will have an import duty of 25% to be paid by the Client, when the glass arrives in the port), custom clearance costs, broker costs.
- All ground works (e.g. equalisation of the ground, etc)
- V.A.T., taxes, insurance and local costs.
- Any additional movement of the delivered materials outside of normal building activities.
- Dispose of remaining ground.
- Expenses caused by third parties.
- A guarded storage yard for the materials.
- The surplus of soil remains onsite.
- All not defined supplies and/or activities that are not described in this contract.
- Dry storage of supplied materials.
- Delivery and erection of any piping for gas, oil or air.
- Any installation or equipment for water softening, water filtering and water treatments.
- Efficiency and/or capacity tests in addition to the standard tests when putting into operation of the plants.
- Gas line from the outside wall of the boiler house to the mean gas connection.
- Gas reducer burner.
- Chemical dosing installation and chemicals magnetic bag filter.
- Delivery and installation of any aeration and venting materials for the boiler house.
- All not defined supplies and/or activities that are not described in this contract.
- All labour for installing the grow gutters.

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Note	If the building time will be postponed, then the materials which are on site need to be moved into a closed building for proper storage. All costs associated with relocating and storing (rental of indoor space) of said material is the responsibility of the client. If the client wishes Havecon or its partners to facilitate then the costs will be presented in the form of an additional work contract and agreed upon prior to executing the work. Havecon Projects BV cannot be held responsible for any forthcoming product loss if the materials are not properly handled.

Conditions of this contract

- The land has to be levelled 100%, access road and laydown area are to be in place, before we start with foundation works.
- In this contract, the labour is calculated and will be executed on a 7 working days/week basis. Workdays are 7:00-20:00. If this deviates according to local requirements, any additional costs will be discussed.
- The contract price is based on the execution of works in 1 work process.
- In case the wind chill factor drops to or below -15ºC we will charge an extra USD 70,00 per labour hour (per person).
- All agreements between Havecon Projects BV and the client are by Dutch law.
- Havecon Projects BV always reserves the right to review its prices due to international circumstances.
- All materials on site remain property of Havecon Projects BV until the final payment has been effected.
- Rest materials remain property of Havecon Projects BV.
- Havecon Projects BV's liability with respect to indirect loss, such as, however explicitly not limited to, loss of profit and turnover, is excluded.

Invoices are directly claimable.
Additional extra delivery of materials have to be signed for confirmation and will be carried out after the signed confirmation is returned.
The resulting extra costs will be directly invoiced after the delivery have been completed.

Installation, service/maintenance and repairs of machinery and equipment
Included in the purchase price is the installation, commissioning, programming, and testing of the structure, machinery, and equipment at Rhode Island Grows LLC located at Exeter, Rhode Island, USA and the provision of related specialist services, by Havecon crew (including Havecon hired subcontractors), unless installation of certain parts is specifically excluded in the purchase and sale agreement.
Havecon shall supply all specialist personnel and provide all services necessary to install the structure, machinery and equipment, unless installation of certain parts is specifically excluded in this purchase and sale agreement.
Rhode Island Grows LLC shall provide and pay for all necessary labour other than Havecon specialist personnel, to be indicated by Havecon.
Rhode Island Grows LLC specifically agrees that Havecon has a contractual right of first refusal to provide for all service/maintenance and repair related services, to be provided on Rhode Island Grows LLC project.

Contact persons :

Pre-works engineer	Erwin Starink,	tel. 0031-10-2663270
Site engineer	Henk Kraaijenbos,	tel. 0031-6-20703405
Sales,	Jon Adams,	tel. 001-9053216855

We thank you for your confidence in our company and we will execute your order with greatest care.

For accord,

Date : Date : September 20th 2019

Place : Place : Bleiswijk Netherlands

Rhode Island Grows, LLC
One Arnold Place
Exeter, Rhode Island 02822
USA

Havecon Projects BV
Lorentzstraat 8
2665 JH Bleiswijk
The Netherlands

HAVECON
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General Terms and Conditions of the private limited company Havecon Projects BV, registered offices at Bleiswijk

Article 1 General
1.1 These terms and conditions apply to all offers, requests, notices and agreements of HAVECON Projects BV (hereinafter referred to as Havecon) with third parties (hereinafter referred to as the Client), with respect to the purchase and sale of goods and installations, the execution of contracted work and the contracting of work, unless agreed otherwise in writing.

1.2 Deviation from these general terms and conditions is only possible if HAVECON has accepted this deviation in writing.
In case of a conflict between these terms and conditions and similar conditions, including any purchasing conditions of the Client, the terms and conditions of HAVECON will exclusively apply.

1.3 If a provision of these general terms and conditions is wholly or partially invalid or void, then the remaining provisions will remain in full force. HAVECON and the client agree to replace the invalid or voidable provision with a provision that they would have agreed if they had known the invalidity or voidability.

1.4 Agreements concerning the purchase and sale of goods and installations, the execution of contracted work, as well as the contracting of work and any additions thereto shall only become binding when confirmed in writing by HAVECON.
Arrangements with or announcements by subordinate staff members of HAVECON shall not be binding on it, insofar as it has not confirmed these in writing.
In this respect all employees who are not authorised to represent the company according to the Trade Register shall be regarded as subordinate members of staff.

1.5 The existence and content of the quotation and /or agreement will be kept secret by the client, treated confidentially and not made public.

Article 2 Creditworthiness
Each agreement shall be entered into by HAVECON on the condition that the Client is proven to be sufficiently creditworthy. HAVECON is entitled to request the Client to provide, at the discretion of HAVECON, sufficient security and is furthermore entitled to suspend the performance of the agreement until its request has been met.

Article 3 Force Majeure
3.1 Without prejudice to its rights, HAVECON, if it should be prevented by force majeure to perform the agreement or to perform it on time, is entitled to suspend the performance of the agreement or to terminate the agreement in whole or in part, such at the discretion of HAVECON, without it being obliged to pay any damages or provide any other form of compensation.

3.2 Force majeure is taken to mean every circumstance due to which compliance with or the timely performance of the agreement can no longer reasonably be demanded by the Client, such including, but not limited to, war, revolution, danger of war, civil war, riots, strikes, transportation issues, fire and other interruptions at HAVECON's company, or at that of one or more of its suppliers or subcontractors, delayed delivery of materials, raw materials and consumables or parts ordered on time, floods, gales, whirlwinds, hail, rain, mist, frost, snowfall, black ice, traffic interruptions, interruptions in the supply of energy and any government measures.

Article 4 Liability
4.1 If HAVECON should not meet its obligations, it shall only be responsible for the costs of the repairs or the replacement by a third party. This liability shall only apply after the Client has declared HAVECON to be in default in writing and has granted a reasonable term within which HAVECON can yet meet its obligations.
HAVECON has the right not to repair, but to compensate the damage of the client in cases where the costs of the repair considerably exceed the damage suffered by the client of Havecon as a result of the defect. The damage suffered by the client is limited to the depreciation of the goods.

4.2 Furthermore, HAVECON's liability shall be limited to the amount of the purchase price or contract price, or the invoiced amount relating to the services provided, on the understanding that HAVECON's liability with respect to indirect loss, such as, however explicitly not limited to, loss of profit and turnover, is excluded.

4.3 The Client commits itself to indemnify HAVECON against any claims by third parties for damages against HAVECON relating to the delivery for whatever reason and is liable for any costs that may ensue.

Article 5 Payment
5.1 All payments must be made at the office of HAVECON or into an account designated by it within eight days of the invoice date. The Client shall not be entitled to set-off or deferment.

5.2 If goods are delivered in instalments, each delivery will be invoiced separately. Prior to delivery or prior to continuing the delivery or performing the contracted work, HAVECON shall always be entitled to request from the Client, at HAVECON's discretion, sufficient security for meeting payment obligations. This provision also applies when supplier credit has been agreed.

5.3 Refusal on the part of the Client to provide security entitles HAVECON to terminate the agreement without prejudice to its rights to compensation.
Regulations, laid down by whichever authority, that prevent the use of the goods to be delivered or the goods that have already been delivered shall not affect the payment obligation of the Client.

5.4 If payment should not have been made in time, the Client will at least owe the statutory commercial interest on the amount not paid from the due date without prejudice to the provisions of articles 6, 14 and 19 and without prejudice to the rights to make further claims permitted to HAVECON by law.

Article 6 Costs
If the Client does not, does not timely or does not properly meet any of its obligations under the agreement with HAVECON, the Client shall be in default due solely because of the breach or negligence, without a notice of default or warning being required. All costs resulting from or relating to the judicial or extra judicial collection of the principal sum or interest shall be payable by the Client, including those for any notifications and notices of default and those which in case of a legal action are not charged to the unsuccessful party. The extrajudicial costs are set in advance at 15% of the invoiced amounts, or at least of the amounts still owed.

Article 7 Termination
7.1 If the Client does not, does not properly or does not timely meet any of its obligations under the agreement with HAVECON as well as if it is declared bankrupt, has requested suspension of payments, terminates or disposes of its business, is placed in receivership, has its movable and immovable property partially or fully confiscated or expropriated, requisitioned, destroyed or seriously damaged, or if the Client moves its place of residency legally or actually to another country, it is deemed to be in default by operation of law and HAVECON shall be entitled, without prejudice to the provisions of Article 15 and without a notice of default or warning and without any recourse to the courts being required, to suspend the performance of the agreement, to demand security for payments, to remove any materials and tools brought to the construction site, or to decide to terminate the agreement fully or in part, without HAVECON being obliged to pay any damages or provide any other form of compensation.

7.2 If HAVECON suspends the performance of the agreement and should as yet proceed to perform the agreement at a later date, the Client is obliged to reimburse any damage which HAVECON may have suffered in this respect.

7.3 When HAVECON terminates the agreement, the Client is obliged under the obligation to cancel to pay the full contract price to HAVECON after deducting the cost price of the materials that were not used by HAVECON due to the non-performance or the incomplete performance of the agreement, as well as any unpaid wages, as calculated by HAVECON, which shall be binding on the Client. If HAVECON terminates the agreement and the Client subsequently has the construction executed by another contractor, the damages to which HAVECON is entitled with respect to this breach of contract by the Client shall be fixed at 10% of the contract price, without prejudice to HAVECON's right to full compensation.

Article 8 Disputes
8.1 Any dispute resulting from the offers and delivery by HAVECON, the purchase and sales agreements, as well as agreements concerning the provision of services concluded with HAVECON is, to the exclusion of the competent court according to statutory competence requirements, always subject to the jurisdiction of the civil court in The Hague.

8.2 Dutch law shall apply to the agreement between HAVECON and the Client and on any agreements that ensue from that agreement insofar as this is not deviated from in these terms and conditions, with the exception of the Vienna Sales Convention.

CONTRACTING WORK

Article 9 Offers
9.1 The offers made are subject to alteration without notice and are drawn up based on the information the Client has provided to HAVECON. The offers shall be made as accurately as possible. Any earthwork shall not be included in the offer, unless otherwise agreed.

9.2 All time limits stated in the offer are only made for the benefit of HAVECON and are to be regarded as final deadlines by the Client.

Article 10 Drawings, calculations and designs
All rights relating to drawings, calculations, designs and suchlike are explicitly reserved by HAVECON, which therefore are and remain the property of HAVECON. It will not be permitted to copy these documents, or to provide or show them to third parties without the explicit written consent from HAVECON. All documents handed over by HAVECON in this regard must be returned on demand.

Article 11 Execution of work
11.1 In the execution of work, those deviations that HAVECON deems necessary, useful or desired shall be permitted. Measurements and weights provided by HAVECON are approximations only; any legal action related to any difference in measurements or weights is excluded.

11.2 HAVECON only accepts liability and only bears responsibility for designs it has made itself, so that HAVECON can therefore never be liable for any failures to structures built according to designs of the Client or third parties and neither if it should appear that the information provided by the Client was incomplete or not entirely correct. Furthermore no liability will be accepted with respect to the quality of the materials which are used by HAVECON at the request or indication of the Client and neither with respect to the possibility of using those materials. Nor is liability accepted for the bearing capacity of the soil. Any ensuing damage will have to be borne by the Client, including any damage which HAVECON suffers in this connection.

11.3 The Client undertakes to ensure that the work to be executed by HAVECON can be executed at the points in time it has indicated. The Client furthermore undertakes to ensure that HAVECON will be able to store the materials it brings to the construction site in a manner and in locations where these materials cannot suffer damage. Any damage suffered by HAVECON if these obligations should not be met are for the account of the Client, while HAVECON shall then be entitled to postpone the delivery date.

11.4 Materials shall be delivered by or on behalf of HAVECON at a loading location that is as close as possible to the construction site as can be reached by trucks. The Client is obliged to help with the unloading and is responsible for any further transportation to the site. For the duration of the construction, the Client must make storage space available for materials and tools as well as any water and electricity that are required.

11.5 In case of business premises, the site must be accessible to a loading crane and concrete mixers.

Unless otherwise agreed, the materials required will be of standard commercial quality. All materials remaining after the construction or remainders of such materials are the property of HAVECON and it may therefore remove these from the construction site.

Article 12 Delivery time
12.1 HAVECON shall not accept any liability if the work is not delivered within the timeframe indicated.

12.2 All dates provided by HAVECON should only be regarded as target dates. If the indicated timeframe is exceeded, the Client shall never be able to refuse the executed work or to terminate the agreement unilaterally or to carry out the work or to have the work carried out to perform the agreement, whether or not by legal authorisation, or to refuse to meet any of its obligations under the agreement.

12.3 Without prejudice to that which is stated in these terms and conditions with respect to force majeure, it is determined that the delivery time is postponed by as many working days as the number of days the workforce of HAVECON has been unable to work, also at other Clients, due to adverse weather conditions in the period between the date the agreement was entered into and the delivery date and as a result of which the construction schedule was disrupted.

The delivery time shall commence on the last of the following points in time:
A. the day of the formation of the agreement;
B. the day that HAVECON receives the documents, details, permits and suchlike required for the execution of the work;
C. the day that the formalities required prior to the start of the work have been completed;
D. the day on which the Client, when a financial restriction was included in the agreement, has informed HAVECON that it has obtained the financing required for the construction;
E. the day on which the land on which the building is to be constructed by HAVECON is made available to it and is clean and empty.

12.4 The delivery time is determined in the expectation that the circumstances under which HAVECON will be executing the work shall remain the same as at the time at which the agreement was concluded and that it receives the required materials on time. If a delay should occur due to the fact that the circumstances referred to above are changed or that the required materials, although ordered on time, are not delivered to HAVECON on time, the delivery time shall automatically be extended by the duration of the delay.

The delivery time will also in any case be extended by the time during which the Client has not paid any amount it owes to HAVECON, after it has become payable, or in any of the cases referred to in the third paragraph of Article 11. HAVECON is entitled to extend the agreed delivery times to the extent that this is necessary.

Any contractual fine agreed with regard to the failure to meet the delivery time shall not be owed if this is the result of force majeure as referred to in Article 3.

Article 13 Delivery
13.1 As soon as HAVECON indicates that the work is ready for (partial) delivery, the inspection must take place within seven days. The Client must co-operate with the inspection. If the Client should not cooperate, the delivery shall be deemed to have taken place. The delivery shall also be deemed to have taken place if the executed work has actually been made available to the Client by HAVECON or when the Client has started to use it.

13.2 All goods and/or installations which have been brought in by HAVECON shall be at the risk of the Client from the moment that these are present on the premises of the Client. During the construction the risk of the building shall be for the account of HAVECON, until a start is made with the placing of the glass. As of that time the risk for the building shall be for the account of the Client. Any claims with respect to defects in the building must be reported to HAVECON in writing within one month from the actual delivery or occupation as referred to in the previous paragraph. If this term should be exceeded, any claim from the Client against HAVECON with respect to defects shall lapse.

13.3 The Client is not entitled to suspend the fulfilment of its obligations on the basis of a submitted claim.
If the Client does not, does not properly or does not timely meet any obligation under the agreement it has entered into with HAVECON or any related agreement, HAVECON shall not be obliged to fulfil any guarantee, however named, with respect to any of these agreements.

Before delivery has taken place, the Client shall not be able to use the work. If the Client should nevertheless start to use part of the work, this shall be for its own account. HAVECON cannot be held liable for this in any way.

Article 14 Price change
If cost price determining factors should change after the point in time at which HAVECON made its offer, it shall be entitled to amend the contract price by such an amount that all price increases since the moment that the offer was made shall be for the account of the Client, without prejudice to HAVECON's right to terminate the agreement.

Article 15 Retention of title
15.1 HAVECON shall retain ownership of the work and/or the delivered goods or installations until the point in time that the contract price or the price of the goods and installations delivered or still to be delivered to the Client has been fully paid, as well as for the benefit of any claims of HAVECON relating to the delivery of goods, executed work or work to be executed and of that which the Client owes due to its failure to comply with the agreements concluded with the Client, including costs, interest and fines.

15.2 Without prejudice to that which is determined in Articles 5 and 6, HAVECON is entitled without notice of default or recourse to the courts to dismantle the building and to take back the goods if payment is not made on time. In that context, the Client grants HAVECON access to all its premises used for its business, without prejudice to HAVECON's right to claim damages.

15.3 The Client is obliged to properly insure goods and/or installations for the duration of the retention of title, preferably via a Construction-all-risk insurance and make the policy documents (and proof of premium payment) of this insurance available to HAVECON for its perusal on demand. Any claims from the Client against the insurers based on the insurances referred to above shall be pledged to HAVECON by the Client on demand in accordance with Article 239, Book 3 of the Dutch Civil Code, such as additional security that the claims of HAVECON against the Client shall be met. HAVECON recommends that the Client insures the building.

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Article 16 Resolutive condition
16.1 If an agreement between the Client and HAVECON has been entered into on the resolutive condition that financing cannot be obtained, the Client is entitled to terminate the agreement if the Client has not obtained financing or the offer thereto within a year and a half of the signing of the agreement.

16.2 The Client and HAVECON mutually agree to do all that which is reasonable to obtain the financing referred to above.

16.3 If the Client has obtained or can obtain financing within the stated timeframe, however it is not sufficient for the full execution of the agreement in question, the parties will by mutual consent introduce the required savings or reduce the size of the object with the purpose of performing the agreement in a changed format, however one that resembles the original intent as much as possible, such in accordance with the provisions of Article 17 of these terms and conditions.

16.4 If the Client has obtained or can obtain financing within the stated timeframe, however the financier has stipulated that an object with a larger surface area must be built than described in the agreement with HAVECON, the parties will by mutual consent change the agreement relating to the object with respect to the price, as well as any related provisions, all of this with the purpose of performing the agreement in a changed format, however one that resembles the original intent as much as possible, such in accordance with the provisions of Article 17 of these terms and conditions.
If the Client should, within one year after the period for which the financial restriction applied, have the building or a substantial part thereof executed by a third party, the Client shall owe a fine to the amount of 10% of the contract price, without prejudice to HAVECON's right to full compensation.

Article 17 Contract variations
17.1 The settlement of variations resulting in an increase or decrease of the agreed work will take place as soon as possible after these have been established. When after the agreement has been entered into it is decided, in consultation with the Client, that the surface area of the building to be constructed will be larger or smaller than originally determined, HAVECON is entitled to charge the real costs of the resulting additional work to the Client, or to deduct the real costs that have been saved as a result from the contract price owed, so that HAVECON is not obliged to increase or decrease the original contract price by an amount that is proportionate to the increase or decrease of the original surface area of the building.

17.2 All changes in the work, whether due to a special request from the Client or whether proven necessary to prevent any unforeseen difficulties or to solve problems that have arisen, such as reinforcement or strengthening of the foundations of the building, are within the context of this article to be considered as additional work if this results in increased costs and as less work if reduced costs are incurred. The additional work will only be started after the Client has signed a purchase order. Havecon reasonably determines the extent of the additional work.

PURCHASE AND SALE/DELIVERY OF GOODS AND INSTALLATIONS

Article 18
18.1 Goods that are purchased from HAVECON are delivered by HAVECON ex warehouse or ex works. Delivery times will be determined by approximation. The delivery time shall commence on the last of the points in time referred to in Article 12. The delivery time is determined anticipating that HAVECON can obtain any materials that are required from third parties in the normal manner.

18.2 Failure to meet the delivery time can never, also not after a notice of default, be the basis for a compensation claim, unless otherwise agreed in writing.

18.3 HAVECON reserves the right to deliver the goods in more than one instalment.

18.4 When the purchaser has not taken delivery of the goods after the term of delivery has passed, these goods will be stored at its disposal for its own account and at its own risk. Deliveries for which no price has been agreed will be calculated based on the supplier's current price on the day of delivery.

18.5 All orders will, also with respect to the price, be accepted without any obligation. Article 14 shall apply mutatis mutandis. The prices are inclusive of standard packaging, but exclusive of freight charges and postage costs.

18.6 The Client who is of the opinion that the delivered goods are not consistent with the agreement is obliged, on penalty of forfeiture of rights, within eight days after he has detected or could have detected the shortcoming or when the goods have been delivered and/or the work has been performed, at least within eight days after the defect could reasonably have been detected, to inform HAVECON thereof in writing. If it appears that the goods or materials have been damaged, the Client should take all measures to obtain compensation.
The risk of the goods shall pass to the Client upon delivery of the goods, which, unless otherwise agreed in writing, shall take place ex works or ex central warehouse.

18.7 If delivery takes place other than ex works or ex warehouse, the Client must inform HAVECON and the transport company immediately about any shortcomings and all damage to the goods that occurred during transportation on penalty of forfeiture of any right to make a claim.

Article 14 shall apply mutatis mutandis.

Article 19 Guarantee
19.1 Guarantees with respect to the fulfilment of special requirements are only binding when they have been confirmed in writing by HAVECON in advance.

19.2 HAVECON guarantees the delivered goods during a 12 month period after delivery, which means that it will repair without cost all parts that show any impeding defects due to inferior materials, or inferior construction, or that it will replace those (to be decided at the discretion of HAVECON), on the condition that such defect was immediately brought to its attention after it was discovered and, insofar as HAVECON so wishes, the relevant parts are immediately sent carriage paid. The guarantee from HAVECON only applies when HAVECON itself has performed the assembly or if another party performed the assembly entirely according to the instructions of HAVECON.

The parts which have been installed to replace defective parts shall be guaranteed by HAVECON during a 12 month period after the parts have been put into use. Subject to the provisions in the previous paragraph, HAVECON shall never be liable for any damage whatsoever, including any loss of profits, which the Client might suffer resulting from an agreement entered into with HAVECON.

When the guarantee period expires, any obligation to indemnify, any liability and any other obligation of HAVECON towards the Client ends.

Should the Client execute any repairs or changes without prior consent from HAVECON during the guarantee period, or have these executed by another party, or should it not meet its payment obligations, any obligations of HAVECON under the guarantee shall lapse immediately.

19.3 HAVECON does not provide any further guarantee and does not accept any liability other than provided or accepted by the factory towards HAVECON.
HAVECON has the right not to repair, but to compensate the damage of the client in cases where the costs of the repair considerably exceed the damage suffered by the client of Havecon as a result of the defect. The damage suffered by the client is limited to the depreciation of the goods.

With respect to the quantities to be delivered, the usual overruns or underruns shall be reserved.
Goods with respect to which the aforementioned guarantee is invoked may only be returned by the Client if prior consent has been received from HAVECON. Goods that are returned but not found to be faulty will be returned to the Client at the Client's expense whereby the costs incurred by HAVECON with respect to the investigations undertaken with reference to the complaint will also be payable by the Client.

These terms and conditions are available in Dutch and *in English*. In the event of *discrepancies* between the two *versions*, the Dutch *version shall prevail*.

AMENDMENT

HAVECON
Horticultural Projects

Rhode Island Grows, LLC
One Arnold Place
Exeter, Rhode Island 02822
USA

Tel : 001 – 401 294 2044
Mob : 001 - 203-223-4450 (Mr. Laist)
E-mail : f.laist@rigrows.com
tim@rigrows.com

Budget quotation number : A19 – 05 – 2728 – 2 - Budget cogeneration plant
Contract number : H19 – 1963
Quotation number : A19 – 05 – 2728
Project Information : Rhode Island Grows, LLC

Bleiswijk, August 13th 2020

Dear Mr. Schartner and Mr. Laist,

Your enquiry is very much appreciated and we have the pleasure to hereby submit, without any obligation, our budget quotation for a cogeneration plant, in accordance with the following specifications.

Havecon is a flexible and customer-minded organization with a lot of experience in the field of development, construction and the complete realization of horticultural projects. Innovating, unburdening and keeping appointments keep our people busy every day. We enjoy doing so and we always want to share that passion with our customers.
Together with the Voorwinden Group we can make a tight construction schedule so we won't be in your way very long.
We'd be happy to mean something to you, if you so wish.

In addition to contract H19 – 1963 the following budget quotation :

In response to your inquiry we are pleased to offer a budget for a pre-engineered, 13,336 kW containerized cogeneration greenhouse power plant.

The proposed cogeneration plant includes the following:

- 4 x Ecomax 33 GH containerized natural gas engine cogeneration plant, with as prime mover the Jenbacher, model J620, each rated 3,334 kW, 60 Hz, 13.8 kV
- All auxiliary components required for proper operation
- Indoor enclosure designed for 70 dB(A) at 33ft distance
- 2 x Catalyst for CO2 recovery
- 2 x SCR
- 4 x Engine Jacket Water, Oil Cooler, After Cooler Heat Recovery
- 2 x Exhaust gas heat Recovery
- 2 x Exhaust gas heat Recovery + bypass
- 2 x Condenser heat Recovery
- Exhaust silencer and stack
- 4 x LT radiator
- 2 x HT radiator
- Engine Management System, Controls and SCADA System
- Software for full integration to the greenhouse climate computer
- Master Control for Grid parallel, Island operation, emergency power, import/export control.
- Grow light Control
- Fresh and waste oil tanks
- DDP Transportation to site,
- Assistance to assembly
- Commissioning of the complete system
- Insulation on all exhaust gas and water piping for safety
- Final UL inspection
- Customer operator training (to perform daily/weekly tasks)
- Import Duties 2%

The above system will provide the following customer connection points:

- Gas inlet at container wall
- Hot water supply and return at container wall
- Electrical at generator terminals
- CO2 on 2 units at the exit of the CO2 valve

Not included:

1. Civil works - Concrete foundation and building to support the Ecomax Container.
2. Interface between Ecomax container and boiler room.
3. Electrical works external of Ecomax Container.
4. Gas piping external of Ecomax Container.
5. Continuous emission monitoring system.
6. Other site-specific variances/needs which may arise.
7. Assembly of total scope of supply , Offloading Cranes an heavy lifting devices.

The units without CO2 have an **SCR** included to meet the local emission requirements

Budgetary sell price for the above scope: **USD 13.859.000,00**

Please be aware that by deducting this prices you eliminate the heat recovery from the exhaust gas cooler and condenser.
We added a HT dump radiator to destroy the engine heat.
When not cooling down the exhaust gas heat the exhaust gasses cannot be used as CO2 in the greenhouse anymore.
We did not give a separate price for the CO2 Catalyst as most probably a SCR system is needed to meet the local emission requirements. When we know the exact location of the installation we can decide if we can remove the Catalyst from the scope or exchange for one with a higher emission level

HAVECON
Horticultural Projects

Estimates as place holders
These estimates are based ion previous projects and have to be fully quoted and engineered by a local company.

- MV 13,8 kV switchgear **USD 5.492.500,00**
  Grid connection, generator breakers, outgoing feeders, aux transformers
- MV 13,8 KV ring around the greenhouse with growlight transformers **USD 1.318.500,00**
  13,8 kV cabling around the greenhouse, step down transformers 13,8 kV / 400 Vac
- Cabling power and control cables in energy center **USD 1.098.500,00**
  13,8 kV cabling generators, aux transformer 13,8 kV / 400 Vac

The general terms and conditions as agreed upon according to contract H19–1963 apply to this contract.

Terms of payment (payment due on receiving invoice within 6 days) :
25% by signing the contract
25% by shipping materials
25% by first delivery materials onsite
25% by all materials onsite

Contact persons :

Pre-works engineer	Erwin Starink,	tel. 0031-10-2663270
Site engineer	Henk Kraaijenbos,	tel. 0031-6-20703405
Sales,	Jon Adams,	tel. 001-9053216855

Thank you for giving us the opportunity to quote and we look forward to execute your order.
Your news is awaited with interest.

Yours faithfully,

Havecon Projects BV
Bleiswijk

HAVECON
Horticultural Projects

General Terms and Conditions of the private limited company Havecon Projects BV, registered offices at Bleiswijk

Article 1 General
1.1 These terms and conditions apply to all offers, requests, notices and agreements of HAVECON Projects BV (hereinafter referred to as Havecon) with third parties (hereinafter referred to as the Client), with respect to the purchase and sale of goods and installations, the execution of contracted work and the contracting of work, unless agreed otherwise in writing.

1.2 Deviation from these general terms and conditions is only possible if HAVECON has accepted this deviation in writing.
In case of a conflict between these terms and conditions and similar conditions, including any purchasing conditions of the Client, the terms and conditions of HAVECON will exclusively apply.

1.3 If a provision of these general terms and conditions is wholly or partially invalid or void, then the remaining provisions will remain in full force. HAVECON and the client agree to replace the invalid or voidable provision with a provision that they would have agreed if they had known the invalidity or voidability.

1.4 Agreements concerning the purchase and sale of goods and installations, the execution of contracted work, as well as the contracting of work and any additions thereto shall only become binding when confirmed in writing by HAVECON.
Arrangements with or announcements by subordinate staff members of HAVECON shall not be binding on it, insofar as it has not confirmed these in writing.
In this respect all employees who are not authorised to represent the company according to the Trade Register shall be regarded as subordinate members of staff.

1.5 The existence and content of the quotation and /or agreement will be kept secret by the client, treated confidentially and not made public.

Article 2 Creditworthiness
Each agreement shall be entered into by HAVECON on the condition that the Client is proven to be sufficiently creditworthy. HAVECON is entitled to request the Client to provide, at the discretion of HAVECON, sufficient security and is furthermore entitled to suspend the performance of the agreement until its request has been met.

Article 3 Force Majeure
3.1 Without prejudice to its rights, HAVECON, if it should be prevented by force majeure to perform the agreement or to perform it on time, is entitled to suspend the performance of the agreement or to terminate the agreement in whole or in part, such at the discretion of HAVECON, without it being obliged to pay any damages or provide any other form of compensation.

3.2 Force majeure is taken to mean every circumstance due to which compliance with or the timely performance of the agreement can no longer reasonably be demanded by the Client, such including, but not limited to, war, revolution, danger of war, civil war, riots, strikes, transportation issues, fire and other interruptions at HAVECON's company, or at that of one or more of its suppliers or subcontractors, delayed delivery of materials, raw materials and consumables or parts ordered on time, floods, gales, whirlwinds, hail, rain, mist, frost, snowfall, black ice, traffic interruptions, interruptions in the supply of energy and any government measures.

Article 4 Liability
4.1 If HAVECON should not meet its obligations, it shall only be responsible for the costs of the repairs or the replacement by a third party. This liability shall only apply after the Client has declared HAVECON to be in default in writing and has granted a reasonable term within which HAVECON can yet meet its obligations.
HAVECON has the right not to repair, but to compensate the damage of the client in cases where the costs of the repair considerably exceed the damage suffered by the client of Havecon as a result of the defect. The damage suffered by the client is limited to the depreciation of the goods.

4.2 Furthermore, HAVECON's liability shall be limited to the amount of the purchase price or contract price, or the invoiced amount relating to the services provided, on the understanding that HAVECON's liability with respect to indirect loss, such as, however explicitly not limited to, loss of profit and turnover, is excluded.

4.3 The Client commits itself to indemnify HAVECON against any claims by third parties for damages against HAVECON relating to the delivery for whatever reason and is liable for any costs that may ensue.

Article 5 Payment
5.1 All payments must be made at the office of HAVECON or into an account designated by it within eight days of the invoice date. The Client shall not be entitled to set-off or deferment.

5.2 If goods are delivered in instalments, each delivery will be invoiced separately. Prior to delivery or prior to continuing the delivery or performing the contracted work, HAVECON shall always be entitled to request from the Client, at HAVECON's discretion, sufficient security for meeting payment obligations. This provision also applies when supplier credit has been agreed.

5.3 Refusal on the part of the Client to provide security entitles HAVECON to terminate the agreement without prejudice to its rights to compensation.
Regulations, laid down by whichever authority, that prevent the use of the goods to be delivered or the goods that have already been delivered shall not affect the payment obligation of the Client.

5.4 If payment should not have been made in time, the Client will at least owe the statutory commercial interest on the amount not paid from the due date without prejudice to the provisions of articles 6, 14 and 19 and without prejudice to the rights to make further claims permitted to HAVECON by law.

Article 6 Costs
If the Client does not, does not timely or does not properly meet any of its obligations under the agreement with HAVECON, the Client shall be in default due solely because of the breach or negligence, without a notice of default or warning being required. All costs resulting from or relating to the judicial or extra judicial collection of the principal sum or interest shall be payable by the Client, including those for any notifications and notices of default and those which in case of a legal action are not charged to the unsuccessful party. The extrajudicial costs are set in advance at 15% of the invoiced amounts, or at least of the amounts still owed.

Article 7 Termination
7.1 If the Client does not, does not properly or does not timely meet any of its obligations under the agreement with HAVECON as well as if it is declared bankrupt, has requested suspension of payments, terminates or disposes of its business, is placed in receivership, has its movable and immovable property partially or fully confiscated or expropriated, requisitioned, destroyed or seriously damaged, or if the Client moves its place of residency legally or actually to another country, it is deemed to be in default by operation of law and HAVECON shall be entitled, without prejudice to the provisions of Article 15 and without a notice of default or warning and without any recourse to the courts being required, to suspend the performance of the agreement, to demand security for payments, to remove any materials and tools brought to the construction site, or to decide to terminate the agreement fully or in part, without HAVECON being obliged to pay any damages or provide any other form of compensation.

7.2 If HAVECON suspends the performance of the agreement and should as yet proceed to perform the agreement at a later date, the Client is obliged to reimburse any damage which HAVECON may have suffered in this respect.

7.3 When HAVECON terminates the agreement, the Client is obliged under the obligation to cancel to pay the full contract price to HAVECON after deducting the cost price of the materials that were not used by HAVECON due to the non-performance or the incomplete performance of the agreement, as well as any unpaid wages, as calculated by HAVECON, which shall be binding on the Client. If HAVECON terminates the agreement and the Client subsequently has the construction executed by another contractor, the damages to which HAVECON is entitled with respect to this breach of contract by the Client shall be fixed at 10% of the contract price, without prejudice to HAVECON's right to full compensation.

Article 8 Disputes
8.1 Any dispute resulting from the offers and delivery by HAVECON, the purchase and sales agreements, as well as agreements concerning the provision of services concluded with HAVECON is, to the exclusion of the competent court according to statutory competence requirements, always subject to the jurisdiction of the civil court in The Hague.

8.2 Dutch law shall apply to the agreement between HAVECON and the Client and on any agreements that ensue from that agreement insofar as this is not deviated from in these terms and conditions, with the exception of the Vienna Sales Convention.

CONTRACTING WORK

Article 9 Offers
9.1 The offers made are subject to alteration without notice and are drawn up based on the information the Client has provided to HAVECON. The offers shall be made as accurately as possible. Any earthwork shall not be included in the offer, unless otherwise agreed.

9.2 All time limits stated in the offer are only made for the benefit of HAVECON and are to be regarded as final deadlines by the Client.

Article 10 Drawings, calculations and designs
All rights relating to drawings, calculations, designs and suchlike are explicitly reserved by HAVECON, which therefore are and remain the property of HAVECON. It will not be permitted to copy these documents, or to provide or show them to third parties without the explicit written consent from HAVECON. All documents handed over by HAVECON in this regard must be returned on demand.

Article 11 Execution of work
11.1 In the execution of work, those deviations that HAVECON deems necessary, useful or desired shall be permitted. Measurements and weights provided by HAVECON are approximations only; any legal action related to any difference in measurements or weights is excluded.

11.2 HAVECON only accepts liability and only bears responsibility for designs it has made itself, so that HAVECON can therefore never be liable for any failures to structures built according to designs of the Client or third parties and neither if it should appear that the information provided by the Client was incomplete or not entirely correct. Furthermore no liability will be accepted with respect to the quality of the materials which are used by HAVECON at the request or indication of the Client and neither with respect to the possibility of using those materials. Nor is liability accepted for the bearing capacity of the soil. Any ensuing damage will have to be borne by the Client, including any damage which HAVECON suffers in this connection.

11.3 The Client undertakes to ensure that the work to be executed by HAVECON can be executed at the points in time it has indicated. The Client furthermore undertakes to ensure that HAVECON will be able to store the materials it brings to the construction site in a manner and in locations where these materials cannot suffer damage. Any damage suffered by HAVECON if these obligations should not be met are for the account of the Client, while HAVECON shall then be entitled to postpone the delivery date.

11.4 Materials shall be delivered by or on behalf of HAVECON at a loading location that is as close as possible to the construction site as can be reached by trucks. The Client is obliged to help with the unloading and is responsible for any further transportation to the site. For the duration of the construction, the Client must make storage space available for materials and tools as well as any water and electricity that are required.

11.5 In case of business premises, the site must be accessible to a loading crane and concrete mixers.

Unless otherwise agreed, the materials required will be of standard commercial quality. All materials remaining after the construction or remainders of such materials are the property of HAVECON and it may therefore remove these from the construction site.

Article 12 Delivery time
12.1 HAVECON shall not accept any liability if the work is not delivered within the timeframe indicated.

12.2 All dates provided by HAVECON should only be regarded as target dates. If the indicated timeframe is exceeded, the Client shall never be able to refuse the executed work or to terminate the agreement unilaterally or to carry out the work or to have the work carried out to perform the agreement, whether or not by legal authorisation, or to refuse to meet any of its obligations under the agreement.

12.3 Without prejudice to that which is stated in these terms and conditions with respect to force majeure, it is determined that the delivery time is postponed by as many working days as the number of days the workforce of HAVECON has been unable to work, also at other Clients, due to adverse weather conditions in the period between the date the agreement was entered into and the delivery date and as a result of which the construction schedule was disrupted.

The delivery time shall commence on the last of the following points in time:
A. the day of the formation of the agreement;
B. the day that HAVECON receives the documents, details, permits and suchlike required for the execution of the work;
C. the day that the formalities required prior to the start of the work have been completed;
D. the day on which the Client, when a financial restriction was included in the agreement, has informed HAVECON that it has obtained the financing required for the construction;
E. the day on which the land on which the building is to be constructed by HAVECON is made available to it and is clean and empty.

12.4 The delivery time is determined in the expectation that the circumstances under which HAVECON will be executing the work shall remain the same as at the time at which the agreement was concluded and that it receives the required materials on time. If a delay should occur due to the fact that the circumstances referred to above are changed or that the required materials, although ordered on time, are not delivered to HAVECON on time, the delivery time shall automatically be extended by the duration of the delay.

The delivery time will also in any case be extended by the time during which the Client has not paid any amount it owes to HAVECON, after it has become payable, or in any of the cases referred to in the third paragraph of Article 11. HAVECON is entitled to extend the agreed delivery times to the extent that this is necessary.

Any contractual fine agreed with regard to the failure to meet the delivery time shall not be owed if this is the result of force majeure as referred to in Article 3.

Article 13 Delivery
13.1 As soon as HAVECON indicates that the work is ready for (partial) delivery, the inspection must take place within seven days. The Client must co-operate with the inspection. If the Client should not cooperate, the delivery shall be deemed to have taken place. The delivery shall also be deemed to have taken place if the executed work has actually been made available to the Client by HAVECON or when the Client has started to use it.

13.2 All goods and/or installations which have been brought in by HAVECON shall be at the risk of the Client from the moment that these are present on the premises of the Client. During the construction the risk of the building shall be for the account of HAVECON, until a start is made with the placing of the glass. As of that time the risk for the building shall be for the account of the Client. Any claims with respect to defects in the building must be reported to HAVECON in writing within one month from the actual delivery or occupation as referred to in the previous paragraph. If this term should be exceeded, any claim from the Client against HAVECON with respect to defects shall lapse.

13.3 The Client is not entitled to suspend the fulfilment of its obligations on the basis of a submitted claim.
If the Client does not, does not properly or does not timely meet any obligation under the agreement it has entered into with HAVECON or any related agreement, HAVECON shall not be obliged to fulfil any guarantee, however named, with respect to any of these agreements.

Before delivery has taken place, the Client shall not be able to use the work. If the Client should nevertheless start to use part of the work, this shall be for its own account. HAVECON cannot be held liable for this in any way.

Article 14 Price change
If cost price determining factors should change after the point in time at which HAVECON made its offer, it shall be entitled to amend the contract price by such an amount that all price increases since the moment that the offer was made shall be for the account of the Client, without prejudice to HAVECON's right to terminate the agreement.

Article 15 Retention of title
15.1 HAVECON shall retain ownership of the work and/or the delivered goods or installations until the point in time that the contract price or the price of the goods and installations delivered or still to be delivered to the Client has been fully paid, as well as for the benefit of any claims of HAVECON relating to the delivery of goods, executed work or work to be executed and of that which the Client owes due to its failure to comply with the agreements concluded with the Client, including costs, interest and fines.

15.2 Without prejudice to that which is determined in Articles 5 and 6, HAVECON is entitled without notice of default or recourse to the courts to dismantle the building and to take back the goods if payment is not made on time. In that context, the Client grants HAVECON access to all its premises used for its business, without prejudice to HAVECON's right to claim damages.

15.3 The Client is obliged to properly insure goods and/or installations for the duration of the retention of title, preferably via a Construction-all-risk insurance and make the policy documents (and proof of premium payment) of this insurance available to HAVECON for its perusal on demand. Any claims from the Client against the insurers based on the insurances referred to above shall be pledged to HAVECON by the Client on demand in accordance with Article 239, Book 3 of the Dutch Civil Code, such as additional security that the claims of HAVECON against the Client shall be met. HAVECON recommends that the Client insures the building.

HAVECON
Horticultural Projects

Article 16 Resolutive condition
16.1 If an agreement between the Client and HAVECON has been entered into on the resolutive condition that financing cannot be obtained, the Client is entitled to terminate the agreement if the Client has not obtained financing or the offer thereto within a year and a half of the signing of the agreement.

16.2 The Client and HAVECON mutually agree to do all that which is reasonable to obtain the financing referred to above.

16.3 If the Client has obtained or can obtain financing within the stated timeframe, however it is not sufficient for the full execution of the agreement in question, the parties will by mutual consent introduce the required savings or reduce the size of the object with the purpose of performing the agreement in a changed format, however one that resembles the original intent as much as possible, such in accordance with the provisions of Article 17 of these terms and conditions.

16.4 If the Client has obtained or can obtain financing within the stated timeframe, however the financier has stipulated that an object with a larger surface area must be built than described in the agreement with HAVECON, the parties will by mutual consent change the agreement relating to the object with respect to the price, as well as any related provisions, all of this with the purpose of performing the agreement in a changed format, however one that resembles the original intent as much as possible, such in accordance with the provisions of Article 17 of these terms and conditions.
If the Client should, within one year after the period for which the financial restriction applied, have the building or a substantial part thereof executed by a third party, the Client shall owe a fine to the amount of 10% of the contract price, without prejudice to HAVECON's right to full compensation.

Article 17 Contract variations
17.1 The settlement of variations resulting in an increase or decrease of the agreed work will take place as soon as possible after these have been established. When after the agreement has been entered into it is decided, in consultation with the Client, that the surface area of the building to be constructed will be larger or smaller than originally determined, HAVECON is entitled to charge the real costs of the resulting additional work to the Client, or to deduct the real costs that have been saved as a result from the contract price owed, so that HAVECON is not obliged to increase or decrease the original contract price by an amount that is proportionate to the increase or decrease of the original surface area of the building.

17.2 All changes in the work, whether due to a special request from the Client or whether proven necessary to prevent any unforeseen difficulties or to solve problems that have arisen, such as reinforcement or strengthening of the foundations of the building, are within the context of this article to be considered as additional work if this results in increased costs and as less work if reduced costs are incurred. The additional work will only be started after the Client has signed a purchase order. Havecon reasonably determines the extent of the additional work.

PURCHASE AND SALE/DELIVERY OF GOODS AND INSTALLATIONS

Article 18
18.1 Goods that are purchased from HAVECON are delivered by HAVECON ex warehouse or ex works. Delivery times will be determined by approximation. The delivery time shall commence on the last of the points in time referred to in Article 12. The delivery time is determined anticipating that HAVECON can obtain any materials that are required from third parties in the normal manner.

18.2 Failure to meet the delivery time can never, also not after a notice of default, be the basis for a compensation claim, unless otherwise agreed in writing.

18.3 HAVECON reserves the right to deliver the goods in more than one instalment.

18.4 When the purchaser has not taken delivery of the goods after the term of delivery has passed, these goods will be stored at its disposal for its own account and at its own risk. Deliveries for which no price has been agreed will be calculated based on the supplier's current price on the day of delivery.

18.5 All orders will, also with respect to the price, be accepted without any obligation. Article 14 shall apply mutatis mutandis. The prices are inclusive of standard packaging, but exclusive of freight charges and postage costs.

18.6 The Client who is of the opinion that the delivered goods are not consistent with the agreement is obliged, on penalty of forfeiture of rights, within eight days after he has detected or could have detected the shortcoming or when the goods have been delivered and/or the work has been performed, at least within eight days after the defect could reasonably have been detected, to inform HAVECON thereof in writing. If it appears that the goods or materials have been damaged, the Client should take all measures to obtain compensation.
The risk of the goods shall pass to the Client upon delivery of the goods, which, unless otherwise agreed in writing, shall take place ex works or ex central warehouse.

18.7 If delivery takes place other than ex works or ex warehouse, the Client must inform HAVECON and the transport company immediately about any shortcomings and all damage to the goods that occurred during transportation on penalty of forfeiture of any right to make a claim.

Article 14 shall apply mutatis mutandis.

Article 19 Guarantee
19.1 Guarantees with respect to the fulfilment of special requirements are only binding when they have been confirmed in writing by HAVECON in advance.

19.2 HAVECON guarantees the delivered goods during a 12 month period after delivery, which means that it will repair without cost all parts that show any impeding defects due to inferior materials, or inferior construction, or that it will replace those (to be decided at the discretion of HAVECON), on the condition that such defect was immediately brought to its attention after it was discovered and, insofar as HAVECON so wishes, the relevant parts are immediately sent carriage paid. The guarantee from HAVECON only applies when HAVECON itself has performed the assembly or if another party performed the assembly entirely according to the instructions of HAVECON.

The parts which have been installed to replace defective parts shall be guaranteed by HAVECON during a 12 month period after the parts have been put into use. Subject to the provisions in the previous paragraph, HAVECON shall never be liable for any damage whatsoever, including any loss of profits, which the Client might suffer resulting from an agreement entered into with HAVECON.

When the guarantee period expires, any obligation to indemnify, any liability and any other obligation of HAVECON towards the Client ends.

Should the Client execute any repairs or changes without prior consent from HAVECON during the guarantee period, or have these executed by another party, or should it not meet its payment obligations, any obligations of HAVECON under the guarantee shall lapse immediately.

19.3 HAVECON does not provide any further guarantee and does not accept any liability other than provided or accepted by the factory towards HAVECON.
HAVECON has the right not to repair, but to compensate the damage of the client in cases where the costs of the repair considerably exceed the damage suffered by the client of Havecon as a result of the defect. The damage suffered by the client is limited to the depreciation of the goods.

With respect to the quantities to be delivered, the usual overruns or underruns shall be reserved.
Goods with respect to which the aforementioned guarantee is invoked may only be returned by the Client if prior consent has been received from HAVECON. Goods that are returned but not found to be faulty will be returned to the Client at the Client's expense whereby the costs incurred by HAVECON with respect to the investigations undertaken with reference to the complaint will also be payable by the Client.

These terms and conditions are available in Dutch and *in English*. In the event of *discrepancies* between the two *versions*, the Dutch *version shall prevail*.

RHODE ISLAND GROWS LLC

"The future grows here"

RHODE ISLAND GROWS.

17 August 2020

Havecon Horticultural Products

Postbus 25

2665 ZG Bleiswijk Lorentzsraat 8

Holland KVK 27362799

Ref: Budget quotation number: **A19-05-2728-2-Budget cogeneration plant**

Contract number: **H19-1963**

Havecon:

All parties agree to execute this first amendment to Contract number H19-1963 to install a cogeneration (CHP) plant pursuant to receipt of confirmation of eligibility of the project for the Incentive Program with National Grid and the Rhode Island Public Utilities Commission.

Sincerely,

Frederick J. Laist

CFO, Rhode island Grows, LLC

ONE ARNOLD PLACE EXETER RHODE ISLAND 02822
(401) 862-7437 PHONE (401) 294-6996 FAX
RIGROWS.COM

Project Costing Summary

Shartner Farms CHP
8/13/2020

Description of Costs		*Cost*
CHP Engine Installation	Havecon	$ 13,859,000
13.8 KV switchgear	Havecon	$ 5,492,500
Cabling Around Greenhouse amd 480 SD Xformers	Havecon	$ 1,318,500
Cabling Power and Control Cables for Energy Center	Havecon	$ 1,098,500
Offloading Assembly of supply	Local	$ 75,000
CHP Building and piping connections	Estimate	$ 500,000
Gas Piping to site	N-Grid	$ -
Electrical Interconection Budget	N-Grid	$ 1,000,000
Continuous Monitoring System		$ 200,000
Sub-Total: Material & Labor Cost		$ 23,543,500
Contingency	3%	$ 706,305
Sub-Total: Direct Project Costs		$ 24,249,805
Owner's Engineering	1.50%	$ 363,747
Project Development Expense		$ 65,000
Project Management Expense	2%	$ 484,996
Contract Management Expense		$ 242,498
Performance & Payment Bonds		$ 193,998
Sub-Total: Indirect Project Costs		$ 986,493
Project Cost, before Sales Tax		$ 25,236,298
Sales Tax		$ -
Total Project Cost		$ 25,236,298

HAVECON
Horticultural Projects

Rhode Island Grows, LLC
One Arnold Place
Exeter, Rhode Island 02822
USA

Tel : 001 – 401 294 2044
Mob : 001 - 203-223-4450 (Mr. Laist)
E-mail : f.laist@rigrows.com
tim@rigrows.com

Budget quotation number : A19 – 05 – 2728 – 2 - Budget cogeneration plant
Contract number : H19 – 1963
Quotation number : A19 – 05 – 2728
Project Information : Rhode Island Grows, LLC

Bleiswijk, August 13th 2020

Dear Mr. Schartner and Mr. Laist,

Your enquiry is very much appreciated and we have the pleasure to hereby submit, without any obligation, our budget quotation for a cogeneration plant, in accordance with the following specifications.

Havecon is a flexible and customer-minded organization with a lot of experience in the field of development, construction and the complete realization of horticultural projects. Innovating, unburdening and keeping appointments keep our people busy every day. We enjoy doing so and we always want to share that passion with our customers.
Together with the Voorwinden Group we can make a tight construction schedule so we won't be in your way very long.
We'd be happy to mean something to you, if you so wish.

In addition to contract H19 – 1963 the following budget quotation :

In response to your inquiry we are pleased to offer a budget for a pre-engineered, 13,336 kW containerized cogeneration greenhouse power plant.

The proposed cogeneration plant includes the following:

- 4 x Ecomax 33 GH containerized natural gas engine cogeneration plant, with as prime mover the Jenbacher, model J620, each rated 3,334 kW, 60 Hz, 13.8 kV
- All auxiliary components required for proper operation
- Indoor enclosure designed for 70 dB(A) at 33ft distance
- 2 x Catalyst for CO2 recovery
- 2 x SCR
- 4 x Engine Jacket Water, Oil Cooler, After Cooler Heat Recovery
- 2 x Exhaust gas heat Recovery
- 2 x Exhaust gas heat Recovery + bypass
- 2 x Condenser heat Recovery
- Exhaust silencer and stack
- 4 x LT radiator
- 2 x HT radiator
- Engine Management System, Controls and SCADA System
- Software for full integration to the greenhouse climate computer
- Master Control for Grid parallel, Island operation, emergency power, import/export control.
- Grow light Control
- Fresh and waste oil tanks
- DDP Transportation to site,
- Assistance to assembly
- Commissioning of the complete system
- Insulation on all exhaust gas and water piping for safety
- Final UL inspection
- Customer operator training (to perform daily/weekly tasks)
- Import Duties 2%

The above system will provide the following customer connection points:

- Gas inlet at container wall
- Hot water supply and return at container wall
- Electrical at generator terminals
- CO2 on 2 units at the exit of the CO2 valve

Not included:

1. Civil works - Concrete foundation and building to support the Ecomax Container.
2. Interface between Ecomax container and boiler room.
3. Electrical works external of Ecomax Container.
4. Gas piping external of Ecomax Container.
5. Continuous emission monitoring system.
6. Other site-specific variances/needs which may arise.
7. Assembly of total scope of supply , Offloading Cranes an heavy lifting devices.

The units without CO2 have an **SCR** included to meet the local emission requirements

Budgetary sell price for the above scope: **USD 13.859.000,00**

Please be aware that by deducting this prices you eliminate the heat recovery from the exhaust gas cooler and condenser.
We added a HT dump radiator to destroy the engine heat.
When not cooling down the exhaust gas heat the exhaust gasses cannot be used as CO2 in the greenhouse anymore.
We did not give a separate price for the CO2 Catalyst as most probably a SCR system is needed to meet the local emission requirements. When we know the exact location of the installation we can decide if we can remove the Catalyst from the scope or exchange for one with a higher emission level

HAVECON
Horticultural Projects

Estimates as place holders
These estimates are based ion previous projects and have to be fully quoted and engineered by a local company.

- MV 13,8 kV switchgear **USD 5.492.500,00**
  Grid connection, generator breakers, outgoing feeders, aux transformers
- MV 13,8 KV ring around the greenhouse with growlight transformers **USD 1.318.500,00**
  13,8 kV cabling around the greenhouse, step down transformers 13,8 kV / 400 Vac
- Cabling power and control cables in energy center **USD 1.098.500,00**
  13,8 kV cabling generators, aux transformer 13,8 kV / 400 Vac

The general terms and conditions as agreed upon according to contract H19–1963 apply to this contract.

Terms of payment (payment due on receiving invoice within 6 days) :
25% by signing the contract
25% by shipping materials
25% by first delivery materials onsite
25% by all materials onsite

Contact persons :

Pre-works engineer	Erwin Starink,	tel. 0031-10-2663270
Site engineer	Henk Kraaijenbos,	tel. 0031-6-20703405
Sales,	Jon Adams,	tel. 001-9053216855

Thank you for giving us the opportunity to quote and we look forward to execute your order.
Your news is awaited with interest.

Yours faithfully,

Havecon Projects BV
Bleiswijk

HAVECON
Horticultural Projects

General Terms and Conditions of the private limited company Havecon Projects BV, registered offices at Bleiswijk

Article 1 General
1.1 These terms and conditions apply to all offers, requests, notices and agreements of HAVECON Projects BV (hereinafter referred to as Havecon) with third parties (hereinafter referred to as the Client), with respect to the purchase and sale of goods and installations, the execution of contracted work and the contracting of work, unless agreed otherwise in writing.

1.2 Deviation from these general terms and conditions is only possible if HAVECON has accepted this deviation in writing.
In case of a conflict between these terms and conditions and similar conditions, including any purchasing conditions of the Client, the terms and conditions of HAVECON will exclusively apply.

1.3 If a provision of these general terms and conditions is wholly or partially invalid or void, then the remaining provisions will remain in full force. HAVECON and the client agree to replace the invalid or voidable provision with a provision that they would have agreed if they had known the invalidity or voidability.

1.4 Agreements concerning the purchase and sale of goods and installations, the execution of contracted work, as well as the contracting of work and any additions thereto shall only become binding when confirmed in writing by HAVECON.
Arrangements with or announcements by subordinate staff members of HAVECON shall not be binding on it, insofar as it has not confirmed these in writing.
In this respect all employees who are not authorised to represent the company according to the Trade Register shall be regarded as subordinate members of staff.

1.5 The existence and content of the quotation and /or agreement will be kept secret by the client, treated confidentially and not made public.

Article 2 Creditworthiness
Each agreement shall be entered into by HAVECON on the condition that the Client is proven to be sufficiently creditworthy. HAVECON is entitled to request the Client to provide, at the discretion of HAVECON, sufficient security and is furthermore entitled to suspend the performance of the agreement until its request has been met.

Article 3 Force Majeure
3.1 Without prejudice to its rights, HAVECON, if it should be prevented by force majeure to perform the agreement or to perform it on time, is entitled to suspend the performance of the agreement or to terminate the agreement in whole or in part, such at the discretion of HAVECON, without it being obliged to pay any damages or provide any other form of compensation.

3.2 Force majeure is taken to mean every circumstance due to which compliance with or the timely performance of the agreement can no longer reasonably be demanded by the Client, such including, but not limited to, war, revolution, danger of war, civil war, riots, strikes, transportation issues, fire and other interruptions at HAVECON's company, or at that of one or more of its suppliers or subcontractors, delayed delivery of materials, raw materials and consumables or parts ordered on time, floods, gales, whirlwinds, hail, rain, mist, frost, snowfall, black ice, traffic interruptions, interruptions in the supply of energy and any government measures.

Article 4 Liability
4.1 If HAVECON should not meet its obligations, it shall only be responsible for the costs of the repairs or the replacement by a third party. This liability shall only apply after the Client has declared HAVECON to be in default in writing and has granted a reasonable term within which HAVECON can yet meet its obligations.
HAVECON has the right not to repair, but to compensate the damage of the client in cases where the costs of the repair considerably exceed the damage suffered by the client of Havecon as a result of the defect. The damage suffered by the client is limited to the depreciation of the goods.

4.2 Furthermore, HAVECON's liability shall be limited to the amount of the purchase price or contract price, or the invoiced amount relating to the services provided, on the understanding that HAVECON's liability with respect to indirect loss, such as, however explicitly not limited to, loss of profit and turnover, is excluded.

4.3 The Client commits itself to indemnify HAVECON against any claims by third parties for damages against HAVECON relating to the delivery for whatever reason and is liable for any costs that may ensue.

Article 5 Payment
5.1 All payments must be made at the office of HAVECON or into an account designated by it within eight days of the invoice date. The Client shall not be entitled to set-off or deferment.

5.2 If goods are delivered in instalments, each delivery will be invoiced separately. Prior to delivery or prior to continuing the delivery or performing the contracted work, HAVECON shall always be entitled to request from the Client, at HAVECON's discretion, sufficient security for meeting payment obligations. This provision also applies when supplier credit has been agreed.

5.3 Refusal on the part of the Client to provide security entitles HAVECON to terminate the agreement without prejudice to its rights to compensation.
Regulations, laid down by whichever authority, that prevent the use of the goods to be delivered or the goods that have already been delivered shall not affect the payment obligation of the Client.

5.4 If payment should not have been made in time, the Client will at least owe the statutory commercial interest on the amount not paid from the due date without prejudice to the provisions of articles 6, 14 and 19 and without prejudice to the rights to make further claims permitted to HAVECON by law.

Article 6 Costs
If the Client does not, does not timely or does not properly meet any of its obligations under the agreement with HAVECON, the Client shall be in default due solely because of the breach or negligence, without a notice of default or warning being required. All costs resulting from or relating to the judicial or extra judicial collection of the principal sum or interest shall be payable by the Client, including those for any notifications and notices of default and those which in case of a legal action are not charged to the unsuccessful party. The extrajudicial costs are set in advance at 15% of the invoiced amounts, or at least of the amounts still owed.

Article 7 Termination
7.1 If the Client does not, does not properly or does not timely meet any of its obligations under the agreement with HAVECON as well as if it is declared bankrupt, has requested suspension of payments, terminates or disposes of its business, is placed in receivership, has its movable and immovable property partially or fully confiscated or expropriated, requisitioned, destroyed or seriously damaged, or if the Client moves its place of residency legally or actually to another country, it is deemed to be in default by operation of law and HAVECON shall be entitled, without prejudice to the provisions of Article 15 and without a notice of default or warning and without any recourse to the courts being required, to suspend the performance of the agreement, to demand security for payments, to remove any materials and tools brought to the construction site, or to decide to terminate the agreement fully or in part, without HAVECON being obliged to pay any damages or provide any other form of compensation.

7.2 If HAVECON suspends the performance of the agreement and should as yet proceed to perform the agreement at a later date, the Client is obliged to reimburse any damage which HAVECON may have suffered in this respect.

7.3 When HAVECON terminates the agreement, the Client is obliged under the obligation to cancel to pay the full contract price to HAVECON after deducting the cost price of the materials that were not used by HAVECON due to the non-performance or the incomplete performance of the agreement, as well as any unpaid wages, as calculated by HAVECON, which shall be binding on the Client. If HAVECON terminates the agreement and the Client subsequently has the construction executed by another contractor, the damages to which HAVECON is entitled with respect to this breach of contract by the Client shall be fixed at 10% of the contract price, without prejudice to HAVECON's right to full compensation.

Article 8 Disputes
8.1 Any dispute resulting from the offers and delivery by HAVECON, the purchase and sales agreements, as well as agreements concerning the provision of services concluded with HAVECON is, to the exclusion of the competent court according to statutory competence requirements, always subject to the jurisdiction of the civil court in The Hague.

8.2 Dutch law shall apply to the agreement between HAVECON and the Client and on any agreements that ensue from that agreement insofar as this is not deviated from in these terms and conditions, with the exception of the Vienna Sales Convention.

CONTRACTING WORK

Article 9 Offers
9.1 The offers made are subject to alteration without notice and are drawn up based on the information the Client has provided to HAVECON. The offers shall be made as accurately as possible. Any earthwork shall not be included in the offer, unless otherwise agreed.

9.2 All time limits stated in the offer are only made for the benefit of HAVECON and are to be regarded as final deadlines by the Client.

Article 10 Drawings, calculations and designs
All rights relating to drawings, calculations, designs and suchlike are explicitly reserved by HAVECON, which therefore are and remain the property of HAVECON. It will not be permitted to copy these documents, or to provide or show them to third parties without the explicit written consent from HAVECON. All documents handed over by HAVECON in this regard must be returned on demand.

Article 11 Execution of work
11.1 In the execution of work, those deviations that HAVECON deems necessary, useful or desired shall be permitted. Measurements and weights provided by HAVECON are approximations only; any legal action related to any difference in measurements or weights is excluded.

11.2 HAVECON only accepts liability and only bears responsibility for designs it has made itself, so that HAVECON can therefore never be liable for any failures to structures built according to designs of the Client or third parties and neither if it should appear that the information provided by the Client was incomplete or not entirely correct. Furthermore no liability will be accepted with respect to the quality of the materials which are used by HAVECON at the request or indication of the Client and neither with respect to the possibility of using those materials. Nor is liability accepted for the bearing capacity of the soil. Any ensuing damage will have to be borne by the Client, including any damage which HAVECON suffers in this connection.

11.3 The Client undertakes to ensure that the work to be executed by HAVECON can be executed at the points in time it has indicated. The Client furthermore undertakes to ensure that HAVECON will be able to store the materials it brings to the construction site in a manner and in locations where these materials cannot suffer damage. Any damage suffered by HAVECON if these obligations should not be met are for the account of the Client, while HAVECON shall then be entitled to postpone the delivery date.

11.4 Materials shall be delivered by or on behalf of HAVECON at a loading location that is as close as possible to the construction site as can be reached by trucks. The Client is obliged to help with the unloading and is responsible for any further transportation to the site. For the duration of the construction, the Client must make storage space available for materials and tools as well as any water and electricity that are required.

11.5 In case of business premises, the site must be accessible to a loading crane and concrete mixers.

Unless otherwise agreed, the materials required will be of standard commercial quality. All materials remaining after the construction or remainders of such materials are the property of HAVECON and it may therefore remove these from the construction site.

Article 12 Delivery time
12.1 HAVECON shall not accept any liability if the work is not delivered within the timeframe indicated.

12.2 All dates provided by HAVECON should only be regarded as target dates. If the indicated timeframe is exceeded, the Client shall never be able to refuse the executed work or to terminate the agreement unilaterally or to carry out the work or to have the work carried out to perform the agreement, whether or not by legal authorisation, or to refuse to meet any of its obligations under the agreement.

12.3 Without prejudice to that which is stated in these terms and conditions with respect to force majeure, it is determined that the delivery time is postponed by as many working days as the number of days the workforce of HAVECON has been unable to work, also at other Clients, due to adverse weather conditions in the period between the date the agreement was entered into and the delivery date and as a result of which the construction schedule was disrupted.

The delivery time shall commence on the last of the following points in time:
A. the day of the formation of the agreement;
B. the day that HAVECON receives the documents, details, permits and suchlike required for the execution of the work;
C. the day that the formalities required prior to the start of the work have been completed;
D. the day on which the Client, when a financial restriction was included in the agreement, has informed HAVECON that it has obtained the financing required for the construction;
E. the day on which the land on which the building is to be constructed by HAVECON is made available to it and is clean and empty.

12.4 The delivery time is determined in the expectation that the circumstances under which HAVECON will be executing the work shall remain the same as at the time at which the agreement was concluded and that it receives the required materials on time. If a delay should occur due to the fact that the circumstances referred to above are changed or that the required materials, although ordered on time, are not delivered to HAVECON on time, the delivery time shall automatically be extended by the duration of the delay.

The delivery time will also in any case be extended by the time during which the Client has not paid any amount it owes to HAVECON, after it has become payable, or in any of the cases referred to in the third paragraph of Article 11. HAVECON is entitled to extend the agreed delivery times to the extent that this is necessary.

Any contractual fine agreed with regard to the failure to meet the delivery time shall not be owed if this is the result of force majeure as referred to in Article 3.

Article 13 Delivery
13.1 As soon as HAVECON indicates that the work is ready for (partial) delivery, the inspection must take place within seven days. The Client must co-operate with the inspection. If the Client should not cooperate, the delivery shall be deemed to have taken place. The delivery shall also be deemed to have taken place if the executed work has actually been made available to the Client by HAVECON or when the Client has started to use it.

13.2 All goods and/or installations which have been brought in by HAVECON shall be at the risk of the Client from the moment that these are present on the premises of the Client. During the construction the risk of the building shall be for the account of HAVECON, until a start is made with the placing of the glass. As of that time the risk for the building shall be for the account of the Client. Any claims with respect to defects in the building must be reported to HAVECON in writing within one month from the actual delivery or occupation as referred to in the previous paragraph. If this term should be exceeded, any claim from the Client against HAVECON with respect to defects shall lapse.

13.3 The Client is not entitled to suspend the fulfilment of its obligations on the basis of a submitted claim.
If the Client does not, does not properly or does not timely meet any obligation under the agreement it has entered into with HAVECON or any related agreement, HAVECON shall not be obliged to fulfil any guarantee, however named, with respect to any of these agreements.

Before delivery has taken place, the Client shall not be able to use the work. If the Client should nevertheless start to use part of the work, this shall be for its own account. HAVECON cannot be held liable for this in any way.

Article 14 Price change
If cost price determining factors should change after the point in time at which HAVECON made its offer, it shall be entitled to amend the contract price by such an amount that all price increases since the moment that the offer was made shall be for the account of the Client, without prejudice to HAVECON's right to terminate the agreement.

Article 15 Retention of title
15.1 HAVECON shall retain ownership of the work and/or the delivered goods or installations until the point in time that the contract price or the price of the goods and installations delivered or still to be delivered to the Client has been fully paid, as well as for the benefit of any claims of HAVECON relating to the delivery of goods, executed work or work to be executed and of that which the Client owes due to its failure to comply with the agreements concluded with the Client, including costs, interest and fines.

15.2 Without prejudice to that which is determined in Articles 5 and 6, HAVECON is entitled without notice of default or recourse to the courts to dismantle the building and to take back the goods if payment is not made on time. In that context, the Client grants HAVECON access to all its premises used for its business, without prejudice to HAVECON's right to claim damages.

15.3 The Client is obliged to properly insure goods and/or installations for the duration of the retention of title, preferably via a Construction-all-risk insurance and make the policy documents (and proof of premium payment) of this insurance available to HAVECON for its perusal on demand. Any claims from the Client against the insurers based on the insurances referred to above shall be pledged to HAVECON by the Client on demand in accordance with Article 239, Book 3 of the Dutch Civil Code, such as additional security that the claims of HAVECON against the Client shall be met. HAVECON recommends that the Client insures the building.

Article 16 Resolutive condition

16.1 If an agreement between the Client and HAVECON has been entered into on the resolutive condition that financing cannot be obtained, the Client is entitled to terminate the agreement if the Client has not obtained financing or the offer thereto within a year and a half of the signing of the agreement.

16.2 The Client and HAVECON mutually agree to do all that which is reasonable to obtain the financing referred to above.

16.3 If the Client has obtained or can obtain financing within the stated timeframe, however it is not sufficient for the full execution of the agreement in question, the parties will by mutual consent introduce the required savings or reduce the size of the object with the purpose of performing the agreement in a changed format, however one that resembles the original intent as much as possible, such in accordance with the provisions of Article 17 of these terms and conditions.

16.4 If the Client has obtained or can obtain financing within the stated timeframe, however the financier has stipulated that an object with a larger surface area must be built than described in the agreement with HAVECON, the parties will by mutual consent change the agreement relating to the object with respect to the price, as well as any related provisions, all of this with the purpose of performing the agreement in a changed format, however one that resembles the original intent as much as possible, such in accordance with the provisions of Article 17 of these terms and conditions.
If the Client should, within one year after the period for which the financial restriction applied, have the building or a substantial part thereof executed by a third party, the Client shall owe a fine to the amount of 10% of the contract price, without prejudice to HAVECON's right to full compensation.

Article 17 Contract variations

17.1 The settlement of variations resulting in an increase or decrease of the agreed work will take place as soon as possible after these have been established. When after the agreement has been entered into it is decided, in consultation with the Client, that the surface area of the building to be constructed will be larger or smaller than originally determined, HAVECON is entitled to charge the real costs of the resulting additional work to the Client, or to deduct the real costs that have been saved as a result from the contract price owed, so that HAVECON is not obliged to increase or decrease the original contract price by an amount that is proportionate to the increase or decrease of the original surface area of the building.

17.2 All changes in the work, whether due to a special request from the Client or whether proven necessary to prevent any unforeseen difficulties or to solve problems that have arisen, such as reinforcement or strengthening of the foundations of the building, are within the context of this article to be considered as additional work if this results in increased costs and as less work if reduced costs are incurred. The additional work will only be started after the Client has signed a purchase order. Havecon reasonably determines the extent of the additional work.

PURCHASE AND SALE/DELIVERY OF GOODS AND INSTALLATIONS

Article 18

18.1 Goods that are purchased from HAVECON are delivered by HAVECON ex warehouse or ex works. Delivery times will be determined by approximation. The delivery time shall commence on the last of the points in time referred to in Article 12. The delivery time is determined anticipating that HAVECON can obtain any materials that are required from third parties in the normal manner.

18.2 Failure to meet the delivery time can never, also not after a notice of default, be the basis for a compensation claim, unless otherwise agreed in writing.

18.3 HAVECON reserves the right to deliver the goods in more than one instalment.

18.4 When the purchaser has not taken delivery of the goods after the term of delivery has passed, these goods will be stored at its disposal for its own account and at its own risk. Deliveries for which no price has been agreed will be calculated based on the supplier's current price on the day of delivery.

18.5 All orders will, also with respect to the price, be accepted without any obligation. Article 14 shall apply mutatis mutandis. The prices are inclusive of standard packaging, but exclusive of freight charges and postage costs.

18.6 The Client who is of the opinion that the delivered goods are not consistent with the agreement is obliged, on penalty of forfeiture of rights, within eight days after he has detected or could have detected the shortcoming or when the goods have been delivered and/or the work has been performed, at least within eight days after the defect could reasonably have been detected, to inform HAVECON thereof in writing. If it appears that the goods or materials have been damaged, the Client should take all measures to obtain compensation.
The risk of the goods shall pass to the Client upon delivery of the goods, which, unless otherwise agreed in writing, shall take place ex works or ex central warehouse.

18.7 If delivery takes place other than ex works or ex warehouse, the Client must inform HAVECON and the transport company immediately about any shortcomings and all damage to the goods that occurred during transportation on penalty of forfeiture of any right to make a claim.

Article 14 shall apply mutatis mutandis.

Article 19 Guarantee

19.1 Guarantees with respect to the fulfilment of special requirements are only binding when they have been confirmed in writing by HAVECON in advance.

19.2 HAVECON guarantees the delivered goods during a 12 month period after delivery, which means that it will repair without cost all parts that show any impeding defects due to inferior materials, or inferior construction, or that it will replace those (to be decided at the discretion of HAVECON), on the condition that such defect was immediately brought to its attention after it was discovered and, insofar as HAVECON so wishes, the relevant parts are immediately sent carriage paid. The guarantee from HAVECON only applies when HAVECON itself has performed the assembly or if another party performed the assembly entirely according to the instructions of HAVECON.

The parts which have been installed to replace defective parts shall be guaranteed by HAVECON during a 12 month period after the parts have been put into use. Subject to the provisions in the previous paragraph, HAVECON shall never be liable for any damage whatsoever, including any loss of profits, which the Client might suffer resulting from an agreement entered into with HAVECON.

When the guarantee period expires, any obligation to indemnify, any liability and any other obligation of HAVECON towards the Client ends.

Should the Client execute any repairs or changes without prior consent from HAVECON during the guarantee period, or have these executed by another party, or should it not meet its payment obligations, any obligations of HAVECON under the guarantee shall lapse immediately.

19.3 HAVECON does not provide any further guarantee and does not accept any liability other than provided or accepted by the factory towards HAVECON.
HAVECON has the right not to repair, but to compensate the damage of the client in cases where the costs of the repair considerably exceed the damage suffered by the client of Havecon as a result of the defect. The damage suffered by the client is limited to the depreciation of the goods.

With respect to the quantities to be delivered, the usual overruns or underruns shall be reserved.
Goods with respect to which the aforementioned guarantee is invoked may only be returned by the Client if prior consent has been received from HAVECON. Goods that are returned but not found to be faulty will be returned to the Client at the Client's expense whereby the costs incurred by HAVECON with respect to the investigations undertaken with reference to the complaint will also be payable by the Client.

These terms and conditions are available in Dutch and *in English*. In the event of *discrepancies* between the two *versions*, the Dutch *version shall prevail*.

Exhibit D
CHP Project BCR Screening dated April 22, 2021

Exhibit D is an Excel file and is too large to create a legible PDF file.

Please see Excel version of Exhibit D

Exhibit D1

Application of CHP Project BCR Screening that applies sensitivities related to the removal of economic benefits

Exhibit D1 is an Excel file and is too large to create a legible PDF file.

Please see Excel version of Exhibit D1

Natural Gas Capacity Analysis Report – 1 Arnold Place, Exeter RI

Impact on Gas System Reliability

The impact of the proposed customer load of 100.720 dth/hr at 1 Arnold Place, Exeter on gas system reliability was performed using the Synergi Gas modeling software. The customer will be directly supplied from the 99 psig distribution system. The proposed load is located in the area of Rhode Island commonly referred to as the Southern Rhode Island distribution system that includes the towns of East Greenwich, Exeter, Narraganset, North Kingstown, South Kingstown, Warwick, and West Warwick. The high forecasted customer growth for the area resulted in the Company's Southern Rhode Island Expansion Project. This includes developing, approving, and beginning construction of the pipeline infrastructure project known as GrowthPoint.

The Company continues to track the proposed large-use customers in the Southern RI area and when they are expected to be added to the distribution system. The phased construction of the GrowthPoint project ensures that the reliability of the distribution system is not compromised as these customers are added. The Company performed the impact of the 1 Arnold Place customer load on gas system reliability assuming the current schedule of these other known customer additions. In general, adding this load to the Synergi model results in a reduction of pressures on the 99 psig distribution system in the 4-7 psig range.

The results of the Synergi hydraulic modeling analysis indicated that construction of the GrowthPoint project addresses the impact of the 1 Arnold place customer load on distribution system reliability. The proposed load is expected to be on the 99 psig distribution system for the 2022-23 heating season. Thus, the analysis was performed for the 2021-22 heating season with Phase 2 of the 20-inch main installation portion of Growth Point complete as well as looking out to 2024-25 (year 5 of the current 5-year Synergi model) with all three (3) phases of the 20-inch main installation portion of Growth Point complete. Another component of the Southern Rhode Island Expansion Project is the increase of the Maximum Operating Pressure (MOP) of the upstream transmission line from 150 psig to 200 psig, which was also incorporated in the analysis.

For 2021-22, pressures at the extremities of the 99 psig distribution system are predicted to be approximately 83 psig without the 1 Arnold place customer load and then approximately 81 psig with it, which is sufficient to maintain overall gas system reliability. If due to unforeseen occurrences, no additional 20-inch Phase 2 main were to be installed in 2021 beyond the 6,500 ft expected to be completed in 2020, the pressures are predicted to be 77 psig and 71 psig, respectively, which is also sufficient to maintain overall gas system reliability. Increasing the

MOP of the upstream 150 psig transmission line has no effect on pressures on the 99 psig distribution system for the 2021-22 heating season. Maintaining sufficient gas system reliability includes ensuring that adequate pressures are maintained at the inlet to district regulator stations supplying downstream distribution pressures systems (for proper regulator operation) and ensuring that existing customer delivery pressure requirements throughout the entire distribution system are met. In this case, the 99 psig distribution system is supplying a 35 psig district regulator station at the southernmost extremity in South Kingstown. See Attachment 1 slides 1-4 for screen shots from the Synergi model.

For 2024-25, pressures at the extremities of the 99 psig distribution system are predicted to be approximately 85 psig without the 1 Arnold place customer load and then approximately 83 psig with it, which is sufficient to maintain overall distribution system reliability. If due to unforeseen occurrences, the MOP increase of the upstream 150 psig transmission line to 200 psig is not completed by the 2024-25 heating season, the pressures are predicted to be 75 psig and 70 psig respectively, which is also sufficient to maintain overall gas system reliability. See Attachment 1 slides 5-6 for screen shots from the Synergi model.

Cost of Distribution System Reinforcements

As mentioned above, completion of the GrowthPoint main installation project ensures that distribution system reliability is maintained. The projected total cost of the Southern Rhode Island Gas Expansion project is approximately $128.98 million, with the 20-inch main installation of GrowthPoint projected to be near $100.0 million. The project costs are part of the Company's Gas Capital Investment Plan, detailed in the annual Gas Infrastructure, Safety and Reliability Plan.

Impact on Net Need Analysis

With respect to the design hour, the Company's Synergi analysis was completed using the Company's 2019 models with the design peak hour customer requirements adjusted to meet the 2020 forecast for the three firm customer requirement categories; Sales and FT-2, FT-1 and Capacity Exempt. Tables 1 through 5 shows the hourly imbalance at each take station for the five-year forecast period, Forecast Period 2020/21 to 2024/25. This analysis indicates an overall portfolio deficit in the 2023/24 gas year, requiring incremental resources on both AGT and Tennessee.

After evaluation of the Company's 2020 forecast, an analysis was performed to show the impact on the hourly imbalance at each take station. The proposed customer load will be supplied from the Cranston Take Station. Although the proposed customer load is not part of

the forecast, it was determined there is space in the forecast starting in Winter 2022/23 to accommodate the load after review of upcoming projects in Rhode Island. Tables 6 through 10 shows the impact of the proposed customer load to the hourly imbalance at each take station for the five-year forecast period. This analysis indicates that the overall portfolio deficit is not impacted, still requiring incremental resources on both AGT and Tennessee starting in 2023/24 gas year.

Table 1

RESULTS FOR WINTER 2020/21
Design Peak Hour Table Before RI Grows, Exeter, RI, Added Peak Hour Load

				2020/21		
Pipeline/LNG	Lateral	Take Station	Meter No.	Total Supply Deliveries Company & Marketers (Dth/hr)	Total Firm Peak Hour Model Flow (DTH/hr)	Total Firm Peak Hour Balance (-) = Shortfall (+) = Surplus (DTH/hr)
AGT	G	Barrington	00064	0	0	0
AGT	G	Warren	00012	811	755	56
AGT		Burrillville	00044	0	28	-28
AGT	G	Crary St	00842	0	3,487	-3,487
AGT	G	Dey St	00004	5,388	2,067	3,321
AGT	G	Cumberland	00083	42	49	-8
AGT	G	Portsmouth	00013	1,045	1,044	1
AGT	G	Tiverton	00033	56	65	-10
AGT	G	E Providence	00010	1,698	1,085	613
AGT	E	Westerly	00008	144	124	20
AGT		Montville	00059	208	215	-7
TGP	Cranston	Cranston	420750	3,399	2,102	1,297
TGP	Cranston	Lincoln	420758	1,283	1,313	-30
TGP	Cranston	Smithfield	420910	450	1,570	-1,120
TGP		Cumberland	420135	1,343	1,343	0
PORTABLE LNG		Portsmouth		650	130	520
LNG		Exeter		1,000	1,000	0
LNG (incl. KLNG)		Providence		3,958	3,958	0
PORTABLE LNG		Cumberland		750	750	0
			Total:	22,226	21,085	1,141

Notes
1) Flows reflect a managed system for Northern Rhode Island.

2) Flows reflect 2019 hydraulic model with a global adjustment to have demand match sendout for Capacity Exempt, FT-1 and rest of customers (SFT2) for the June 2020 forecast.

Table 2

RESULTS FOR WINTER 2021/22
Design Peak Hour Table Before RI Grows, Exeter, RI, Added Peak Hour Load

				2021/22		
Pipeline/LNG	Lateral	Take Station	Meter No.	Total Supply Deliveries Company & Marketers (Dth/hr)	Total Firm Peak Hour Model Flow (DTH/hr)	Total Firm Peak Hour Balance (-) = Shortfall (+) = Surplus (DTH/hr)
AGT	G	Barrington	00064	0	0	0
AGT	G	Warren	00012	811	767	45
AGT		Burrillville	00044	0	28	-28
AGT	G	Crary St	00842	0	3,545	-3,545
AGT	G	Dey St	00004	5,401	2,107	3,294
AGT	G	Cumberland	00083	42	49	-8
AGT	G	Portsmouth	00013	1,045	1,044	1
AGT	G	Tiverton	00033	56	67	-11
AGT	G	E Providence	00010	1,698	1,168	530
AGT	E	Westerly	00008	144	125	19
AGT		Montville	00059	208	221	-13
TGP	Cranston	Cranston	420750	3,419	2,239	1,180
TGP	Cranston	Lincoln	420758	1,283	1,366	-83
TGP	Cranston	Smithfield	420910	450	1,595	-1,145
TGP		Cumberland	420135	1,343	1,343	0
PORTABLE LNG		Portsmouth		650	155	495
LNG		Exeter		1,000	1,000	0
LNG (incl. KLNG)		Providence		3,958	3,958	0
PORTABLE LNG		Cumberland		750	750	0
			Total:	22,259	21,527	732

Notes

1) Flows reflect a managed system for Northern Rhode Island.

2) Flows reflect 2019 hydraulic model with a global adjustment to have demand match sendout for Capacity Exempt, FT-1 and rest of customers (SFT2) for the June 2020 forecast.

Table 3

RESULTS FOR WINTER 2022/23
Design Peak Hour Table Before RI Grows, Exeter, RI, Added Peak Hour Load

				2022/23		
Pipeline/LNG	Lateral	Take Station	Meter No.	Total Supply Deliveries Company & Marketers (Dth/hr)	Total Firm Peak Hour Model Flow (DTH/hr)	Total Firm Peak Hour Balance (-) = Shortfall (+) = Surplus (DTH/hr)
AGT	G	Barrington	00064	0	0	0
AGT	G	Warren	00012	811	787	24
AGT		Burrillville	00044	0	29	-29
AGT	G	Crary St	00842	0	3,650	-3,650
AGT	G	Dey St	00004	5,444	2,176	3,269
AGT	G	Cumberland	00083	42	49	-8
AGT	G	Portsmouth	00013	1,045	1,044	2
AGT	G	Tiverton	00033	56	69	-13
AGT	G	E Providence	00010	1,698	1,305	392
AGT	E	Westerly	00008	144	128	16
AGT		Montville	00059	208	229	-21
TGP	Cranston	Cranston	420750	3,484	2,436	1,048
TGP	Cranston	Lincoln	420758	1,283	1,449	-166
TGP	Cranston	Smithfield	420910	450	1,638	-1,188
TGP		Cumberland	420135	1,343	1,343	0
PORTABLE LNG		Portsmouth		650	195	455
LNG		Exeter		1,000	1,000	0
LNG (incl. KLNG)		Providence		3,958	3,958	0
PORTABLE LNG		Cumberland		750	750	0
			Total:	22,367	22,236	131

Notes

1) Flows reflect a managed system for Northern Rhode Island.

2) Flows reflect 2019 hydraulic model with a global adjustment to have demand match sendout for Capacity Exempt, FT-1 and rest of customers (SFT2) for the June 2020 forecast.

Table 4

RESULTS FOR WINTER 2023/24
Design Peak Hour Table Before RI Grows, Exeter, RI, Added Peak Hour Load

				2023/24		
Pipeline/LNG	Lateral	Take Station	Meter No.	Total Supply Deliveries Company & Marketers (Dth/hr)	Total Firm Peak Hour Model Flow (DTH/hr)	Total Firm Peak Hour Balance (-) = Shortfall (+) = Surplus (DTH/hr)
AGT	G	Barrington	00064	0	0	0
AGT	G	Warren	00012	770	813	-44
AGT		Burrillville	00044	0	30	-30
AGT	G	Crary St	00842	0	3,755	-3,755
AGT	G	Dey St	00004	5,474	2,237	3,237
AGT	G	Cumberland	00083	42	49	-8
AGT	G	Portsmouth	00013	1,045	1,044	1
AGT	G	Tiverton	00033	56	70	-15
AGT	G	E Providence	00010	1,698	1,445	253
AGT	E	Westerly	00008	144	130	14
AGT		Montville	00059	208	236	-28
TGP	Cranston	Cranston	420750	3,736	2,482	1,254
TGP	Cranston	Lincoln	420758	1,283	1,522	-239
TGP	Cranston	Smithfield	420910	450	1,685	-1,235
TGP		Cumberland	420135	1,343	1,343	0
PORTABLE LNG		Portsmouth		650	225	425
LNG		Exeter		1,000	1,000	0
LNG (incl. KLNG)		Providence		3,958	3,958	0
PORTABLE LNG		Cumberland		750	750	0
			Total:	22,607	22,775	-168

Notes

1) Flows reflect a managed system for Northern Rhode Island.

2) Flows reflect 2019 hydraulic model with a global adjustment to have demand match sendout for Capacity Exempt, FT-1 and rest of customers (SFT2) for the June 2020 forecast.

Table 5

RESULTS FOR WINTER 2023/24
Design Peak Hour Table Before RI Grows, Exeter, RI, Added Peak Hour Load

				2024/25		
Pipeline/LNG	Lateral	Take Station	Meter No.	Total Supply Deliveries Company & Marketers (Dth/hr)	Total Firm Peak Hour Model Flow (DTH/hr)	Total Firm Peak Hour Balance (-) = Shortfall (+) = Surplus (DTH/hr)
AGT	G	Barrington	00064	0	0	0
AGT	G	Warren	00012	770	798	-29
AGT		Burrillville	00044	0	29	-29
AGT	G	Crary St	00842	0	3,715	-3,715
AGT	G	Dey St	00004	5,461	2,222	3,240
AGT	G	Cumberland	00083	42	49	-8
AGT	G	Portsmouth	00013	1,045	1,045	0
AGT	G	Tiverton	00033	56	70	-14
AGT	G	E Providence	00010	1,698	1,395	302
AGT	E	Westerly	00008	144	129	15
AGT		Montville	00059	208	236	-28
TGP	Cranston	Cranston	420750	3,718	2,623	1,096
TGP	Cranston	Lincoln	420758	1,283	1,510	-227
TGP	Cranston	Smithfield	420910	450	1,666	-1,216
TGP		Cumberland	420135	1,343	1,343	0
PORTABLE LNG		Portsmouth		650	226	424
LNG		Exeter		1,000	1,000	0
LNG (incl. KLNG)		Providence		3,958	3,958	0
PORTABLE LNG		Cumberland		750	750	0
			Total:	22,576	22,765	-189

Notes

1) Flows reflect a managed system for Northern Rhode Island.

2) Flows reflect 2019 hydraulic model with a global adjustment to have demand match sendout for Capacity Exempt, FT-1 and rest of customers (SFT2) for the June 2020 forecast.

Table 6

RESULTS FOR WINTER 2020/21
Design Peak Hour Table After RI Grows, Exeter, RI, Added Peak Hour Load

				2020/21			
Pipeline/LNG	Lateral	Take Station	Meter No.	Total Supply Deliveries Company & Marketers (Dth/hr)	Total Firm Peak Hour Model Flow (DTH/hr)	Added Load not included in Forecast	Total Firm Peak Hour Balance (-) = Shortfall (+) = Surplus (DTH/hr)
AGT	G	Barrington	00064	0	0	0	0
AGT	G	Warren	00012	811	755	0	56
AGT		Burrillville	00044	0	28	0	-28
AGT	G	Crary St	00842	0	3,487	0	-3,487
AGT	G	Dey St	00004	5,388	2,067	0	3,321
AGT	G	Cumberland	00083	42	49	0	-8
AGT	G	Portsmouth	00013	1,045	1,044	0	1
AGT	G	Tiverton	00033	56	65	0	-10
AGT	G	E Providence	00010	1,698	1,085	0	613
AGT	E	Westerly	00008	144	124	0	20
AGT		Montville	00059	208	215	0	-7
TGP	Cranston	Cranston	420750	3,399	2,102	0	1,297
TGP	Cranston	Lincoln	420758	1,283	1,313	0	-30
TGP	Cranston	Smithfield	420910	450	1,570	0	-1,120
TGP		Cumberland	420135	1,343	1,343	0	0
PORTABLE LNG		Portsmouth		650	130	0	520
LNG		Exeter		1,000	1,000	0	0
LNG (incl. KLNG)		Providence		3,958	3,958	0	0
PORTABLE LNG		Cumberland		750	750	0	0
			Total:	22,226	21,085	0	1,141

Notes
1) Flows reflect a managed system for Northern Rhode Island.

2) Flows reflect 2019 hydraulic model with a global adjustment to have demand match sendout for Capacity Exempt, FT-1 and rest of customers (SFT2) for the July 2020 forecast for Rhode Island and the region focused July 2020 forecast for Aquidneck Island.

Table 7

RESULTS FOR WINTER 2021/22
Design Peak Hour Table After RI Grows, Exeter, RI, Added Peak Hour Load

				2021/22			
Pipeline/LNG	Lateral	Take Station	Meter No.	Total Supply Deliveries Company & Marketers (Dth/hr)	Total Firm Peak Hour Model Flow (DTH/hr)	Added Load not included in Forecast	Total Firm Peak Hour Balance (-) = Shortfall (+) = Surplus (DTH/hr)
AGT	G	Barrington	00064	0	0	0	0
AGT	G	Warren	00012	811	767	0	45
AGT		Burrillville	00044	0	28	0	-28
AGT	G	Crary St	00842	0	3,545	0	-3,545
AGT	G	Dey St	00004	5,401	2,107	0	3,294
AGT	G	Cumberland	00083	42	49	0	-8
AGT	G	Portsmouth	00013	1,045	1,044	0	1
AGT	G	Tiverton	00033	56	67	0	-11
AGT	G	E Providence	00010	1,698	1,168	0	530
AGT	E	Westerly	00008	144	125	0	19
AGT		Montville	00059	208	221	0	-13
TGP	Cranston	Cranston	420750	3,419	2,239	0	1,180
TGP	Cranston	Lincoln	420758	1,283	1,366	0	-83
TGP	Cranston	Smithfield	420910	450	1,595	0	-1,145
TGP		Cumberland	420135	1,343	1,343	0	0
PORTABLE LNG		Portsmouth		650	155	0	495
LNG		Exeter		1,000	1,000	0	0
LNG (incl. KLNG)		Providence		3,958	3,958	0	0
PORTABLE LNG		Cumberland		750	750	0	0
			Total:	22,259	21,527	0	732

Notes

1) Flows reflect a managed system for Northern Rhode Island.

2) Flows reflect 2019 hydraulic model with a global adjustment to have demand match sendout for Capacity Exempt, FT-1 and rest of customers (SFT2) for the July 2020 forecast for Rhode Island and the region focused July 2020 forecast for Aquidneck Island.

Table 8

RESULTS FOR WINTER 2022/23
Design Peak Hour Table After RI Grows, Exeter, RI, Added Peak Hour Load

				2022/23			
Pipeline/LNG	Lateral	Take Station	Meter No.	Total Supply Deliveries Company & Marketers (Dth/hr)	Total Firm Peak Hour Model Flow (DTH/hr)	Added Load not included in Forecast	Total Firm Peak Hour Balance (-) = Shortfall (+) = Surplus (DTH/hr)
AGT	G	Barrington	00064	0	0	0	0
AGT	G	Warren	00012	811	787	0	24
AGT		Burrillville	00044	0	29	0	-29
AGT	G	Crary St	00842	0	3,650	0	-3,650
AGT	G	Dey St	00004	5,444	2,176	0	3,269
AGT	G	Cumberland	00083	42	49	0	-8
AGT	G	Portsmouth	00013	1,045	1,044	0	2
AGT	G	Tiverton	00033	56	69	0	-13
AGT	G	E Providence	00010	1,698	1,305	0	392
AGT	E	Westerly	00008	144	128	0	16
AGT		Montville	00059	208	229	0	-21
TGP	Cranston	Cranston	420750	3,484	2,436	0	1,048
TGP	Cranston	Lincoln	420758	1,283	1,449	0	-166
TGP	Cranston	Smithfield	420910	450	1,638	0	-1,188
TGP		Cumberland	420135	1,343	1,343	0	0
PORTABLE LNG		Portsmouth		650	195	0	455
LNG		Exeter		1,000	1,000	0	0
LNG (incl. KLNG)		Providence		3,958	3,958	0	0
PORTABLE LNG		Cumberland		750	750	0	0
			Total:	22,367	22,236	0	131

Notes
1) Flows reflect a managed system for Northern Rhode Island.

2) Flows reflect 2019 hydraulic model with a global adjustment to have demand match sendout for Capacity Exempt, FT-1 and rest of customers (SFT2) for the July 2020 forecast for Rhode Island and the region focused July 2020 forecast for Aquidneck Island.

Table 9

RESULTS FOR WINTER 2023/24
Design Peak Hour Table After RI Grows, Exeter, RI, Added Peak Hour Load

				2023/24			
Pipeline/LNG	Lateral	Take Station	Meter No.	Total Supply Deliveries Company & Marketers (Dth/hr)	Total Firm Peak Hour Model Flow (DTH/hr)	Added Load not included in Forecast	Total Firm Peak Hour Balance (-) = Shortfall (+) = Surplus (DTH/hr)
AGT	G	Barrington	00064	0	0	0	0
AGT	G	Warren	00012	770	813	0	-44
AGT		Burrillville	00044	0	30	0	-30
AGT	G	Crary St	00842	0	3,755	0	-3,755
AGT	G	Dey St	00004	5,474	2,237	0	3,237
AGT	G	Cumberland	00083	42	49	0	-8
AGT	G	Portsmouth	00013	1,045	1,044	0	1
AGT	G	Tiverton	00033	56	70	0	-15
AGT	G	E Providence	00010	1,698	1,445	0	253
AGT	E	Westerly	00008	144	130	0	14
AGT		Montville	00059	208	236	0	-28
TGP	Cranston	Cranston	420750	3,736	2,482	0	1,254
TGP	Cranston	Lincoln	420758	1,283	1,522	0	-239
TGP	Cranston	Smithfield	420910	450	1,685	0	-1,235
TGP		Cumberland	420135	1,343	1,343	0	0
PORTABLE LNG		Portsmouth		650	225	0	425
LNG		Exeter		1,000	1,000	0	0
LNG (incl. KLNG)		Providence		3,958	3,958	0	0
PORTABLE LNG		Cumberland		750	750	0	0
			Total:	22,607	22,775	0	-168

Notes
1) Flows reflect a managed system for Northern Rhode Island.

2) Flows reflect 2019 hydraulic model with a global adjustment to have demand match sendout for Capacity Exempt, FT-1 and rest of customers (SFT2) for the July 2020 forecast for Rhode Island and the region focused July 2020 forecast for Aquidneck Island.

Table 10

RESULTS FOR WINTER 2024/25
Design Peak Hour Table After RI Grows, Exeter, RI, Added Peak Hour Load

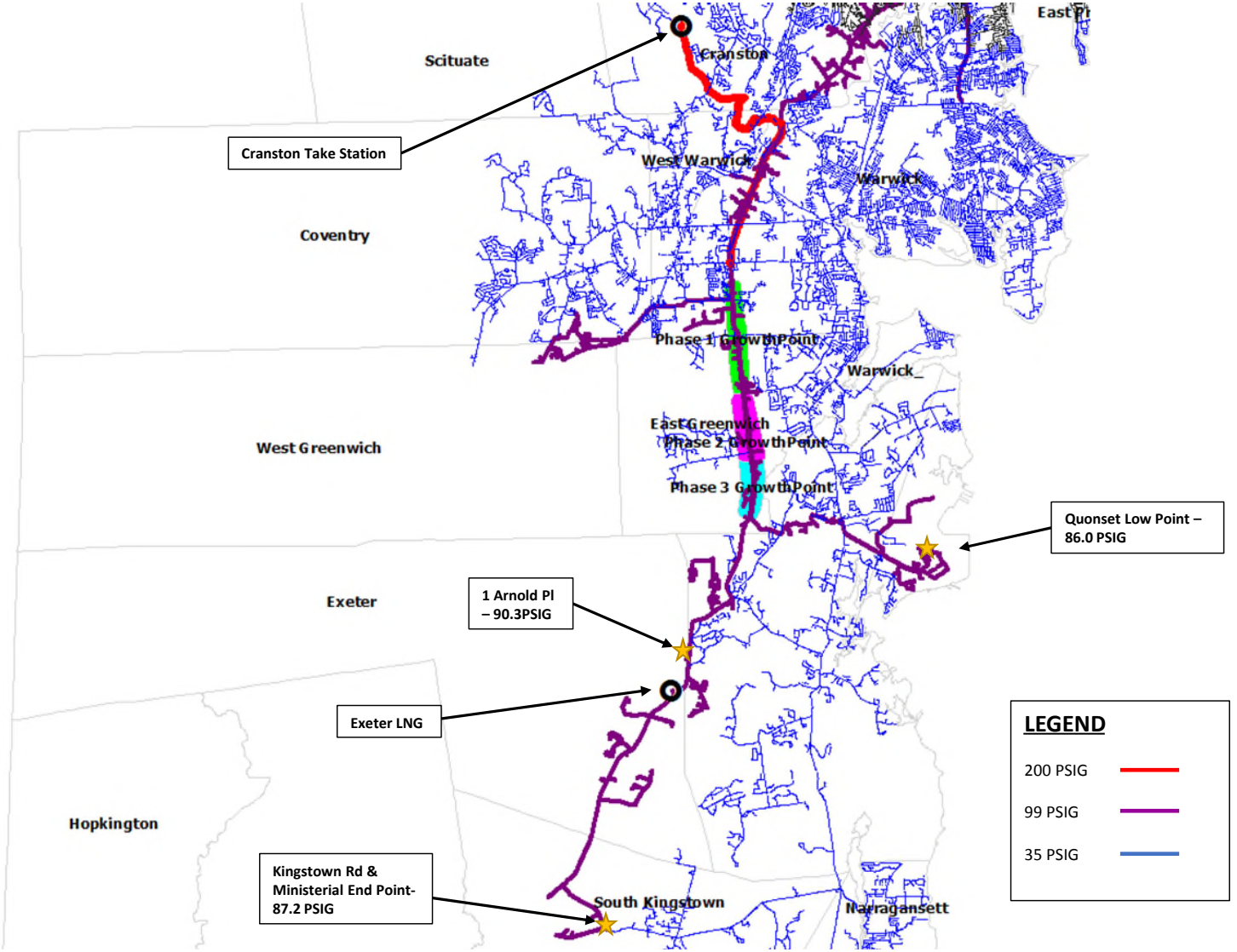
				2024/25			
Pipeline/LNG	Lateral	Take Station	Meter No.	Total Supply Deliveries Company & Marketers (Dth/hr)	Total Firm Peak Hour Model Flow (DTH/hr)	Added Load not included in Forecast	Total Firm Peak Hour Balance (-) = Shortfall (+) = Surplus (DTH/hr)
AGT	G	Barrington	00064	0	0	0	0
AGT	G	Warren	00012	770	798	0	-29
AGT		Burrillville	00044	0	29	0	-29
AGT	G	Crary St	00842	0	3,715	0	-3,715
AGT	G	Dey St	00004	5,461	2,222	0	3,240
AGT	G	Cumberland	00083	42	49	0	-8
AGT	G	Portsmouth	00013	1,045	1,045	0	0
AGT	G	Tiverton	00033	56	70	0	-14
AGT	G	E Providence	00010	1,698	1,395	0	302
AGT	E	Westerly	00008	144	129	0	15
AGT		Montville	00059	208	236	0	-28
TGP	Cranston	Cranston	420750	3,718	2,623	0	1,096
TGP	Cranston	Lincoln	420758	1,283	1,510	0	-227
TGP	Cranston	Smithfield	420910	450	1,666	0	-1,216
TGP		Cumberland	420135	1,343	1,343	0	0
PORTABLE LNG		Portsmouth		650	226	0	424
LNG		Exeter		1,000	1,000	0	0
LNG (incl. KLNG)		Providence		3,958	3,958	0	0
PORTABLE LNG		Cumberland		750	750	0	0
			Total:	22,576	22,765	0	-189

Notes

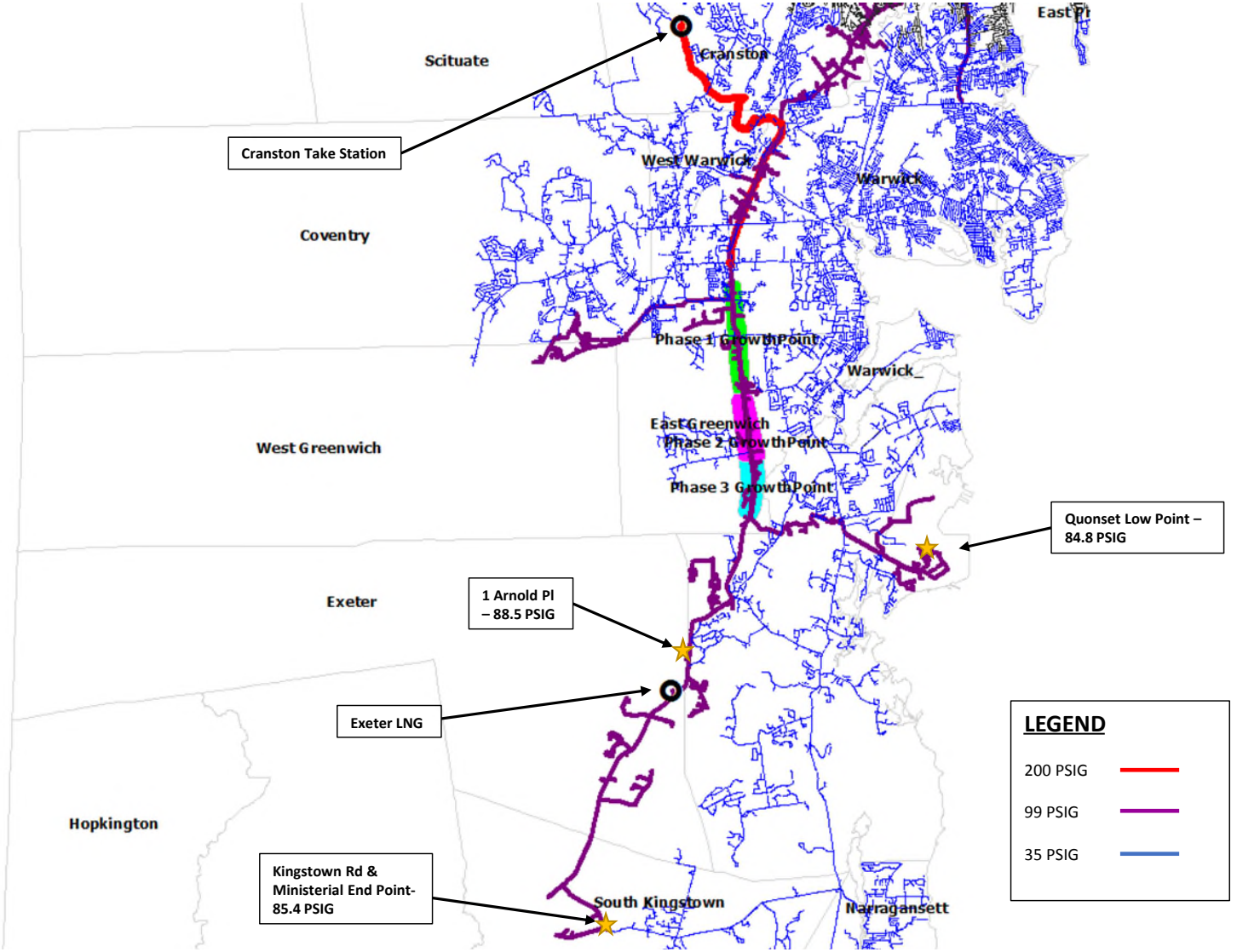
1) Flows reflect a managed system for Northern Rhode Island.

2) Flows reflect 2019 hydraulic model with a global adjustment to have demand match sendout for Capacity Exempt, FT-1 and rest of customers (SFT2) for the July 2020 forecast for Rhode Island and the region focused July 2020 forecast for Aquidneck Island.

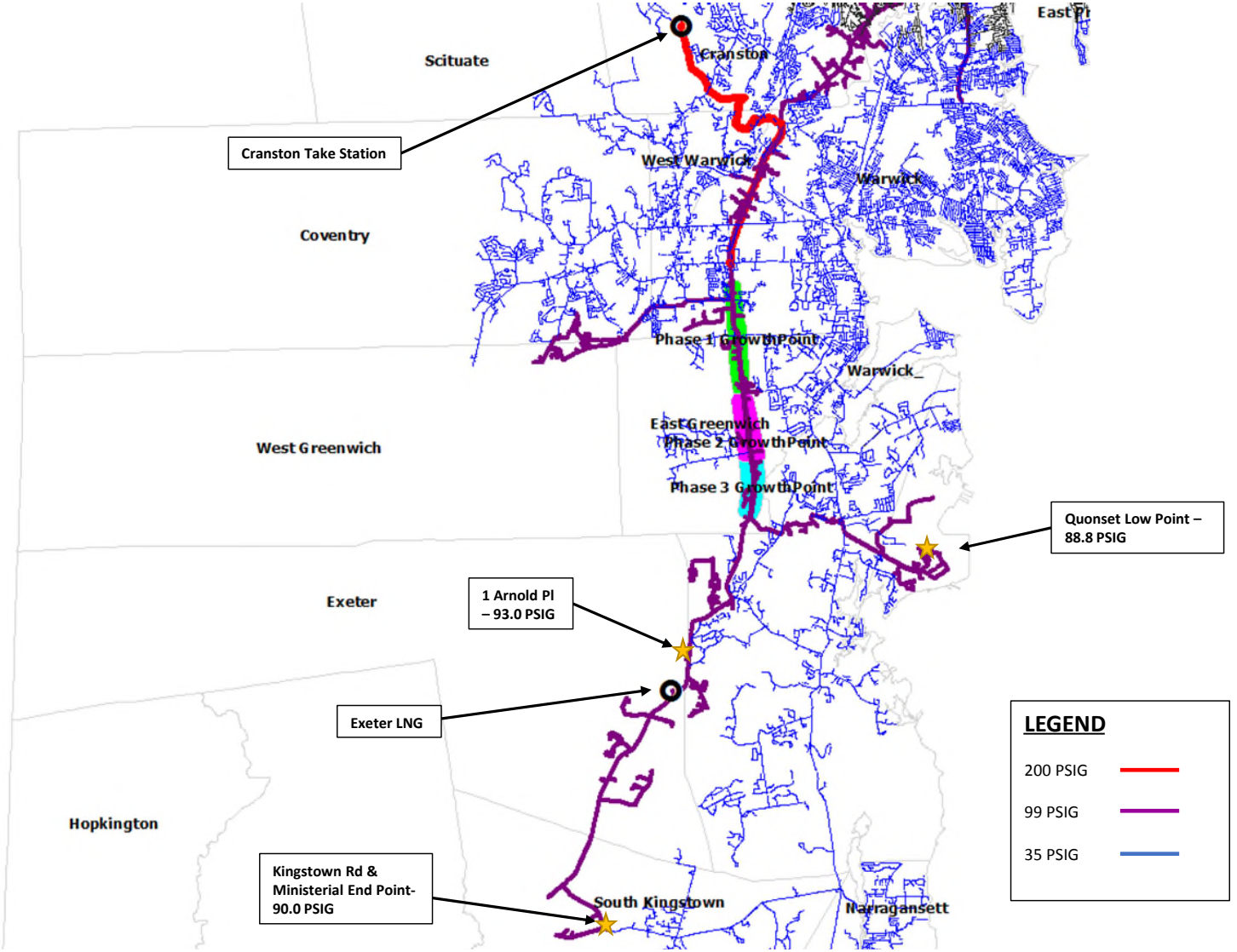
2022-23 Peak Hour
Phase 1,2 complete



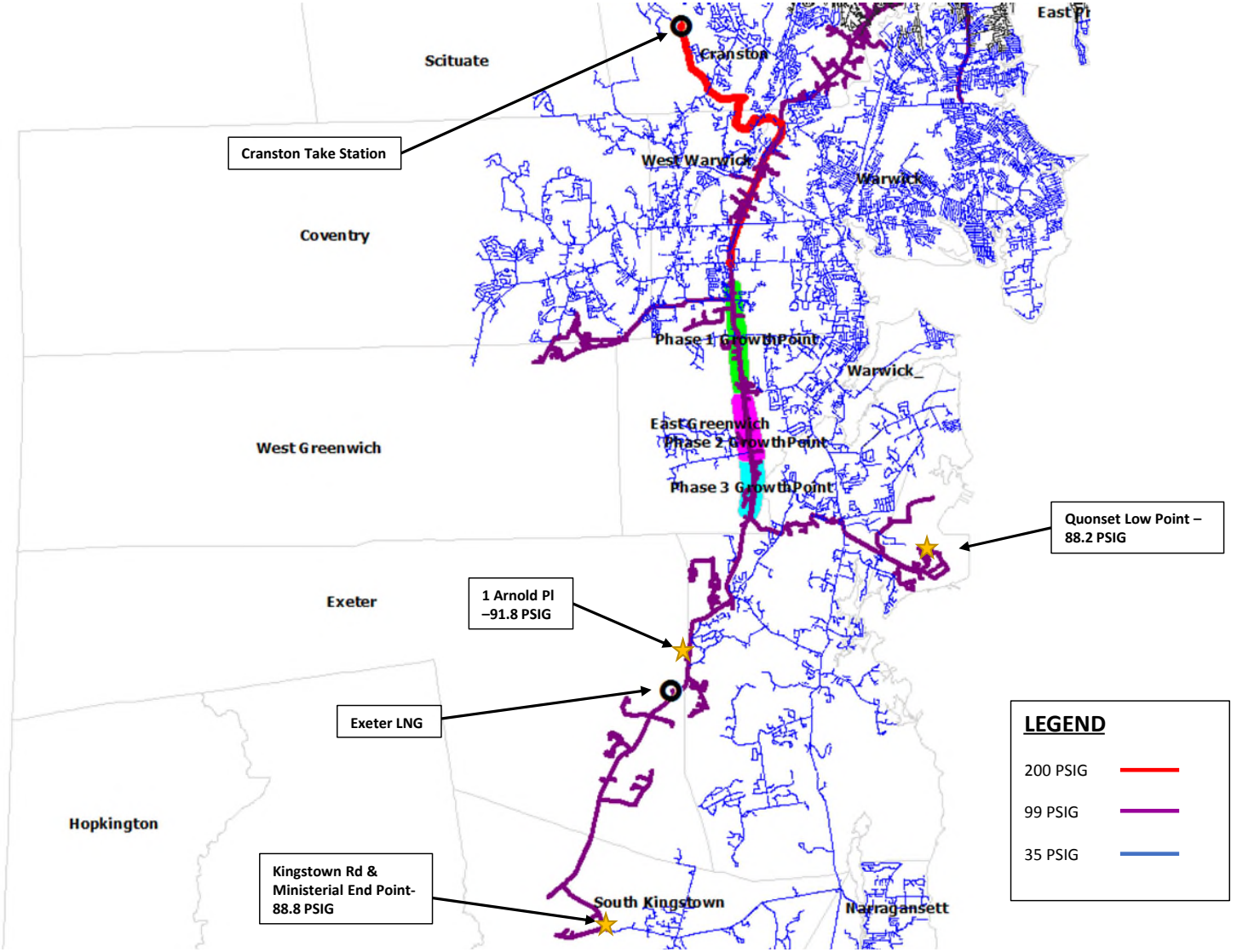
2022-23 Peak Hour
Phase 1,2 complete
w/ 1 Arnold PL CHP
unit



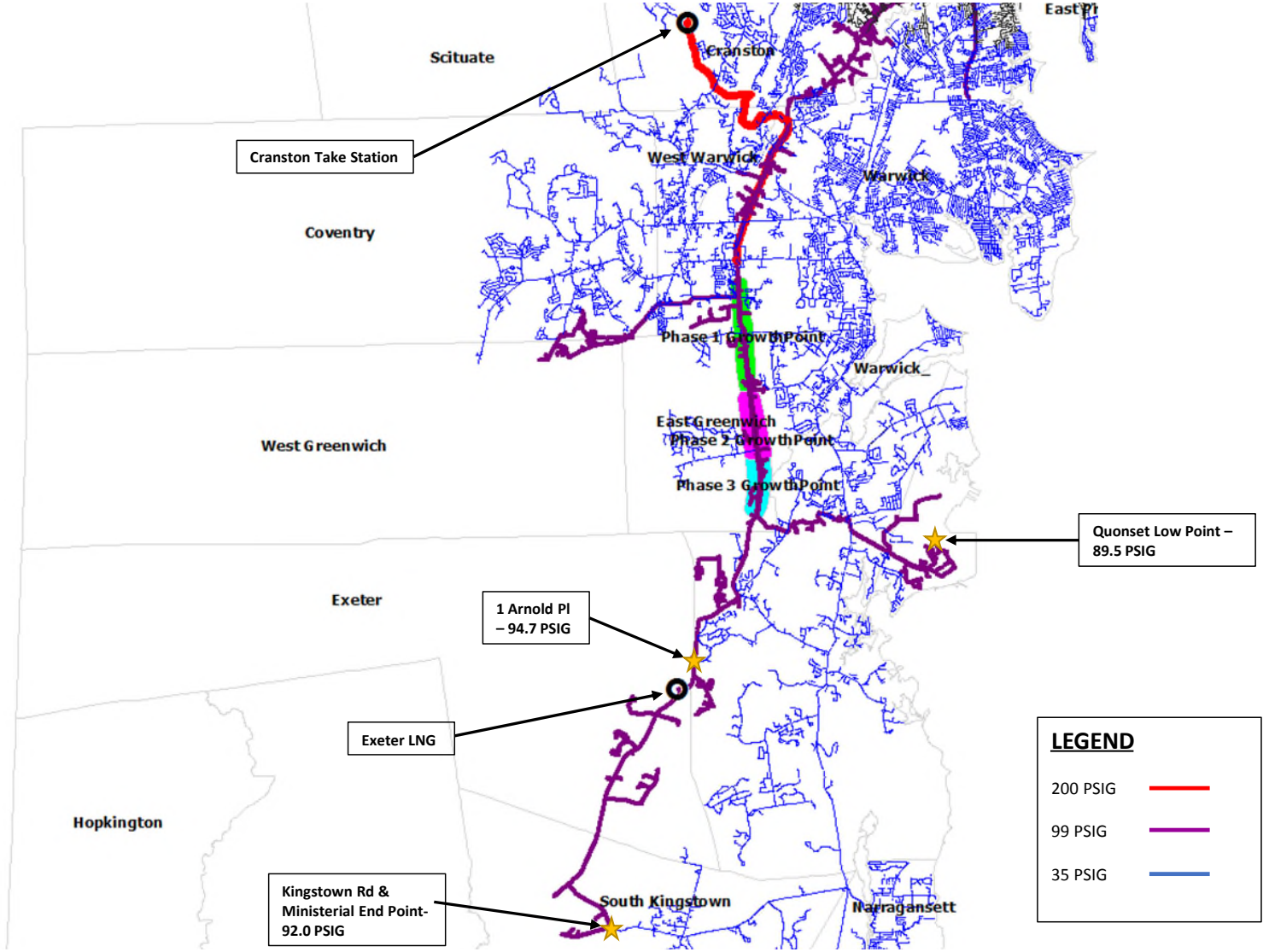
2022-23 Peak Hour
Phase 1,2,3 complete



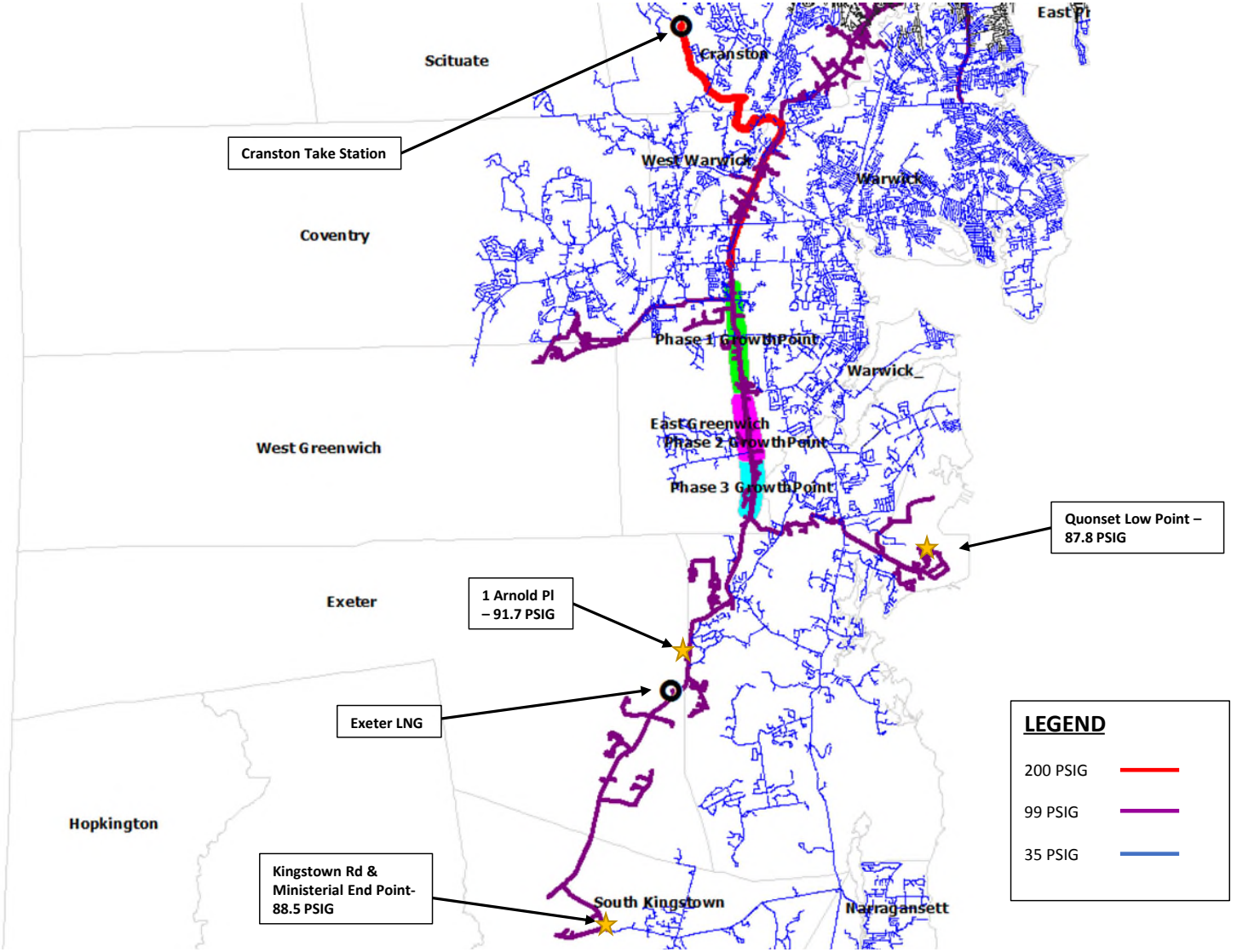
2022-23 Peak Hour
Phase 1,2,3 complete
w/ 1 Arnold PL CHP
unit



2025-26 Peak Hour
Phase 1,2,3 complete



2025-26 Peak Hour
Phase 1,2,3 complete
w/ 1 Arnold PL CHP unit



COMBINED HEAT AND POWER STUDY REPORT

prepared for

RI Grows

Exeter, RI

ERS
120 Water St., Suite 350
North Andover, MA 01845
Phone: (978) 521-2550
Fax: (978) 521-4588
www.ers-inc.com

Draft, Revision 3, 14/22/2021

Contents

RI Grows
Combined Heat and Power Study

1 EXECUTIVE SUMMARY

This report presents the potential impact of installing a combined heat and power (CHP) plant at the new 99,972 m^2 (24.7 acres) controlled environmental agriculture facility planned by RI Grows in Exeter, RI. ERS developed this report based on information provided by John Rizzo of RI Grows. At the time of this report, no design documents were made available to ERS.

RI Grows is interested in installing a 13.317 MW CHP plant to provide electricity, hot water and CO_2 for the greenhouse. The proposed system consists of four Jenbacher JMS620 GS-NL internal combustion engines with the following ISO standard rated capabilities:

- Electric generation: 3,329 kW/unit;
- Thermal generation: 12.306 MBH of hot water.
- Thermal storage: 660,000 gallons (2,500 m^3).

The plant is designed to operate only when the horticultural process lighting is in operation. Two engines will be equipped only with a Denox – SCR system to meet the emissions regulations. Two other two engines will be equipped with a Codinox – SCR system to be able to use the CO_2-rich flue gases inside the greenhouse.

Table 1, below, presents a summary of the preliminary evaluation of the CHP system. Overall, we estimate that the CHP plant would have an annual fuel utilization efficiency of approximately 70%. The simple payback of the system, before any National Grid incentives, is approximately 13 years. Details of the other assumptions used in this analysis are presented in the following sections.

The results presented in Table 1 are subject to change based on final equipment selection and design. A final assessment of the plant performance should be performed once the plant design becomes available.

Table 1. Summary of 8,760 CHP Analysis

	Notes	Units	CHP#1
CHP Performance			
Net installed electrical capacity[1]		*kW*	11,773
Yearly CHP Full Equivalent Load Hours		*hrs*	2,248
Annual gas input, HHV[2]		*Therms*	2,540,563
Annual thermal production		*Therms*	861,339
Annual electrical production		*kWh*	26,465,290
Annual GHG emission reduction[2]		*tons of CO_2e*	688
Annual electric efficiency		*%*	35.7%
Annual thermal efficiency		*%*	33.9%
Annual Fuel Utilization Efficiency		*%*	69.6%
Annual boiler thermal displacement[3]		*Therms*	936,238
Annual CHP CO_2 production		*tons of CO_2*	1,328
Annual gas penalty		*Therms*	-1,604,324
CHP Operating Costs			
Annual CHP fuel cost[4]	0.60 $/therm	*$*	$1,524,338
Annual CHP maintenance cost[5]	0.020 $/kWh generated	*$*	$529,306
Annual CO_2 recovery O&M cost[7]	15.3 $/engine run-hour	*$*	$68,789
CHP Benefits			
Annual electrical savings[4]	0.12 $/kWh	*$*	$3,175,835
Annual gas savings (boiler thermal displacement)[4]	0.60 $/therm	*$*	$561,743
Annual avoided CO_2 cost[7]	200 $/ton CO2	*$*	$265,532
CHP Economics			
Total annual cash flow		*$*	$1,880,678
CHP plant installed cost[6]		*$*	$24,236,298
Simple payback		***Years***	**12.9**
NGRID preliminary incentives		*$*	
Simple payback with NGRID incentives		***Years***	**12.9**
IRR (20 years life)		**%**	**4.2%**

Notes:

1. Accounts for parasitic loads
2. Calculated using the EPA CHP Energy and Emissions Savings Calculator
3. Assumed boiler efficiency: 92%
4. Provided by RI Grows
5. Provided by RI Grows
6. Provided by RI Grows; does not include interconnection costs
7. Provided by CHP plant designer (VEK Adviesgroep BV)

Items that should be revisited once RI Grows has obtained concrete proposals and designs from the equipment providers and installers are:

- Refine the thermal analysis load calculations based on final specification for the greenhouse structure. At the time of this study, a simplified thermal load calculation has

been performed using available information. This thermal load profile does not account for the following factors: plants evapo-transpiration cooling effect, humidity effect, sun incidence angle, opening of ventilation windows to control condensation, heat losses through the floor and knee wall (if specified), etc. In our estimation, these components will increase the heat load to be served by the CHP, potentially improving the overall system efficiency.

- A more in-depth look at the electric needs for the ancillary equipment, particularly hot water pumps that will affect the CHP electric loading.
- Confirm lighting systems operation. The proposed lighting fixtures can be dimmed down to 50% of nominal output. All calculations performed in this report are based on information provided by John Rizzo that the lighting fixtures will not be dimmed.

ERS will be happy to work with RI Grows and National Grid to revise the analysis once more design details become available.

2 FACILITY DESCRIPTION

RI Grows is developing a 24.7-acre controlled environment greenhouse to grow tomatoes at Schartner Farms in Exeter, RI. The facility will deploy a series of state-of-the-art indoor agriculture technologies designed to create a high-quality tomato product at the minimum operating costs. The most significant energy impacting features are:

- Artificial lighting control scheme to provide optimized growth results;
- Controlled shading to reduce both heat loss and solar radiation gains;
- Controlled ventilation, via operable windows.

The following section discuss each of these features and the anticipated operational schedules, as provided by RI Grows.

At the time of this report, no design documents we made available to ERS. All of the information provided in the following sections is presented in the attached CHP analysis spreadsheet, provided by RI Grows and vetted out by ERS.

2.1 Horticultural Process Lighting

The new horticultural process lighting consists of 11,088 1000-Watt High Pressure Sodium fixtures, equipped with electronic ballasts. At the time of this report, the basis of design for the light fixtures is Mega Photon 1,000 W, 400 Volt system. The power draw for this fixture is 1,032 Watts (https://www.mphoton.com/product-details.html), for a total of 11.442 MW when the fixtures are on. The lighting fixtures will not be dimmed.

The artificial lighting will operate on a proprietary control scheme, specifically designed for the facility in Exeter RI. Table 2 presents the expected operating schedule for the artificial lighting provided by RI Grows. Total number of hours when the artificial lighting is on is 2,248 hours/year. The CHP is anticipated to only run during these hours.

Table 2. Anticipated Horticultural Process Lighting Schedule

Lights Time Table													
Months		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
days /month		31	28	31	30	31	30	31	31	30	31	30	31
days /year		365											
On / Off		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0:01- 1:00		1	1	0	0	0	0	0	0	0	0	1	1
1:01- 2:00		1	1	0	0	0	0	0	0	0	0	1	1
2:01- 3:00		1	1	0	0	0	0	0	0	0	0	1	1
3:01- 4:00		1	1	0	0	0	0	0	0	0	0	1	1
4:01- 5:00		1	1	0	0	0	0	0	0	0	0	1	1
5:01- 6:00		1	1	1	0	0	0	0	0	0	1	1	1
6:01- 7:00		1	1	1	0	0	0	0	0	0	1	1	1
7:01- 8:00		1	1	1	0	0	0	0	0	0	1	1	1
8:01- 9:00		1	0	0	0	0	0	0	0	0	0	1	1
9:01-10:00		1	0	0	0	0	0	0	0	0	0	1	1
10:01-11:00		1	0	0	0	0	0	0	0	0	0	1	1
11:01-12:00		1	0	0	0	0	0	0	0	0	0	0	1
12:01-13:00		1	0	0	0	0	0	0	0	0	0	0	1
13:01-14:00		1	0	0	0	0	0	0	0	0	0	0	1
14:01-15:00		1	0	0	0	0	0	0	0	0	0	1	1
15:01-16:00		1	0	0	0	0	0	0	0	0	0	1	1
16:01-17:00		1	0	0	0	0	0	0	0	0	0	1	1
17:01-18:00		1	1	1	0	0	0	0	0	0	1	1	1
18:01-19:00		1	1	1	0	0	0	0	0	0	1	1	1
19:01-20:00		0	0	0	0	0	0	0	0	0	0	0	0
20:01-21:00		0	0	0	0	0	0	0	0	0	0	0	0
21:01-22:00		0	0	0	0	0	0	0	0	0	0	0	0
22:01-23:00		0	0	0	0	0	0	0	0	0	0	0	0
23:01-24:00		0	0	0	0	0	0	0	0	0	0	0	0
Hours on	/day	19	10	5	0	0	0	0	0	0	5	16	19
Hours on	/month	589	280	155	0	0	0	0	0	0	155	480	589
Total Hours on	/year	2,248											

2.2 Shading control strategy

The proposed shading control strategy incorporates two components:

- Thermal shading to be deployed at night between 8 PM and 6 AM, every hour when the outside air temperature is below the greenhouse temperature of 18°C (64.4°F). The anticipated effect of the thermal on the assembly thermal U-factor is as follows:

  No thermal shade: assembly U-factor of 7.29 W/m²·°K (1.285 Btu/h·ft2·°F)

  With thermal shade: assembly U-factor of 4.22 W/m²·°K (0.744 Btu/h·ft2·°F)

- Solar shading to be deployed on the opposite schedule from the thermal shading. The shading coefficient for the solar shades is 0.8.

More details regarding the U-factor calculations are presented in the attached spreadsheet (*RI Grows Energy Analysis_v5 4-22-2021.xlsx*). At the time for this report, we have not seen the specification sheets for these shades.

2.3 Controlled ventilation

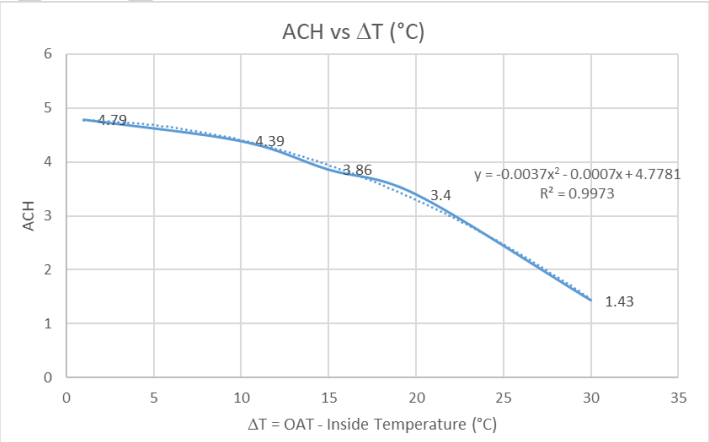
The proposed design incorporates an automatic natural ventilation strategy via computer-controlled motorized windows. The strategy uses an algorithm based on temperature difference between the outside air temperature and the greenhouse inside temperature (ΔT). The lower the ΔT (higher outside air), the higher the window opening. RI Grows has provided the strategy and the calculator used by the grower to determine the outside air infiltration flow rates, which were then converted into air-changes per hour (ACH). Table 3 presents the anticipated ACH based on the proposed windows sequence of operation. A detailed description of the operation is provided in the attached spreadsheet (*RI Grows Energy Analysis_v5 4-22-2021.xlsx*).

Table 3. Windows Sequence of Operation

OAT (°C)	OA Temp Diff (°C) (OAT to Inside)	Window % Open	ACH
-20	40	5	1.7
-10	30	5	1.43
0	20	10	3.4
5	15	12	3.86
10	10	15	4.39
20	1	35	4.79

ERS has created a regression function for ACH versus ΔT to be used in the facility thermal loads calculation. This allows for flexibility in the calculation of the ACH if the greenhouse temperature changes. Figure 1 presents the regression curve and coefficients.

Figure 1. ACH Regression Curve



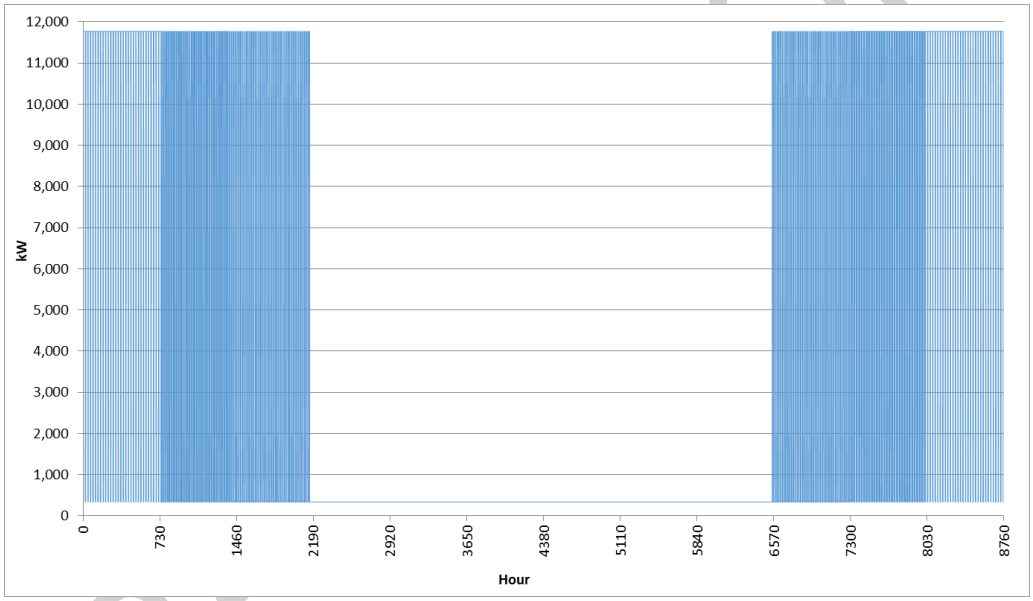
2.4 Other building loads

At the time of this report, we have not received any detailed information regarding other building loads: pumps, fans, support area loads, etc. The only information provided so far is that the anticipated electrical additional loads would be approximately 330 kW.

3 Electric Load Profile

The modeled facility electric load profile is presented in Figure 2. As discussed in the previous section, the CHP will operate only when the horticultural process lighting is on. The other facility loads have a minimum impact on the CHP as the plant is not expected to run outside of the lighting hours.

Figure 2. Hourly Electric Load Profile



4 Thermal Load Profile

RI Grows has provided an hourly thermal load analysis for the facility using TMY3 weather data for Providence RI. The analysis incorporates the following components:

- Heat transfer through conduction using a U×A×ΔT methodology, using the U-factors presented in Section 2.2 above;
- Heat transfer via solar radiation, using the solar shading coefficients presented in Section 2.2 above;
- Heat transfer via infiltration, using the ACH profile presented in Section 2.3;

- Heat added by the lighting fixtures.

The final thermal load profile for the facility is presented in Figure 3. Figure 4 presents the modeled thermal load duration curve for the facility. The facility does not need any heat for approximatively 50% of the annual hours.

Figure 3. Hourly Thermal Load Profile

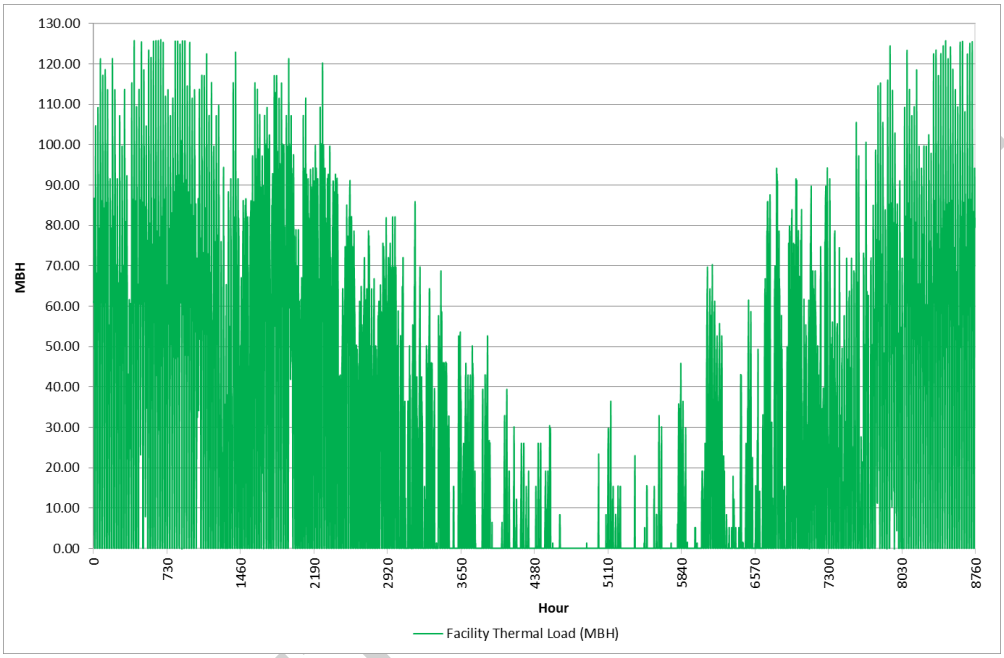
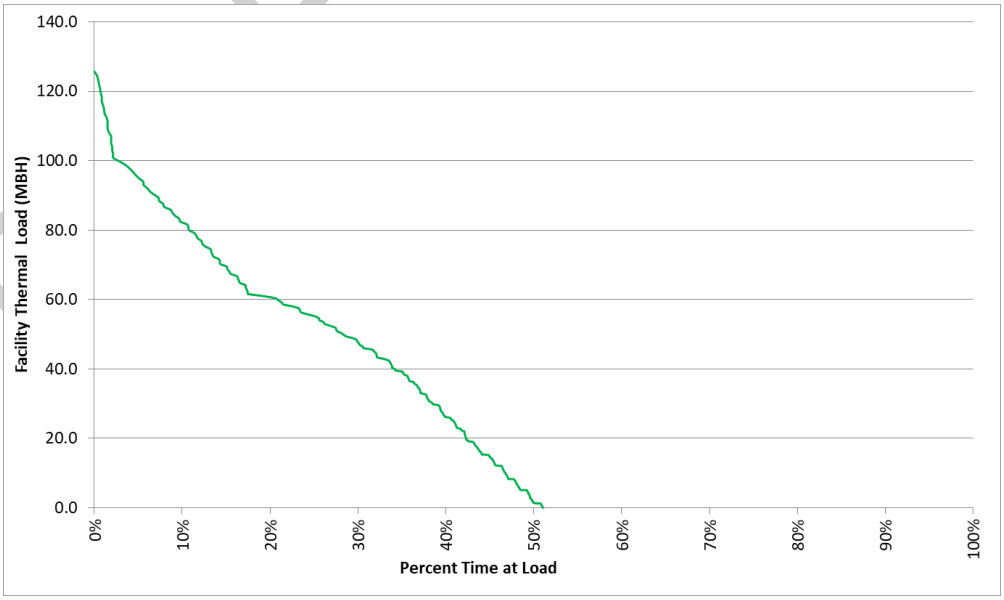


Figure 4. Thermal Load Duration Curve



5 CO_2 Load Profile

RI Grows has provided an hourly CO_2 load profile for the facility calculated based on the plant's CO_2 demand, presented in Table 4. Overall, the facility estimates that it would need approximately 4,060 tons CO_2 annually.

Table 4. Anticipated Horticultural CO_2 Load Profile

kg CO2													
Months		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
days	/month	31	28	31	30	31	30	31	31	30	31	30	31
days	/year	365											
On / Off		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0:01- 1:00		511	511	0	0	0	0	0	0	0	0	511	511
1:01- 2:00		511	511	0	0	0	0	0	0	0	0	511	511
2:01- 3:00		511	511	0	0	0	0	0	0	0	0	511	511
3:01- 4:00		511	511	0	0	0	0	0	0	0	0	511	511
4:01- 5:00		511	511	0	0	0	0	0	0	0	0	511	511
5:01- 6:00		511	511	693	0	0	0	0	0	0	693	511	511
6:01- 7:00		511	511	693	809	746	746	746	746	809	693	511	511
7:01- 8:00		511	511	693	809	746	746	746	746	809	693	511	511
8:01- 9:00		511	511	693	809	746	746	746	746	809	693	511	511
9:01-10:00		511	511	693	809	746	746	746	746	809	693	511	511
10:01-11:00		511	511	693	809	746	746	746	746	809	693	511	511
11:01-12:00		511	511	693	809	746	746	746	746	809	693	511	511
12:01-13:00		511	511	693	809	746	746	746	746	809	693	511	511
13:01-14:00		511	511	693	809	746	746	746	746	809	693	511	511
14:01-15:00		511	511	693	809	746	746	746	746	809	693	511	511
15:01-16:00		511	511	693	809	746	746	746	746	809	693	511	511
16:01-17:00		511	511	693	809	746	746	746	746	809	693	511	511
17:01-18:00		511	511	693	809	746	746	746	746	809	693	511	511
18:01-19:00		511	511	693	809	746	746	746	746	809	693	511	511
19:01-20:00		0	0	0	0	746	746	746	746	0	0	0	0
20:01-21:00		0	0	0	0	0	0	0	0	0	0	0	0
21:01-22:00		0	0	0	0	0	0	0	0	0	0	0	0
22:01-23:00		0	0	0	0	0	0	0	0	0	0	0	0
23:01-24:00		0	0	0	0	0	0	0	0	0	0	0	0
kg	/day	9,702	9,702	9,702	10,511	10,448	10,448	10,448	10,448	10,511	9,702	9,702	9,702
kg	/month	300,762	271,656	300,762	315,315	323,898	313,449	323,898	323,898	315,315	300,762	291,060	300,762
Total kg	/year	3,681,536											

6 New CHP Plant Specifications and Costs

This section discussed the main components of the new CHP plant.

6.1 Engine Specifications

Table 5 presents the specifications for the GE Jenbacher JMS620 GS-NL engines. The plan is to install four units.

Table 5. Engines Specifications

Load		100%	75%	50%
Power input	MBTU/hr	25.158	19.296	13.434
Gas volume	scfhr	27.435	21.042	14.650
Mechanical output	bhp	4.601	3.450	2.300
Electrical output	kW el.	3.329	2.489	1.643
Recoverable thermal output (calculated with Glykol 37%)				
~ Intercooler	MBTU/hr	3.314	1.866	790
~ Lube oil (with gearbox)	MBTU/hr	1.188	1.060	897
~ Jacket water	MBTU/hr	1.774	1.553	1.303
~ Exhaust gas cooled to 122 °F	MBTU/hr	6.030	5.208	4.023
Total recoverable thermal output	MBTU/hr	12.306	9.687	7.013
Heat to be dissipated (calculated with Glykol 37%)				
~ Intercooler	MBTU/hr	484	318	135
~ Lube oil (with gearbox)	MBTU/hr	~	~	~
~ Surface heat	MBTU/hr	859	~	~
Spec. fuel consumption of engine electric	BTU/kWel.h r	7556	7753	8175
Spec. fuel consumption of engine	BTU/bhp.hr	5468	5592	5841
Lube oil consumption	gal/hr	21	~	~
Electrical efficiency		45.20%	44.00%	41.70%
Thermal efficiency HT		48.90%	50.10%	52.20%
Total efficiency HT		94.10%	94.10%	93.90%
Hot water circuit:				
Forward temperature	°F	203	198	184
Return temperature	°F	149	149	149
Hot water flow rate	GPM	456	456	456

RI Grows does not have complete proposals and designs from the CHP provider. We do not know the full extent of ancillary power (pumps, controls) for the CHP plant. At his time, the ancillary power is estimated to be approximately 5% of the unit nameplate.

The current analysis includes a 660,000-gallon (2,500 m^3) hot water storage (maximum temperature 200°F) that will be used for two purposes:

- To store thermal energy from the CHP when the building load is lower than the plant output;
- To store hot water generated by the boilers when the facility needs CO_2 generated by the boilers but does not have use for the hot water.

Two engines will be equipped with a CO_2 recovery system.

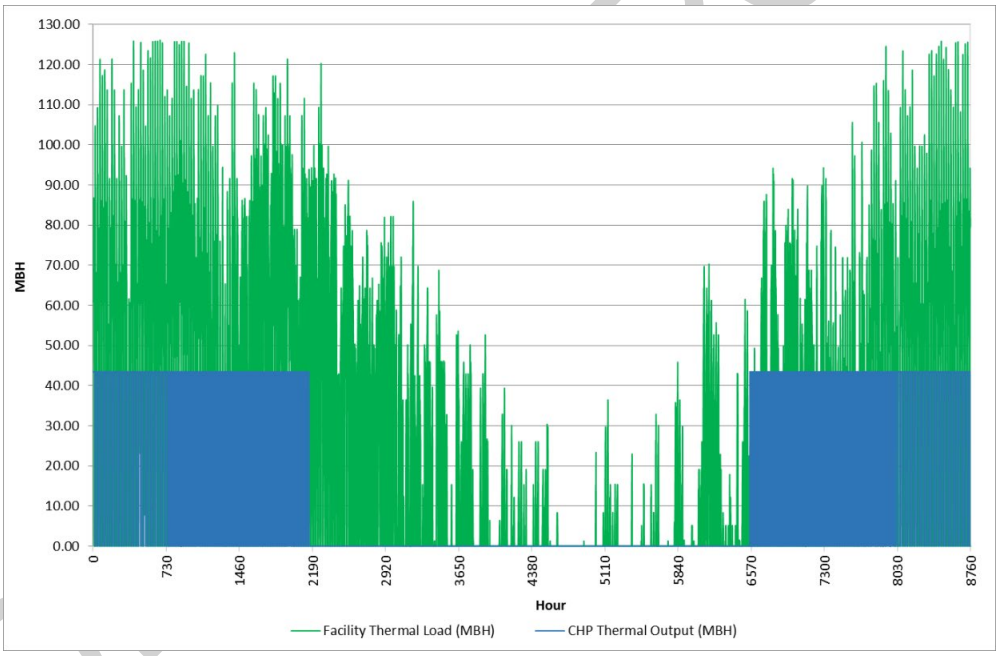
6.2 Project Costs

RI Grows has provided the most current estimate for the CHP plant costs of $25,236,298, including $1,000,000 estimated interconnection costs. The quote is attached to this report (*Schartner Farms CHP Energy Plant Cost Breakdown.pdf*).

7 CHP Calculation and Assumptions

RI Grows has provided an 8,760 analysis of this CHP plant using the electric and thermal load profiles described in the sections above. We have vetted out the calculations and concluded that the methodology is adequate, and the results are reasonable. The plant will only run for 2,248 hours/year and will produce approximately 26,465 MWh of electricity. When running, the plant will produce approximately 43.52 MBH of hot water, which will be fully utilized by the facility. Figure 5 presents the CHP thermal output overlaid on top of the facility thermal load.

Figure 5. Hourly Facility Thermal Load and CHP Thermal Output



The analysis includes the benefits associated with reclaiming the CO_2. Based on conversations with the CHP plant designer – Pascal van Oers of VEK Adviesgroep BV – the exhaust flue gases from the engines equipped with the CO_2 recovery system will be cooled off and cleaned to be used in the greenhouse. If CO_2 is not needed, the exhaust will be diverted to the stack. The attached file (*RI Grows CHP Carbon Capture Correspondence.pdf*) shows the designer's responses to our questions regarding the CO_2 recovery system.

Table 6 shows the estimated CO_2 production from the CHP plant that will be used by plants. This will replace CO_2 the facility would have to import in the form of bottled CO_2.

Table 6. Anticipated CHP Plant CO_2 Production Used by Plants

Total CHP CO2 Production (kg)													
Months		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
days	/month	31	28	31	30	31	30	31	31	30	31	30	31
days	/year	365											
MMBTU		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0:01- 1:00		511	511	0	0	0	0	0	0	0	0	511	511
1:01- 2:00		511	511	0	0	0	0	0	0	0	0	511	511
2:01- 3:00		511	511	0	0	0	0	0	0	0	0	511	511
3:01- 4:00		511	511	0	0	0	0	0	0	0	0	511	511
4:01- 5:00		511	511	0	0	0	0	0	0	0	0	511	511
5:01- 6:00		511	511	693	0	0	0	0	0	0	693	511	511
6:01- 7:00		511	511	693	0	0	0	0	0	0	693	511	511
7:01- 8:00		511	511	693	0	0	0	0	0	0	693	511	511
8:01- 9:00		511	0	0	0	0	0	0	0	0	0	511	511
9:01-10:00		511	0	0	0	0	0	0	0	0	0	511	511
10:01-11:00		511	0	0	0	0	0	0	0	0	0	511	511
11:01-12:00		511	0	0	0	0	0	0	0	0	0	0	511
12:01-13:00		511	0	0	0	0	0	0	0	0	0	0	511
13:01-14:00		511	0	0	0	0	0	0	0	0	0	0	511
14:01-15:00		511	0	0	0	0	0	0	0	0	0	511	511
15:01-16:00		511	0	0	0	0	0	0	0	0	0	511	511
16:01-17:00		511	0	0	0	0	0	0	0	0	0	511	511
17:01-18:00		511	511	693	0	0	0	0	0	0	693	511	511
18:01-19:00		511	511	693	0	0	0	0	0	0	693	511	511
19:01-20:00		0	0	0	0	0	0	0	0	0	0	0	0
20:01-21:00		0	0	0	0	0	0	0	0	0	0	0	0
21:01-22:00		0	0	0	0	0	0	0	0	0	0	0	0
22:01-23:00		0	0	0	0	0	0	0	0	0	0	0	0
23:01-24:00		0	0	0	0	0	0	0	0	0	0	0	0
kg	/day	9,702	5,106	3,465	0	0	0	0	0	0	3,465	8,170	9,702
kg	/month	300,762	142,977	107,415	0	0	0	0	0	0	107,415	245,103	300,762
Total kg	/year	1,204,434											

Here are the major assumptions used in our analysis:

- No minimum electrical import requirement.
- No electrical export.
- Existing boilers efficiency: 92%, assumed for condensing boiler anticipated in the proposed design.
- Total parasitic loads for the CHP unit (pumps, controls, etc.) account for 5% of the machine's nameplate.
- The CHP will be available anytime the artificial lighting is on.
- Gas and electricity costs provided by RI Grows.
- Maintenance costs provided by RI Grows.
- CO_2 reclamation cost and bottled CO_2 costs provided by Pascal van Oers of VEK Adviesgroep BV, the designer of the CHP plant.
- The simulation assumes an electric following operation.
- The CHP heat recovery will be at 113°F, flue gases are cooled to 122°F.

Major observations from our analysis:

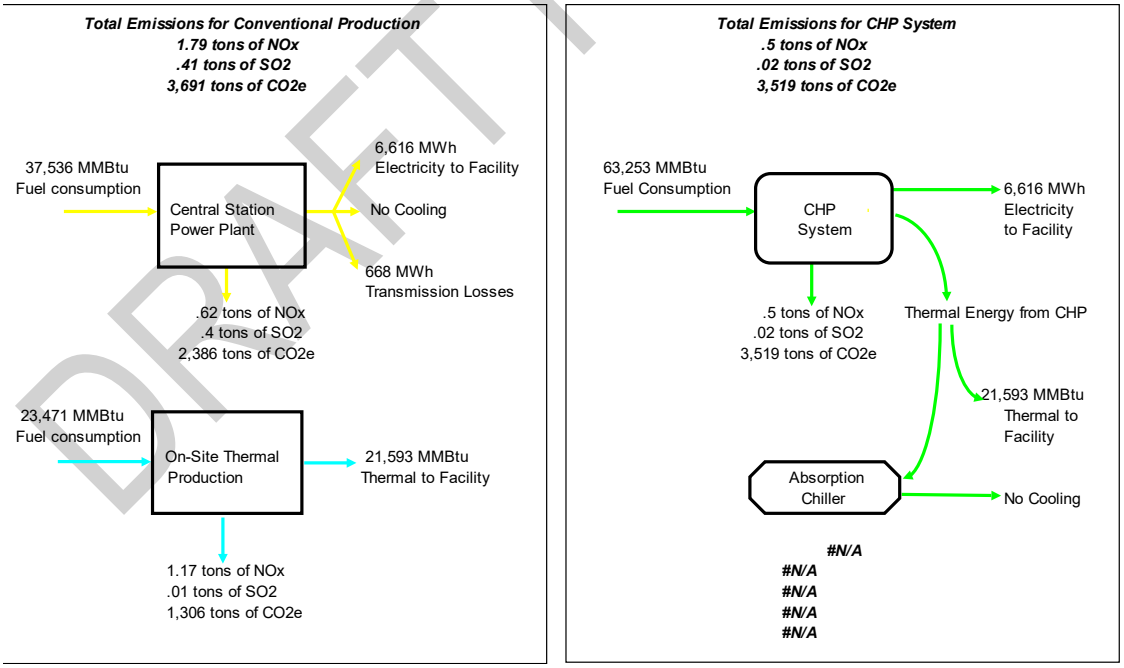
- The simulation shows that the average loading factors for the CHP units are 89%.
- The overall fuel utilization efficiency is approximately 70%.
- The project has a simple payback of approximately 13 years, before any National Grid incentives and an IRR of 4.2%, assuming a 20-year life.

Table 1, at the beginning of this report, presents the results of our analysis. The attached spreadsheet (*RI Grows Energy Analysis_v5 3-22-2021.xlsx*) provides the detailed 8,760 analysis.

ERS used the Department of Energy CHP energy and emissions calculator[1] to determine the environmental impacts of the CHP plant. We customized the emissions factors per the most recent New England ISO report[2].

The attached spreadsheet (*CHP_energy_and_emissions_savings_calculator_RI Grows_v1.xlxm*) shows the results for one engine (total production divided by four), due to tool limitations on how to handle multiple units. Figure 6 presents a summary of the results. Each engine will save approximately 172 tons of CO_2e, for a total of 688 tons of CO_2e for the entire plant. These calculations account for the CO_2 recovery from both the boilers and the CHP.

Figure 6. Greenhouse Gas Emissions



[1] https://www.epa.gov/chp/chp-energy-and-emissions-savings-calculator

[2] https://www.iso-ne.com/static-assets/documents/2020/05/2018_air_emissions_report.pdf

Exhibit G

CHP Project Economic Impacts (2020-2039) dated March 27, 2021

Exhibit G is an Excel file and is too large to create a legible PDF file.

Please see Excel version of Exhibit G

REMI ANALYSIS OF RI GROWS CHP PROJECT

NOVEMBER 9, 2020

NATIONAL GRID

REMI Analysis of the RI Grows Project

The Company conducted a REMI analysis of the RI Grows CHP project to estimate its economic benefits. REMI is regional economic model of Rhode Island that includes industry output, employment, wages, industry linkages, energy prices and consumer and business demand. [1] By entering projections of RI Grows investment spending, benefits and costs into the model, REMI predicts their impact on the Rhode Island economy in terms of jobs, income, gross domestic product (GDP) and other Rhode Island economic indicators.

Summary of Results

Table 1 summarizes REMI estimated economic impacts for the RI Grows project over its 20-year life. The project is expected to yield net economic benefits to the State of Rhode Island totaling 225 job years, $23.37 million in GDP and $6.49 million in real personal income. This is the sum of all RI Grows economic impacts to the State of Rhode Island, positive and negative, as detailed in Table 1. Besides jobs, income and GDP created during CHP plant construction, the project will continue to generate economic benefits after it is placed in service. This includes economic benefits from operation and maintenance of the plant, net gas and electric sector impacts and reductions in market electricity prices. Weighing against these benefits is the negative impact of the project's $25.24 million cost.

Table 1
RI Grows Economic Impacts (2020-2039)
State of Rhode Island

RI Grows Economic Impacts	Amount ($2020m)	Job Years *	GDP ($2020m)	Personal Income ($2020m)	State Tax Revenue ($2020m)
Local CHP Construction Spending	$15.14	195	$19.54	$15.27	$0.96
Increased O&M spending	$10.17	136	$14.08	$11.68	$0.74
Increased natural gas spending	$27.23	34	$3.79	$3.19	$0.20
Reduced electricity spending	-$43.72	-17	-$3.41	-$1.32	-$0.08
RI Grows Benefits and DRIPE	$6.28	79	$10.95	$17.68	$1.11
Project Costs	$25.24	-202	-$21.58	-$40.02	-$2.52
Net Economic Benefits - State of Rhode Island		225	$23.37	$6.49	$0.41

* A "job year" is one job for a period of one year. Over time, job yeas equal the sum of annual jobs created each year of the project.

CHP Construction

Local CHP construction spending, which includes planning and installation of the plant, is expected to total $15.14 million. This will create jobs in construction, engineering and other professional services, as well as secondary jobs in the local service sector as workers spend their income. Overall, REMI estimates that planning and construction of the CHP plant will lead to the creation of 195 Rhode Island job years while adding $19.54 million to Rhode Island GDP and $15.27 million to Rhode Island real personal income.

[1] REMI is owned by Regional Economic Models, Incorporated and leased to its clients throughout the United States. Model details, documentation, publications, research and client lists are available at www.remi.com.

Operation and Maintenance

Spending on operation and maintenance (O&M) of the plant is expected to total $10.17 million in real terms over the 20-year plant life. The REMI model estimates this will create an additional 136 job years, $14.08 million of GDP and $11.68 in real personal income during the life of the project in the State of Rhode Island.

Increased Natural Gas Spending

Increased winter natural gas demand from the CHP plant, estimated at $27.23 million in real terms, will lead more gas infrastructure demand and construction activity. Including secondary effects, this is expected to add 34 job years, $3.79 million in GDP and $3.19 million in personal income to the Rhode Island economy.

Reduced Electricity Spending

Reduced spending on electricity due to the CHP plant, including electric DRIPE savings, total -$43.72 million over project life. This is lost revenue to the electric power generation and transmission sector. However, this has a relatively small economic impact on Rhode Island because most of electric power and generation sector lies outside of the state. The local Rhode Island electric distribution industry does not lose revenue because of decoupled rates. Moreover, there is no reduced demand for electric distribution infrastructure and negative impact on construction activity because the avoided electric demand occurs in the winter. Overall, reduced electric spending is projected to reduce economic benefits by 17 jobs years, $3.41 million in GDP and $1.32 million in personal income.

RI Grows Benefits and DRIPE

RI Grows net benefits and market DRIPE impacts total $6.28 million over the life of the plant. This consists primarily of electric DRIPE impacts which are market electricity price decreases induced by the reduction in electricity demand. These electricity price savings benefit all Rhode Island electric customers, boosting local spending and the regional competitiveness of business firms. REMI estimates that this will lead to the creation of 79 jobs years, $10.95 million in Rhode Island GDP and $17.68 million in personal income over the life of the project.

Project Costs

The $25.24 million cost of the project will be split between all electric customers and RI Grows. This reduces economic benefits by 202 jobs years, $21.58 million in GDP and $40.02 million in real income.

REMI Model Details

The REMI model was developed by Regional Economic Models, Incorporated based on public data and peer-reviewed methodology. The model has been used in the industry for over 30 years to estimate the economic impact of various investments, programs and policy proposals. REMI has over 150 US and international clients including the Rhode Island Department of Revenue; dozens of state, federal and local government planning agencies; non-profit research organizations; economic and energy consultants; universities and utilities.

REMI economic impact estimates are based on an input-output model that captures the Rhode Island industry structure and how a change in demand in one industry changes demand in other industries related to it. The REMI model also includes consumer demand functions and production cost functions that estimate how changes in energy costs impact local consumer demand, business spending and economic activity. Finally, the model includes regional purchase coefficients (RPCs) that measure the portion of local demand that is met by local suppliers versus suppliers from outside of Rhode Island.

REMI estimates total economic impacts, including direct, indirect and induced impacts. Direct impacts are tied directly to the project, for example the number of construction workers and electrical contractors hired to install the CHP plant. Indirect impacts are felt in the local supply chain, for example, industries providing goods and services for CHP construction. Induced impacts are felt mainly in the local service sector, for example, increased retail activity and hiring as the direct and indirect workers spend a portion of their incomes locally.

RI Grows Methodology

The REMI analysis of the RI Grows CHP project followed the approach recommended by the Brattle Group, an economic consulting firm, for estimating the economic development benefits of Rhode Island CHP investments and for including them in the CHP benefit-cost analysis.[2] Brattle's approach avoids overestimation of CHP economic benefits by considering all economic impacts related to the investments, both positive and negative. For example, besides the positive economic impact of CHP construction activity, consideration is also given to the negative economic impact of reduced power sector activity related to decreased electricity demand.

In terms of the CHP benefit-cost analysis (BCA), Brattle recommends including the full economic impact CHP spending in the BCA but only the indirect and induced impact of CHP benefits and costs. These indirect and induced impacts result when CHP benefits or costs lead to changes in Rhode Island economic activity. For example, the indirect and induced impact of a reduction in residential electricity costs due to DRIPE is the economic activity generated when customers spend a portion of their electricity cost savings locally. While the DRIPE savings themselves are already in the BCA as a benefit, the indirect and induced economic activity generated by these DRIPE savings are not.

Finally, Brattle recommends using Rhode Island Gross Domestic Product (GDP) to measure the societal benefit of economic impacts such as job years, incomes and the competitiveness of Rhode Island business firms due to the CHP.

Documentation of REMI Inputs and Results

CHP construction economic impacts were based projected local CHP construction spending, estimated at 60% of the $25.24 million total cost of the project or $15.14 million. This is the portion of the CHP investment needed to construct the plant and excludes the cost of the gas turbine and CHP plant components purchased from outside of Rhode Island. The $15.14 million was entered into REMI as increased Rhode Island demand for power line and structures construction, yielding the "Local CHP Construction Spending" economic impacts shown in Table 1.

Operation and maintenance costs over the life of the CHP project, totaling $10.17 million in real terms, were taken from the RI Grows BCA. This was divided equally among the 20-year life of the plant and entered into REMI as increased Rhode Island demand for commercial and industrial repair and maintenance, yielding the "Increased O&M spending" economic impacts shown in Table 1

Increased natural gas spending to run the CHP plant, totaling $27.23 million, was taken from the CHP BCA model. This spending benefits gas commodity producers and transmission providers but none of them are located in Rhode Island. The local gas distribution industry does not benefit because of decoupled rates. However, the increase in gas demand adds to winter capacity requirements, including

[2] Mark Berkman and Jurgen Weiss, "Review of the RI Test and Proposed Methodology," Prepared for National Grid, by The Brattle Group, February 2019.

local distribution capacity. This was assumed to account for 16% of the $27.23 million in CHP gas costs based on more detailed, available electric data. Typically, 75% of electric and gas infrastructure spending is used for construction and 25% used to purchase equipment from outside of Rhode Island. Therefore, 75% * 16% * $27.2 million of CHP gas spending was divided equally and entered into REMI as increased construction demand, yielding the "Increased natural gas spending" impacts shown in Table 1.

The reduction in electricity spending due to the CHP plant, totaling -$43.72 million, was taken from the CHP BCA model. This consists of both avoided electricity costs and electric DRIPE savings. Both of these are reduced revenue to the electric transmission and power generation industry, negatively impacting them. However, the impact is relatively small in Rhode Island because only 7% of that industry is located in the state according to the US Energy Administration. There is no impact on the local electric distribution industry because of decoupled rates. Moreover, since the electric spending reduction occurs in the winter it does not reduce electric distribution and transmission capacity requirements, so it does not negatively impact local construction activity. To model these impacts 7% of the $43.7 million reduction in electricity spending was entered into REMI as decreased Rhode Island electric transmission and generation demand, yielding the "Reduced electricity spending" economic impacts shown in Table 1

RI Grows benefits consist of net cost savings to the firm over the life of the CHP plant. This consists of avoided electricity costs plus the cost of gas and O&M needed to run the plant. These benefits, totaling -$3.66 million in real terms, were taken from the BCA model, divided equally among the 20-years and entered into REMI as increased business costs to RI Grows. In addition, the BCA model identifies electric and gas DRIPE impacts as CHP benefits totaling $29,409 for gas and -$9.98 million for electric, both in real terms. These amounts were split between residential and commercial, divided equally among years 2020 and 2039, and entered into REMI as increased natural gas costs and decreased electricity costs, respectively. Overall results are shown as "RI Grows Benefits and DRIPE" economic impacts in Table 1.

Project costs totaling $25.24 million were split 41% into customer costs and 59% into incentive. The customer cost, totaling $10.44 million in real terms, was entered into REMI and increased business costs. The incentive, totaling $14.79 million in real terms, was entered into REMI as a residential and commercial electricity price increase.

BCA Consideration

The net economic benefits of the RI Grows CHP project to the state of Rhode Island is the sum of the all economic impacts shown in Table 1, as calculated on the final row, "Net Economic Benefits – State of Rhode Island." This shows net Rhode Island GDP benefits of $23.37 million and includes the full (direct, indirect and induced) impact of CHP project spending, benefits and costs.

However, as mentioned the Brattle Group study recommends including only the indirect and induced impact of CHP benefits and costs in the BCA model. Table 2 shows GDP impacts for the RI Grows project broken down into direct, indirect and induced impacts. The "Full GDP Impact" is the sum of the direct, indirect and induced impacts. The "BCA GDP Impact" includes only the indirect and induced impact of CHP benefits and costs but the full impact for all other economic impacts. Making this adjustment, the GDP impact for consideration in the BCA is $23.56 million.

Table 2
RI Grows Economic Impacts (2020-2039)
State of Rhode Island

RI Grows Economic Impacts	Direct GDP Impact ($2020m)	Indirect GDP Impact ($2020m)	Induced GDP Impact ($2020m)	Full GDP Impact ($2020m)	BCA GDP Impact ($2020m)
Local CHP Construction Spending	$9.72	$3.04	$6.78	$19.54	$19.54
Increased O&M spending	$1.49	$1.18	$11.41	$14.08	$14.08
Increased natural gas spending	$2.72	$0.54	$0.52	$3.79	$3.79
Reduced electricity spending	-$0.90	-$0.56	-$1.94	-$3.41	-$3.41
RI Grows Benefits	-$0.49	-$0.26	-$1.20	-$1.95	-$1.46
Gas DRIPE	-$0.01	-$0.01	-$0.02	-$0.04	-$0.03
Electric DRIPE	$1.25	$2.13	$9.56	$12.94	$11.69
Project Costs	-$0.93	-$3.39	-$17.26	-$21.58	-$20.65
Total	$12.85	$2.67	$7.85	$23.37	$23.56

RI Grows Pipeline Notification Check List

Pipeline Notification Process: The Company commits to updating this pipeline table in each annual Energy Efficiency Plan and reconciliation filing to the PUC going forward. Direct notification shall be sent to the Division of Public Utilities & Carries, the Office of Energy Resources, and the Energy Efficiency and Resource Management Council via email whenever a CHP project with a net output of 1 MW or greater is added, removed, or updated after the Technical Assistance Study and before the offer letter is provided to the customer.

Customer Name or Company Name*	Approximate Size of CHP (MW and annual MWh)	Location Information			Current Status (Scoping, Study, Under Construction, Post-Inspection or Commissioning)	Estimated Year(s) in which the Company will claim energy savings
		Feeder	Substation	Gas Line ID		
RI Grows	13.3 MW 26,465 Annual MWh	49-56-88F1	Tower Hill Substation	416612250	Scoping	2022, 2023

*Customers and/or Companies may opt-out of disclosing their names in this table. If a customer or company has opted-out their names have been redacted in the table above. The Company will provide a confidential pipeline table without redacted names to the PUC, DPUC, and/or OER, if requested.