EXHIBIT D

Kennedy, John C.

From: Kennedy, John C.
Sent: Thursday, October 24, 2013 2:37 PM
To: Mark Wind
Cc: George, Caleb; David Colombo
Subject: RE: RI-14319785 WED #1 and RI-14462941

Hi Mark,
We are 99% complete on the impact study for both turbines 1&2. We need the flicker data information as requested in July to complete. Please provide as soon as able.
We also need the payment for #2 turbine, RI – 14462941.

Thanks,

John C. Kennedy

nationalgrid
Lead Technical Support Consultant - RI
Technical Sales and Engineering Support
Office: 401-784-7221
Cell: 401-255-5191

Please select the appropriate link below for the latest information on:
Interconnection Standards - MA, RI, NH
Net Metering - MA, RI, NH
Wholesale Energy Procurements

From: Kennedy, John C.
Sent: Tuesday, July 23, 2013 10:15 AM
To: Mark Wind
Cc: George, Caleb
Subject: FW: RI-14319785 WED

Mark,
Please have your engineer provide a flicker data sheet per our engineer's request below.
Thanks,

John C. Kennedy

nationalgrid
Lead Technical Support Consultant - RI
Technical Sales and Engineering Support
Office: 401-784-7221
Cell: 401-255-5191

Please select the appropriate link below for the latest information on:
Interconnection Standards - MA, RI, NH
Net Metering - MA, RI, NH
Wholesale Energy Procurements

Subject: RI-14319785 WED

John,

Could you please ask the developer to provide a Flicker data sheet similar to the attached based upon the fault characteristics calculated at the POI for RI-14319785 listed below:

POI RI-14319785 Piggy Ln 12.47kV Single Phase to Ground Fault Type=A					
FAULT CURRENT (A @ DEG)					
+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
251.3@ -94.2	251.3@ -94.2	251.3@ -94.2	754.0@ -94.2	0.0@ 0.0	0.0@ 0.0
THEVENIN IMPEDANCE (OHM)					
2.97133+j6.05887	2.97135+j6.05878	6.96014+j14.3161			
SHORT CIRCUIT MVA= 16.7					
POI RI-14319785 Piggy Ln 12.47kV 3 Phase Fault					
FAULT CURRENT (A @ DEG)					
+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
1095.6@ -94.1	0.0@ 0.0	0.0@ 0.0	1095.6@ -94.1	1095.6@ 145.9	1095.6@ 25.9

THEVENIN IMPEDANCE (OHM)					
2.97133+j6.05887	2.97135+j6.05878	6.96014+j14.3161			
SHORT CIRCUIT MVA= 24.3					

Please contact me if you have any questions.

Thanks,

Nick

Nicholas Reis PE
Consulting Engineer
Control Point Technologies
Cell 401-413-9099
Nreis@controlpointtech.com

ControlPoint Technologies, Inc. 300 LEDGEWOOD PLACE, ROCKLAND, MA, 02370

EXHIBIT E

Kennedy, John C.

From: Kennedy, John C.
Sent: Wednesday, February 12, 2014 3:31 PM
To: 'Laura Anthony'
Cc: 'mdepasquale Windenergydevelopment'
Subject: FW: RI-14319785 WED Coventry & RI-14462941 Coventry Town Hall
Attachments: Impact Study Agreement: 14462941 WED Coventry Two, LLC; INVOICE-Impact Study.pdf

Hi Laura,
We did receive the data required and have recently completed the combined study for both projects referenced as requested.
We do need to complete the execution of the Impact Study Agreement however that was sent out on September 23, 2013. This includes signing agreement and submitting payment. Please reference agreement and invoice within attachments.

Please contact me with any questions you might have.

Best regards,

John Kennedy

national**grid**
Lead Technical Support Consultant - RI
Technical Sales and Engineering Support
Office: 401-784-7221

Please select the appropriate link below for the latest DG information:
National Grid's DG Website(RI)
RIPUC No.2078 Standards for Connecting Distributed Generation
RIPUC No.2075 Net Metering Provision
ESB No.756 Requirements for Parallel Generation

From: Laura Anthony [mailto:la@wedenergy.com]
Sent: Wednesday, February 12, 2014 9:52 AM
To: Kennedy, John C.
Cc: Mark(Wind) Depasquale
Subject: RE: RI-14319785 WED Coventry & RI-14462941 Coventry Town Hall

Good morning John,

I have not seen any additional correspondence pertaining to this issue. I wanted to follow up to see if you had everything you needed and that this has been resolved.

Laura Anthony

WIND ENERGY Development llc

3760 Quaker Lane
North Kingstown, RI 02852
Office: 401-295-4998 Ext. 104
Fax: 401-295-4944
la@wedenergy.com

Please consider the environment before printing this email.

From: Raquel Justa [mailto:rjusta@goldwindamerica.com]
Sent: Monday, January 13, 2014 5:16 PM
To: John.Kennedy@nationalgrid.com; nreis@Controlpointtech.com; caleb.george@nationalgrid.com
Cc: Thomas Nemila; Scott Rowland; Mark(Wind) Depasquale; Tim O'Malley
Subject: RE: RI-14319785 WED Coventry & RI-14462941 Coventry Town Hall

Dear John,

I write regarding the Flicker data from Goldwind turbines for the projects in Rhode Island. I understand that the attached is the template to provide the info. Is it possible for you to setup a call later this week to clarify a couple points?

I look forward to hearing from you.
Kind regards,

Raquel Justa
Engineering & Technical Sales Support
Goldwind Americas
200 W. Madison, Ste. 2800 | Chicago, IL 60606
T: +1.312.948.8037 | M: +1.312.288.1605
rjusta@goldwindamerica.com | goldwindamerica.com

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EXHIBIT F

The Narragansett Electric Company
Standards for Connecting Distributed Generation

Exhibit E – Impact Study or ISRDG Agreement

This Agreement, dated April 3, 2014, is entered into by and between **WED Coventry Two, LLC** ("Interconnecting Customer') and the Company, for the purpose of setting forth the terms, conditions and costs for conducting an Impact Study relative to the Standard Process as defined in Section 1.0 and outlined in Section 3.0 of the Interconnection Tariff. This Impact Study pertains to Application Number **RI-14462941** (the Interconnecting Customer's application ID number).

1. The Interconnecting Customer agrees to provide, in a timely and complete manner, all additional information and technical data necessary for the Company to conduct the Impact Study not already provided in the Interconnecting Customer's application.

2. All work pertaining to the Impact Study that is the subject of this Agreement will be approved and coordinated only through designated and authorized representatives of the Company and the Interconnecting Customer. Each party shall inform the other in writing of its designated and authorized representative, if different than what is in the application.

3. Where there are other potentially Affected Systems, and no single Party is in a position to prepare an Impact Study covering all potentially Affected Systems, the Company will coordinate but not be responsible for the timing of any additional studies required to determine the impact of the interconnection request on other potentially Affected Systems. The Interconnecting Customer will be directly responsible to the potentially Affected System operators for all costs of any additional studies required to evaluate the impact of the interconnection on the potentially Affected Systems. The Company will not proceed with this Impact Study without the Interconnecting Customer's consent to have the other studies conducted.

4. If the Company determines, in accordance with Good Utility Practice, that the System Modifications to the Company EPS are not substantial, the Impact Study will determine the scope and cost of the modifications. If the Company determines, in accordance with Good Utility Practice, that the System Modifications to the Company EPS are substantial, the Impact Study will produce an estimate for the modification costs (within ±25%) and a Detailed Study Agreement and its estimated cost.

5. Impact Study, together with any additional studies contemplated in Paragraph 3, shall form the basis for the Interconnecting Customer's proposed use of the Company EPS and shall be furthermore utilized in obtaining necessary third-party approvals of any required facilities and requested distribution services. The Interconnecting Customer understands and acknowledges that any use of study results by the Interconnecting Customer or its agents, whether in preliminary or final form, prior to NEPOOL 18.4 approval, should such approval be required, is completely at the Interconnecting Customer's risk.

6. The Impact Study fee of **$10,000.00** (except as noted below) is due in full prior to the execution of the Impact Study. For a Renewable Interconnecting Customer the ISRDG Study fee is as per Table 2 in Section 3.5 of the interconnection tariff.

7. Final Accounting. Upon request by the Interconnecting Customer, the Company within ninety (90) business days after completion of the construction and installation of the System Modifications described in an attached exhibit to the Interconnection Service Agreement, shall provide Interconnecting Customer with a final accounting report of any difference between (a) Interconnecting Customer's cost responsibility under the Interconnection Service Agreement for the actual cost of such System Modifications, and (b) Interconnecting Customer's previous aggregate payments to the Company for such System Modifications. To the extent that Interconnecting Customer's cost responsibility in the Interconnection Service Agreement exceeds Interconnecting Customer's previous aggregate payments, the Company shall invoice Interconnecting Customer and Interconnecting Customer shall make payment to the Company within forty-five (45) days. To the extent that

The Narragansett Electric Company
Standards for Connecting Distributed Generation

Interconnecting Customer's previous aggregate payments exceed Interconnecting Customer's cost responsibility under this agreement, the Company shall refund to Interconnecting Customer an amount equal to the difference within forty-five (45) days of the provision of such final accounting report.

8. In the event this Agreement is terminated for any reason, the Company shall refund to the Interconnecting Customer the portion of the above fee or any subsequent payment to the Company by the Interconnecting Customer that the Company did not expend or commit in performing its obligations under this Agreement. Payments for work performed shall not be subject to refunding except in accordance with Paragraph 11 below.

9. Nothing in this Agreement shall be interpreted to give the Interconnecting Customer immediate rights to wheel over or interconnect with the Company's EPS.

10. Except as precluded by the laws of the State of Rhode Island and the Providence Plantations, Interconnecting Customer and Company shall each indemnify, defend and hold the other, its directors, officers, employees and agents (including, but not limited to, affiliates and contractors and their employees), harmless from and against all liabilities, damages, losses, penalties, claims, demands, suits and proceedings of any nature whatsoever for personal injury (including death) or property damages to unaffiliated third parties that arise out of, or are in any manner connected with, the performance of this Agreement by that party, except to the extent that such injury or damages to unaffiliated third parties may be attributable to the negligence or willful misconduct of the party seeking indemnification.

    Notwithstanding the foregoing, the Interconnecting Customer hereby waives recourse against the Company and its Affiliates for, and releases the Company and its Affiliates from, any and all liabilities arising from or attributable to incomplete, inaccurate, or otherwise faulty information supplied by the Interconnecting Customer. Moreover, with respect to an ISRDG provided to a Renewable Interconnecting Customer, the Company may not be held liable or responsible if the actual costs exceed the estimate as long as the estimate was provided in good faith and the interconnection was implemented prudently the Company.

11. If either party materially breaches any of its covenants hereunder, the other party may terminate this Agreement by serving notice of same on the other party to this Agreement.

12. This agreement shall be construed and governed in accordance with the laws of the State of Rhode Island and the Providence Plantations.

13. All amendments to this Agreement shall be in written form executed by both Parties.

14. The terms and conditions of this Agreement shall be binding on the successors and assigns of either Party.

15. This Agreement will remain in effect for a period of up to two years from its effective date.

16. This Agreement may be terminated under the following conditions.

    a) The Parties agree in writing to terminate the Agreement.

    b) The Interconnecting Customer may terminate this agreement at any time by providing written notice to Company.

    c) The Company may terminate this Agreement if the Interconnecting Customer either: (1) has not paid the fee or, (2) has not responded to requests for further information in accordance with provisions in the Interconnection Tariff.

The Narragansett Electric Company
Standards for Connecting Distributed Generation

Interconnecting Customer:		Narragansett Electric Company d/b/a National Grid:	
Name:	Mark Depasquale	Name:	
Title:	Managing Member	Title:	
Date:	4.3.2014	Date:	
Signature:		Signature:	

EXHIBIT G

The Narragansett Electric Company
Standards for Connecting Distributed Generation

Exhibit E – Impact Study or ISRDG Agreement

This Agreement, dated _____, is entered into by and between Wind Energy Development, LLC ("Interconnecting Customer') and the Company, for the purpose of setting forth the terms, conditions and costs for conducting an Impact Study relative to the Standard Process as defined in Section 1.0 and outlined in Section 3.0 of the Interconnection Tariff. This Impact Study pertains to Application Numbers 14319785, 14462941, 15640455, 15772951, 17599370, and 17600293 (the Interconnecting Customer's application ID numbers).

1. The Interconnecting Customer agrees to provide, in a timely and complete manner, all additional information and technical data necessary for the Company to conduct the Impact Study not already provided in the Interconnecting Customer's application.

2. All work pertaining to the Impact Study that is the subject of this Agreement will be approved and coordinated only through designated and authorized representatives of the Company and the Interconnecting Customer. Each party shall inform the other in writing of its designated and authorized representative, if different than what is in the application.

3. Where there are other potentially Affected Systems, and no single Party is in a position to prepare an Impact Study covering all potentially Affected Systems, the Company will coordinate but not be responsible for the timing of any additional studies required to determine the impact of the interconnection request on other potentially Affected Systems. The Interconnecting Customer will be directly responsible to the potentially Affected System operators for all costs of any additional studies required to evaluate the impact of the interconnection on the potentially Affected Systems. The Company will not proceed with this Impact Study without the Interconnecting Customer's consent to have the other studies conducted.

4. If the Company determines, in accordance with Good Utility Practice, that the System Modifications to the Company EPS are not substantial, the Impact Study will determine the scope and cost of the modifications. If the Company determines, in accordance with Good Utility Practice, that the System Modifications to the Company EPS are substantial, the Impact Study will produce an estimate for the modification costs (within ±25%) and a Detailed Study Agreement and its estimated cost.

5. Impact Study, together with any additional studies contemplated in Paragraph 3, shall form the basis for the Interconnecting Customer's proposed use of the Company EPS and shall be furthermore utilized in obtaining necessary third-party approvals of any required facilities and requested distribution services. The Interconnecting Customer understands and acknowledges that any use of study results by the Interconnecting Customer or its agents, whether in preliminary or final form, prior to NEPOOL 18.4 approval, should such approval be required, is completely at the Interconnecting Customer's risk.

6. The Impact Study fee of $50,000.00 (except as noted below) is due in full prior to the execution of the Impact Study. For a Renewable Interconnecting Customer the ISRDG Study fee is as per Table 2 in Section 3.5 of the interconnection tariff.

7. Final Accounting. Upon request by the Interconnecting Customer, the Company within ninety (90) business days after completion of the construction and installation of the System Modifications described in an attached exhibit to the Interconnection Service Agreement, shall provide Interconnecting Customer with a final accounting report of any difference between (a) Interconnecting

Customer's cost responsibility under the Interconnection Service Agreement for the actual cost of such System Modifications, and (b) Interconnecting Customer's previous aggregate payments to the Company for such System Modifications. To the extent that Interconnecting Customer's cost responsibility in the Interconnection Service Agreement exceeds Interconnecting Customer's previous aggregate payments, the Company shall invoice Interconnecting Customer and Interconnecting Customer shall make payment to the Company within forty-five (45) days. To the extent that Interconnecting Customer's previous aggregate payments exceed Interconnecting Customer's cost responsibility under this agreement, the Company shall refund to Interconnecting Customer an amount equal to the difference within forty-five (45) days of the provision of such final accounting report.

8. In the event this Agreement is terminated for any reason, the Company shall refund to the Interconnecting Customer the portion of the above fee or any subsequent payment to the Company by the Interconnecting Customer that the Company did not expend or commit in performing its obligations under this Agreement. Payments for work performed shall not be subject to refunding except in accordance with Paragraph 11 below.

9. Nothing in this Agreement shall be interpreted to give the Interconnecting Customer immediate rights to wheel over or interconnect with the Company's EPS.

10. Except as precluded by the laws of the State of Rhode Island and the Providence Plantations, Interconnecting Customer and Company shall each indemnify, defend and hold the other, its directors, officers, employees and agents (including, but not limited to, affiliates and contractors and their employees), harmless from and against all liabilities, damages, losses, penalties, claims, demands, suits and proceedings of any nature whatsoever for personal injury (including death) or property damages to unaffiliated third parties that arise out of, or are in any manner connected with, the performance of this Agreement by that party, except to the extent that such injury or damages to unaffiliated third parties may be attributable to the negligence or willful misconduct of the party seeking indemnification.

    Notwithstanding the foregoing, the Interconnecting Customer hereby waives recourse against the Company and its Affiliates for, and releases the Company and its Affiliates from, any and all liabilities arising from or attributable to incomplete, inaccurate, or otherwise faulty information supplied by the Interconnecting Customer. Moreover, with respect to an ISRDG provided to a Renewable Interconnecting Customer, the Company may not be held liable or responsible if the actual costs exceed the estimate as long as the estimate was provided in good faith and the interconnection was implemented prudently the Company.

11. If either party materially breaches any of its covenants hereunder, the other party may terminate this Agreement by serving notice of same on the other party to this Agreement.

12. This agreement shall be construed and governed in accordance with the laws of the State of Rhode Island and the Providence Plantations.

13. All amendments to this Agreement shall be in written form executed by both Parties.

14. The terms and conditions of this Agreement shall be binding on the successors and assigns of either Party.

15. This Agreement will remain in effect for a period of up to two years from its effective date.

The Narragansett Electric Company
Standards for Connecting Distributed Generation

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a) The Parties agree in writing to terminate the Agreement.

b) The Interconnecting Customer may terminate this agreement at any time by providing written notice to Company.

c) The Company may terminate this Agreement if the Interconnecting Customer either: (1) has not paid the fee or, (2) has not responded to requests for further information in accordance with provisions in the Interconnection Tariff.

Interconnecting Customer:		Narragansett Electric Company d/b/a National Grid:	
Name:	Mark DePasquale	Name:	
Title:	CEO	Title:	
Date:	8/15/14	Date:	
Signature:	Mark DePasquale KB	Signature:	

EXHIBIT H

Kennedy, John C.

From: Kennedy, John C.
Sent: Friday, September 12, 2014 2:42 PM
To: George, Caleb; Enayati, Babak; Kamal, Rashed; Teixeira, John M.; 'Nick Reis'; Ryan, James W. (US-WBRO-Ops); 'Mark(Wind) Depasquale'; 'David Colombo'
Subject: RE: WED Turbine Meeting Notes

All,
Below are my notes from our meeting yesterday that we had reviewed. Please provide comment if you feel I missed anything.

WED will:

- Provide UL listing documentation and 1741 compliance documentation as soon as able
- Provide verification that turbines have active anti-islanding protection
- Revise one lines to show:
  - Effectively grounded systems
  - Impedance information of grounding banks
- Y-grd / Y-grd transformers(preferred by turbine mfg.)
- Stability Model of turbines
- Flicker data of turbines per template and date provided by NGrid today.
- Pole numbers of POI's - complete
- Pole numbers of POI's on one-lines
- Contact ISO help desk to initiate discussion
- Contact Verizon/Cable Co's to initiate POTS line, DTT leased line(if req'd), ISO RTU line(if req'd)

NGrid will:

- Provide Flicker Data templates and necessary data – complete
- Provide ISO Operation data – OP-14, 18 and contact information – complete
- Provide PSSE modeling template –
- Request Transmission Planning Study cases be opened

Discussion other than above:

- ISO Process / Requirements expected:
  - Two separate Transmission Planning Studies will be required

    - Lengthy process, concurrent to Impact Study once information is locked down, exceeds impact study timeline
    - Many aspects of ISO process and timeline NGrid does not control
- Customer need date: December 2015
- Generally felt that Distribution and Transmission systems will handle proposed 15mW's – completed impact study to confirm and detail System Modifications to do so.
- Overvoltage protection, 3V0, will be required at Coventry Station transformer and at both Hopkins Hill Station transformers
- DTT will most likely be required if active anti-islanding protection is not provided. May be required if both UL listing and active anti-islanding is provided. Completed Impact Study will provide determination.
- DTT communication options:
    - Verizon; most comfortable but timely
    - Line of Sight
    - Fiber
- Estimated Timelines:
    - D-line design – 3months
    - D-line construction; 6-9 mo's
    - Substation design and construction; 72-80 weeks
    - Estimated timelines discussed will be refined and provided in completed Impact Study
- Station supply line outage coordination can add to construction timelines estimated.

John Kennedy

national**grid**
Lead Technical Support Consultant - RI
Technical Sales and Engineering Support
Office: 401-784-7221

Please select the appropriate link below for the latest DG information:
National Grid's DG Website(RI)
RIPUC No.2078 Standards for Connecting Distributed Generation
RIPUC No.2075 Net Metering Provision
ESB No.756 Requirements for Parallel Generation

-----Original Appointment-----
From: Kennedy, John C.
Sent: Wednesday, September 03, 2014 2:48 PM
To: Kennedy, John C.; George, Caleb; Enayati, Babak; Kamal, Rashed; Teixeira, John M.; Piekarz, Jeannie; 'Nick Reis'; Ryan, James W. (US-WBRO-Ops); 'Mark(Wind) Depasquale'; David Colombo

Cc: Hayduk, Brian
Subject: WED Turbine Meeting
When: Thursday, September 11, 2014 9:30 AM-11:00 AM (GMT-05:00) Eastern Time (US & Canada).
Where: CR- Providence - P(25) Melrose St - Executive Board Room

Mark, Dave,
Below are items for discussion during tomorrow's meeting.
Looking forward to seeing you both. Please call my cell when you arrive and I will meet you in the Customer Lobby.
John

- Further documentation regarding UL1741 listing.
- One line diagrams require update to provide effectively grounded sources.
- Site diagrams need update for clearer locations of turbines (distances to closest intersections and if possible pole numbers).
- Due to the size of the sites, ISO-NE reporting will be required. Customer should start that process with them.
    - Additionally a PPA study may be required to be completed by National Grid's Transmission Planning group.

Transmission Planning said I can represent them so here is some things we discussed:

1. Transmission Planning see this as 2 separate studies – separate PPA's – probably same transmission planning engineer so that means double the time
    a. discuss the process both internal and ISO
2. In the past there have been problems obtaining wind stability models – even if a stability study is not required – ISO wants the stability models
3. OP-14 requirements would apply and the customer probably has not thought of that

EXHIBIT I

Ramos, Adam M.

From: David Colombo <Dave@powerengineersllc.com>
Sent: Thursday, October 09, 2014 8:44 AM
To: Kennedy, John C.; George, Caleb; Mark(Wind) Depasquale
Subject: Fwd: Abschlussbericht Flicker & Voltage Evaluation
Attachments: ATT00001.htm; 141008-Final Report- Flicker and Voltage Evaluation- Coventry-Rhode Island.Rev01.pdf

John / Caleb
Attached are the flicker results from Vensys. Can you confirm this is the information needed?

Sincerely,
Dave

David J. Colombo, P.E.
Power Engineers, LLC
(508) 612-0382
Dave@PowerEngineersLLC.com

---------- Forwarded message ----------
From: **Theo Peters** <T.Peters@vensys.de>
Date: 2014-10-09 8:39 GMT-04:00
Subject: Fwd: Abschlussbericht Flicker & Voltage Evaluation
To: David Colombo <Dave@powerengineersllc.com>, Mark DePasquale <md@wedenergy.com>

David, Hope this fits the NG requirements.
Let me know if there are any questions.
Theo

Sent from my iPhone

Begin forwarded message:

> **From:** "Patrick Feld" <p.feld@renect.de>
> **To:** "Theo Peters" <T.Peters@vensys.de>
> **Cc:** "c.contini@renect.de" <c.contini@renect.de>
> **Subject: Abschlussbericht Flicker & Voltage Evaluation**
>
> Hallo Herr Peters,
>
> anbei finden Sie den fertigen Bericht. Wie gewünscht wurde jede EZA erst mit einer Erzeugungseinheit, dann 2, 3 und 4 gerechnet. Die Werte sind alle ok. Bitte bestätigen Sie mir noch einmal mit einer kurzen Mail den Empfang des Berichts.
>
> Viele Grüße
> P.Feld
> M. Sc. Patrick Feld

Telefon +49 681 9494-1645
Telefax +49 681 9494-1647
p.feld@renect.de<mailto:p.feld@renect.de>

ReNeCt GmbH
St. Johanner Straße 101-105
66115 Saarbrücken
Germany

Geschäftsführung: Christian Contini, Bernd Endres
Sitz der Gesellschaft: Saarbrücken
Registergericht Amtsgericht Saarbrücken
Handelsregister B 100487

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Flicker and Voltage Evaluation
Rhode Island
10/2014

Final Report

prepared by:

ReNeCt GmbH

M.Sc. Patrick Feld

St.Johanner Str. 101-105
66115 Saarbrücken

Tel:+49(681)9494-1645
Fax:+49(681)9494-1647
Email: p.feld@renect.de

Customer:

Vensys Energy AG
Im Langental 6
66539 Neunkirchen

08.10.2014

Titel	Flicker and Voltage Evaluation Rhode Island				
Index	Date	Name	Amendements	Approved	Date
01	08.10.2014	P.Feld	Document created	C.Contini 	09.10.14

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Summary

On behalf of Vensys Energy AG, ReNeCt GmbH has carried out an evaluation of flicker and voltage variation of 3 wind farms of the project coventry.

The following parameters were checked:

- Flicker emission during continuous operation
- Flicker emissions due to switching operations (10 minutes)
- Flicker emissions due to switching operations (120 minutes)
- Voltage change due to a switching operation

Conclusion:

The results show no conspicuities. All checked parameters are below the given limit values. No recommendations needed.

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1 Purpose

On behalf of Vensys Energy AG, ReNeCt GmbH has carried out an evaluation of flicker and voltage variation of 3 wind farms of the project Coventry which were connected to different grid points. These points are:

- Perry Hill/ Piggy Lane (units 1; 2; 2A and 2B)
- Flat River Road (units 3 and 4)
- Victory Highway (units 5; 6; 6A and 6B)

The detailed connection is to be found in Figure 1 to Figure 4.

In the calculation the following parameters were determined:

- Flicker emission during continuous operation
- Flicker emissions due to switching operations (10 minutes)
- Flicker emissions due to switching operations (120 minutes)
- Voltage change due to a switching operation

2 Rated data

The parameters of the wind turbine Vensys 82 SDL were taken from the test report of the unit certificate (Figure 5). The grid data were sent by mail by Mr. Nicola Reis (ControlPoint Technologies, Inc.) (Figure 6).

3 Calculation

The calculations were explained after the desired example. Moreover the equations from the example were also used. The “worst” parameters of the wind turbine were taken for the calculation, to get worst case results.

3.1 Wind farm at Perry Hill/ Piggy Lane, unit 1; 2; 2A and 2B

3.1.1 One turbine in service

			Grid Phase Angle	
Wind Turbine Data	Symbol	Unit	70°	85°
Flicker Coefficent	c		0,970	0,880
Flicker Step Factor for grid phase angle of 70°/85 °	K_f	°	0,093	0,096
Voltage variation factor for grid phase angle of 70°/85 °	K_u		0,162	-0,160
Rated power of wind turbine	S_n	MVA	1,5	1,5
Number of identical turbines	N_{wt}		1	1
Number of switching operations per turbine over 10 minutes				
-for startup at cut-in wind speed			10	10
-for startup at rated wind speed	N_{10}		1	1
-for worst case of switching between generators				
Number of switching operations per turbine over 120 minutes				
-for startup at cut-in wind speed			12	12
-for startup at rated wind speed	N_{120}		12	12
-for worst case of switching between generators				
Sytem Data				
Short circuit level at PCC	S_k	MVA	27,70	
Grid impedance phase angle		°	71,66	
Short circuit ratio relative to wind farming	$S_k/(N_{wt} \times S_n)$		18,47	
Criteria				
Flicker emission during continous operation	P_{lt}		0,7	
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,9	
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,7	
Voltage change due to a switching operation	Δu			
-1 change per minute due to 1 turbine		%	2,0	
-10 change per minute due to 10 turbine		%	1,2	
-25 change per minute due to 10 turbine		%	1,0	
Calculations				
Flicker emission during continous operation	P_{lt}		0,053	0,048
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,185	0,191
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,087	0,090
Voltage change due to a switching operation	Δu	%	0,009	-0,009
Criteria Check				
Flicker emission during continous operation	P_{lt}		OK	OK
Flicker emissions due to switching operations (10 minutes)	P_{st}		OK	OK
Flicker emissions due to switching operations (120 minutes)	P_{lt}		OK	OK
Voltage change due to a switching operation	Δu		OK	OK

3.1.2 Two turbines in service

			Grid Phase Angle	
Wind Turbine Data	Symbol	Unit	70°	85°
Flicker Coefficent	c		0,970	0,880
Flicker Step Factor for grid phase angle of 70/85 °	K_f	°	0,093	0,096
Voltage variation factor for grid phase angle of 70/85 °	K_u		0,162	-0,160
Rated power of wind turbine	S_n	MVA	1,5	1,5
Number of identical turbines	N_{wt}		2	2
Number of switching operations per turbine over 10 minutes				
-for startup at cut-in wind speed			10	10
-for startup at rated wind speed	N_{10}		1	1
-for worst case of switching between generators				
Number of switching operations per turbine over 120 minutes				
-for startup at cut-in wind speed			12	12
-for startup at rated wind speed	N_{120}		12	12
-for worst case of switching between generators				
Sytem Data				
Short circuit level at PCC	S_k	MVA	27,70	
Grid impedance phase angle		°	71,66	
Short circuit ratio relative to wind farming	$S_k/(N_{wt} \times S_n)$		9,23	
Criteria				
Flicker emission during continous operation	P_{lt}		0,7	
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,9	
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,7	
Voltage change due to a switching operation	Δu			
-1 change per minute due to 1 turbine		%	2,0	
-10 change per minute due to 10 turbine		%	1,2	
-25 change per minute due to 10 turbine		%	1,0	
Calculations				
Flicker emission during continous operation	P_{lt}		0,074	0,067
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,229	0,237
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,108	0,111
Voltage change due to a switching operation	Δu		0,009	-0,009
Criteria Check				
Flicker emission during continous operation	P_{lt}		OK	OK
Flicker emissions due to switching operations (10 minutes)	P_{st}		OK	OK
Flicker emissions due to switching operations (120 minutes)	P_{lt}		OK	OK
Voltage change due to a switching operation	Δu		OK	OK

3.1.3 Three turbines in service

			Grid Phase Angle	
Wind Turbine Data	Symbol	Unit	70°	85°
Flicker Coefficent	c		0,970	0,880
Flicker Step Factor for grid phase angle of 70°/85 °	K_f	°	0,093	0,096
Voltage variation factor for grid phase angle of 70°/85 °	K_u		0,162	-0,160
Rated power of wind turbine	S_n	MVA	1,5	1,5
Number of identical turbines	N_{wt}		3	3
Number of switching operations per turbine over 10 minutes				
-for startup at cut-in wind speed			10	10
-for startup at rated wind speed	N_{10}		1	1
-for worst case of switching between generators				
Number of switching operations per turbine over 120 minutes				
-for startup at cut-in wind speed			12	12
-for startup at rated wind speed	N_{120}		12	12
-for worst case of switching between generators				
Sytem Data				
Short circuit level at PCC	S_k	MVA	27,70	
Grid impedance phase angle		°	71,66	
Short circuit ratio relative to wind farming	$S_k/(N_{wt} \times S_n)$		6,16	
Criteria				
Flicker emission during continous operation	P_{lt}		0,7	
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,9	
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,7	
Voltage change due to a switching operation	Δu			
-1 change per minute due to 1 turbine		%	2,0	
-10 change per minute due to 10 turbine		%	1,2	
-25 change per minute due to 10 turbine		%	1,0	
Calculations				
Flicker emission during continous operation	P_{lt}		0,091	0,083
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,260	0,269
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,122	0,126
Voltage change due to a switching operation	Δu		0,039	-0,009
Criteria Check				
Flicker emission during continous operation	P_{lt}		OK	OK
Flicker emissions due to switching operations (10 minutes)	P_{st}		OK	OK
Flicker emissions due to switching operations (120 minutes)	P_{lt}		OK	OK
Voltage change due to a switching operation	Δu		OK	OK

3.1.4 Four turbines in service

			Grid Phase Angle	
Wind Turbine Data	Symbol	Unit	70°	85°
Flicker Coefficent	c		0,970	0,880
Flicker Step Factor for grid phase angle of 70°/85 °	K_f	°	0,093	0,096
Voltage variation factor for grid phase angle of 70°/85 °	K_u		0,162	-0,160
Rated power of wind turbine	S_n	MVA	1,5	1,5
Number of identical turbines	N_{wt}		4	4
Number of switching operations per turbine over 10 minutes				
-for startup at cut-in wind speed			10	10
-for startup at rated wind speed	N_{10}		1	1
-for worst case of switching between generators				
Number of switching operations per turbine over 120 minutes				
-for startup at cut-in wind speed			12	12
-for startup at rated wind speed	N_{120}		12	12
-for worst case of switching between generators				
Sytem Data				
Short circuit level at PCC	S_k	MVA	27,70	
Grid impedance phase angle		°	71,66	
Short circuit ratio relative to wind farming	$S_k/(N_{wt} \times S_n)$		4,62	
Criteria				
Flicker emission during continous operation	P_{lt}		0,7	
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,9	
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,7	
Voltage change due to a switching operation	Δu			
-1 change per minute due to 1 turbine		%	2,0	
-10 change per minute due to 10 turbine		%	1,2	
-25 change per minute due to 10 turbine		%	1,0	
Calculations				
Flicker emission during continous operation	P_{lt}		0,105	0,095
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,284	0,294
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,134	0,138
Voltage change due to a switching operation	Δu		0,053	-0,009
Criteria Check				
Flicker emission during continous operation	P_{lt}		OK	OK
Flicker emissions due to switching operations (10 minutes)	P_{st}		OK	OK
Flicker emissions due to switching operations (120 minutes)	P_{lt}		OK	OK
Voltage change due to a switching operation	Δu		OK	OK

3.2 Wind farm at Flat River Road, unit 3 and 4

3.2.1 One turbine in service

			Grid Phase Angle	
Wind Turbine Data	Symbol	Unit	50°	70°
Flicker Coefficent	c		1,530	0,970
Flicker Step Factor for grid phase angle of 50°/70 °	K_f	°	0,104	0,093
Voltage variation factor for grid phase angle of 50°/70 °	K_u		0,521	0,162
Rated power of wind turbine	S_n	MVA	1,5	1,5
Number of identical turbines	N_{wt}		1	1
Number of switching operations per turbine over 10 minutes				
-for startup at cut-in wind speed			10	10
-for startup at rated wind speed	N_{10}		1	1
-for worst case of switching between generators				
Number of switching operations per turbine over 120 minutes				
-for startup at cut-in wind speed			12	12
-for startup at rated wind speed	N_{120}		12	12
-for worst case of switching between generators				
Sytem Data				
Short circuit level at PCC	S_k	MVA	26,20	
Grid impedance phase angle		°	67,91	
Short circuit ratio relative to wind farming	$S_k/(N_{wt} \times S_n)$		17,47	
Criteria				
Flicker emission during continous operation	P_{lt}		0,7	
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,9	
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,7	
Voltage change due to a switching operation	Δu			
-1 change per minute due to 1 turbine		%	2	
-10 change per minute due to 10 turbine		%	1,2	
-25 change per minute due to 10 turbine		%	1	
Calculations				
Flicker emission during continous operation	P_{lt}		0,088	0,056
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,219	0,196
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,103	0,092
Voltage change due to a switching operation	Δu	%	0,030	0,009
Criteria Check				
Flicker emission during continous operation	P_{lt}		OK	OK
Flicker emissions due to switching operations (10 minutes)	P_{st}		OK	OK
Flicker emissions due to switching operations (120 minutes)	P_{lt}		OK	OK
Voltage change due to a switching operation	Δu		OK	OK

3.2.2 Two turbines in service

			Grid Phase Angle	
Wind Turbine Data	Symbol	Unit	50°	70°
Flicker Coefficent	c		1,530	0,970
Flicker Step Factor for grid phase angle of 50/70 °	K_f	°	0,104	0,093
Voltage variation factor for grid phase angle of 50/70 °	K_u		0,521	0,162
Rated power of wind turbine	S_n	MVA	1,5	1,5
Number of identical turbines	N_{wt}		2	2
Number of switching operations per turbine over 10 minutes				
-for startup at cut-in wind speed			10	10
-for startup at rated wind speed	N_{10}		1	1
-for worst case of switching between generators				
Number of switching operations per turbine over 120 minutes				
-for startup at cut-in wind speed			12	12
-for startup at rated wind speed	N_{120}		12	12
-for worst case of switching between generators				
Sytem Data				
Short circuit level at PCC	S_k	MVA	26,20	
Grid impedance phase angle		°	67,91	
Short circuit ratio relative to wind farming	$S_k/(N_{wt} \times S_n)$		8,73	
Criteria				
Flicker emission during continous operation	P_{lt}		0,7	
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,9	
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,7	
Voltage change due to a switching operation	Δu			
-1 change per minute due to 1 turbine		%	2,0	
-10 change per minute due to 10 turbine		%	1,2	
-25 change per minute due to 10 turbine		%	1,0	
Calculations				
Flicker emission during continous operation	P_{lt}		0,124	0,079
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,271	0,243
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,128	0,114
Voltage change due to a switching operation	Δu		0,030	0,009
Criteria Check				
Flicker emission during continous operation	P_{lt}		OK	OK
Flicker emissions due to switching operations (10 minutes)	P_{st}		OK	OK
Flicker emissions due to switching operations (120 minutes)	P_{lt}		OK	OK
Voltage change due to a switching operation	Δu		OK	OK

3.3 Wind farm at Victory Highway, unit 5; 6, 6A and 6B

3.3.1 One turbine in service

			Grid Phase Angle	
Wind Turbine Data	Symbol	Unit	70°	85°
Flicker Coefficent	c		0,970	0,880
Flicker Step Factor for grid phase angle of 70°/85 °	K_f	°	0,093	0,096
Voltage variation factor for grid phase angle of 70°/85 °	K_u		0,162	-0,160
Rated power of wind turbine	S_n	MVA	1,5	1,5
Number of identical turbines	N_{wt}		1	1
Number of switching operations per turbine over 10 minutes				
-for startup at cut-in wind speed			10	10
-for startup at rated wind speed	N_{10}		1	1
-for worst case of switching between generators				
Number of switching operations per turbine over 120 minutes				
-for startup at cut-in wind speed			12	12
-for startup at rated wind speed	N_{120}		12	12
-for worst case of switching between generators				
Sytem Data				
Short circuit level at PCC	S_k	MVA	19,20	
Grid impedance phase angle		°	72,74	
Short circuit ratio relative to wind farming	$S_k/(N_{wt} \times S_n)$		12,80	
Criteria				
Flicker emission during continous operation	P_{lt}		0,7	
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,9	
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,7	
Voltage change due to a switching operation	Δu			
-1 change per minute due to 1 turbine		%	2,0	
-10 change per minute due to 10 turbine		%	1,2	
-25 change per minute due to 10 turbine		%	1,0	
Calculations				
Flicker emission during continous operation	P_{lt}		0,076	0,069
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,267	0,276
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,126	0,130
Voltage change due to a switching operation	Δu	%	0,013	-0,013
Criteria Check				
Flicker emission during continous operation	P_{lt}		OK	OK
Flicker emissions due to switching operations (10 minutes)	P_{st}		OK	OK
Flicker emissions due to switching operations (120 minutes)	P_{lt}		OK	OK
Voltage change due to a switching operation	Δu		OK	OK

3.3.2 Two turbines in service

			Grid Phase Angle	
Wind Turbine Data	Symbol	Unit	70°	85°
Flicker Coefficent	c		0,970	0,880
Flicker Step Factor for grid phase angle of 70/85 °	K_f	°	0,093	0,096
Voltage variation factor for grid phase angle of 70/85 °	K_u		0,162	-0,160
Rated power of wind turbine	S_n	MVA	1,5	1,5
Number of identical turbines	N_{wt}		2	2
Number of switching operations per turbine over 10 minutes				
-for startup at cut-in wind speed			10	10
-for startup at rated wind speed	N_{10}		1	1
-for worst case of switching between generators				
Number of switching operations per turbine over 120 minutes				
-for startup at cut-in wind speed			12	12
-for startup at rated wind speed	N_{120}		12	12
-for worst case of switching between generators				
Sytem Data				
Short circuit level at PCC	S_k	MVA	19,20	
Grid impedance phase angle		°	72,74	
Short circuit ratio relative to wind farming	$S_k/(N_{wt} \times S_n)$		6,40	
Criteria				
Flicker emission during continous operation	P_{lt}		0,7	
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,9	
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,7	
Voltage change due to a switching operation	Δu			
-1 change per minute due to 1 turbine		%	2,0	
-10 change per minute due to 10 turbine		%	1,2	
-25 change per minute due to 10 turbine		%	1,0	
Calculations				
Flicker emission during continous operation	P_{lt}		0,107	0,097
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,331	0,342
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,156	0,161
Voltage change due to a switching operation	Δu		0,013	-0,013
Criteria Check				
Flicker emission during continous operation	P_{lt}		OK	OK
Flicker emissions due to switching operations (10 minutes)	P_{st}		OK	OK
Flicker emissions due to switching operations (120 minutes)	P_{lt}		OK	OK
Voltage change due to a switching operation	Δu		OK	OK

3.3.3 Three turbines in service

			Grid Phase Angle	
Wind Turbine Data	Symbol	Unit	70°	85°
Flicker Coefficent	c		0,970	0,880
Flicker Step Factor for grid phase angle of 70°/85 °	K_f	°	0,093	0,096
Voltage variation factor for grid phase angle of 70°/85 °	K_u		0,162	-0,160
Rated power of wind turbine	S_n	MVA	1,5	1,5
Number of identical turbines	N_{wt}		3	3
Number of switching operations per turbine over 10 minutes				
-for startup at cut-in wind speed			10	10
-for startup at rated wind speed	N_{10}		1	1
-for worst case of switching between generators				
Number of switching operations per turbine over 120 minutes				
-for startup at cut-in wind speed			12	12
-for startup at rated wind speed	N_{120}		12	12
-for worst case of switching between generators				
Sytem Data				
Short circuit level at PCC	S_k	MVA	19,20	
Grid impedance phase angle		°	72,74	
Short circuit ratio relative to wind farming	$S_k/(N_{wt} \times S_n)$		4,27	
Criteria				
Flicker emission during continous operation	P_{lt}		0,7	
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,9	
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,7	
Voltage change due to a switching operation	Δu			
-1 change per minute due to 1 turbine		%	2,0	
-10 change per minute due to 10 turbine		%	1,2	
-25 change per minute due to 10 turbine		%	1,0	
Calculations				
Flicker emission during continous operation	P_{lt}		0,131	0,119
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,375	0,387
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,177	0,182
Voltage change due to a switching operation	Δu		0,057	-0,013
Criteria Check				
Flicker emission during continous operation	P_{lt}		OK	OK
Flicker emissions due to switching operations (10 minutes)	P_{st}		OK	OK
Flicker emissions due to switching operations (120 minutes)	P_{lt}		OK	OK
Voltage change due to a switching operation	Δu		OK	OK

3.3.4 Four turbines in service

			Grid Phase Angle	
Wind Turbine Data	Symbol	Unit	70°	85°
Flicker Coefficent	c		0,970	0,880
Flicker Step Factor for grid phase angle of 70°/85 °	K_f	°	0,093	0,096
Voltage variation factor for grid phase angle of 70°/85 °	K_u		0,162	-0,160
Rated power of wind turbine	S_n	MVA	1,5	1,5
Number of identical turbines	N_{wt}		4	4
Number of switching operations per turbine over 10 minutes				
-for startup at cut-in wind speed			10	10
-for startup at rated wind speed	N_{10}		1	1
-for worst case of switching between generators				
Number of switching operations per turbine over 120 minutes				
-for startup at cut-in wind speed			12	12
-for startup at rated wind speed	N_{120}		12	12
-for worst case of switching between generators				
Sytem Data				
Short circuit level at PCC	S_k	MVA	19,20	
Grid impedance phase angle		°	72,74	
Short circuit ratio relative to wind farming	$S_k/(N_{wt} \times S_n)$		3,20	
Criteria				
Flicker emission during continous operation	P_{lt}		0,7	
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,9	
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,7	
Voltage change due to a switching operation	Δu			
-1 change per minute due to 1 turbine		%	2,0	
-10 change per minute due to 10 turbine		%	1,2	
-25 change per minute due to 10 turbine		%	1,0	
Calculations				
Flicker emission during continous operation	P_{lt}		0,152	0,138
Flicker emissions due to switching operations (10 minutes)	P_{st}		0,410	0,424
Flicker emissions due to switching operations (120 minutes)	P_{lt}		0,193	0,199
Voltage change due to a switching operation	Δu		0,076	-0,013
Criteria Check				
Flicker emission during continous operation	P_{lt}		OK	OK
Flicker emissions due to switching operations (10 minutes)	P_{st}		OK	OK
Flicker emissions due to switching operations (120 minutes)	P_{lt}		OK	OK
Voltage change due to a switching operation	Δu		OK	OK

4 Conclusion and recommendations

The results show no conspicuities. All checked parameters are below the given limit values. No recommendations needed.

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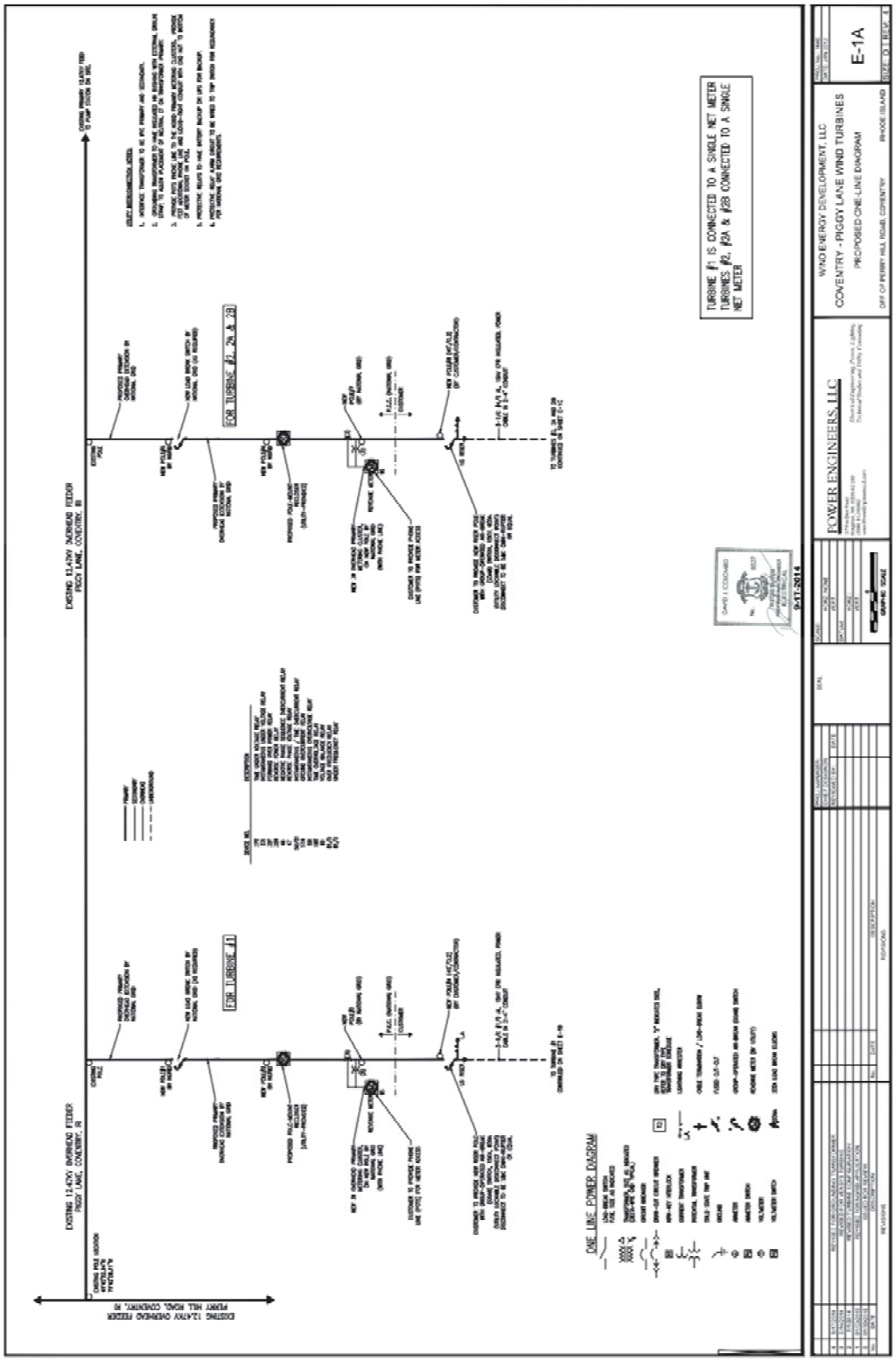

Figure 1: Grid Connection of Units 1; 2; 2A and 2 B (Perry Hill /Piggy Lane)

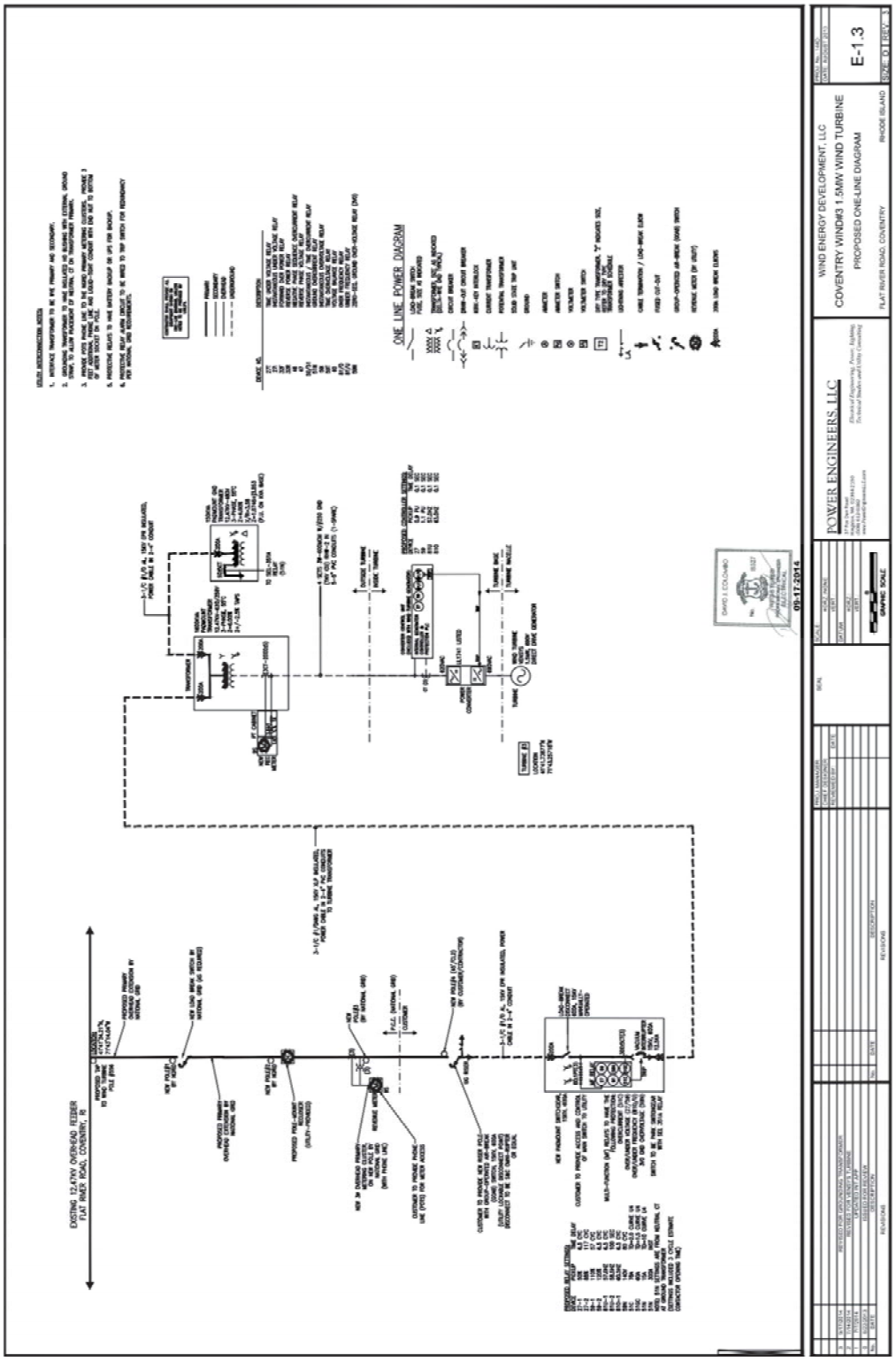

Figure 2: Grid Connection of Unit 3 (Flat River Road)

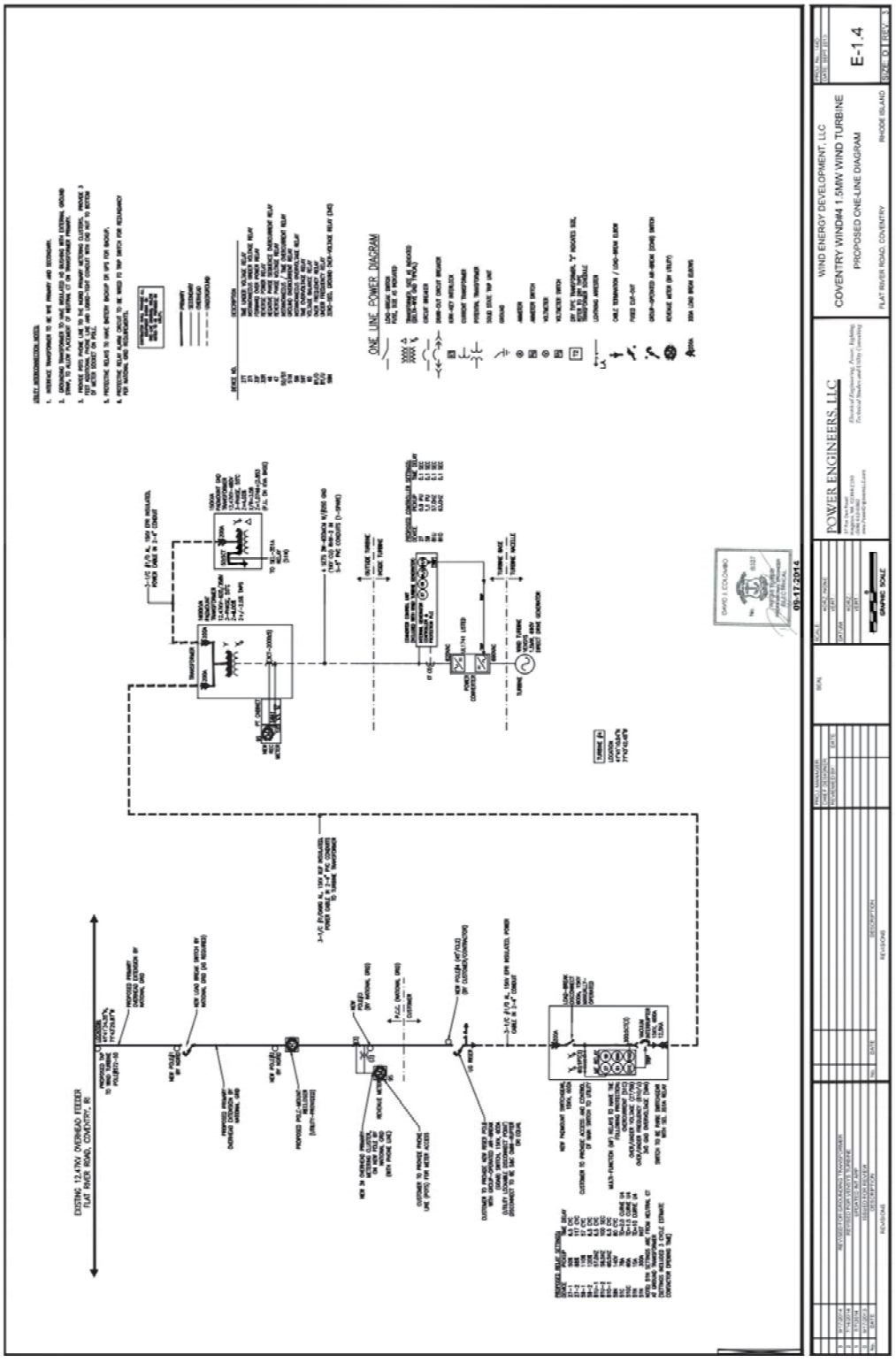

Figure 3: Grid Connection of Unit 4 (Flat River Road)

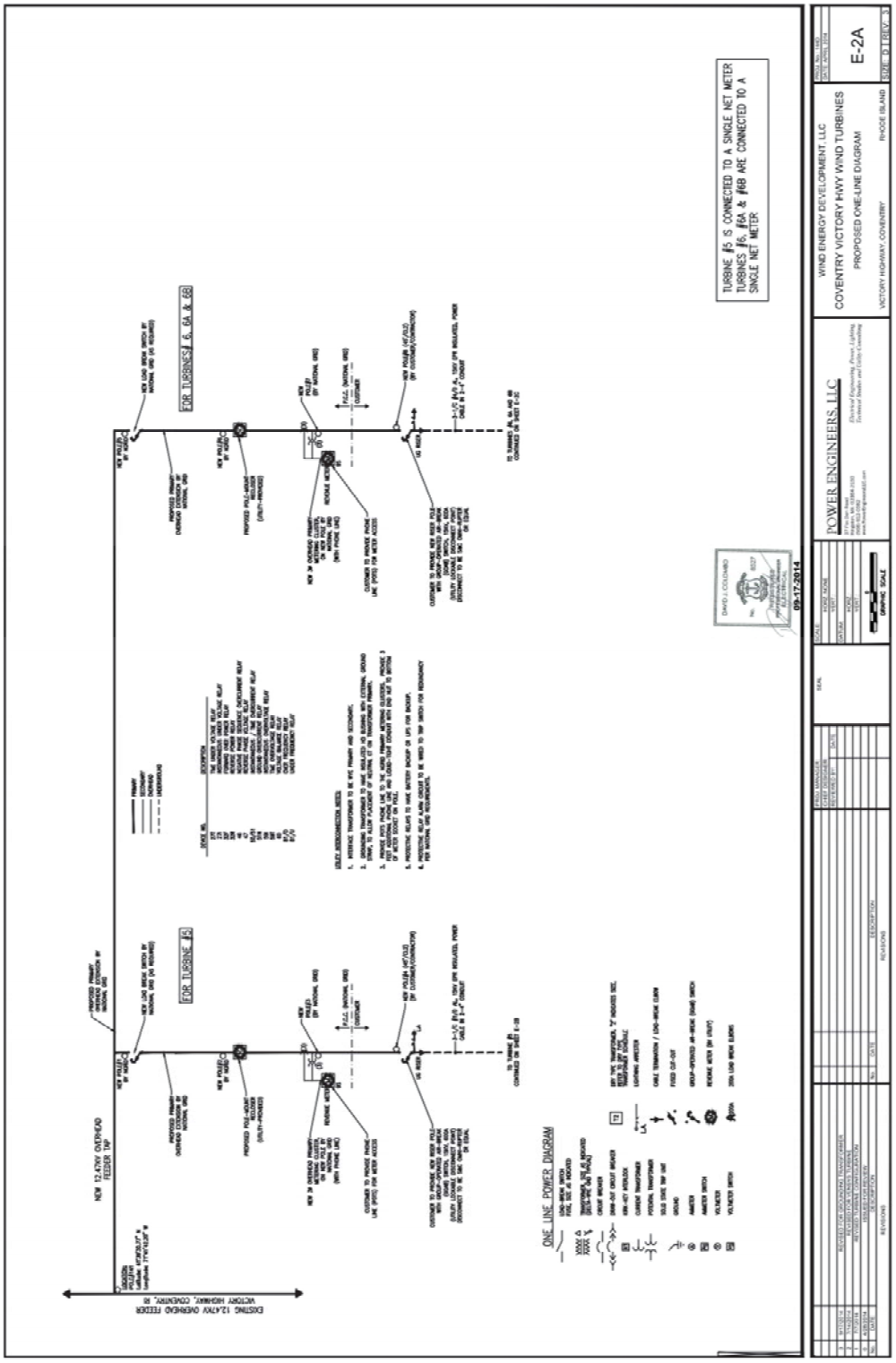

Figure 4: Grid Connection of Units 5; 6; 6A and 6B

Nenndaten / Rated data:

Nennscheinleistung S_n *Rated apparent power S_n*	1,500 kVA	Nennstrom I_n *Rated current I_n*	1,396.8 A
Nennfrequenz f_n *rated frequency f_n*	50 Hz	Nennspannung U_n *rated Voltage U_n*	620 V

Flicker:

Netzimpedanzwinkel/ Network impedance phase angle, yk	30°	50°	70°	85°
Mittlere Jahreswindgeschwindigkeit/ Annual average wind speed, va (m/s)	Flickerkoeffizient/*Flicker coefficient*, $c(\psi_k, v_a)$			
v_a = 6.0 m/s	1.29	1.53	0.97	0.88
v_a = 7.5 m/s	1.40	1.21	0.97	0.87
v_a = 8.5 m/s	1.45	1.25	0.97	0.87
v_a = 10.0 m/s	1.50	1.28	0.97	0.87

Schalthandlungen/*Switching operations*:

Schaltvorgang/*Case of switching operation*	Einschalten bei Einschaltwind/*Start-up at cut-in wind speed*			
Max. Anzahl an Schalthandlungen, N_{10} *Max. number of switching operations, N_{10}*	10			
Max. Anzahl an Schalthandlungen, N_{120} *Max. number of switching operations, N_{120}*	12			
Netzimpedanzwinkel/*Grid impedance angle*	30°	50°	70°	85°
Spannungsänderungsfaktor/ *Voltage change factor*, $k_U(\psi_k)$	0.023	0.012	-0.001	-0.010
Flickerformfaktor/ *Flicker step factor*, $k_f(\psi_k)$	0.081	0.069	0.058	0.057

Schaltvorgang/*Case of switching operation*	Einschalten bei Nennwind/*Start-up at rated wind speed*			
Max. Anzahl an Schalthandlungen, N_{10} *Max. number of switching operations, N_{10}*	1			
Max. Anzahl an Schalthandlungen, N_{120} *Max. number of switching operations, N_{120}*	12			
Netzimpedanzwinkel/*Grid impedance angle*	30°	50°	70°	85°
Spannungsänderungsfaktor/ *Voltage change factor*, $k_U(\psi_k)$	0.816	0.521	0.162	-0.124
Flickerformfaktor/ *Flicker step factor*, $k_f(\psi_k)$	0.121	0.104	0.089	0.088

Schaltvorgang/*Case of switching operation*	Seviceabschaltung bei Nennleistung/*Cut off at rated power*			
Max. Anzahl an Schalthandlungen, N_{10} *Max. number of switching operations, N_{10}*	1			
Max. Anzahl an Schalthandlungen, N_{120} *Max. number of switching operations, N_{120}*	12			
Netzimpedanzwinkel/*Grid impedance angle*	30°	50°	70°	85°
Spannungsänderungsfaktor/ *Voltage change factor*, $k_U(\psi_k)$	0.802	0.496	0.130	-0.160
Flickerformfaktor/ *Flicker step factor*, $k_f(\psi_k)$	0.068	0.082	0.093	0.096
Schlechtester Wert aller Schaltvorgänge, k_{imax}/ *Worst case all switching operation, k_{imax}*	1.142			

Figure 5: Wind Turbine Data from the test report of the Vensys 82 SDL (only extracts)

WED 1, 2, 2A, & 2B POI Perry Hill/Piggy Fault DATA Perry Hill & Flat River Reconductored	AMPS	MVA	X/R	Ro/X1	Xo/X1
Single Phase	854.4	19	2.609	2.60962	2.30792
Three Phase	1247	27.7	3.01595	0.98764	2.30792

THEVENIN IMPEDANCE (OHM)		
Positive sequence	Negative Sequence	Zero Sequence
1.86734+j5.63181	1.86735+j5.63173	5.56218+j12.9978

WED 3 & 4 POI Fault DATA 4/0 flat River Reconductored	AMPS	MVA	X/R	Ro/X1	Xo/X1
Single Phase	803	17.8	2.46399	1.04629	2.32746
Three Phase	1178	26.2	2.46399	1.04629	2.32746

THEVENIN IMPEDANCE (OHM)		
Positive sequence	Negative Sequence	Zero Sequence
2.10129+j5.91929	2.1013+j 5.9192	6.19331+j13.7769

WED 5, 6, 6A & 6B POI Fault DATA	AMPS	MVA	X/R	Ro/X1	Xo/X1
Single Phase	701	15.6	3.21898	0.4655	1.73289
Three Phase	863	19.2	3.21898	0.4655	1.73289

THEVENIN IMPEDANCE (OHM)		
Positive sequence	Negative Sequence	Zero Sequence
2.82348+j8.13514	2.82356+j8.13525	3.7869+j14.0973

Figure 6: Grid data received for the calculation of the flicker and voltage variation. Perry Hill/Piggy (top), Flat river Road (mid) and Victory Highway (below) are the corresponding connection points.

EXHIBIT J

Ramos, Adam M.

From: David Colombo <Dave@powerengineersllc.com>
Sent: Wednesday, October 29, 2014 10:56 AM
To: Mark(Wind) Depasquale; Kennedy, John C.; George, Caleb; Theo Peters
Subject: WED - Coventry 1, 2, 2A, 2B One-Lines
Attachments: Coventry Wind 1 2 2A 2B One-Line Rev 10-29-2014.pdf

John
Per our last meeting on 10/15, attached are the revised one-lines for Coventry 1, 2, 2A and 2B wind turbines. The changes reflect the new pole area at Perry Hill Road and the customer installing the underground feeders to the intersection of Piggy Lane and Perry Hill for interconnection.
Please let me know if you have any questions.

Sincerely,
Dave

David J. Colombo, P.E.
Power Engineers, LLC
(508) 612-0382
Dave@PowerEngineersLLC.com

Ramos, Adam M.

From: Kennedy, John C. <John.Kennedy@nationalgrid.com>
Sent: Tuesday, November 04, 2014 3:41 PM
To: 'Mark(Wind) Depasquale'; 'David Colombo'; George, Caleb; Kamal, Rashed; Ryan, James W. (US-WBRO-Ops); 'nreis@controlpointtech.com'
Subject: WED Coventry 1-6: 10/31 Meeting Notes
Attachments: WED_CombinedStudyChecklist_10-31-14.xlsx

All,
Please review attached and let me know if anything needs editing.

Mark,
Regarding DTT and communication required point to point: Please provide us with your proposed plan, for our review/approval, detailing how all generator breakers will be taken off line(tripped) within the 2 second tariff requirement. This is needed for us to progress the study and will impact substation modifications. I believe Vensys was to provide you with some detail with a proposal for bring the leased line to one point within project sites.
Note: other than the leased line for DTT; a point to point radio system would be an option. It would require a 3rd party to study the line of sight potential from you turbine sites to our substations.

Please contact me with any questions.

Thanks,

John Kennedy

national**grid**
Lead Technical Support Consultant - RI
Technical Sales and Engineering Support
Office: 401-784-7221

Please select the appropriate link below for the latest DG information:
National Grid's DG Website(RI)
RIPUC No.2078 Standards for Connecting Distributed Generation
RIPUC No.2075 Net Metering Provision
ESB No.756 Requirements for Parallel Generation

Wind Energy Development: WTG Projects; Coventry One -Six
Impact Study Progress Meeting Checklist

Item	Responsible Party	Date Identified	Date Closed	Status	Notes
Provide Stability Model of Turbines for Trans. Planning Study	WED	9/11/2014		open	WED provided on 10/31 and model is under Ngrid review
Contact ISO-NE help desk	WED	9/11/2014		closed	
Contact Verizon for POTS lines, DTT leased lines, ISO RTU line(if req'd)	WED	9/11/2014		open	
Provide UL1741 listing documentation	WED	9/11/2014		closed.	
Provide active anti-islanding protection documents	WED	9/11/2014		closed.	
Revise one-lines to show; effectively grounded systems, grounding bank impedance, y-grd/y-grd .xfmrs, pole #'s of POI's.	WED	9/11/2014		closed.	
Provide voltage flicker data in format required.	WED	9/11/2014		closed.	
Provide voltage flicker data templates and necessary format	NGrid	9/11/2014		**closed.**	
Provide ISO OP-14, 18 doc's and contact information	NGrid	9/11/2014		closed.	
Provide PSSE modeling template info	NGrid	9/11/2014		closed.	Does not exist
Request Trans. Planning Study case be opened.	NGrid	9/11/2014		closed.	Does not exist
Schedule bi-weekly Impact Study progress review meetings	NGrid	10/15/2014	10/15/2014	closed.	
Provide Verizon communications request form	NGrid	10/15/2014		closed	
provide RFL spec's when available	NGrid	10/15/2014		open	
provide ISO-NE Help Desk ph. #	NGrid	10/15/2014	10/15/2014	closed	413-540-4220
provide Trans. Plan'g Study Cost Estimate	NGrid	10/15/2014		open	
provide revised one-lines detailing: primary conductor sizes with length and impedance(turbines to POI's).	WED	10/15/2014		open	Received Cov 1 & 2 on 10/29/14. WED to provide another revisions of plans per discussion on 10/31. Still require for other POI's.
provide POI sketch of equipment; piggly ln. at perry hill.	NGrid	10/15/2014	10/15/2014	closed	
Provide comment on system improvement costs relative to system impact costs	NGrid	10/15/2014		open	
schedule meeting to review Net Metering Provision details.	NGrid	10/15/2014		open	WED provided description of NM"g intent.

Age of equipment to be replaced	NGrid	10/31/2014		open	
DTT Design Proposal	WED	10/31/2014			

On Fri, Sep 12, 2014 at 2:42 PM, Kennedy, John C. <John.Kennedy@nationalgrid.com> wrote:

All,

Below are my notes from our meeting yesterday that we had reviewed. Please provide comment if you feel I miss

WED will:

- Provide UL listing documentation and 1741 compliance documentation as soon as able
- Provide verification that turbines have active anti-islanding protection

Revise one lines to show:

- Effectively grounded systems
- Impedance information of grounding banks
- Y-grd / Y-grd transformers(preferred by turbine mfg.)
- Stability Model of turbines
- Flicker data of turbines per template and date provided by NGrid today.
- Pole numbers of POI's - complete
- Pole numbers of POI's on one-lines

- Contact ISO help desk to initiate discussion
- Contact Verizon/Cable Co's to initiate POTS line, DTT leased line(if req'd), ISO RTU line(if req'd)

NGrid will:

Provide Flicker Data templates and necessary data – complete
Provide ISO Operation data – OP-14, 18 and contact information – complete
Provide PSSE modeling template – complete
Request Transmission Planning Study cases be opened- complete

Discussion other than above:

ISO Process / Requirements expected:
Two separate Transmission Planning Studies will be required
Lengthy process, concurrent to Impact Study once information is locked down, exceeds impact study timeline
Many aspects of ISO process and timeline NGrid does not control

Customer need date: December 2015
Generally felt that Distribution and Transmission systems will handle proposed 15mW's – completed impact stu
Overvoltage protection, 3V0, will be required at Coventry Station transformer and at both Hopkins Hill Station tr
DTT will most likely be required if active anti-islanding protection is not provided. May be required if both UL list

DTT communication options:
Verizon; most comfortable but timely
Line of Sight
Fiber

Estimated Timelines:

D-line design – 3months
D-line construction; 6-9 mo's
Substation design and construction; 72-80 weeks
Estimated timelines discussed will be refined and provided in completed Impact Study

Station supply line outage coordination can add to construction timelines estimated.

ed anything.

dy to confirm and detail System Modifications to do so.
ansformers
ing and active anti-islanding is provided. Completed Impact Study will provide determination.

Discussion points and Meeting Notes:

- Discuss Mark's report that Vensys will complete active anti-islanding study in six months.

o How does that affect UL Listing?

o Will active anti-islanding by Vensys be a consideration for this 15mW's of DG?

o Temporary Overvoltage study will be required; dependent on conversation anti-islanding study may also be

Above items were discussed; Mark clarified that UL 1741 listing is not available at this time and that active anti-islanding will not be provided or considered in the future for this project.

Based on that information, National Grid stated that only the Temporary Overvoltage study will be conducted/contracted out; timeline to be determined. DTT will be required for all POI's.

- Merits of moving turbine Cov. 2b(54F1) to Cov. 5 & 6 POI(63F6).

o Piggy Ln & Victory Hwy customer owned primary cable sizing.

o Cable size and impedance needed to continue study(new one line req'd.).

Above item was discussed; turbines are optimally located with regard to system impacts on 54F1 and 63F6 circuits. WED will provide revised one-lines detailing new primary conductor size and distances between

- Trans Planning Study / PSSE Modeling Template – status, questions.

Above discussed; once NGrid obtains ISO-NE confirmation of study scope the study cost estimate will be provided to WED and invoiced.

- Voltage Flicker Data Submitted - looks good. – discussed.
- One Lines - discussion
- DTT Requirements

o Is there possibility of hardwiring generator breakers to limit DTT lines required? **WED indicated yes, this will allow for two to three lines to be leased**.

o WED to contact Verizon for service and inquire on monthly expense. **NGrid to provide additional information to WED to help facilitate.**

o WED to explore other options if desirable, .ie, line of sight, fiber, etc.

- Estimated time remaining to complete study.

o Original 11/13/14 due date. ISRDG executed 8/15/14.

o 4 weeks to receive flicker data(requested 9/11/14, received 10/9/14)

o December 11, 14 is new due date at this point(temporary overvoltage study completion may affect this date, as will other data requests)

Above items were discussed.

- Other items??

Discussion Points for Friday, 10/31:

- Review attached checklist; outstanding items.
- Review recently submitted one-line for Cov. 1 & 2.
- Review ISO – NE process; what National Grid does, what WED does
- Questions

Attendees: Ngrid- J. Kennedy, J. Ryan, Caleb George, N. Reis, R. Kamal. WED- M. DePasquale

- ISO-NE process was reviewed by Jim Ryan. Jim will touch base with ISO-NE prior to WED making contact again; ir
- System Improvement/Upgrades: still pending
- Net Metering Discussion Meeting : pending, Mark has provided detail for review; once complete meeting tobe s
- Verizon: WED to contact on service requests and system upgrades
- Ngrid to provide substation addresses. Completed.
- WED requested age of equipment that is to be replaced.
- Discussion held re: DTT requirement and leased lines. Ngrid will schedule a separate meeting to discuss both iter
-

nitial call to ISO help desk has been made. Joint call with ISO-NE scheduled for 11/13/14.

cheduled.

ms.

Ramos, Adam M.

From: Kennedy, John C. <John.Kennedy@nationalgrid.com>
Sent: Friday, November 07, 2014 3:04 PM
To: 'Mark(Wind) Depasquale'; 'David Colombo'
Subject: FW: RI WED

Mark, Dave,
Is this something that you can provide?
From Nick:

"In order to perform a Long term dynamic analysis I would like to have expected power output data, versus time, on a variable windy day, for these machines."

Thanks,

John Kennedy

national**grid**
Lead Technical Support Consultant - RI
Technical Sales and Engineering Support
Office: 401-784-7221

Please select the appropriate link below for the latest DG information:
National Grid's DG Website(RI)
RIPUC No.2078 Standards for Connecting Distributed Generation
RIPUC No.2075 Net Metering Provision
ESB No.756 Requirements for Parallel Generation

EXHIBIT K

Ramos, Adam M.

From: David Colombo <Dave@powerengineersllc.com>
Sent: Wednesday, October 29, 2014 10:56 AM
To: Mark(Wind) Depasquale; Kennedy, John C.; George, Caleb; Theo Peters
Subject: WED - Coventry 1, 2, 2A, 2B One-Lines
Attachments: Coventry Wind 1 2 2A 2B One-Line Rev 10-29-2014.pdf

John
Per our last meeting on 10/15, attached are the revised one-lines for Coventry 1, 2, 2A and 2B wind turbines. The changes reflect the new pole area at Perry Hill Road and the customer installing the underground feeders to the intersection of Piggy Lane and Perry Hill for interconnection.
Please let me know if you have any questions.

Sincerely,
Dave

David J. Colombo, P.E.
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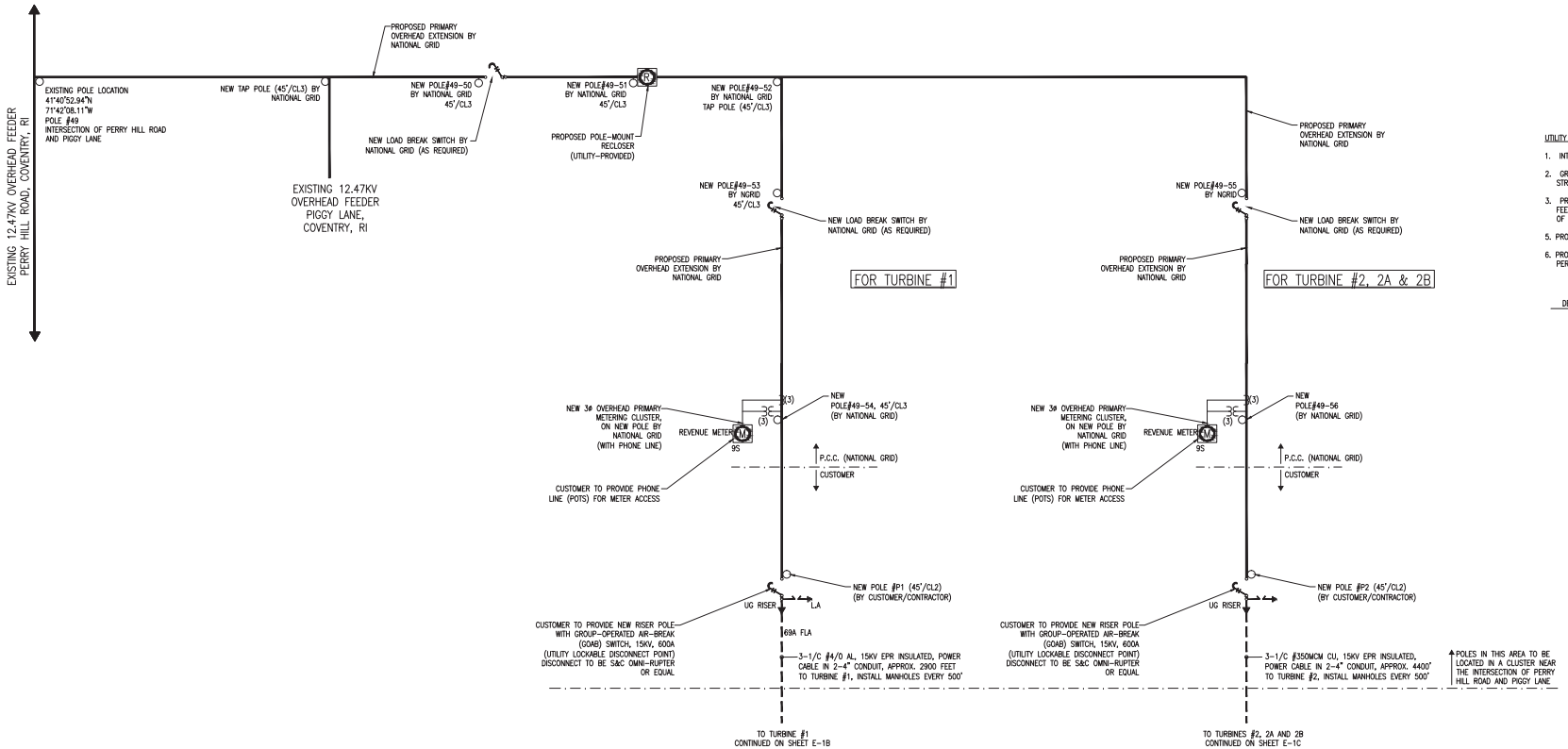


UTILITY INTERCONNECTION NOTES:

1. INTERFACE TRANSFORMER TO BE WYE PRIMARY AND SECONDARY.
2. GROUNDING TRANSFORMER TO HAVE INSULATED H0 BUSHING WITH EXTERNAL GROUNI STRAP, TO ALLOW PLACEMENT OF NEUTRAL CT ON TRANSFORMER PRIMARY.
3. PROVIDE POTS PHONE LINE TO THE NGRID PRIMARY METERING CLUSTERS. PROVIDE FEET ADDITIONAL PHONE LINE AND LIQUID-TIGHT CONDUIT WITH END NUT TO BOTTOM OF METER SOCKET ON POLE.
5. PROTECTIVE RELAYS TO HAVE BATTERY BACKUP OR UPS FOR BACKUP.
6. PROTECTIVE RELAY ALARM CIRCUIT TO BE WIRED TO TRIP SWITCH FOR REDUNDANCY PER NATIONAL GRID REQUIREMENTS.

DEVICE NO.	DESCRIPTION
27T	TIME UNDER VOLTAGE RELAY
27I	INSTANTANEOUS UNDER VOLTAGE RELAY
32F	FORWARD OVER POWER RELAY
32R	REVERSE POWER RELAY
46	NEGATIVE PHASE SEQUENCE OVERCURRENT RELAY
47	REVERSE PHASE VOLTAGE RELAY
50/51	INSTANTANEOUS / TIME OVERCURRENT RELAY
51N	GROUND OVERCURRENT RELAY
59I	INSTANTANEOUS OVERVOLTAGE RELAY
59T	TIME OVERVOLTAGE RELAY
60	VOLTAGE BALANCE RELAY
81/O	OVER FREQUENCY RELAY
81/U	UNDER FREQUENCY RELAY

PRIMARY
SECONDARY
OVERHEAD
UNDERGROUND

ONE LINE POWER DIAGRAM

- LOAD-BREAK SWITCH FUSE, SIZE AS INDICATED
- TRANSFORMER, SIZE AS INDICATED (DELTA-WYE GND TYPICAL)
- CIRCUIT BREAKER
- DRAW-OUT CIRCUIT BREAKER
- KI KIRK-KEY INTERLOCK
- CURRENT TRANSFORMER
- POTENTIAL TRANSFORMER
- SOLID STATE TRIP UNIT
- GROUND
- A AMMETER
- AS AMMETER SWITCH
- V VOLTMETER
- VS VOLTMETER SWITCH
- T2 DRY TYPE TRANSFORMER. "2" INDICATES SIZE, REFER TO DRY TYPE TRANSFORMER SCHEDULE
- L.A. LIGHTNING ARRESTER
- CABLE TERMINATION / LOAD-BREAK ELBOW
- FUSED CUT-OUT
- GROUP-OPERATED AIR-BREAK (GOAB) SWITCH
- M REVENUE METER (BY UTILITY)
- 200A 200A LOAD BREAK ELBOWS

TURBINE #1 IS CONNECTED TO A SINGLE NET METER
TURBINES #2, #2A & #2B CONNECTED TO A SINGLE NET METER

DAVID J. COLOMBO No. 8527 REGISTERED PROFESSIONAL ENGINEER ELECTRICAL
10-29-2014

No.	DATE	DESCRIPTION
5	10/29/2014	REVISED FOR PERRY HILL INTERCONNECTION POINT
4	9/17/2014	REVISED FOR GROUNDING TRANSFORMER
3	7/14/2014	REVISED FOR VENSYS TURBINE
2	7/7/2014	REVISED TURBINE CONFIGURATION
1	01/03/2013	REVISED FOR NGRID APPLICATION
0	01/20/2012	ISSUED FOR REVIEW

REVISIONS

PROJ. MANAGER:
CHIEF DESIGNER:
REVIEWED BY: DATE

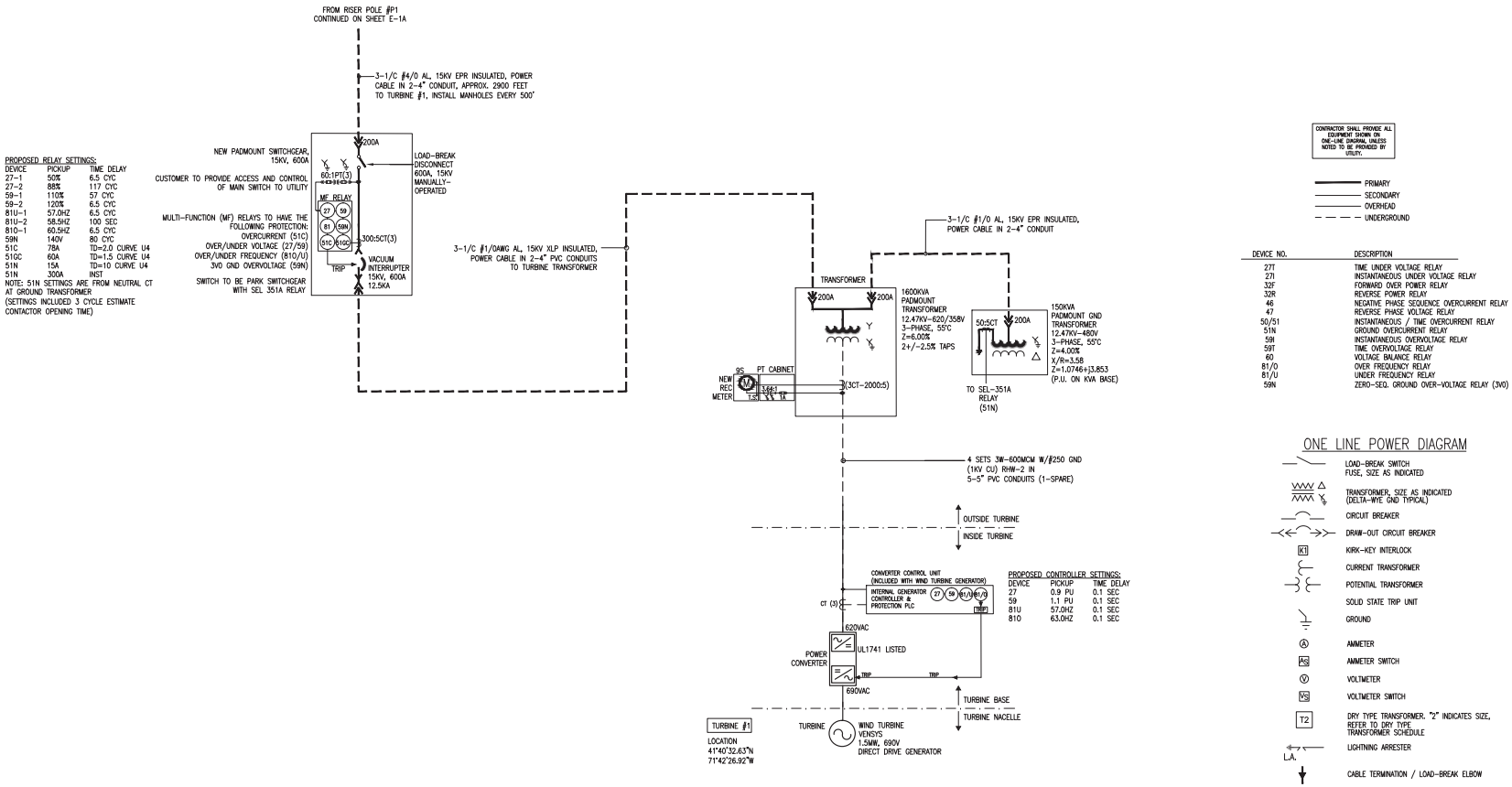
SEAL

SCALE:
HORZ.: NONE
VERT.:
DATUM:
HORZ.:
VERT.:
0
GRAPHIC SCALE

POWER ENGINEERS, LLC
37 Fox Den Road
Kingston, MA 02364-2150
(508) 612-0382
www.PowerEngineersLLC.com
Electrical Engineering, Power, Lighting, Technical Studies and Utility Consulting

WIND ENERGY DEVELOPMENT, LLC
COVENTRY - PIGGY LANE WIND TURBINES
PROPOSED ONE-LINE DIAGRAM
OFF OF PERRY HILL ROAD, COVENTRY RHODE ISLAND

PROJ. No.: 144D
DATE: JAN 2012
E-1A
SIZE: D REV: 5



PROPOSED RELAY SETTINGS:

DEVICE	PICKUP	TIME DELAY
27-1	50%	6.5 CYC
27-2	88%	117 CYC
59-1	110%	57 CYC
59-2	120%	6.5 CYC
81U-1	57.0HZ	6.5 CYC
81U-2	58.5HZ	100 SEC
81O-1	60.5HZ	6.5 CYC
59N	140V	80 CYC
51C	78A	TD=2.0 CURVE U4
51GC	60A	TD=1.5 CURVE U4
51N	15A	TD=10 CURVE U4
51N	300A	INST

NOTE: 51N SETTINGS ARE FROM NEUTRAL CT AT GROUND TRANSFORMER
(SETTINGS INCLUDED 3 CYCLE ESTIMATE CONTACTOR OPENING TIME)

PROPOSED CONTROLLER SETTINGS:

DEVICE	PICKUP	TIME DELAY
27	0.9 PU	0.1 SEC
59	1.1 PU	0.1 SEC
81U	57.0HZ	0.1 SEC
81O	63.0HZ	0.1 SEC

CONTRACTOR SHALL PROVIDE ALL EQUIPMENT SHOWN ON ONE-LINE DIAGRAM UNLESS NOTED TO BE PROVIDED BY UTILITY.

PRIMARY
SECONDARY
OVERHEAD
UNDERGROUND

DEVICE NO.	DESCRIPTION
27T	TIME UNDER VOLTAGE RELAY
27I	INSTANTANEOUS UNDER VOLTAGE RELAY
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59I	INSTANTANEOUS OVERVOLTAGE RELAY
59T	TIME OVERVOLTAGE RELAY
60	VOLTAGE BALANCE RELAY
81/O	OVER FREQUENCY RELAY
81/U	UNDER FREQUENCY RELAY
59N	ZERO-SEQ. GROUND OVER-VOLTAGE RELAY (3V0)

ONE LINE POWER DIAGRAM

- LOAD-BREAK SWITCH FUSE, SIZE AS INDICATED
- TRANSFORMER, SIZE AS INDICATED (DELTA-WYE GND TYPICAL)
- CIRCUIT BREAKER
- DRAW-OUT CIRCUIT BREAKER
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- CURRENT TRANSFORMER
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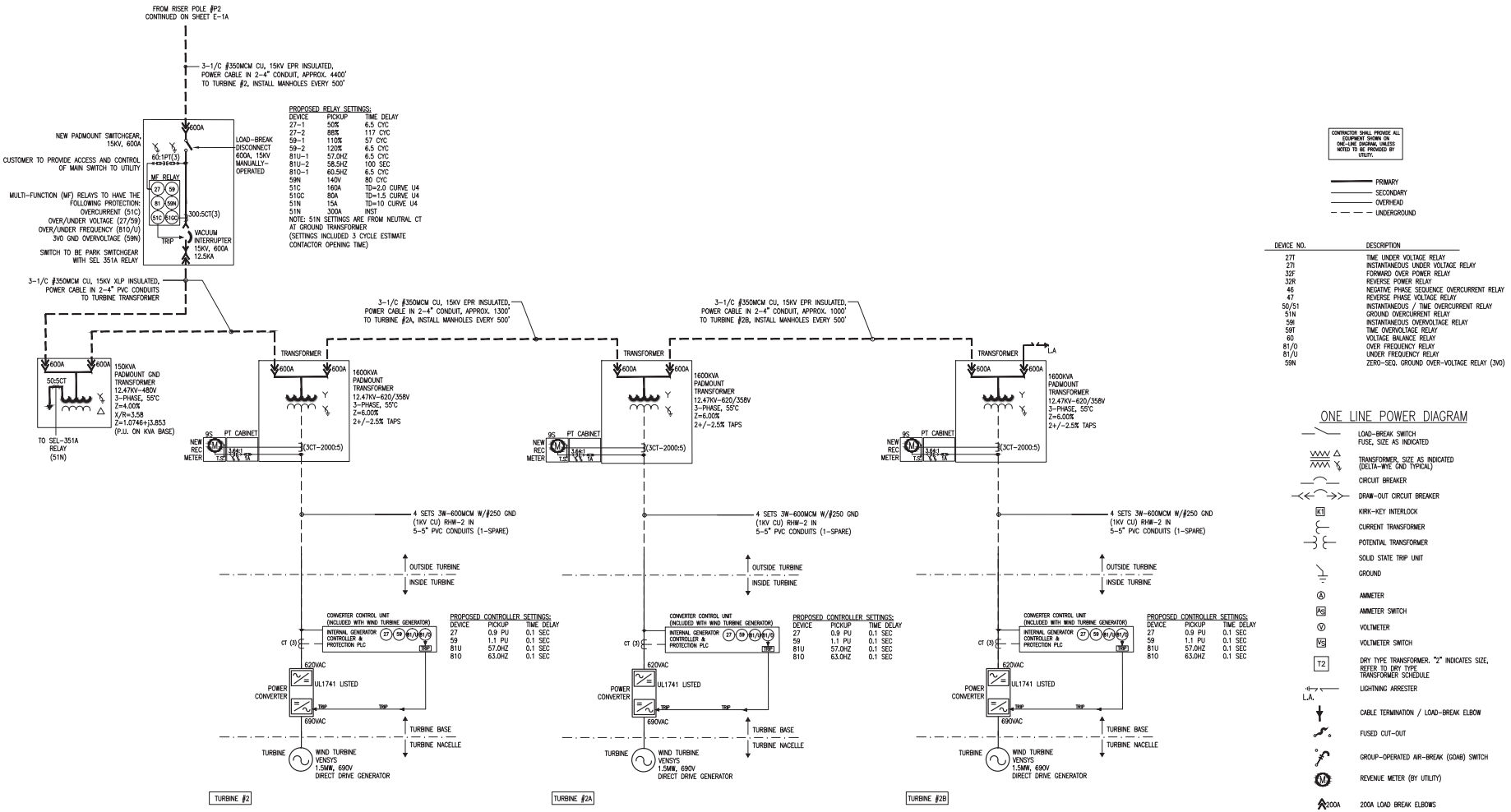
PROJ. No.: 144D
DATE: JAN 2012
E-1B
SIZE: D REV: 5



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PROJ. MANAGER:
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SEAL

SCALE:
HORZ.:NONE
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OFF OF PERRY HILL ROAD, COVENTRY RHODE ISLAND

PROJ. No.: 144D
DATE: JAN 2012
E-1C
SIZE: D REV: 5

Ramos, Adam M.

From: Mark(Wind) Depasquale <md@wedenergy.com>
Sent: Friday, November 14, 2014 2:37 PM
To: Kennedy, John C.
Subject: Wind Data 2013 11 12-2014 11 12.xlsx
Attachments: Wind Data 2013 11 12-2014 11 12.xlsx

John, attached is the wind data we spoke of.

Thanks,
Mark

George, Caleb

From: Mark(Wind) Depasquale <md@wedenergy.com>
Sent: Wednesday, November 26, 2014 9:14 AM
To: Kennedy, John C.
Cc: 'P. E. David J. Colombo (Dave@PowerEngineersLLC.com)'; Mark(Wind) Depasquale
Subject: Distance between turbines

John, regarding your request on November 14, to supply the distance between the turbines, they are on the site drawings submitted to National Grid at the beginning of the process. National Grid engineers stated they wanted the measurements so they would not have to scale the drawings, but this information is clearly obtainable from the drawing that were submitted.

1. WED Coventry One will interconnect at Piggy Lane at the end of the existing service on site 332 feet.
2. WED Coventry Two will interconnect at the intersection of Perry Hill Road and Piggy Lane, 4,110 feet to WED Coventry Two. 1,120 feet from WED Coventry Two to Two A, and 997 feet from Two A to Two B.
3. WED Coventry Three, from road to turbine, 1,163 feet.
4. WED Coventry Four, from road to turbine, 2,673 feet.
5. WED Coventry Five, from road to turbine, 1,475 feet.
6. WED Coventry Six, from road to Six B, 3,614 feet, from 6B to 6A, 3,016 feet and from 6A to 6 is 2,921 feet.

I hope this clarifies your engineer's questions. At this time, there are no outstanding items from WED and per our discussion on November 14th, we are anticipating the interconnection study on the second week in December. Per your request, I have held off on releasing the transformers on this project, but as of last week, we solidified our turbines and expect them in the port in August 2015. We will be ready for witness test by the end of September.

Per the tariff, prior to National Grid's revisions at the PUC to change the tariff on Monday November 23rd, it is clear that National Grid needs to interconnect this project in 150 days. Just to remind you, National Grid has been aware and studying this project for 630 days, and with the resubmission of the applications, it has been 102 days.

Have a Happy Thanksgiving.

Mark

Mark DePasquale

WIND ENERGY Development llc

3760 Quaker Lane
North Kingstown, RI 02852
Office: 401-295-4998 Ext. 103
Fax: 401-295-4944
md@wedenergy.com

Please consider the environment before printing this email.

George, Caleb

From: Kennedy, John C.
Sent: Wednesday, November 26, 2014 5:23 PM
To: George, Caleb; nreis@controlpointtech.com
Subject: FW: 3-26 to 3-28 Real Time Data
Attachments: Wind Speed and Active Power 3-26 to 3-28 2014.xlsx

FYI, talk next week

John Kennedy

From: Mark(Wind) Depasquale
Sent: 11/26/2014 5:13 PM
To: Kennedy, John C.
Cc: Mark(Wind) Depasquale
Subject: FW: 3-26 to 3-28 Real Time Data

John, I gave you the data from 03/25/14 through 03/28/14 in 10 sec intervals per your request.

Thanks,
Mark

Mark DePasquale

WIND ENERGY Development llc

3760 Quaker Lane
North Kingstown, RI 02852
Office: 401-295-4998 Ext. 103
Fax: 401-295-4944
md@wedenergy.com

Please consider the environment before printing this email.

EXHIBIT L

Ramos, Adam M.

From: Kennedy, John C. <John.Kennedy@nationalgrid.com>
Sent: Friday, January 30, 2015 4:01 PM
To: 'Mark(Wind) Depasquale'
Cc: Kelly, Kevin G.; LaBrake-Jr, Neil F.; George, Caleb; 'David Colombo'
Subject: WED Coventry 1-6; 23kV Interconnection and Impact Study

Mark,
It was great to speak with you this morning. To recap our meeting please see below and let me know if any edits or additions are needed.

- Caleb and his team have completed enough analysis of the 23kV sub-transmission circuit to determine that 3V0 and DTT will not be required.
- We agreed that National Grid will provide an Impact Study of the 23kV sub-transmission interconnection. Impact Study fees will not be charged at this point and will be included in the payment plan of the Interconnection Service Agreement(ISA). We will include the tariff fee of $10,000 per application/POI totaling $60,000 in study fees at time of ISA. Note: I failed to mention it during our call; as a point of information, National Grid has incurred approximately $100,000 in consulting fees alone for Coventry 1-6.
    - The study will provide an estimate of system modification which will include an overhead line extension of the 2232 circuit along Flat River Rd to Coventry 3 and Coventry 4; along Log Bridge and West Log Bridge Roads to the cul de sac on West Log Bridge Road. The estimate will also include an underground line extension from the cul de sac on West Log Bridge Road to Coventry 1, 2, 5, and 6. WED will design, provide necessary permits, procure and construct the manhole and duct system per National Grid's construction and material standards. MH/Duct system will be conveyed to National Grid prior to National Grid installing cable. The mh/duct installation will be subject to a donated property tax. Further details of this arrangement to be provided at a later date.
    - The study will also provide an estimate of system modification which will include an underground line extension of the 2232 circuit along Flat River Rd to Coventry 3 and Coventry 4; along Log Bridge and West Log Bridge Roads to Coventry 1, 2, 5, and 6. WED will design, provide necessary permits, procure and construct the manhole and duct system per National Grid's construction and material standards. MH/Duct system will be conveyed to National Grid prior to National Grid installing cable. The mh/duct installation will be subject to a donated property tax. Further details of this arrangement to be provided at a later date.
- We received the revised one-lines yesterday. We also received the rendering of POI's for Coventry 1, 2,5 & 6 on Wednesday of this week. A more definitive site plan will be required prior to completion of the study showing property lines and limits of public way.
- We reviewed that the overhead extension estimate of the study will be completed first as the underground extension will need to be modeled. National Grid will endeavor to provide the 23kV interconnection Impact Study and estimates of both options as soon as possible.

Please let me know if you have any questions.

Enjoy the weekend – Go Pats!,

John Kennedy

nationalgrid
Lead Technical Support Consultant - RI
Technical Sales and Engineering Support
Office: 401-784-7221

Please select the appropriate link below for the latest DG information:

National Grid's DG Website(RI)
RIPUC No.2078 Standards for Connecting Distributed Generation
RIPUC No.2075 Net Metering Provision
ESB No.756 Requirements for Parallel Generation

EXHIBIT M

The Narragansett Electric Company
Standards for Connecting Distributed Generation

Exhibit E – Impact Study or ISRDG Agreement

This Agreement, dated February 18, 2015 is entered into by and between **WED Coventry One, LLC, WED Coventry Two, LLC, WED Coventry Three, LLC, WED Coventry Four, LLC,WED Coventry Five, LLC, WED Coventry Six, LLC** ("Interconnecting Customer's") and the Company, for the purpose of setting forth the terms, conditions and costs for conducting an Impact Study relative to the Standard Process as defined in Section 1.0 and outlined in Section 3.0 of the Interconnection Tariff. This Impact Study pertains to Application Numbers **14319785, 14462941, 15640455, 15772951, 17599370, and 17600293** (the Interconnecting Customer's application ID numbers).

1. The Interconnecting Customer agrees to provide, in a timely and complete manner, all additional information and technical data necessary for the Company to conduct the Impact Study not already provided in the Interconnecting Customer's application.

2. All work pertaining to the Impact Study that is the subject of this Agreement will be approved and coordinated only through designated and authorized representatives of the Company and the Interconnecting Customer. Each party shall inform the other in writing of its designated and authorized representative, if different than what is in the application.

3. Where there are other potentially Affected Systems, and no single Party is in a position to prepare an Impact Study covering all potentially Affected Systems, the Company will coordinate but not be responsible for the timing of any additional studies required to determine the impact of the interconnection request on other potentially Affected Systems. The Interconnecting Customer will be directly responsible to the potentially Affected System operators for all costs of any additional studies required to evaluate the impact of the interconnection on the potentially Affected Systems. The Company will not proceed with this Impact Study without the Interconnecting Customer's consent to have the other studies conducted.

4. If the Company determines, in accordance with Good Utility Practice, that the System Modifications to the Company EPS are not substantial, the Impact Study will determine the scope and cost of the modifications. If the Company determines, in accordance with Good Utility Practice, that the System Modifications to the Company EPS are substantial, the Impact Study will produce an estimate for the modification costs (within ±25%) and a Detailed Study Agreement and its estimated cost.

5. Impact Study, together with any additional studies contemplated in Paragraph 3, shall form the basis for the Interconnecting Customer's proposed use of the Company EPS and shall be furthermore utilized in obtaining necessary third-party approvals of any required facilities and requested distribution services. The Interconnecting Customer understands and acknowledges that any use of study results by the Interconnecting Customer or its agents, whether in preliminary or final form, prior to NEPOOL 18.4 approval, should such approval be required, is completely at the Interconnecting Customer's risk.

6. The Impact Study fee of **$60,000.00*** (except as noted below) is due in full prior to the execution of the Impact Study**. For a Renewable Interconnecting Customer the ISRDG Study fee is as per Table 2 in Section 3.5 of the interconnection tariff.

7. Final Accounting. Upon request by the Interconnecting Customer, the Company within ninety (90) business days after completion of the construction and installation of the System Modifications described in an attached exhibit to the Interconnection Service Agreement, shall provide

The Narragansett Electric Company
Standards for Connecting Distributed Generation

Interconnecting Customer with a final accounting report of any difference between (a) Interconnecting Customer's cost responsibility under the Interconnection Service Agreement for the actual cost of such System Modifications, and (b) Interconnecting Customer's previous aggregate payments to the Company for such System Modifications. To the extent that Interconnecting Customer's cost responsibility in the Interconnection Service Agreement exceeds Interconnecting Customer's previous aggregate payments, the Company shall invoice Interconnecting Customer and Interconnecting Customer shall make payment to the Company within forty-five (45) days. To the extent that Interconnecting Customer's previous aggregate payments exceed Interconnecting Customer's cost responsibility under this agreement, the Company shall refund to Interconnecting Customer an amount equal to the difference within forty-five (45) days of the provision of such final accounting report.

8. In the event this Agreement is terminated for any reason, the Company shall refund to the Interconnecting Customer the portion of the above fee or any subsequent payment to the Company by the Interconnecting Customer that the Company did not expend or commit in performing its obligations under this Agreement. Payments for work performed shall not be subject to refunding except in accordance with Paragraph 11 below.

9. Nothing in this Agreement shall be interpreted to give the Interconnecting Customer immediate rights to wheel over or interconnect with the Company's EPS.

10. Except as precluded by the laws of the State of Rhode Island and the Providence Plantations, Interconnecting Customer and Company shall each indemnify, defend and hold the other, its directors, officers, employees and agents (including, but not limited to, affiliates and contractors and their employees), harmless from and against all liabilities, damages, losses, penalties, claims, demands, suits and proceedings of any nature whatsoever for personal injury (including death) or property damages to unaffiliated third parties that arise out of, or are in any manner connected with, the performance of this Agreement by that party, except to the extent that such injury or damages to unaffiliated third parties may be attributable to the negligence or willful misconduct of the party seeking indemnification.

    Notwithstanding the foregoing, the Interconnecting Customer hereby waives recourse against the Company and its Affiliates for, and releases the Company and its Affiliates from, any and all liabilities arising from or attributable to incomplete, inaccurate, or otherwise faulty information supplied by the Interconnecting Customer. Moreover, with respect to an ISRDG provided to a Renewable Interconnecting Customer, the Company may not be held liable or responsible if the actual costs exceed the estimate as long as the estimate was provided in good faith and the interconnection was implemented prudently the Company.

11. If either party materially breaches any of its covenants hereunder, the other party may terminate this Agreement by serving notice of same on the other party to this Agreement.

12. This agreement shall be construed and governed in accordance with the laws of the State of Rhode Island and the Providence Plantations.

13. All amendments to this Agreement shall be in written form executed by both Parties.

14. The terms and conditions of this Agreement shall be binding on the successors and assigns of either Party.

15. This Agreement will remain in effect for a period of up to two years from its effective date.

The Narragansett Electric Company
Standards for Connecting Distributed Generation

16. This Agreement may be terminated under the following conditions.

    a) The Parties agree in writing to terminate the Agreement.

    b) The Interconnecting Customer may terminate this agreement at any time by providing written notice to Company.

    c) The Company may terminate this Agreement if the Interconnecting Customer either: (1) has not paid the fee or, (2) has not responded to requests for further information in accordance with provisions in the Interconnection Tariff.

*** The $60,000 ISRDG fee is a combined total for all six interconnection applications.**
**** The Company and the Interconnecting Customer have agreed to include study fee in the payment terms or plan within the Interconnection Service Agreement. If the projects do not progress to an Interconnection Service Agreement, the Interconnecting Customer will pay the study fee by a mutually agreed upon date.**

Interconnecting Customers:

Name: Mark DePasquale
Title: Member, WED Coventry One LLC
Date: 2/18/15
Signature:

Name: Mark DePasquale
Title: Member, WED Coventry Two LLC
Date: 2/18/15
Signature:

Name: Mark DePasquale
Title: Member, WED Coventry Three, LLC
Date: 2/18/15
Signature:

Narragansett Electric Company d/b/a National Grid:

Name: John Kennedy
Title: Lead Technical Consultant
Date: February 18, 2015
Signature: John C Kennedy

The Narragansett Electric Company
Standards for Connecting Distributed Generation

Name: Mark De Pasquale
Title: Member, WED Coventry Four, LLC
Date: 2/18/15
Signature:

Name: Mark DePasquale
Title: Member, WED Coventry Five, LLC
Date: 2/18/15
Signature:

Name: Mark DePasquale
Title: Member, WED Coventry Six, LLC
Date: 2/18/15
Signature:

EXHIBIT O

Ramos, Adam M.

From: Mark DePasquale <md@wedenergy.com>
Sent: Friday, February 20, 2015 6:06 PM
To: Kennedy, John C.; Mark DePasquale
Cc: Ben Kaplan; Kelly, Kevin G.; P. E. David J. Colombo (Dave@PowerEngineersLLC.com)
Subject: RE: WED Coventry 1-6 Combined Impact Study -23kV Interconnection

John, regarding Tuesday's meeting, I would like to postpone until the first week of March. David Colombo is out of town this week, which will give him time to review the interconnection study. I also would like to send you questions regarding your study. We have engaged a civil engineer to work on a utility easement and permits to run this system underground. One of my biggest concerns about the above ground system is that it is 17 to 20 months out, which you are fully aware that it will push us out of the DG Contracts for Three and Four and National Grid will unjustly keep my deposits. We have consulted with the state and our engineers and feel confident that we can have all permits and easements completed by the end of May, which allows me 90 days to complete the installation of the underground system. The town has already given us approval to do the underground system on their roads within their jurisdiction with easements , this is already in the agreement between WED and the town of Coventry. We currently have two quotes for the underground system. It is a preliminary number +/- 25% after final design, but we are at $3,794,784 for the entire scope (not including taxes and NGrid's fee). This includes permitting, E&B, concrete duct banks, splice boxes, wire, pulling of wire, pad mounted metering switches at each site from the Coventry substation to WED Coventry Five. We have estimated additional footage that is not on your interconnection. Once I receive your price for the wire, pad mounted gear and your installation, that you acknowledge I would have next week, and receive answers that David will forward to you and questions I ask below, we can have an intelligent conversation at the meeting and compare costs.

A couple of questions that I would like you to respond to

1. I am being charged $819,000 for taxes on the entire system. We assume you are being taxed on the existing system. I would assume that I should only pay taxes on the wiring for the 23kv circuit, because everything on the proposal is in operation and taxes is being paid on. If this assumption is wrong, can you please explain the tax liability and possibly the system is already depreciated due to its age.
2. I would like you to give me the specification on the lifespan of the telephone poles from the manufacturer.
3. It appears that I am building the entire system, I think it will be unjust to donate a new system and have to pay half a million to remove the antiquated system, Please review.
4. Please give me a breakdown of the O&M of $509,000 and what it includes.
5. I would like to know how we can expedite the above ground system to be ready in October for the turbines to run.

This is only my questions, these don't include questions from the engineers.

Please let me know of a new date we can meet and any updates on your underground quote.

Thank you,
Mark

From: Kennedy, John C. [mailto:John.Kennedy@nationalgrid.com]
Sent: Wednesday, February 18, 2015 11:35 PM
To: Mark(Wind) Depasquale
Cc: Ben Kaplan; Kelly, Kevin G.
Subject: WED Coventry 1-6 Combined Impact Study -23kV Interconnection

Mark,
Here is the 23kV Interconnection Impact Study with the OH option estimate as discussed. Please review in detail and let me know if you have any questions. You may request that the Interconnection Service Agreements be drafted at this point which will include the System Modification costs estimate for the OH option or you may opt to wait for the UG estimate to be completed and make your decision at that time.

Again, I am involved in a workshop tomorrow and away from the office Friday. I will be checking emails during that time and will try to get back to you with any questions that you have. As an option for review of this study, please let me know if you would like to meet or conference early next week.

Best,

John Kennedy

national**grid**
Lead Technical Support Consultant - RI
Technical Sales and Engineering Support
Office: 401-784-7221

Please select the appropriate link below for the latest DG information:
National Grid's DG Website(RI)
RIPUC No.2078 Standards for Connecting Distributed Generation
RIPUC No.2075 Net Metering Provision
ESB No.756 Requirements for Parallel Generation

From: Kennedy, John C.
Sent: Wednesday, February 18, 2015 5:34 PM
To: 'Mark(Wind) Depasquale'
Cc: 'Ben Kaplan'
Subject: RE: WED Coventry 1-6 Combined Study Agreement -23kV Interconnection & PCC Confirmation Reply

Mark,
Here is your copy of the executed Combined Study Agreement. I will send over study as soon as I get the final version. I am told that it will be available tomorrow. Please remember that the study will have the overhead estimate and the underground estimate and any underground related requirements will be provided at a later date.

Best,

John Kennedy

national**grid**
Lead Technical Support Consultant - RI
Technical Sales and Engineering Support
Office: 401-784-7221

Please select the appropriate link below for the latest DG information:
National Grid's DG Website(RI)
RIPUC No.2078 Standards for Connecting Distributed Generation
RIPUC No.2075 Net Metering Provision
ESB No.756 Requirements for Parallel Generation

From: Mark(Wind) Depasquale [mailto:md@wedenergy.com]
Sent: Wednesday, February 18, 2015 11:13 AM
To: Kennedy, John C.
Cc: Mark(Wind) Depasquale; Ben Kaplan
Subject: RE: WED Coventry 1-6 Combined Study Agreement -23kV Interconnection & PCC Confirmation Reply

John:

Thank you for revising the Impact Study Agreement. I've attached the signed agreement. Please confirm that:

1) There will be no "detailed studies" as mentioned in paragraph 4 of the agreement, the impact study you have done (if agreed by the projects) will lead directly to an Interconnection Service Agreement.

2) You will conduct an account of final interconnection costs and true them up to the estimated number. That agreement in Docket 4483 is not shown in paragraph 7 of this Impact Study agreement. If you still think it necessary to request an accounting, we request an accounting so please confirm our request.

3) I'm willing to rely on your 1/30 email about the agreed scope of the study but it may be clearer to include that as an exhibit to the agreement.

We look forward to an improved study with a revised cost and a committed timeline to the interconnection of these 10 turbines.

Thank you.

Mark

Mark DePasquale

WIND ENERGY Development llc

3760 Quaker Lane
North Kingstown, RI 02852
Office: 401-295-4998 Ext. 103
Fax: 401-295-4944
md@wedenergy.com

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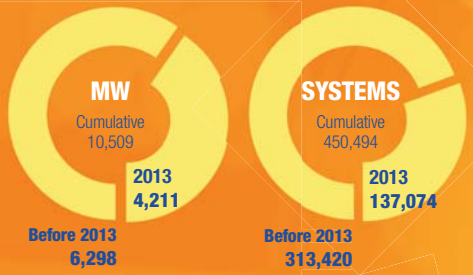
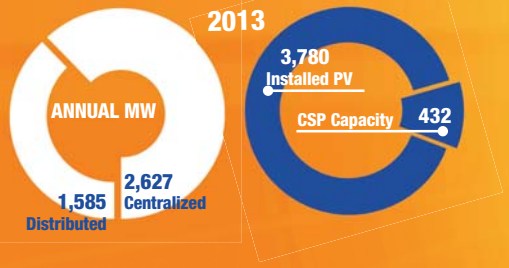
EXHIBIT P

SOLAR POWER *stats*

PRESENTED BY THE SOLAR ELECTRIC POWER ASSOCIATION

2013 solar surpassed FOUR GIGAWATTS (GW), bringing U.S. solar capacity to over 10.5 GW.

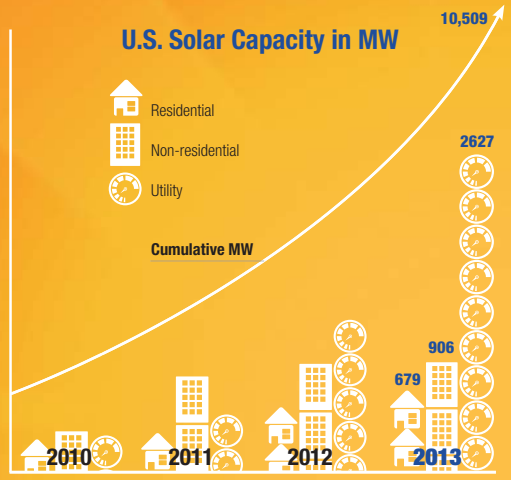


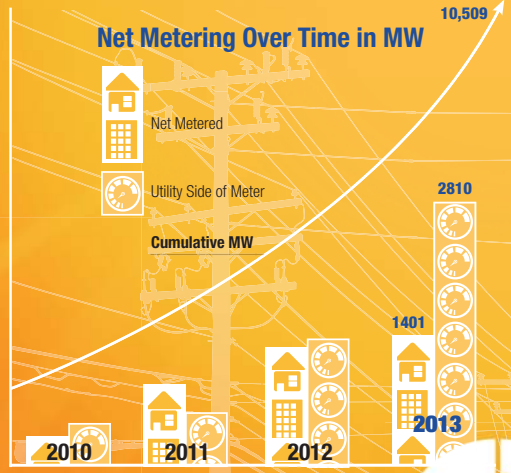


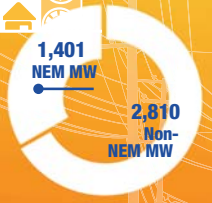
Program News from 2013 Utility Survey

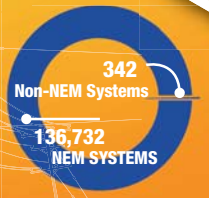
70% of responding utilities are currently offering customer solar incentives.

45% are currently offering programs for key accounts.









MW = megawatt-ac

2013 UTILITY SOLAR LEADERS

SEPAtop10.org

	ANNUAL MW	ANNUAL W/CUSTOMER	ANNUAL INTERCONNECTIONS	ANNUAL INTERCONNECTIONS PER 1,000 CUSTOMERS	
1	Pacific Gas and Electric Company (CA) 1471 MW	Sterling Municipal Light Dept (MA) 831 W	Pacific Gas and Electric Company (CA) 28,807 projects	Hawaiian Electric Company, Inc. (HI) 47 projects	1
2	San Diego Gas & Electric Company (CA) 643 MW	San Diego Gas & Electric Company (CA) 461 W	Southern California Edison (CA) 26,372 projects	Kaua'i Island Utility Cooperative (HI) 26 projects	2
3	Arizona Public Service (AZ) 417 MW	Silicon Valley Power/City of Santa Clara (CA) 427 W	Hawaiian Electric Company, Inc. (HI) 14,071 projects	Hawaii Electric Light Company (HI) 24 projects	3
4	Southern California Edison (CA) 373 MW	Arizona Public Service (AZ) 368 W	San Diego Gas & Electric Company (CA) 10,945 projects	Maui Electric Company Ltd (HI) 23 projects	4
5	Duke Energy Progress (NC, SC) 137 MW	Hawaiian Electric Company, Inc. (HI) 329 W	Arizona Public Service (AZ) 7,286 projects	Pennsylvania Electric Company (PA) 13 projects	5
6	National Grid (MA, RI) 111 MW	Pacific Gas and Electric Company (CA) 281 W	Xcel Energy-Public Service Co. of Colorado (CO) 5,426 projects	San Diego Gas & Electric Company (CA) 8 projects	6
7	Public Service Electric & Gas Company (NJ) 103 MW	Hawaii Electric Light Company (HI) 182 W	Los Angeles Dept. of Water and Power (CA) 4,156 projects	Sulphur Springs Valley Electric Co-op (AZ) 7 projects	7
8	Hawaiian Electric Company, Inc. (HI) 98 MW	Maui Electric Company Ltd (HI) 178 W	Salt River Project (AZ) 2,676 projects	Arizona Public Service (AZ) 6 projects	8
9	Georgia Power Company (GA) 59 MW	Kaua'i Island Utility Cooperative (HI) 167 W	Public Service Electric & Gas Company (NJ) 2,374 projects	Pacific Gas and Electric Company (CA) 5 projects	9
10	Duke Energy Carolinas (NC, SC) 58 MW	Imperial Irrigation District (CA) 159 W	National Grid (MA, RI) 2,259 projects	Southern California Edison (CA) 5 projects	10

Top 10 Solar States (total MW)

SEPA

solar electric power association

Exhibit Q

FREEING THE GRID 2015

SEARCH

HOME STATE GRADES EDUCATION CENTER DOWNLOAD
FTG ABOUT BLOG CONTACT

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RHODE ISLAND

B B

NET METERING INTERCONNECTION

2007	2008	2009	2010	2011	2012	2013	2014	2015
D	N/A	N/A	N/A	D	D	B	B	B

RECOMMENDATIONS

- The state should adopt IRECs model interconnection procedures

ELIGIBLE RENEWABLE/OTHER TECHNOLOGIES

N/A

APPLICABLE SECTORS

N/A

APPLICABLE UTILITIES

WEB FONTS BY fonts.com

Exhibit Q

N/A

SYSTEM CAPACITY LIMIT

N/A

BONUS

Applications and agreements accepted electronically; Insurance Waived for Generators up to 25 kW; Dispute resolution process adopted to address disputes

---

NOTES

Rhode Island has not made any significant changes to its net metering policy since 2011. As revised in 2011, the law provides for a system that resembles net metering, but which could be argued is not net metering as practiced in other states. As currently constructed, the law provides that a net metering customer receives _net metering creditsî that offset up to 100% of the customers usage during a month, and is _paidî for generation of up to 25% in excess of consumption at the utilitys standard service offer (SSO) rate. Thus the customer may offset on-site consumption with self-generation at the retail rate during a billing period (i.e., net metering) and carry over excess of up to 25% at the SSO rate, but the transaction itself could be seen as blurring the line between net metering and a buy-all, sell-all rate. In 2014, Rhode Island enacted legislation modestly increasing its score by removing the former 3% of statewide peak load aggregate net metering cap for National Grid (the utility provider for 98.5% of the states electric customers), and clarifying that net metering customers own the renewable energy credits produced by their systems (formerly unspecified).

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1 TWEETS

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Exhibit Q

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