STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
PUBLIC UTILITIES COMMISSION

PETITION OF THE NARRAGANSETT ELECTRIC CO. D/B/A NATIONAL GRID FOR APPROVAL OF ITS PROPOSED POWER SECTOR TRANSFORMATION VISION AND IMPLEMENTATION PLAN	)	DOCKET NO. 4780

PRE-FILED DIRECT TESTIMONY OF

FRANK LACEY

ON BEHALF OF

DIRECT ENERGY BUSINESS, LLC, DIRECT ENERGY SERVICES, LLC, AND DIRECT ENERGY SOLAR

EXHIBIT DE-FL-1

APRIL 25, 2018

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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Frank Lacey. My business address is 3 Traylor Drive, West Chester, PA 19382.

Q. BY WHOM ARE YOU EMPLOYED AND ON WHOSE BEHALF, ARE YOU TESTIFYING?

A. I am an independent consultant submitting this testimony on behalf of Respondent Direct Energy Services, LLC and its affiliates Direct Energy Business, LLC, and Direct Energy Solar (collectively, "Direct Energy"). Direct Energy is a national retail electricity and natural gas supplier licensed to serve residential, small commercial and large commercial and industrial customers in Rhode Island. Direct Energy is one of the world's leading integrated energy companies, and the number one home services provider in North America. Direct Energy, through its affiliated company Centrica Business Solutions, is providing demand response, electric storage resources, on-site generation solutions, enhanced usage analytics, resilience and other advanced energy management solutions.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. As a consultant, I am providing policy- and market-related consulting services to advanced energy management companies and end-use customers. I have worked in the electric power industry for approximately 25 years, beginning immediately after earning my graduate degree. I have worked on major industry restructuring issues including generation asset divestiture, with a specialization in

environmental asset valuation; stranded cost valuations; transmission restructuring including the development of Independent System Operators ("ISOs") and Regional Transmission Organization ("RTOs") and other independent transmission entities; the development of retail energy markets; and the development of demand response markets. Early in my career, I was employed as a consultant to industry participants, first by Putnam, Hayes & Bartlett, Inc. and then by Arthur Andersen Business Consulting. Within the industry, I have worked for Strategic Energy, a retail electricity supplier, Direct Energy, a retail energy supplier that acquired Strategic Energy in 2008, and most recently, Comverge, Inc. and CPower, two companies that shared a common owner and provide demand response services to residential and to commercial & industrial ("C&I") customers, respectively. I created Electric Advisors Consulting LLC in the fall of 2015. I hold a Bachelor of Science degree in Transportation and Logistics from the University of Maryland and a Master of Science in Industrial Administration with concentrations in finance and environmental management from the Tepper School of Business at Carnegie Mellon University. My resume is provided as Exhibit DE-FL-2.

Q. WOULD YOU PLEASE DESCRIBE YOUR PROFESSIONAL AFFILIATIONS?

A. I am currently a member of the board of directors of the Smart Electric Power Alliance ("SEPA"), a trade association with more than 1,000 members including utilities, distributed resource providers and related service providers. I am the Chairman of the Advisory Council on Demand Response and Smart Grid within

SEPA, which is a standing committee dedicated to enhancing the vision of demand response and smart grid within SEPA. Prior to its dissolution in 2015, I served on the board of directors of the Demand Response and Smart Grid Coalition. I am also a founding member and the current Chairman of the Advanced Energy Management Alliance. I served on the board of directors of the Electric Reliability Council of Texas ("ERCOT"), the grid operator in Texas, from 2002 to 2004.

Q. HAVE YOU EVER TESTIFIED BEFORE THE RHODE ISLAND PUBLIC UTILITY COMMISSION OR ANY OTHER UTILITY REGULATORY AGENCY?

A. I have not testified before the Rhode Island Public Utility Commission ("RIPUC" or "Commission"). I have, however, testified numerous times before other state regulatory agencies, legislatures, and twice as a technical conference witness at the Federal Energy Regulatory Commission ("FERC"). I have provided expert testimony in New York, Pennsylvania, Ohio, Maryland, Massachusetts, Illinois, Delaware, Virginia, Utah and California. I have presented oral testimony in less formal proceedings before the Commissions of Maryland, Pennsylvania, Delaware and Texas. I have presented legislative testimony in New York, Maryland, Pennsylvania, Delaware, Michigan, California and Texas. I recently filed an expert report on energy matters in the Superior Court of New Jersey in Bergen County. I have also spoken at numerous trade shows, conferences and other industry and corporate events as an expert on electricity market issues. A summary of my prior testimony is contained in Exhibit DE-FL-3.

Q. WHAT IS THE DIRECT ENERGY'S INTEREST IN THIS PROCEEDING?

A. Direct Energy is an active market participant in the Rhode Island electricity market. On November 27, 2017, The Narragansett Electric Company d/b/a National Grid ("Utility" or "National Grid") filed a Power Sector Transformation ("PST") Vision and Implementation Plan ("Plan"). As stated by National Grid, the Plan "is designed to create a platform that will empower the [Utility's] customers and support the transition to an affordable, sustainable clean energy future for Rhode Island." (PST Panel Testimony, p. 21 of 22, emphasis added.). Direct Energy seeks to ensure that its customers, its customer relationships and its business interests are not in any way harmed by the Utility's Plan and that Direct Energy can continue to provide innovative products and services at competitive rates to customers in National Grid's service territory. Moreover, Direct Energy seeks to ensure that the Plan is designed and implemented in a competitively neutral manner that does not disadvantage Direct Energy or other market participants.

II. SUMMARY AND CONCLUSIONS

Q. HAVE YOU READ NATIONAL GRID'S PST AND IMPLEMENTATION PLAN?

A. I have.

Q. COULD YOU PLEASE SUMMARIZE THE PLAN AND YOUR CONCLUSIONS?

A. Certainly. National Grid's PST will transform its distribution infrastructure into what has been called a "smart grid" in many other jurisdictions. This plan includes deployment of advanced metering functionality, communications technologies and hardware and software to aid in the efficient management of the electric distribution grid. I fully support the implementation of smart grid technologies so long as the smart grid tools and technologies can be used by all market participants to benefit all customers. National Grid's Plan appears, at a minimum, to ignore Direct Energy and its peer companies, known as non-regulated power producers ("NPP"), or potentially overtly omit the NPPs from its Plan. In addition to neglecting Direct Energy and NPPs in general, National Grid has proposed several "demonstration" projects and concepts in the Plan that will directly compete with and potentially harm the customer relationships and business interests of Direct Energy. The Utility proposals include the development of additional retail service products, the development of additional tariffs at some point in the future, and the direct participation in wholesale and retail energy markets with investments in EV infrastructure, storage facilities and other distributed energy resources. None of these proposals should be undertaken by a regulated utility with risks borne by rate payers. If National Grid should elect to undertake these business ventures, it should only be allowed to do so through one or more unregulated affiliate companies in competition with other market participants. Finally, while it is acknowledged that distribution system

planning is a critical function and focus of National Grid, the Utility Plan places too much emphasis on utility-derived benefits and not enough on the development of a modern grid that enhances consumer value and benefit.

III. THE ROLE OF THE ELECTRIC UTILITY

Q. WHAT IS YOUR UNDERSTANDING OF THE ROLE OF AN ELECTRIC DISTRIBUTION UTILITY IN RHODE ISLAND?

A. I understand that the Rhode Island legislature, by statutory mandate in the Utility Restructuring Act of 1996 ("URA"), required the utilities in the state to unbundle certain functions of its then current operations and to place the distinct functions into relevant separate business units, described as generation, transmission and distribution. P.L. 1996, ch. 316, § 1. The URA enabled competitive retail choice for electric supply. In an effort to promote economic development and the creation and preservation of employment opportunities within the state, the electricity statutes require that the distribution companies "shall offer retail access from nonregulated power producers to all customers." R.I. Gen. Laws § 39-1-27.3(a). In order to facilitate fair competition, the legislature prohibited the electric distribution company "<u>from selling electricity at retail and from owning, operating, or controlling generating facilities</u>…" R.I. Gen. Laws § 39-1-27(d), emphasis added. The only exception to the retail sale prohibition is the utility provision of a single "standard offer" retail service. *Id.* While I am not an attorney, it is clear to me from the plain language of the URA that the state-regulated distribution company should be an enabler of retail energy services and

not the provider of those services. National Grid has seemingly ignored these very important provisions of Rhode Island law.

Q. COULD YOU BRIEFLY DESCRIBE WHAT NATIONAL GRID HAS PROPOSED THAT YOU FIND INCONSISTENT WITH THE LEGISLATED ROLE OF THE DISTRIBUTION UTILITY?

Yes. The Utility is proposing multiple new retail products in the Plan and has stated that it intends to offer more tariffs in the future. The Utility is also proposing to invest in generation resources including solar assets and electric storage resources. Additionally, the Utility is proposing a significant investment in electric vehicle ("EV") charging infrastructure and EV retail products. Most importantly, as mentioned above, National Grid has completely omitted NPPs from the Plan. It appears that the regulated distribution utility intends to compete directly with NPPs and other third-parties by offering all of the services that competitive retail service companies (including Direct Energy and its affiliates) are striving to provide. Instead, the utility should be planning and building out a flexible and resilient modern grid infrastructure that will enable NPPs and other third parties to offer innovative retail goods and services that will empower business and residential consumers to optimize their energy usage. I will explain each of these in more detail below.

IV. CONSUMER IMPACT

Q. WHAT WILL BE THE IMPACT ON CONSUMERS IF THE UTILITY IS ALLOWED TO FULLY IMPLEMENT ITS PLAN AS PRESENTED?

A. Consumers will be harmed from lack of product innovation and increased costs. They will also be saddled with the Utility's risks associated with Plan implementation and operations. National Grid mentions in grand terms consumer enablement and empowerment. However, what they fail to mention in the Plan is that their proposed enablement and empowerment initiatives will be paid with ratepayer dollars whether they are successful or not. Customers will also be harmed by delay. National Grid is proposing significant "demonstration" projects in its Plan. They include the rollout of EV Charging Stations, and Utility investment in storage and solar resources. These "demonstration" projects are not necessary and will only serve to slow down the development of a fully functional and competitive energy market. Competitive entities may be reluctant to enter markets where subsidized resources are participating. Additionally, these services have already been deployed by third-parties and NPPs in other markets, so demonstration projects are not needed. Additionally, the Plan discusses with some level of detail several of the other "pilots" and "demonstration" projects that National Grid has undertaken in its other jurisdictions. Further "demonstrations" only serve to slow progress. Under the Plan as presented by National Grid, many will pay but few will benefit. Instead, the Utility should focus on building the requisite infrastructure and enabling the market participants like Direct Energy

and its peer companies to offer innovative products and services designed to help consumers to better manage their energy usage.

Q. WHY DO YOU CONCLUDE THAT THE UTILITY IS MORE FOCUSED ON BENEFITS TO THE UTILITY THAN IT IS ON PROVIDING VALUE TO CUSTOMERS?

A. The descriptions of value and benefits presented by National Grid in the Plan are generally utility-centric. National Grid acknowledges early in the Plan that "advances in technology, changing customer needs, and [others] are changing the way the grid is used and the demands that are placed on it." (Plan Ch. 3, p. 1 of 29.) The acknowledgement of "changing customer needs" however, seems generally lost in the Plan after that opening statement. For example, to facilitate "sharing of information with DER providers, and others, the [Utility] is proposing to develop a system data portal and populate it with information intended to facilitate DER integration in the most advantageous locations and as cost-effectively as possible." (Plan Ch. 3, p. 6 of 29.) This statement shows a lack of understanding of customers' needs and of the market dynamics. The grid is changing because the customers are changing and are compelling the utilities to react. Customers invest in DER because they are interested in more closely managing their own operations and achieving other objectives such as cost savings and control, utilizing renewables and/or using energy more efficiently and sustainability, etc. Customers are not investing in DER because the Utility is looking to relieve a constraint. However, as described by National Grid, it is viewing the "most advantageous location" from the perspective of National Grid

and not from the customer. This ignores reality. A utility need is not going to drive a customer's decision making. Rather, it is the customers that are driving utility behaviors.

V. THIRD PARTY PROVIDERS / RETAIL ELECTRIC PROVIDERS

Q. COULD YOU PLEASE EXPLAIN WHY YOU INTERPRET THE PLAN TO READ THAT NATIONAL GRID HAS NEGLECTED OR IGNORED RETAIL ELECTRIC PROVIDERS?

A. National Grid mentioned NPPs or retail electric providers just once in its entire ten-chapter Plan. Its only reference to retail electric providers is mentioned in Chapter 8. In supporting its proposed investment in solar resources, National Grid states that its solar program helps achieve several state policies including the Renewable Energy Standard, "which requires the State's retail electricity providers to supply 38.5% of their retail electricity sales from renewable resources by 2035." (Plan, Ch. 8, p 4 of 4.) In other words, the Utility's only mention of NPPs is that the Utility believes it can help NPPs meet their legal obligations with respect to renewable energy requirements. The NPPs do not need that type of assistance from National Grid. The notable point here is that throughout the remainder of the almost 200-page Plan, NPPs are not mentioned, reinforcing the utility-centric approach of the Plan. Further, in some instances, the Utility seems to want to displace the NPPs' services with utility services. For example, the Utility states that it can deliver "affordable, reliable, and safe energy", "access to actionable information", and "greater choice and control over

their energy use" "by providing customers with insights into their consumption patterns, offering more pricing options, and facilitating the integration of smarter devices and Distributed energy resources…" (Plan Ch. 4, p. 1 of 31.) The distribution utility should be in the role of "delivering" safe and reliable energy and not energy management and consumer engagement services related to energy management. Direct Energy and other third parties are more effectively positioned to meet the needs of a dynamic customer base and a competitive market. Rhode Island law is quite clear in the expectations of the role of the distribution utility; the distribution companies: "shall offer retail access from nonregulated power producers to all customers" (R.I. Gen. Laws § 39-1-27.3(a)); are "prohibited from selling electricity at retail", (R.I. Gen. Laws § 39-1-27(d)) except for "a standard power supply offer" (R.I. Gen. Laws § 39-1-27.3(b)); are "not . . . entitled to recover any profit margin on the sale of standard offer power"; (R.I. Gen. Laws § 39-1-27.3(b)); and their employees must function independently of those "engaged in the business of a nonregulated power producer." R.I. Gen. Laws § 39-1-27.6(b)(1). I understand that National Grid is not proposing a nonregulated subsidiary in this Plan. It is, however, proposing products and services that should be provided by a nonregulated subsidiary. Allowing the distribution Utility to provide these retail services will only embolden the incumbent utility and enhance its monopoly position.

National Grid mentions "third parties" in the Plan and how they might participate in the process and/or benefit from the Plan. However, "third parties" are not

defined anywhere in the Plan. Because of this, National Grid's distinction between "retail electric providers" in one sentence in the Plan and "third parties" everywhere else in the document is very troubling. At the very least, it is not clear whether National grid considers NPPs to be part of this "third party" universe.

VI. VALUE OF COMPETITIVE MARKETS

Q. CAN YOU PLEASE EXPLAIN THE VALUE OF COMPETITIVE MARKETS AND WHY NPPS SHOULD BE EXPLICITLY INCLUDED IN THE PLAN?

A. It is estimated that billions of dollars of savings have accrued to consumers as a result of electricity industry restructuring. These studies, however, focus on savings generated from wholesale market restructuring and not from product innovation at the consumer level. These savings have largely accrued to customers through lower electricity costs. Advances in metering and communications technologies such as those outlined in the Plan, coupled with disruptive technologies such as smart energy management devices, are empowering NPPs to expand on these savings and offer value-enhancing products, services and greater benefits to consumers.

Q. CAN YOU PLEASE DESCRIBE SOME OF THE VALUE-ENHANCING RETAIL PRODUCTS THAT NPPS ARE PROVIDING THAT YOU ARE FAMILIAR WITH?

A. Yes. NPPs are providing innovative products and services to residential and business customers in restructured energy markets. For example, in the residential market, NPPs are offering bundled product offerings that include

energy efficiency products and services such as HVAC servicing, home warranties and smart thermostats and related devices. NPPs also bundle demand response offerings and Time of Use offerings to residential customers. Direct Energy, for example, is offering a Free Power Weekends product to retail customers in some state jurisdictions[1]. Direct Energy also offers a retail product that comes with communications technology that allow a customer to control remotely thermostats, lighting and appliances. For business customers, Direct Energy offers its Panoramic Power product which is comprised of self-powered, wireless sensors that transmit real-time data from energy-using equipment to a cloud-based analytics platform. The intelligence driven by this data helps business customers to optimize performance, deal with potential equipment failures before they happen, and reduce energy inefficiencies and waste. This service is providing Direct Energy's commercial customers with insights into their energy usage at the circuit-breaker level, going far beyond site-wide metering data. It also offers distributed energy resources, demand response products, energy efficiency products, back-up generation for resilience, and energy storage resources. These competitive and innovative products and services are made possible by the risk

[1] With Direct Energy's Free Power Weekend Plan, residential customers receive free electricity every weekend for the 12-month contract term allowing them to shift their high-energy usage and home chores for these weekend days. The rate offering is a fixed-rate plan for weekdays. The free weekend usage begins at 6:00 PM on Friday evenings and ends on Sunday night at midnight.

capital and investments of Centrica/Direct Energy's shareholders and not ratepayer dollars.

Q. WHAT ARE THE PRIMARY BENEFITS TO CONSUMERS FROM THESE PRODUCTS?

A. Some of these products benefit only the specific customer engaged with the product, however, other products benefit the entire market. For example, a customer participating in a capacity-market demand response program helps mitigate capacity prices for all customers. Specific benefits to customers are numerous. These benefits include the basics of price certainty and cost savings. They include the ability to manage and optimize in-home energy usage remotely from a smart phone or other communications-enabled device. They also include business sustainability and resilience to weather or other grid-damaging impacts. Further products and customer benefits are discussed below.

Q. HOW ARE THESE BENEFITS IMPAIRED IF THE UTILITY WAS TO CLOSE OFF THE GRID TO NPPS?

A. Customers will be harmed in material ways if the Plan precludes or limits in any way, NPPs from utilizing the smart grid. The market is dynamic and requires flexibility to accommodate the changing needs of different customer segments. Clearly, no entity, including the Utility, is big enough or diverse enough to provide customers with the myriad of products and services they need or desire. Wisely, the Rhode Island legislature realized that instead of relying on a traditional utility, it should allow NPPs to evolve to optimize service to the retail markets and to provide for the niche needs and desires of every customer. If

Rhode Island's modernized grid is not made available to Direct Energy and other NPPs and third parties, the desired products and services will simply not be delivered to all customers and innovation in the state's energy markets will be stifled. An analogy can be drawn from the telecommunications industry. Smart phones and similar devices serve as a platform to provide innovative mobile applications. This pairing of apps with the phone have undoubtedly enhanced the everyday lives of consumers. However, it is the "apps" on the phone that typically provide the "value". The platform is the vehicle upon which the apps perform. If Apple and/or Google had imposed significant restrictions on mobile app developers, society would not have experienced nearly the level of beneficial effects of this disruptive technology. Rhode Island cannot afford to have the Utility stand in the way of innovation that will enhance customers' lives.

Q. HAS NATIONAL GRID PROPOSED BANNING NPPS FROM THE MARKET?

A. Not directly, but its Plan could have the same effect. National Grid has proposed that it offer several subsidized retail products that would compete unfairly with the NPPs and NPP products. The practical implications of the Plan for NPPs and other third parties will be a market in which it will be much more difficult to operate because the incumbent, with entrenched name recognition, will be offering competitive retail products and will be doing so while not bearing any of the risks of those product offerings.

Q. SHOULD THE UTILITY BE ALLOWED TO OFFER ANY RETAIL PRODUCTS AND SERVICES OTHER THAN STANDARD OFFER?

A. No. Rhode Island law requires the Utility to provide a standard offer product and prohibits them from selling other retail energy products. R.I. Gen. Laws § 39-1-27(d). The Commission should interpret that prohibition liberally and prohibit the Utility from providing any of the non-distribution-related retail products and services that it has proposed in its Plan. If the Utility provides these services, they will be doing so with subsidized ratepayer funding, thus, stifling competition and innovation in the market. There is no need for the Utility to offer the proposed retail products and services. I do not believe that National Grid has proposed any retail product or service that is not being offered by NPPs in other markets elsewhere in the country. As previously stated, if National Grid desires to sell retail energy products, it should take the necessary legal and regulatory steps to establish a NPP and register it with the RIPUC.

Q. DOES NATIONAL GRID'S PROPOSAL FOR COMMUNICATIONS UPGRADES SUPPORT THE DELIVERY OF INNOVATIVE RETAIL PRODUCTS?

A. It could, but as presented, it leaves me very concerned that the Utility is trying to capture all of the retail customers and prevent NPPs from having access to certain grid technologies and information. The Plan explains that "[c]ommunication between devices in the field and Company systems is essential to the overall success of the modern grid." It states that robust communications can "[p]rovide a reliable, cost-effective, two-way communications capability to end devices including meters, grid automation controls, field sensors, substations, field force,

and customer home area network (HAN) devices" and "[e]nable new grid technologies as they become available." The Plan continues to say the Utility "anticipates using its existing private network infrastructure—both private fiber and multiprotocol label switching (MPLS) wide area network (WAN)—to support power sector transformation objectives." (Plan Ch. 3, p. 22 of 29, emphasis added.) The Plan fails to mention anything about NPP or third-party access to the data that would be moving on the "private network infrastructure." Realizing significant gains in product innovation and energy efficiency will come not from consumers interacting with their raw energy data, but rather indirectly from NPPs and third-party providers who process, digest and act upon energy data, often times, on the customers' behalf. The Utility is proposing to go "behind the meter" to communicate with home area network devices, and to do so on private or "closed" networks. National Grid's Plan is quite troubling and appears myopic from the standpoint of a modernized grid of the future. Moreover, there is no discussion about how NPPs, who are already serving these customers, can have access to the same information. In contrast, other jurisdictions have taken a far more progressive approach. For example, Texas has made the determination that consumers own their own energy usage data. A common web portal, Smart Meter Texas, was established that allows consumers across the state a consistent method to access their own energy usage data. Real-time data is available through the Home Area network interface. The data available for customer download are in Green Button, but the data transmitted automatically to authorized third-parties is

in a different format. Also, California has consistently embraced data access without charge as a requirement in connection with AMI deployment. While California has not made a determination regarding ownership of energy usage data, it has clearly established that consumers have a right to receive data from their meter and share it with third-parties of their choice. Within the scope of this proceeding, the state of Rhode Island can and should follow these leads and mandate a truly "open network".

Q. WHAT SHOULD THE COMMISSION DO TO RECTIFY THESE SHORTFALLS IN THE PLAN?

A. At a minimum, the Commission should require that National Grid recognize NPPs or retail electric providers as an important and existing group of stakeholders that should be explicitly included in the Plan. Third-parties, including NPPs properly registered in the state of Rhode Island, should have full access to the infrastructure investments presented in the Plan, including access to any "private networks" deployed by the utility to facilitate the transfer of customer data; should have full access to their customers usage data and any other customer-specific information in the possession of the Utility; and should have complete capabilities to send and receive data and signals to its customers in as timely a manner as feasible.

Q. IF NATIONAL GRID WERE TO EXPLICITLY INCLUDE NPPS IN THE PLAN, WOULD YOU BE SATISFIED WITH THE PLAN?

A. No. This is just the first of several shortcomings in the Plan. As discussed above, many other changes need to be made to the Plan to eliminate its anti-competitive

aspects and for it to be consistent with the regulatory framework under which National Grid must operate in Rhode Island, in my opinion. For example, the Utility is proposing to introduce new tariff structures and new retail rate designs which will compete directly (and unfairly) with NPP product offerings. The Utility will have the ability to offer ratepayer-subsidized pricing plans to customers, potentially undermining the competitive rate plan offers of NPPs. In my opinion, the implementation of the Utility's proposals will provide a distinct competitive advantage to National Grid while undermining the competitive retail markets and NPPs. This appears to be in direct contrast to Rhode Island policy. National Grid, by its very name, is an infrastructure company. It should focus on what it is best at – designing, building and maintaining distribution infrastructure. National Grid should plan, design and build the most robust, resilient and cost-effective distribution grid that it finds possible. It should focus on developing an infrastructure that will attract investment and innovation from NPPs and other third-parties to Rhode Island. In my opinion, this strategy would provide the most benefit to the state of Rhode Island and its electricity consumers.

VII. THE AMF PROPOSAL

ELECTRICITY PRODUCTS AND NEW RATES

Q. COULD YOU PLEASE EXPLAIN NATIONAL GRID'S AMF PROPOSAL?

A. Yes. In its advanced metering functionality ("AMF") proposal, the Utility has proposed the deployment of smart electric meters and gas encoded radio

transmitters, a communications network, an IT platform to manage the data derived from the modernized metering and network, and project management to support the new initiatives. (Plan Ch. 4, p. 1 of 31.)

Q. DOES THE UTILITY AMF PROPOSAL PROVIDE BENEFITS TO THE MARKET?

As described by the Utility, "[a]dvanced metering technology will deliver new functionalities and offer significant benefits for customers, for the Company in its role as grid operator, and for society." (Plan Ch. 4, p. 1 of 31) National Grid does not proffer any market benefits. In fact, it appears to take any market benefits and usurp them as their own. While the Utility states that AMF will enable customer benefits, including "third-party programs and offerings that will drive innovation and provide additional value to customers, while encouraging new industry participants to enter the market with new customer offerings" the Utility never explains how that will happen. Instead, as shown below, the Utility appears to propose itself as the provider of most market services.

Q. DOES NATIONAL GRID INTEND TO ALLOW NPPS ACCESS TO DATA GENERATED FROM THE AMF PROPOSAL?

A. One of the benefits of AMF, as described by the Utility is "[e]nabling Green Button Connect My Data functionality that will act as the platform to provide authorized third-parties access to energy use data on a near-real time basis." As discussed, this benefit does not necessarily accrue to NPPs, but it certainly should. The Commission should ensure and safeguard NPPs and other third parties access to energy use data on a near-real-time basis. Energy usage data should be

available free of charge as part of basic utility service and access should be viewed as a foundational feature of the modern electric grid. Also, the Utility does not define who is an "authorized third-party" and who is the entity that authorizes the third-parties. It should be clear that all registered NPPs are indeed "authorized third-parties". Furthermore, the Commission should require the Utility to accept all modern means of customer authorizations to access the data, including, but not limited to paper forms and web- or app-based submissions, as an efficient and timely means of facilitating data access. Account access should be granted with some combination of name and identification of account holder and service address. Customer authorization to access data should not require a customer's account number. Finally, if there are any gaps in data between what Green Button provides and what the Utility will collect, the Commission should require the Utility to make that data available to third-parties, including NPPs.

Q. HOW MANY NEW ELECTRIC RATE PLANS TIED TO THE AMF DEPLOYMENT HAS NATIONAL GRID PROPOSED IN ITS PLAN?

A. The Utility has proposed two explicit rate plans. It has described a third. It also has proposed a few products and services that directly influence how a customer will consume energy, and it stated that it is intending to develop more electricity products in the future.

Q. COULD YOU PLEASE EXPLAIN EACH OF THESE RATE PROPOSALS?

Yes. As part of its AMF proposal, the Utility has proposed two separate time-varying rates ("TVR") – Time of Use ("TOU") and Critical Peak Pricing ("CPP").

The Utility has not put much definition behind either of the two proposals. Under TOU rates, the Utility proposes a rate structure where "supply prices would vary by specific time of day, every month, with peak (higher price) and off-peak (lower price) periods defined." (Plan Chapter 4, p. 6 of 31.) Under CPP rates, "supply prices would increase further by time of day on a limited number of specific days (typically during high demands on the electrical system, where customers are notified in advance) designated as critical peak pricing events." (Plan Chapter 4, p. 7 of 31.) These retail products are typical of utility offerings where the utilities are vertically integrated and there is no competition for retail product offerings. Direct Energy and other NPPs are already offering time of use products where metering infrastructure supports such products. There is no need for the Utility to offer them in Rhode Island as part of this Plan, as the NPPs will likely bring innovative products to the market once the advanced metering is in place as they have done in other markets with advanced grid technologies.

Q. IS THE UTILITY PROPOSING THESE RATES AS STANDARD OFFER RATES?

Yes. The Utility appears to be offering the TVR products as Standard Offer products. National Grid intends to "deploy Time Varying Rates (TVR), on an opt-out basis, to customers in conjunction with the AMF program." (Plan Chapter 4, p. 6 of 31, emphasis added.) Two TVR rates plus the opt-out presumably fixed price standard offer rate would mean that the Utility would be offering three "standard offer" or "default service" products. Of course, the

concept of three "standard offer" products appears to be somewhat of an oxymoron. Additionally, it appears to run counter to the legislated policy of Rhode Island. The URA requires the distribution companies to "arrange for a standard power supply offer ("standard offer") to customers that have not elected to enter into power supply arrangements with other nonregulated power suppliers." (R.I. Gen. Laws § 39-1-27.3(b)). The statute only refers to a single standard offer service, using the articles "a" and "the" to describe the singular standard offer service. *Id.* In my view, two new "opt-out" products along with a more traditional standard offer product that a customer can opt into is not consistent with the regulatory market structure mandated by the Rhode Island General Assembly.

Q. CAN DIRECT ENERGY OR OTHER NPPS OFFER TIME VARYING RATES?

A. Yes. As discussed above, they can and do provide customers with time-varying rates where the metering infrastructure supports the effective delivery of those products.

Q. ARE NPPS CURRENTLY OFFERING TIME VARYING RATES IN RHODE ISLAND?

A. I do not believe any NPPs are presently offering TVR to residential customers. The limitations on NPP product design and implementation are largely a result of National Grid's legacy "dumb" metering infrastructure. Experience in other markets provides ample proof that as the distribution grid and regulatory frameworks are modernized, retail market and product development improves. In

fact, National Grid mentions in its Plan that one of the broad benefits of implementing AMF is "[e]nabling innovative rate design options that cannot be delivered by the existing metering infrastructure but when implemented will reward customers for optimizing their energy use." (Plan Chapter 4, p. 2 of 31.) I am confident that as the Rhode Island electric distribution grid is modernized, Direct Energy and its peer companies will be providing many advanced products and services.

Q. HOW SHOULD THE COMMISSION RESPOND TO NATIONAL GRID'S AMF PROPOSAL?

A. The Commission should allow the Utility to proceed with its implementation of its advanced metering and communications plans. The time varying rates and the other rate structures it proposed should not be approved, nor should any of the other retail products and services proposed in the Plan. The Utility should put in place a metering infrastructure, including real-time communications capabilities that will enable customers to contract for dynamic or time-varying rate products offered by their NPPs. The NPP industry will likely offer products tailored to different customers and the result will be many TVR products incentivizing optimal use of the grid. An engaged customer will be more likely to participate in TVR rate structures that fit their specific needs and the benefits of that participation will accrue to the participating customers through product optimization and the market as a whole because of more efficient market operations. National Grid could also engage with NPPs to encourage and facilitate time-of-use offerings; but it should not be providing the service itself.

Q. HAS NATIONAL GRID PROPOSED OTHER RATES IN ADDITION TO THE TVR RATES DISCUSSED ABOVE?

A. Yes. I address the specific product and rate proposals below. More troubling however, is that National Grid appears to believe that the AMF proposal gives them carte blanche to be the provider of all rates. National Grid states that the broader benefits of AMF deployment include "[e]nabling innovative rate design options that cannot be delivered by the existing metering infrastructure but when implemented will reward customers for optimizing their energy use. (The [Utility] considers time-varying rates as a critical component of a successful deployment; new rates will be proposed in the future to align with the deployment of the physical metering infrastructure)." (Plan Ch. 4, p. 2 of 31, emphasis added.)

Q. WHY SHOULDN'T THE UTILITY BE ALLOWED TO OFFER ADDITIONAL TVR PRODUCTS TO SUPPLEMENT WHAT THE NPPS WILL OFFER?

A. Utility rate plan products are inherently anti-competitive. For example, if the Utility were to make a mistake in procuring energy to fulfill a TVR obligation, ratepayers will be assessed to compensate the Utility for its error. On the other hand, NPPs have no such luxury. Additionally, the Utility is proposing TVR as an opt-out rate structure. The opt-out rate design essentially ensures that every National Grid customer will be automatically enrolled in their TVR plan unless or until the customers decides to de-enroll from that plan. If a Rhode Island customer is interested in a TVR product, the Utility's proposed opt-out scheme will create an enormous sales and marketing barrier against which the NPPs would be forced to compete. This is not a level playing field.

THE CUSTOMER PORTAL

Q. DO YOU BELIEVE OTHER ASPECTS OF THE AMF PROPOSAL IS ANTI-COMPETITIVE?

A. Yes, potentially. The Plan states that "the modern grid functionalities that will be advanced through the Company's AMF program include customer portals, customer choice decision support analytics, customer energy information and analytics and smart meters / advanced meters." (Plan Ch. 3, p. 8 of 29, emphasis added.) This is troubling on many fronts. First, National Grid includes no description of what "decisions" the analytics will support. It might be as simple as a retail choice decision or it might be support analytics for a comprehensive DER/microgrid solution. The Plan is silent about scope of the analytics. Regardless of the scope, it is not the purview of the Utility to help customers make choices about services purchased from a competitor of the Utility. The Utility's proposal is analogous to having a car salesman help a customer make a decision about what car to purchase. That advice will likely be inherently biased in favor of the type of car that salesman offers. Similarly, every incentive will be in place to bias the customer to National Grid services.

Q. IS A CUSTOMER PORTAL AN ANTI-COMPETITIVE OFFERING?

A. At its core, the concept of utilities building out a fact-based customer portal that shows usage information is not anti-competitive. However, the answer ultimately depends on how the portal is developed and what the portal accomplishes. If the portal is simply a fact-based portal where a customer or its representatives can get billing information or historic usage data, then that portal might not be anti-

competitive. As discussed above, the Texas web portal, Smart Meter Texas, is an excellent model that the state of Rhode Island should replicate. If the Utility portal makes any recommendations, comparisons, or offers any other subjective information, then it likely becomes an anti-competitive tool. At that level, it is likely to become a market tool that is being paid for with ratepayer dollars. Direct Energy and its peer companies do not have the luxury of using ratepayer dollars to build portals and customer communications tools.

Q. WHAT SHOULD THE COMMISSION DO WITH RESPECT TO THE UTILITY'S PROPOSAL TO BUILD OUT A CUSTOMER PORTAL AND DECISION SUPPORT ANALYTICS.

A. The Commission should mandate that the customer portal provide fact-based information only. It should not be allowed to provide any conclusions, recommendations, or other subjective information and, in no event should it offer recommendations regarding any products or services that are also offered by the utility or by an affiliate of the utility. Additionally, NPPs and other third-parties with customers' authorization, should have full and free access to the data presented on any utility portal. The Commission should simply reject the proposal that the Utility be allowed to provide the customers with decision support tools. If the Utility seeks to provide customers with market recommendations it should be required to make those recommendations via an unregulated subsidiary and it should be fully responsible for any negative outcomes from those recommendations. Customer decision support analytics is not the domain or expertise of an electric distribution utility.

VIII. ELECTRIC VEHICLE PRODUCTS AND INFRASTRUCTURE

Q. IS NATIONAL GRID PROPOSING RETAIL PRODUCTS IN ADDITION TO THE TVR PRODUCTS DISCUSSED ABOVE?

A. Yes. It is proposing retail products related to EV charging.

Q. COULD YOU PLEASE DESCRIBE NATIONAL GRID'S PROPOSAL WITH RESPECT TO EV CHARGING?

A. Yes. The Utility has proposed investments in EV infrastructure and associated retail electricity products.

Q. WHAT RETAIL PRODUCTS HAS NATIONAL GRID PROPOSED?

National Grid has proposed a rebate for time appropriate EV charging. Specifically, the Utility has proposed a kwh rebate for customers who charge their cars between 9:00 PM and 1:00 PM the following day. The rebate is six cents per kwh in the summer months of June through September and four cents per kwh in the other eight months.

Q. IS THIS PRODUCT OFFERING CONSISTENT WITH COMPETITIVE RETAIL ELECTRICITY MARKETS?

A. National Grid states that "[a]nyone charging an EV in National Grid's Rhode Island electric distribution service territory is eligible to participate in the rebate program." (Plan Ch. 5, p. 3 of 19.) While this rebate offer appears to be open to customers who have contracted with a NPP, the Utility does not make that statement explicitly or provide further details. The Utility did not propose an implementation plan for this product, so the applicability is unknown.

Q. IF YOU ASSUME THAT CUSTOMERS WHO TAKE RETAIL SUPPLY ARE ELIGIBLE FOR THE REBATE, DOES THAT ALLEVIATE YOUR CONCERNS ABOUT THE IMPACT TO THE COMPETITIVE MARKET?

A. No. It increases those concerns. First, the scenario ignores the possibility that the NPP's product could already compensate the customer for its willingness to charge in the off-peak hours. Additionally, in the scenario, the Utility would be offering an energy rebate to a NPP's energy customer for consuming the NPP's energy product. Stated another way, the Utility is using ratepayer funds to market its products against a NPP's existing products. This sends a strong signal to the market that the Utility is still the most significant participant.

Q. CAN DIRECT ENERGY AND ITS PEER COMPANIES OFFER PRODUCTS TAILORED TO EV CHARGING?

A. After the AMF is deployed, Direct Energy and its peer companies would be able to offer products tailored to EV Charging, and would have every incentive to have customers charge in the off-peak hours.

Q. COULD THE UTILITY'S PROPOSAL FOR AN EV CHARGING REBATE HAVE AN IMPACT ON RETAIL COMPETITION IN RHODE ISLAND BEYOND THE PRODUCT ISSUES DISCUSSED ABOVE?

A. Yes. The increase in nighttime load, or the shifting of load from on-peak to off-peak will have the impact of flattening the Utility's overall load profile. This could result in lowering the standard offer service rates. This results in an artificially low competitive benchmark against which NPPs like Direct Energy will have to compete. This would be a direct subsidy from distribution rates to standard offer rates. This rebate has significant anti-competitive impacts and should not be allowed.

Q. ISN'T A LOWER STANDARD OFFER RATE GOOD FOR CUSTOMERS?

Not if the standard offer rate is a subsidized rate, because – in total -- customers would ultimately be paying more for distribution service than they should otherwise be paying. Regulated distribution rates formulated to pay for these products would ultimately be used to fund the market-based services. The result is regulated distribution rates that are unfairly high and standard offer rates that do not cover the costs of the retail products and services being provided by the Utility. The best standard offer rate for customers is one that is fully unbundled and incorporates all of the costs to provide that customer with standard offer service. It is only with a fully-cost allocated standard offer service that the customers can best understand their impact on the electric system and best evaluate their competitive market options. Any practices that result in a distribution subsidization of standard offer rates should not be allowed. The proposed EV charging rebate will result in a distribution subsidy of standard offer rates, and therefore, should not be allowed.

Q. WHAT SHOULD COMMISSION DO?

A. The Commission should not allow National Grid to deploy these rebates directly to retail customers. The Utility should be incentivized to build out the infrastructure that allows for decentralized EV charging. Once that infrastructure is deployed, the NPPs should be provided the opportunity to develop and implement EV charging rates, including TVRs, as appropriate. If the Commission

determines that the rebates are necessary, they should be deployed through the NPPs that are offering EV rates and products to the consumers.

Q. IS THE UTILITY PROPOSING A CAPITAL INVESTMENT IN EV INFRASTRUCTURE?

A. Yes. The Utility is proposing to develop 362 EV charging ports at eleven (11) different locations in their service territory. (Plan Ch. 5, p. 4 of 9.) This investment is projected to cost ratepayers over $9 million. (Plan Ch. 5, p. 15 of 19.) This is another instance where the utility will use distribution rate payer funds to subsidize energy offerings that compete directly with NPPs operating in the market.

Q. CAN YOU PLEASE EXPLAIN HOW NATIONAL GRID'S EV INFRASTRUCTURE PROPOSAL WILL BE COMPETING WITH NPPS?

A. Yes. As part of its proposal as outlined in the Plan, the Utility is planning to develop at least four additional retail rates to sell electricity to consumers from the Utility-owned charging stations. These rates are on- and off-peak for "daily charging" and for "fast charging". According to the Plan National Grid "will charge users (drivers) of stations at its Company-operated sites a regulated per-kWh rate for the electric commodity supply and service via the Company's EV supply equipment. The Company has defined this Charging Rate structure to be set formulaically via a Company tariff that will be filed prior to program launch, for review and approval by the PUC. The Charging Rate will be adjusted semi-annually via compliance filings, with modifications made to reflect changes in underlying rates." (Plan Ch. 5, p. 6 of 19.) As further described by the Utility, it

is planning to incentivize through pricing, off-peak EV charging by setting the day-time prices at a premium and include a capacity charge on top of its energy and distribution rates. (Plan Ch. 5, p. 7 of 19.)

Q. HAVE NON-UTILITY DEVELOPERS INSTALLED ANY EV CHARGING STATIONS IN RHODE ISLAND?

A. Yes. According to the Plan, several of the existing charging stations in Rhode Island were installed by non-utility operators. (Plan Ch. 5, p. 1 of 19.)

Q. CAN YOU PLEASE EXPLAIN THE RISKS TO RATEPAYERS ASSOCIATED WITH A UTILITY INVESTMENT IN EV INFRASTRUCTURE?

A. Certainly. The first is obsolescence. While it certainly seems likely that EVs will be part of the US transportation fleet for the long-term, that is actually unknown at this time. The traditional incumbent car manufacturers and oil/gas interests are quite entrenched in our society and the infrastructure required to match the gasoline infrastructure will take decades to replicate. Over that time span fuel and battery technologies will evolve. EV charging stations as we know them today could easily become obsolete as other technologies overtake them. Electricity ratepayers should not be subject to this type of investment risk. This is the type of risk that should be borne by shareholders willing to invest in new technologies. Moreover, this proposed investment could be seen as self-serving. It allows the utility to earn a return on investments that compete directly with non-utility service providers and as discussed above, provides the utility with monopoly retail electricity sales opportunities, keeping NPPs like Direct Energy out of certain strategic market segments.

Q. WHAT SHOULD COMMISSION DO WITH RESPECT TO THE UTILITY'S EV PROPOSALS?

A. The utility should be required to invest in a distribution network that will support EV charging stations. However, the utility should not invest in the charging stations themselves. The Utility could facilitate private investment in charging infrastructure if needed, but the facilities should be owned by third parties. If the Commission allows the Utility to invest in EV charging stations, it should be done through a separate, nonregulated subsidiary and the Utility should undertake a competitive bid process to outsource the electricity sales. In no instance should the distribution utility hold a monopoly over electricity sales to EV customers. It has been clearly shown above that Rhode Island statutes prohibit the distribution company from engaging in the sale of retail electricity except for providing a standard offer service. R.I. Gen. Laws § 39-1-27(d).

IX. DER INVESTMENTS

Q. ARE YOU FAMILIAR WITH NATIONAL GRID'S PROPOSED INVESTMENT IN DISTRIBUTED ENERGY RESOURCES, INCLUDING STORAGE AND SOLAR RESOURCES?

A. Yes. According to the Plan, the Utility:

> "proposes to install and own approximately two MWh of energy storage at locations that will test benefits to the distribution system, maximize benefits to co-located customers/partners, and enable youth/community educational opportunities. The program will include an innovation component, which, in addition to providing the [Utility] with lesson [sic] learned, will facilitate the development of additional projects and improve the Company's ability to accommodate this technology on the distribution system." (Plan Ch. 7, p. 1 of 9.)

The Plan also proposes as part of its programs for Income Eligible customers, a "Solar Program" where the Utility will implement a "utility-owned solar photovoltaic demonstration program for installations up to 3.75 MW. The [Utility] will use these solar sites for community education and renewable energy generation. Several of the [Utility]-owned sites being evaluated for this program are located near affordable housing developments." (Plan Ch. 8, p. 1 of 14.)

Q. WHAT IS YOUR REACTION TO THE DER PROPOSALS?

A. I believe it is inappropriate for the Utility to be investing in solar and storage resources for at least three significant reasons. First, as stated above, the ratepayers should not be compelled to make investments in market resources by the distribution utility. Second, these subsidized resources will compete directly with solar, storage and other distributed energy resources that are developed by other market participants and investors. Finally, as explained in more detail below, distribution utility investment in storage and distributed energy resources runs directly counter to evolving federal policy on such resources participating in wholesale markets. FERC is now seeking to incorporate these resources into the fully competitive wholesale electric markets[2].

[2] See FERC Docket No. RM16-23, Notice of Proposed Rulemaking, *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, 157 FERC ¶ 61,121, November 17, 2016,

Q. SHOULD NATIONAL GRID BE FOCUSED ON DEVELOPING OR INTEGRATING DER RESOURCES AS PART OF THEIR PLAN?

A. The successful, reliable integration of DER is a distribution function. The deployment of DER should be a customer-driven and market function. As part of its Plan, the Utility has proposed rate-payer funded investments that will be used for market-facing initiatives. The Utility should focus its grid modernization initiatives on building a distribution network that will fully and seamlessly integrate distributed energy resources of all types, not developing those resources in direct competition with market participants.

Additionally, as mentioned above, FERC recently issued a Notice of Proposed Rulemaking ("NOPR") that envisions incorporating storage and other DERs into the federally-regulated organized wholesale markets, such as the market operated by ISO-NE across the New England states. In light of FERC's actions, it is not appropriate for the distribution company to invest in market-facing resources such as storage and distributed energy.

Q. COULD YOU PLEASE ELABORATE ON THE NOPR ON INTEGRATING DER RESOURCES INTO THE WHOLESALE MARKETS ISSUED BY FERC?

A. Yes. On November 16, 2016, FERC proposed a rulemaking that seeks to incorporate storage resources and other DERs into the wholesale markets. See FERC Docket No. RM16-23, Notice of Proposed Rulemaking, *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and*

Independent System Operators, 157 FERC ¶ 61,121, November 17, 2016.

Specifically, FERC proposed to require each RTO and ISO to revise its tariff to

> "(1) establish a participation model consisting of market rules that, recognizing the physical and operation characteristics of electric storage resources, accommodates their participation in the organized wholesale electric markets and (2) define distributed energy resource aggregators as a type of market participant that can participate in the organized wholesale electric markets under the participation model that best accommodates the physical and operation characteristics of its distributed energy resource aggregation."

Comments on the proposed rule were filed by interested stakeholders on February 13, 2017. The proposed rules require, among other items, that storage resources be eligible to provide all capacity, energy and ancillary services that they are technically capable of providing; that the storage resources can set the wholesale market clearing prices as both a wholesale seller and a wholesale buyer; and that the sale of energy from a storage resource must be at the wholesale LMP.

Q. WHAT SERVICES DOES FERC ENVISION THAT STORAGE AND OTHER DERS WOULD PROVIDE TO THE ISOS AND RTOS?

A. FERC is proposing that the ISOs allow storage resources to provide capacity, energy, ancillary services at market based rates and other non-market based services such as black start and reactive power at compensation levels commensurate with what generators are paid for these services.

Q. DOES NATIONAL GRID INTEND TO MARKET THESE RESOURCES IN THE WHOLESALE MARKET?

A. Yes. According to the Plan, the Utility intends the solar resource to be an energy and capacity resource in the ISO market. The Plan states:

> "[e]lectricity generated by these solar generators will be sold into ISO-NE's energy markets. The energy output component will be unit-contingent, meaning that ISO-NE will pay for only the energy that is produced by each generating unit. The Company will receive payments from the ISO for this generation at the nodal real time locational marginal price. Energy output from these solar generating units will not be incorporated into the Standard Offer Service. The Company proposes to maintain the flexibility to qualify and commit these solar generation units in the ISO-NE's Forward Capacity Market in the future, in keeping with the stated intent to maximize the value of the units' output." (Plan Ch. 8, p. 2 of 14.)

It should be noted that the Utility does not even intend any piece of the resource to be a "retail" resource – one that can be used for standard offer service. Instead, the solar resources are going to be competitive wholesale market resources.

Q. DOES FERC ENVISION DISTRIBUTION UTILITIES PARTICIPATING IN THE WHOLESALE MARKET?

A. No. Based on the language in the NOPR, FERC is not envisioning the distribution utility being a DER aggregator or market participant. FERC has proposed requiring each RTO and ISO to provide for coordination among the ISO/RTO, the DER aggregator "and the relevant distribution utilities with respect to (1) the registration of distributed energy resource aggregations and (2) ongoing coordination, including operational coordination, between the RTO/ISO, a distributed energy resource aggregator, and the relevant distribution utility or

utilities."[3] The purpose of the coordination is to "ensure that all of the individual resources in the [DER] aggregation are technically capable of providing services to the RTO/ISO through the aggregator and are eligible to be part of the aggregation."[4] Given this very specific language, FERC is envisioning a long-term role for the distribution utilities (including National Grid's distribution utilities) that are not as the market participants or DER aggregators. The utility role in the FERC model is one of distribution system reliability assurance.

Q. DOES THE ROLE OF ENSURING DISTRIBUTION SYSTEM RELIABILITY ENVISIONED BY FERC CONFLICT WITH THE ROLE OUTLINED BY NATIONAL GRID IN ITS PLAN?

A. Yes. The conflict arises because under the Plan, National Grid would own an asset that will be participating in the wholesale market and at the same time, the Utility would be evaluating whether competitive resources are eligible to participate in the exact same market for the exact same product. This creates the potential that National Grid could deploy its own generation assets while at the same time taking steps to make it harder for other market participants to deploy their assets. This market conflict should not be allowed by either state or federal regulators.

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[3] See FERC Docket No. RM16-23, Notice of Proposed Rulemaking, *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, 157 FERC ¶ 61,121, November 17, 2016, p. 116.

[4] See FERC Docket No. RM16-23, Notice of Proposed Rulemaking, *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, 157 FERC ¶ 61,121, November 17, 2016, p. 115.

National Grid's proposal states "[e]lectricity generated by these solar generators will be sold into ISO-NE's energy markets." (Plan Ch. 8, p. 2 of 14.) The Plan also addresses some of the benefits of building out storage resources including "[r]educing system capacity through daily peak shifts" and "[i]dentifying potential reliability benefits related to ramping/smoothing of renewable generation, voltage/VAR support, and reductions in sustained and momentary outages." (Plan Ch. 7, p. 2 of 9.) Obviously, the Utility is looking at both storage and solar resources as market assets. The Utility should not be participating in the market under the guise of Rhode Island policy or federal policy.

Q. COULD NATIONAL GRID OWN DISTRIBUTED ENERGY RESOURCES AND NOT PARTICIPATE IN THE ISO-NE WHOLESALE ENERGY MARKETS?

A. Yes. FERC has not proposed a must-offer obligation on DERs in its NOPR. However, it would be imprudent of National Grid to not collect any available revenues for which the resource could qualify. This issue further exacerbates the glaring conflict that would be created if the Utility were to deploy rate-based storage or other DERs.

Q. IS IT COMMON FOR INTERESTED PARTIES TO FILE COMMENTS ON NOPRS?

A. Yes. The federal rule-making process is an open process designed so that the agencies (in this case FERC) can hear the concerns of affected stakeholders.

Q. DID NATIONAL GRID FILE COMMENTS ON THIS NOPR?

A. I reviewed FERC's website after comments were due to determine if National Grid had filed comments. No comments from National Grid were shown on the FERC website.

Q. DID ISO-NE FILE COMMENTS ON THE NOPR?

A. They did. Citing the NOPR in its comments, ISO-NE agreed that "successful implementation of distributed energy resource aggregations will require close coordination between the RTO or ISO, the aggregator, and the distribution utility."[5] The ISO also stated that

> "it is worth emphasizing the large and critical role envisioned here for the distribution utility in facilitating the participation of these assets in the wholesale markets. FERC is correct that it is the distribution utility that will be primarily responsible for assessing whether the individual assets associated with a distributed energy resource aggregation are properly metered, are technically capable of providing service to the RTO or ISO, are not participating in another retail program, and are able to participate in the wholesale markets without safety or reliability risks to the distribution system, and to report all of this information to the RTO or ISO. These are roles the RTO or ISO cannot itself perform, and so the distribution utility will essentially be certifying to the RTO or ISO that the assets underlying a new or modified aggregation meet all of these requirements."[6]

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[5] See FERC Docket No. RM16-23, Notice of Proposed Rulemaking, *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Comments of ISO-NE, p. 52.

[6] See FERC Docket No. RM16-23, Notice of Proposed Rulemaking, *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Comments of ISO-NE, p. 53-54 (Emphasis added).

One additional note the ISO included was that "a distributed energy resource's retail metering will need to be adjusted to account for its wholesale activities."[7] Based on these comments, it is clear that ISO-NE does not envision the distribution utility participating in the markets as a resource aggregator, but rather as a "gateway" to ensuring technically capable, reliable and properly metered resources are participating.

Q. ARE YOU FAMILIAR WITH ANY DISTRIBUTION UTILITY OPERATING IN A RESTRUCTURED RETAIL MARKET THAT HAS ANY MARKET-BASED RESOURCES PARTICIPATING IN THE WHOLESALE ELECTRICITY MARKETS?

A. Some utility-owned resources are participating in the wholesale energy markets. However, I would caution against it here because FERC has taken some steps that clearly indicate that it will incorporate these resources into the wholesale markets. Owning and managing these resources should be in the domain of competitive market participants and if by a utility company, these resources should be managed by an unregulated affiliate, not the regulated distribution company.

[7] See FERC Docket No. RM16-23, Notice of Proposed Rulemaking, *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Comments of ISO-NE, p. 55.

Q. HAS FERC TAKEN ANY FURTHER ACTIONS ON ITS NOPR ON STORAGE AND DER PARTICIPATING IN WHOLESALE ELECTRIC MARKETS?

A. Yes. FERC has essentially bifurcated the proceeding into a storage component and a DER component. FERC has issued Order No. 841 addressing storage. This order requires each ISO to develop tariffs that

> "(A) Ensures that a resource using the participation model for electric storage resources in an independent system operator or regional transmission organization market is eligible to provide all capacity, energy, and ancillary services that it is technically capable of providing; (B) Ensures that a resource using the participation model for electric storage resources can be dispatched and can set the wholesale market clearing price as both a wholesale seller and wholesale buyer consistent with rules that govern the conditions under which a resource can set the wholesale price; (C) Accounts for the physical and operational characteristics of electric storage resources through bidding parameters or other means; and (D) Establishes a minimum size requirement for resources using the participation model for electric storage resources that does not exceed 100 kW."

Additionally, on April 10 and 11, 2018, FERC hosted a technical conference where it invited market experts to discuss certain topics relevant to DER integration. FERC will accept another round of written comments on DER aggregation and integration issues. After that, they will issue a final rule on DER participation in the wholesale markets. I expect that the order will be very similar to the order for storage resources and it will allow all DERs into the market and will allow them to participate in the markets to the fullest extent to which they are capable. I also expect FERC's forthcoming DER order to clearly delineate lines

of demarcation for market participant, distribution utility and ISO functions, roles and responsibilities.

Q. NATIONAL GRID IS PROPOSING THAT THE SOLAR INVESTMENT BE PART OF THE PROGRAMS AIMED AT INCOME ELIGIBLE CUSTOMERS. SHOULD THE COMMISSION IGNORE FEDERAL POLICIES FOR THE SAKE OF BENEFITTING THE INCOME ELIGIBLE GROUP OF CUSTOMERS?

A. The income eligible programs should continue to be supported by the Utility and by the Commission. Under this Plan, National Grid proposes "to use revenues from the solar sites to lower energy bills for Income Eligible customers who may reside at nonprofit, affordable housing locations. Proceeds will be transferred to the Company's Income Eligible targeted programs, which seek to reduce energy use within this customer group." (Plan Ch. 8, p. 2 of 14.) This is a convoluted mechanism to invest in the income eligible programs. Under this proposal, the Utility can offer no assurance that the funds will ever be generated. Because it is a market resource, it cannot make such guarantees. This is just one of the many reasons the concept is flawed. Instead, the Utility should seek incremental funds from ratepayers that would be used directly for the income eligible programs. The current proposal has ratepayers investing in a market resource and hoping it pays off for the income eligible programs. The Utility should skip the uncertainty and send the funds directly to the applicable programs. That would ensure that the resources would make it to the customers who need the resources.

Q. NATIONAL GRID ALSO STATES THAT THE RHODE ISLAND STATUTES ALLOW FOR THE UTILITY TO INVEST IN SOLAR IF IT BENEFITS AFFORDABLE HOUSING PROJECTS. DOES THAT ALTER YOUR POSITION ABOUT THE UTILITY OWNING SOLAR RESOURCES?

A. No. According to the Plan, the Utility's "Solar Program is designed to meet the specific requirements of R.I. Gen. Laws § 39-26-6(g), which authorizes utility ownership of up to 15 MW of renewable generation demonstration projects, provided that a portion of demonstration projects specifically benefit customers of nonprofit affordable housing projects." However, a full reading of the section cited by National Grid solidifies my opinions. First, the "renewable-generation proposals shall be subject to the review and approval of the Commission." R.I. Gen. Laws § 39-26-6(g). The statutory language is not a directive to the Utility to build renewables. Rather, it is an invitation to seek Commission approval for such investments. In light of evolving market dynamics at the federal level, the Commission should reject the solar proposal as the customers will be better served by competitive market forces operating in truly competitive wholesale and retail markets. Additionally, according to the statute, the renewable energy resources are to be "installed at, or in the vicinity of nonprofit, affordable-housing projects where energy savings benefits are provided to reduce electric bills of the customers at the nonprofit, affordable-housing projects." R.I. Gen. Laws § 39-26-6(g). In my opinion, the Utility proposal does not meet this standard. National Grid has proposed a mechanism where the investment will be made, then, if benefits accrue, they will be placed in a fund to deploy energy efficiency

measures to low-income customers, not necessarily those co-located at the site where the resource was deployed. This proposal will not "reduce electric bills of the customers" at the site, as the statute requires.

X. DEMONSTRATION PROJECTS

Q. NATIONAL GRID HAS PROPOSED MANY DIFFERENT PRODUCTS AND SERVICES THAT YOU HAVE OPPOSED IN THIS TESTIMONY. SHOULD ANY OF THESE INVESTMENTS, PRODUCTS OR SERVICES BE ALLOWED AS DEMONSTRATION PROJECTS OR PILOT PROJECTS?

A. No. National Grid's proposals are not "untested" or "unproven". While these types of projects may not have been implemented in Rhode Island, they have been implemented elsewhere. Most notably, these concepts have been implemented by competitive markets by retail suppliers and third-parties. Competitive retail markets have evolved, where enabled, to markets that provide high-value added products and services to residential and business customers. Direct Energy and its affiliate companies are already offering most of the products and services "envisioned" in National Grid's Plan. I am attaching as Exhibit DE-FL-4, printouts of a variety of web pages and marketing collateral from the Direct Energy companies' websites which validate the product offerings and offer some case studies of the implementation of these goods and services. These pages show a vast array of value added products and services ranging from consumer education to in-depth analytics and also shows deployment of capital investments in distributed energy resources such as solar and storage. These products and

services do not need to be "demonstrated" or "piloted". The Commission should mandate the development of an enabling smart grid and retail market and these products and services will be available in Rhode Island.

XI. CONCLUSION

Q. COULD YOU PLEASE SUMMARIZE YOUR TESTIMONY?

Yes. First and foremost, National Grid should explicitly acknowledge that NPPs are included in their Plan through in nothing else, the undefined term "third-party provider" and that as a third-party provider, NPPs should have access to all of the tools and data described in the grid modernization part of the Plan, including near real-time or real-time access to customer data when authorized by the customer and access to any networks the Utility uses in developing its smart grid. I am very supportive of the concept of the Utility investing in and developing a modernized grid. It is with a modernized grid and regulatory framework that customers will benefit most. The modernized grid will empower NPPs and other third-parties to create numerous creative and consumer-friendly retail products. As such, many parts of the Utility's Plan should be approved. Most notably, the infrastructure to support AMF should be approved. The other systems and infrastructure required to support a modernized grid should also be approved. However, the Utility's proposals that distort the market, that are anti-competitive or in any other way harm competitive market forces should be rejected. Specifically, the Utility should not be allowed to create numerous retail rate

structures, especially rate structures that incentivize the shifting of load to off-peak times as these will artificially lower all standard offer rates. Cross-subsidies between distribution ratepayers and market functions should not be allowed. Finally, the solar, storage and EV demonstration projects should be rejected. These products and related services do not need any further "investigation". They have been implemented in markets across the country. Additionally, the solar and storage demonstration projects run counter to federal energy policy and should be rejected. Specifically, the Utility should not be allowed to invest in any market resources such as storage, solar and other distributed resources, nor should they be allowed to deploy additional retail rate structures beyond a standard offer service.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

EXHIBIT DE-FL-2

Frank Lacey
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West Chester, PA 19382
724-413-0849
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https://www.linkedin.com/in/fplaceyelectricityexpert/

Summary

Recognized energy industry executive known for developing innovative regulatory and business strategies to support emerging energy market products and services. Strong knowledge of regional energy markets, market trends and national energy policy.

Board of Directors positions: Smart Electric Power Alliance (finance committee) (2015-present); Association for Demand Response and Smart Grid (finance chair) (2011-2015); Advanced Energy Management Alliance (Chairman) (2012-Present); ERCOT (finance committee) (2002-2004); Electric Power Supply Association (2002-2004).

Experience

Electric Advisors Consulting 2015- Present
Founder and President

Advise senior leadership on developing strategies to address legislative, regulatory and market design changes in the energy industry. Also provide expert testimony to advise and assist entities on facilitating legislative, regulatory and market changes to accommodate evolving business strategies and technologies.

Comverge, Inc./CPower Corporation 2011-2015
Senior Vice President, Regulatory and Market Strategy

Served on companies' executive teams, developing and implementing corporate and regulatory strategy, including M&A analyses and due diligence, market entry plans and complex communications for entities with a combined $150 million in revenue from demand response services in the electricity markets.

Direct Energy 2006 - 2011
Director, Complex Transactions (2008-2011)

For a multi-billion dollar retail electric and gas company, led team consisting of four direct reports and eight cross-functional leaders, facilitating incremental gross margin sales from non-standard product requests.

Director, Government and Regulatory Affairs (2006-2008)

Managed regulatory strategy and regulatory risk in Mid-Atlantic region of US, participating in multiple rate proceedings and regulatory initiatives, securing shareholder value through reduced credit and collateral exposure and increased sales.

Starlight Energy 2004 - 2006
President

Led the development of business plan and pro formas for venture seeking $20 million in equity financing and other financial relationships. Successes included securing $100 million credit relationship and working capital financing to enable launch of competitive electricity markets retail supply company.

Strategic Energy 2001- 2004
Director, Regulatory Affairs,

Served on the company's Leadership team, managing a regulatory group of 15 people. Managed the development of regulatory strategy, the oversight of regulatory risk and the attainment of desired regulatory results, advocating for market design structures in emerging electricity markets across 16 states and the federal government.

Arthur Andersen 1998 - 2001
Senior Manager

Responsibility for development and growth of Andersen's transmission restructuring business in Eastern half of US market.

Putnam, Hayes and Bartlett, Inc 1995 - 1998
Associate Consultant

Associate consultant in firm's energy practice with expertise in environmental asset valuation.

Education

Carnegie Mellon University, Tepper School of Business
MSIA with concentrations in finance, entrepreneurship and environmental management

University of Maryland
B.S. in Transportation and Logistics

Programs for Life
Certified Leadership Development Trainer

EXHIBIT DE-FL-3

Frank Lacey
Detailed List of Testimony, Speeches and Paper
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Prepared Direct Testimony of Frank Lacey On Behalf of Strategic Energy, LLC, before the Public Utilities Commission of the State of California in the matter of the *Order Instituting Rulemaking Regarding the Implementation of the Suspension of Direct Access Pursuant to Assembly Bill 1X and Decision 01-09-060*. Docket No. R. 02-01-011. June 6, 2002.

Prepared Rebuttal Testimony of Frank Lacey On Behalf of Strategic Energy, LLC before the Public Utilities Commission of the State of California in the matter of the *Order Instituting Rulemaking Regarding the Implementation of the Suspension of Direct Access Pursuant to Assembly Bill 1X and Decision 01-09-060*. Docket No. R. 02-01-011. June 20, 2002

Cross Examination testimony of On Behalf of Strategic Energy, LLC before the Public Utilities Commission of the State of California in the matter of the *Order Instituting Rulemaking Regarding the Implementation of the Suspension of Direct Access Pursuant to Assembly Bill 1X and Decision 01-09-060*. Docket No. R. 02-01-011. July 2002.

Prepared Testimony of Frank Lacey on the subject of truing up the CERS Fee On Behalf of Strategic Energy, LLC before the Public Utilities Commission Of the State Of California in the matter of the *Order Instituting Rulemaking Regarding the Implementation of the Suspension of Direct Access Pursuant to Assembly Bill 1X and Decision 01-09-060*. Docket No. R. 02-01-011. March 19, 2003

Prepared Direct Testimony of Frank Lacey on behalf of Strategic Energy L.L.C. before the Pennsylvania Public Utility Commission in the matter *Pennsylvania Public Utility Commission, et al. v.Duquesne Light Company*, Docket Nos. R-00038092, R-00038092C0001 and R-00038092C0002. January 2003.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Strategic Energy L.L. C. Before the Pennsylvania Public Utility Commission in the matter *Pennsylvania Public Utility Commission, et al. v. Duquesne Light Company* Docket Nos. R-00038092, R-00038092C0001 and R-00038092C0002. February 2003.

Prepared Supplemental Testimony of Frank Lacey on behalf of Strategic Energy L.L.C. before the Pennsylvania Public Utility Commission in the matter *Pennsylvania Public Utility Commission, et al. v. Duquesne Light Company* Docket Nos. R-00038092, R-00038092C0001, R-00038092C0002. November 2003

Cross Examination testimony of Frank Lacey on behalf of Strategic Energy L.L.C. before the Pennsylvania Public Utility Commission in the matter *Pennsylvania Public Utility Commission, et al. v. Duquesne Light Company* Docket Nos. R-00038092, R-00038092C0001, R-00038092C0002. July 1, 2003.

Prepared Direct Testimony of Frank Lacey submitted on behalf of Strategic Energy L.L.C. and Dominion Retail, Inc. before the Public Utilities Commission of Ohio in the matters of the *Continuation of the Rate Freeze and Extension of the Market Development Period for The Dayton Power and Light Company* Case No. 02-2779-EL-ATA and the *Application of The Dayton Power and Light Company for Certain Accounting Authority Pursuant to Section 4905.13, Ohio Revised Code* Case No. 02-2879-EL-AAM. May 19, 2003.

Prepared Supplemental Testimony of Frank Lacey submitted on behalf of Strategic Energy L.L.C. and Dominion Retail, Inc. before the Public Utilities Commission of Ohio in the matters of the *Continuation of the Rate Freeze and Extension of the Market Development Period for The Dayton Power and Light Company* Case No. 02-2779-EL-ATA and the *Application of The Dayton Power and Light Company for Certain Accounting Authority Pursuant to Section 4905.13, Ohio Revised Code* Case No. 02-2879-EL-AAM. June 12, 2003.

Deposition Testimony of Frank Lacey submitted on behalf of Strategic Energy L.L.C. and Dominion Retail, Inc. before the Public Utilities Commission of Ohio in the matters of the *Continuation of the Rate Freeze and Extension of the Market Development Period for The Dayton Power and Light Company* Case No. 02-2779-EL-ATA and the *Application of The Dayton Power and Light Company for Certain Accounting Authority Pursuant to Section 4905.13, Ohio Revised Code* Case No. 02-2879-EL-AAM. May 2003 and June 2003.

Cross Examination testimony of Frank Lacey on behalf of Strategic Energy L.L.C. and Dominion Retail, Inc. before the Public Utilities Commission of Ohio in the matters of the *Continuation of the Rate Freeze and Extension of the Market Development Period for The Dayton Power and Light Company* Case No. 02-2779-EL-ATA and the *Application of The Dayton Power and Light Company for Certain Accounting Authority Pursuant to Section 4905.13, Ohio Revised Code* Case No. 02-2879-EL-AAM. June 2003**.**

Oral Testimony of Frank Lacey before the Standing Committee on Energy of the New York State Assembly on the issue of Ensuring a Reliable Supply of Electricity to the People of New York, Chairman Paul D Tonko, presiding. March 6, 2003

Prepared Direct Testimony of Frank Lacey on behalf of Strategic Energy, L.L.C. before the Pennsylvania Public Utility Commission in the matter of the *Petition of Duquesne Light Company for Approval of Plan for Post-Transition Period Provider of Last Resort Service.* Docket No. P-00032071. February 2004.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Strategic Energy, L.L.C. before the Pennsylvania Public Utility Commission in the matter of the *Petition of Duquesne Light Company for Approval of Plan for Post-Transition Period Provider of Last Resort Service.* Docket No. P-00032071. February 2004.

Cross Examination testimony of Frank Lacey on behalf of Strategic Energy, L.L.C. before the Pennsylvania Public Utility Commission in the matter of the *Petition of Duquesne Light Company for Approval of Plan for Post-Transition Period Provider of Last Resort Service.* Docket No. P-00032071. April 1, 2004.

Oral Testimony of Frank Lacey at the *POLR Roundtable* before the Pennsylvania Public Utility Commission re: Optimal Future POLR Design models. May 3, 2004.

Prepared Direct Testimony of Frank Lacey on behalf of Strategic Energy, L.L.C. and Mid-American Energy Company before the Public Utilities Commission of Ohio in the matters of *The Application of the Cincinnati Gas & Electric Company to Modify its Non-Residential Generation Rates to Provide for Market-Based Standard Service Offer Pricing and to Establish a Pilot Alternative Competitively-Bid Service Rate Option Subsequent to Market Development Period*, Case No. 03-93-EL-ATA, *The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Certain Costs Associated with the Midwest ISO*, Case No. 03-2079-EL-AAM, and *The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Capital investment in its Electric Transmission and Distribution System and to Establish a Capital Investment Reliability Rider to be Effective After the Market Development Period*, Case Nos. 03-2080-EL-AAM and 03-2080-EL-ATA. May 6, 2003.

Deposition of Frank Lacey in the matters of *The Application of the Cincinnati Gas & Electric Company to Modify its Non-Residential Generation Rates to Provide for Market-Based Standard Service Offer Pricing and to Establish a Pilot Alternative Competitively-Bid Service Rate Option Subsequent to Market Development Period*, Case No. 03-93-EL-ATA, *The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Certain Costs Associated with the Midwest ISO*, Case No. 03-2079-EL-AAM, and *The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Capital investment in its Electric Transmission and Distribution System and to Establish a Capital Investment Reliability Rider to be Effective After the Market Development Period*, Case Nos. 03-2080-EL-AAM and 03-2080-EL-ATA. May 2003.

Cross Examination Testimony of Frank Lacey on behalf of Strategic Energy, L.L.C. and Mid-American Energy Company before the Public Utilities Commission of Ohio in the matters of *The Application of the Cincinnati Gas & Electric Company to Modify its Non-Residential Generation Rates to Provide for Market-Based Standard Service Offer Pricing and to Establish a Pilot Alternative Competitively-Bid Service Rate Option Subsequent to Market Development Period*, Case No. 03-93-EL-ATA, *The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Certain Costs Associated with the Midwest ISO*, Case

No. 03-2079-EL-AAM, and *The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Capital investment in its Electric Transmission and Distribution System and to Establish a Capital Investment Reliability Rider to be Effective After the Market Development Period*, Case Nos. 03-2080-EL-AAM and 03-2080-EL-ATA. May 18, 2003.

Oral Testimony of Frank Lacey before the Michigan Senate Committee on Technology and Energy on the subject of revision to Public Act 141, the Michigan Electricity Choice and Restructuring Act, Chairman Bruce Patterson, Presiding. May 19, 2004.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Maryland Senate Finance Committee on Senate Bill 561 on the subject of communications between electric companies and suppliers to enhance the development of competitive electric markets, Chairman Thomas Middleton, Presiding. March 7, 2006.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Maryland Senate Finance Committee on Senate Bills 814, 1048, 1051 and 1078 on the subject of retail electricity market design, Chairman Thomas Middleton, Presiding. March 14, 2006.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Maryland House of Delegates Economic Matters Committee on House Bills 1334, 1654 and 1712 on the subject of retail electricity market design, Chairman Dereck Davis, Presiding. March 14, 2006.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utility Commission in the Matter of *Petition of Direct Energy Services, LLC for Emergency Order*, Docket No. P-00062205, April 11, 2006.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utility Commission in the Matter of *Policies to Mitigate Potential Electricity Price Increases*, Docket No. M-00061957, June 22, 2006.

Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Duquesne Light Company Base Rate Case*, Docket No. R-00061346, July 7, 2006. (Case Settled)

Prepared Rebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Duquesne Light Company Base Rate Case*, Docket No. R-00061346, August 2, 2006. (Case Settled)

Prepared Surrebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Duquesne Light Company Base Rate Case*, Docket No. R-00061346, August 16, 2006. (Case Settled)

Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Petition of PPL Electric Utilities Corporation for Approval of Competitive Bridge Plan*, Docket No. P-00062227, November 15, 2006.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Petition of PPL Electric Utilities Corporation for Approval of Competitive Bridge Plan*, Docket No. P-00062227, December 6, 2006.

Prepared Surrebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Petition of PPL Electric Utilities Corporation for Approval of Competitive Bridge Plan*, Docket No. P-00062227, December 15, 2006.

Oral Rejoinder Testimony and Cross-examination of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Petition of PPL Electric Utilities Corporation for Approval of Competitive Bridge Plan*, Docket No. P-00062227, December 15, 2006.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania House of Representatives, Consumer Affairs Committee, Honorable Joseph Preston Jr., Chairman, March 15, 2007.

Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy Services, LLC and the Retail Energy Supply Association before the Pennsylvania Public Utilities Commission in the Matter of *Petition of Duquesne Light Company for Approval of Default Service Plan for the Period January 1, 2008 through December 31, 2010*, Docket No. P-00072247, March 29, 2007. (case settled)

Prepared Rebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC and the Retail Energy Supply Association before the Pennsylvania Public Utilities Commission in the Matter of *Petition of Duquesne Light Company for Approval of Default Service Plan for the Period January 1, 2008 through December 31, 2010*, Docket No. P-00072247, April 12, 2007. (case settled)

Prepared Surrebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC and the Retail Energy Supply Association before the Pennsylvania Public Utilities Commission in the Matter of *Petition of Duquesne Light Company for Approval of Default Service Plan for the Period January 1, 2008 through December 31, 2010*, Docket No. P-00072247, April 20, 2007. (case settled)

Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Petition of Pike County Light & Power Company for Expedited Approval of its Default Service Implementation Plan, Docket No.* P-00072245, March 28, 2007.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Petition of Pike County Light & Power Company for Expedited Approval of its Default Service Implementation Plan, Docket No.* P-00072245, April 11, 2007.

Oral Surrebuttal Testimony and Cross-examination Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Petition of Pike County Light & Power Company for Expedited Approval of its Default Service Implementation Plan, Docket No.* P-00072245, April 19, 2007.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania House of Representatives Republican Policy Committee, Honorable Michael Turzai, Chairman, March 17, 2008.

Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy Services, LLC and the Retail Energy Supply Association before the Pennsylvania Public Utilities Commission in the Matter of *Petition of West Penn Power Company dba Allegheny Power for Approval of its Retail Electric Default Service Program and Competitive Procurement Plan for Service at the Conclusion of the Restructuring Transition Period, Docket No.* P-00072342, February 12, 2008.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC and the Retail Energy Supply Association before the Pennsylvania Public Utilities Commission in the Matter of *Petition of West Penn Power Company dba Allegheny Power for Approval of its Retail Electric Default Service Program and Competitive Procurement Plan for Service at the Conclusion of the Restructuring Transition Period, Docket No.* P-00072342, March 11, 2008.

Prepared Sur-rebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC and the Retail Energy Supply Association before the Pennsylvania Public Utilities Commission in the Matter of *Petition of West Penn Power Company dba Allegheny Power for Approval of its Retail Electric Default Service Program and Competitive Procurement Plan for Service at the Conclusion of the Restructuring Transition Period, Docket No.* P-00072342, March 25, 2008.

Oral Cross-examination Testimony of Frank Lacey on behalf of Direct Energy Services, LLC and the Retail Energy Supply Association before the Pennsylvania Public Utilities Commission in the Matter of

Petition of West Penn Power Company dba Allegheny Power for Approval of its Retail Electric Default Service Program and Competitive Procurement Plan for Service at the Conclusion of the Restructuring Transition Period, Docket No. P-00072342, April 2, 2008.

Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy Services, LLC, before the Pennsylvania Public Utility Commission in the matter of the *Joint Application of West Penn Power Company d/b/a Allegheny Power, Trans-Allegheny Interstate Line Company and FirstEnergy Corp. for a Certificate of Public Convenience under Section 1102(a)(3) of the Public Utility Code approving a change of control of West Penn Power Company And Trans-Allegheny Interstate Line Company,* Docket Nos. A-2010-2176520 and A-2010-2176732, August 17, 2010

Prepared Sur-Rebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC, before the Pennsylvania Public Utility Commission in the matter of the *Joint Application of West Penn Power Company d/b/a Allegheny Power, Trans-Allegheny Interstate Line Company and FirstEnergy Corp. for a Certificate of Public Convenience under Section 1102(a)(3) of the Public Utility Code approving a change of control of West Penn Power Company And Trans-Allegheny Interstate Line Company,* Docket Nos. A-2010-2176520 and A-2010-2176732, October 1, 2010.

Oral Cross-examination Testimony of Frank Lacey on behalf of Direct Energy Services, LLC, before the Pennsylvania Public Utility Commission in the matter of the *Joint Application of West Penn Power Company d/b/a Allegheny Power, Trans-Allegheny Interstate Line Company and FirstEnergy Corp. for a Certificate of Public Convenience under Section 1102(a)(3) of the Public Utility Code approving a change of control of West Penn Power Company And Trans-Allegheny Interstate Line Company,* Docket Nos. A-2010-2176520 and A-2010-2176732, October 5, 2010.

Oral Testimony of Frank Lacey on behalf of Comverge, Inc. at FERC Technical Conference in the Matter of *PJM Interconnection, L.L.C.*, Docket No. ER11-3322-000, July 29, 2011, discussing the topic of appropriate methodologies to estimate load reductions during a demand response curtailment event.

Prepared Direct Testimony of Frank Lacey on behalf of Comverge, Inc., before the Illinois Commerce Commission in the matter of *Commonwealth Edison Company Petition for Statutory Approval of Smart Grid Advanced Metering Infrastructure Deployment Plan Pursuant to Section 16-108.6 of the Public Utilities Act*, Docket No. 12-0298, March 11, 2012.

Oral Cross-examination Testimony of Frank Lacey on behalf of Comverge, Inc., before the Illinois Commerce Commission in the matter of *Commonwealth Edison Company Petition for Statutory Approval of Smart Grid Advanced Metering Infrastructure*

Deployment Plan Pursuant to Section 16-108.6 of the Public Utilities Act, Docket No. 12-0298, May 23, 2012.

Prepared Direct Testimony of Frank Lacey On Behalf of Comverge, Inc., before the Illinois Commerce Commission in the matter of *Ameren Illinois Company Petition for Statutory Approval of a Smart Grid Advanced Metering Infrastructure Deployment Plan Pursuant to Section 16-108.6 of the Public Utilities Act*, Docket No. 12-0244 on rehearing, August 24, 2012.

Oral Cross-examination Testimony of Frank Lacey On Behalf of Comverge, Inc., before the Illinois Commerce Commission in the matter of *Ameren Illinois Company Petition for Statutory Approval of a Smart Grid Advanced Metering Infrastructure Deployment Plan Pursuant to Section 16-108.6 of the Public Utilities Act*, Docket No. 12-0244 on rehearing, September 20, 2012.

Prepared Direct Testimony of Frank Lacey on Behalf of Comverge, Inc., before the Illinois Commerce Commission in the matter of *Commonwealth Edison Company's Petition for Approval of Tariffs Implementing ComEd's Proposed Peak Time Rebate Program*, Docket No. 12-0484, October 25, 2012.

Oral Cross-examination Testimony of Frank Lacey on Behalf of Comverge, Inc., before the Illinois Commerce Commission in the matter of *Commonwealth Edison Company's Petition for Approval of Tariffs Implementing ComEd's Proposed Peak Time Rebate Program*, Docket No. 12-0484, December 7, 2012.

Prepared Direct Testimony of Frank Lacey on Behalf of Comverge, Inc., before the Maryland Public Service Commission in the matter of *The Investigation of the Process and Criteria for Use in Development of Requests for Proposal by the Maryland Investor-Owned Utilities for New Generation to Alleviate Potential Short-Term Reliability Problems in the State of Maryland*, Case No. 9149, January 31, 2013.

Prepared Supplemental Direct Testimony of Frank Lacey on Behalf of Comverge, Inc., before the Maryland Public Service Commission in the matter of *The Investigation of the Process and Criteria for Use in Development of Requests for Proposal by the Maryland Investor-Owned Utilities for New Generation to Alleviate Potential Short-Term Reliability Problems in the State of Maryland*, Case No. 9149, February 25, 2013.

Oral Testimony of Frank Lacey on behalf of Comverge, Inc. at FERC Technical Conference in the Matter of *PJM Interconnection, L.L.C.*, Docket No. ER13-2108-000, October 11, 2013, discussing the appropriate information requirements for demand response offers made three years prior to a delivery year.

Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy before the Massachusetts Department of Public Utilities in the *Investigation as to the Propriety of Proposed Tariff Change* in response to the Petition of Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid, Docket Number DPU 15-155, March 18, 2016.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Direct Energy before the Massachusetts Department of Public Utilities in the *Investigation as to the Propriety of Proposed Tariff Change* in response to the Petition of Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid, Docket Number DPU 15-155, April 28, 2016.

Oral Cross-examination Testimony of Frank Lacey on behalf of Direct Energy before the Massachusetts Department of Public Utilities in the *Investigation as to the Propriety of Proposed Tariff Change* in response to the Petition of Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid, Docket Number DPU 15-155, May 18, 2016.

Expert Rebuttal Report and Damage Summary of Frank Lacey, Response to the Review Submitted by Nathan Katzenstein, prepared on behalf of Astral Energy in the matter of *Treetop Development, et al. v. Astral Energy, et al.,* Docket #: BER-L-9414-13, Superior Court of New Jersey, Bergen County, December 9, 2016.

Expert Reply (Sur-rebuttal) of Frank Lacey, Reply to the Response Submitted by Nathan Katzenstein, prepared on behalf of Astral Energy in the matter of *Treetop Development, et al. v. Astral Energy, et al.,* Docket #: BER-L-9414-13, Superior Court of New Jersey, Bergen County, April 28, 2017.

Deposition of Frank Lacey on the topic of his Expert Rebuttal Report and Damage Summary prepared on behalf of Astral Energy in the matter of *Treetop Development, et al. v. Astral Energy, et al.*, Docket #: BER-L-9414-13, Superior Court of New Jersey, Bergen County, May 17, 2017.

Oral Testimony and Cross-examination Testimony on behalf of Astral Energy in the matter of *Treetop Development, et al. v. Astral Energy, et al.,* Docket #: BER-L-9414-13, Superior Court of New Jersey, Bergen County, June 5, 2017.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Clearview Energy before the Pennsylvania Public Utilities Commission in *Pennsylvania PUC v. Clearview Electric, Inc.*, Docket No. C-2016-2543592, January 9, 2017.

Prepared Direct Testimony of Frank Lacey on behalf of the Cape Light Compact before the Massachusetts Department of Public Utilities in the *Petition of NSTAR Electric Company and Western Massachusetts Electric Company d/b/a Eversource Energy for*

Approval of their Grid Modernization Plans, Docket No. D.P.U. 15-122/123, March 10, 2017.

Oral Cross-examination Testimony of Frank Lacey (as part of the Cape Light Compact Panel of Witnesses) before the Massachusetts Department of Public Utilities in the *Petition of NSTAR Electric Company and Western Massachusetts Electric Company d/b/a Eversource Energy for Approval of their Grid Modernization Plans*, Docket No. D.P.U. 15-122/123, May 31, 2017.

Prepared Direct Testimony of Frank Lacey on behalf of the Retail Energy Supply Association before the Massachusetts Department of Public Utilities in the *Petition of NSTAR Electric Company and Western Massachusetts Electric Company each d/b/a Eversource Energy for Approval of an Increase in Base Distribution Rates for Electric Service Pursuant to G.L. C. 164, § 94 and 220 C.M.R. § 5.00*, Docket No. D.P.U. 17-05, April 28, 2017.

Oral Cross-examination Testimony of Frank Lacey on behalf of the Retail Energy Supply Association before the Massachusetts Department of Public Utilities in the *Petition of NSTAR Electric Company and Western Massachusetts Electric Company each d/b/a Eversource Energy for Approval of an Increase in Base Distribution Rates for Electric Service Pursuant to G.L. C. 164, § 94 and 220 C.M.R. § 5.00*, Docket No. D.P.U. 17-05, June 27, 2017.

Direct Testimony of Frank Lacey on behalf of the Retail Energy Supply Association before the New York Public Service Commission in the *Matter of Eligibility Criteria for Energy Service Companies*, Case No. 15-M-0127, in the *Proceeding on the Motion of the Commission to Assess Certain Aspects of the Residential and Small Non-Residential Retail Energy Markets in New York State*, Case No. 12-M-0476, and in the *Matter of Retail Access Business Rules*, Case No. 98-M-1343, September 15, 2017.

Rebuttal Testimony of Frank Lacey on behalf of the Retail Energy Supply Association before the New York Public Service Commission in the *Matter of Eligibility Criteria for Energy Service Companies*, Case No. 15-M-0127, in the *Proceeding on the Motion of the Commission to Assess Certain Aspects of the Residential and Small Non-Residential Retail Energy Markets in New York State*, Case No. 12-M-0476, and in the *Matter of Retail Access Business Rules*, Case No. 98-M-1343, October 27, 2017.

Oral Cross-examination Testimony of Frank Lacey on behalf of the Retail Energy Supply Association before the New York Public Service Commission in the *Matter of Eligibility Criteria for Energy Service Companies*, Case No. 15-M-0127, in the *Proceeding on the Motion of the Commission to Assess Certain Aspects of the Residential and Small Non-Residential Retail Energy Markets in New York State*, Case No. 12-M-0476, and in the *Matter of Retail Access Business Rules*, Case No. 98-M-1343, September 15, 2017.

Direct Testimony of Frank Lacey on behalf of Direct Energy Services and its Affiliates before the Virginia State Commerce Commission in the *Application of Virginia Electric and Power Company for Approval of 100% Renewable Energy Tariffs Pursuant to Subsection 56-577 A 5 and 56-234 of the Code of Virginia*, Docket No. PUR-2017-00060, August 23, 2017.

Oral Surrebuttal and Cross-examination Testimony of Frank Lacey on behalf of Direct Energy Services and its Affiliates before the Virginia State Commerce Commission in the *Application of Virginia Electric and Power Company for Approval of 100% Renewable Energy Tariffs Pursuant to Subsection 56-577 A 5 and 56-234 of the Code of Virginia*, Docket No. PUR-2017-00060, December 4, 2017.

Oral Direct and Cross-examination Testimony of Frank Lacey on behalf of the Retail Energy Supply Association before the Public Service Commission of the State of Delaware, *In the Matter of the Review of Customer Choice in the State of Delaware*, Docket No. 15-1693, April 19, 2017.

Lacey, Frank, *FERC Order No. 745 – Problems and Solutions to the "EPSA" Problem*, Presentation to National Regulatory Conference, Williamsburg, VA, May 21, 2015.

Panel Discussion, *The State of Demand Response in Organized Markets – The uncertainty created by EPSA v. FERC*, Energy Bar Association, Northeast Chapter Annual Meeting, Newark, NJ, June 11, 2015.

Lacey, Frank, *The Supreme Court on Energy in 2016, What it Means to Your Business, Presentation to Solar Power International, Las Vegas, NV, September 14, 2016.*

Lacey, Frank, *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators,* Presentation to Solar Power International, Las Vegas, NV, September 11, 2017.

Lacey, Frank, *Update: Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators* Solar Power Northeast, February 5, 2018.

Lacey, Frank, "*The Extermination of BUGS from the US Electricity Markets"*, *em – The Magazine for Environmental Managers*, published by the Air and Waste Management Association, March 2016.

Webinar Participant/Panelist, *The Future of Demand Response*, hosted by Power Markets Today, October 17, 2017.

Webinar Participant/Panelist, *Rethinking Demand Response – The Evolution from Simple to Sophisticated*, Hosted by Smart Electric Power Alliance, December 14, 2017.

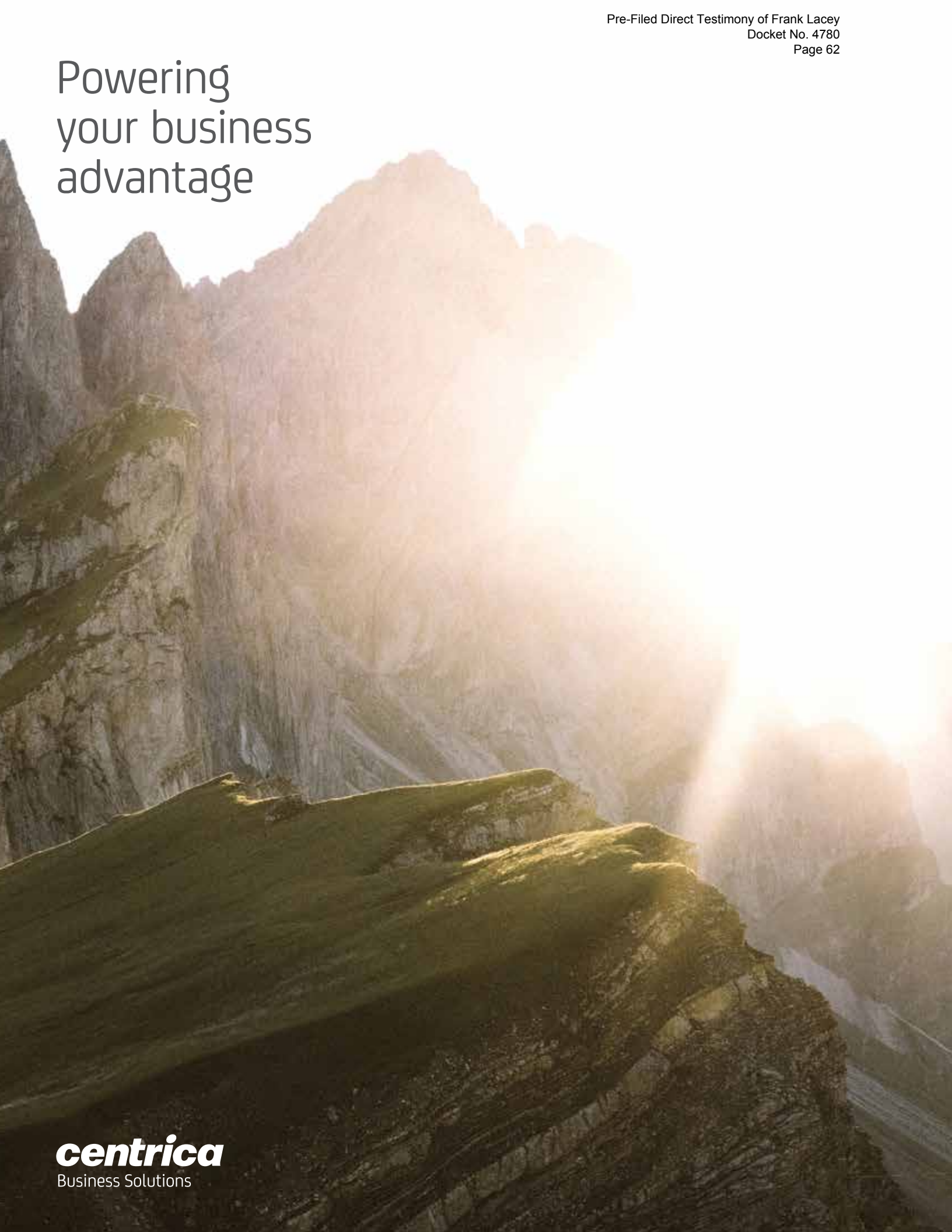
Lacey, Frank and Taff Tschamler, *Implementing Principles of Default Service: A Roadmap for Competitive Retail Power Markets*. Paper released at PA POLR Roundtable, May 2004.

Building a for-profit Transmission Operation; Key Business Parameters. Presentation to the EEI Transmission Planning Task Force, Kansas City, MO.

Dozens of industry and client-specific presentations on the topics of industry transformation in the areas of transmission restructuring, retail restructuring, demand response, and the industry ramifications of FERC Order 745 and FERC jurisdiction over demand response.

EXHIBIT DE-FL-4

Powering your business advantage



centrica
Business Solutions

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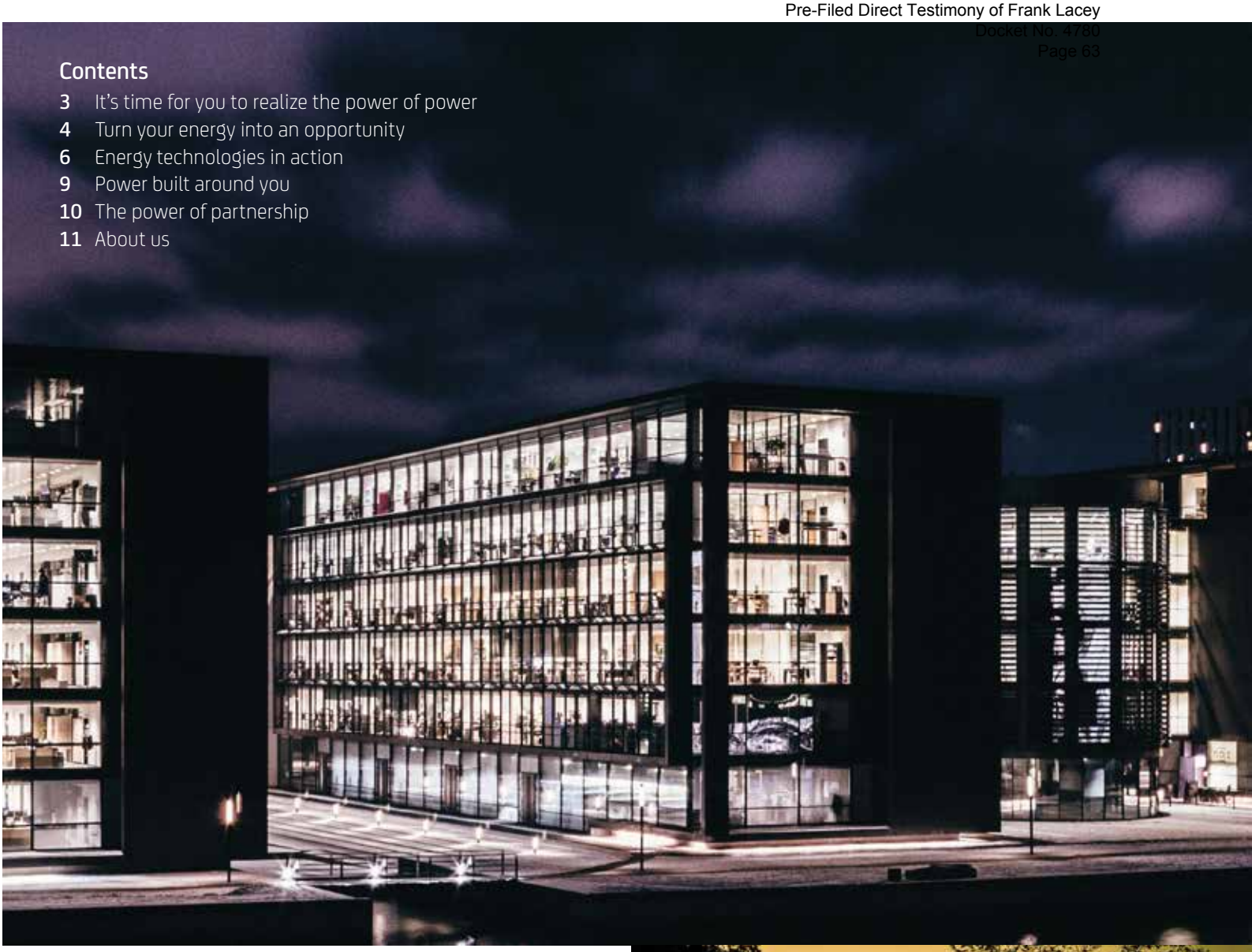
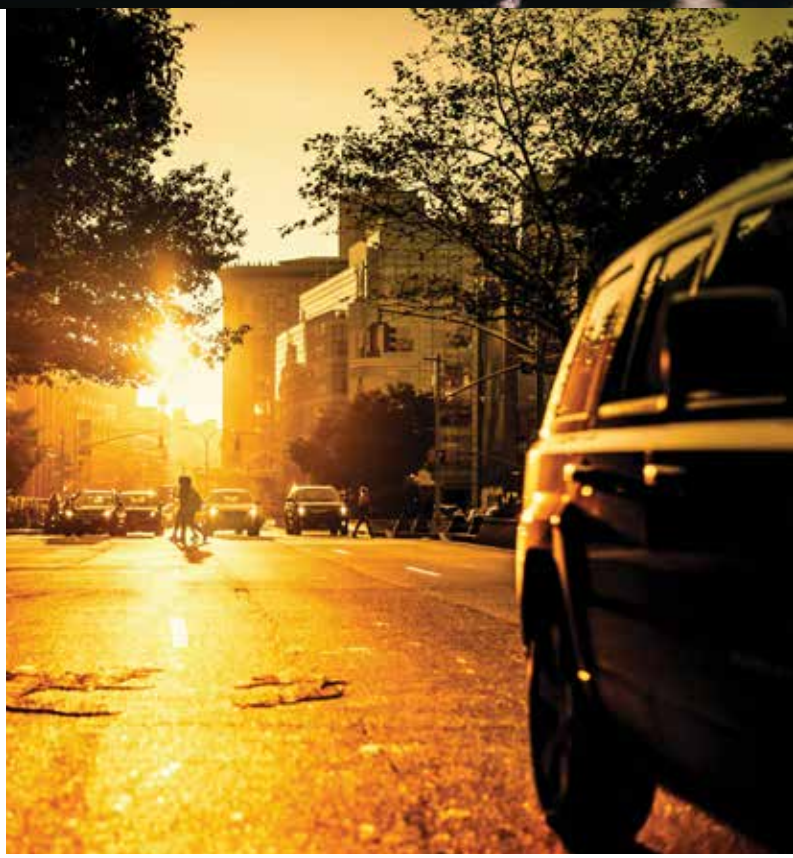


"We are in the midst of an energy revolution. The economic landscape, developments in technology, evolving business models and consumer behavior are changing at an unprecedented rate, creating more opportunities than ever."

UK National Grid Future Energy Report 2017



Power is changing. As new energy sources, insights and technologies emerge, power is more than a commodity and generation is no longer centralized. Businesses are starting to use energy in new ways to take control and gain competitive advantage: increasing resilience, improving operational efficiency and driving their business vision forward. It's time for you to realize the power of power.

Technology is transforming business

The digital revolution is putting business under pressure like never before. As companies evolve in a competitive environment that becomes ever more complex, they continue to face the demands of growth, cost control and risk. At the same time, energy regulation is challenging everyone to use energy more efficiently, and predictability of supply from the grid is no longer as certain as it once was.

Technology is transforming the energy landscape too. New energy sources are appearing, from wind and solar to high efficiency batteries, while supply is becoming decentralized.

These changes are putting power in the hands of customers and turning energy from a simple commodity into a critical source of business advantage.

Centrica is responding

At Centrica, our role as a traditional energy supplier is changing. Centrica Business Solutions has been created to develop new thinking, new technologies and new ways of working to help our customers take control of their power, futureproof their business and deliver their long-term goals. Our energy intelligence, products and distributed energy solutions are already powering the ambitions of 2,000 large energy users around the world. From retail and manufacturing to health and education, we help our customers improve operational efficiency, increase resilience, and drive their business vision forward.

66%

Growing energy management complexity is a concern for many businesses

Source: Centrica research, energy resilience report 2017

88%

Improving operational efficiency is a priority for most businesses

Source: Centrica internal data

Turn your energy into an opportunity

With advances in technology, the energy market has evolved. The power stations of old are being replaced by smaller power sources close to the site of consumption. Renewables like solar feed in to the grid – and energy can be stored locally and consumed when it's needed. These 'distributed energy solutions' are more affordable, efficient and secure power at the point of use.

Three power plays for business

With end-to-end energy solutions based on actionable insights, we help energy users to make the most of distributed energy to power performance, resilience and their future.

Powering Performance

Enhance business value and efficiency

Energy contributes significantly to operational costs and performance excellence. We can improve your energy efficiency and operational performance with our energy insights, new approaches and technologies that optimize your day-to-day processes – and help you achieve your business objectives.

Gain intelligence you can act on using advanced analytics platforms and technologies, providing insights to proactively manage your energy infrastructure.

Optimize your operations, identify opportunities to improve your energy usage, minimize downtime, and reduce carbon emissions.

Simplify your energy management and infrastructure with end-to-end solutions, industry expertise and a range of commercial options.

Performance in action

Mexican restaurant chain operators, CMR Chili's, wanted to improve its energy use while reducing operational costs and environmental impact. Live energy data provided by our wireless sensors has saved enough energy to power 3.6 restaurants for a month.

7.5%

Reduced energy consumption in 32 out of 44 restaurants

"Where once companies saw energy as a cost, now they are seeing it as a source of value and sustainable, competitive advantage."

Jorge Pikunic, Managing Director, Centrica Business Solutions

Powering Resilience

Keep your business on 24/7

As more businesses become digital, your business systems and information resources can be put at risk when the grid goes down. We can help you keep your business always on and protect against future energy uncertainty.

Ensure your continuity of supply by implementing energy solutions that improve site resilience.

Reduce operational failure by modernizing your infrastructure and building a commercial strategy that minimizes financial risk.

Protect against market change and strengthen your compliance with energy regulation using insights, technology and expert guidance.

Resilience in action

Gateshead Council wanted more flexibility over how they manage their energy. We supplemented combined heat and power (CHP) units with the UK's largest commercial battery storage scheme to deliver energy to the local area and store it to cope with spikes in local demand.

3MW

Energy storage capacity – enough to power 3,000 homes for 60 minutes

Powering the Future

Drive your business vision forward

As market and technological changes accelerate, existing business models are under pressure, but energy is providing businesses with opportunities to grow in new and innovative ways.

Drive a growth-oriented energy strategy with a distributed energy plan of action that enables your energy services and infrastructure to evolve with your business.

Build leadership through sustainability by delivering on your ambitions with our range of energy solutions, deep expertise and reporting capability.

Take advantage of innovative energy solutions to break free from traditional energy constraints, enabling you to respond quickly to new opportunities, establish new service offerings and access new revenue streams.

Strategy in action

Alton Towers Resort is one of the largest theme parks in Europe. They wanted a long-term energy strategy for reducing their energy use, utility cost and carbon footprint. Installing a CHP unit on site achieved 80% energy efficiency. Providing them with an innovative end-to-end solution, from manufacturing and installing to servicing, they felt de-risked.

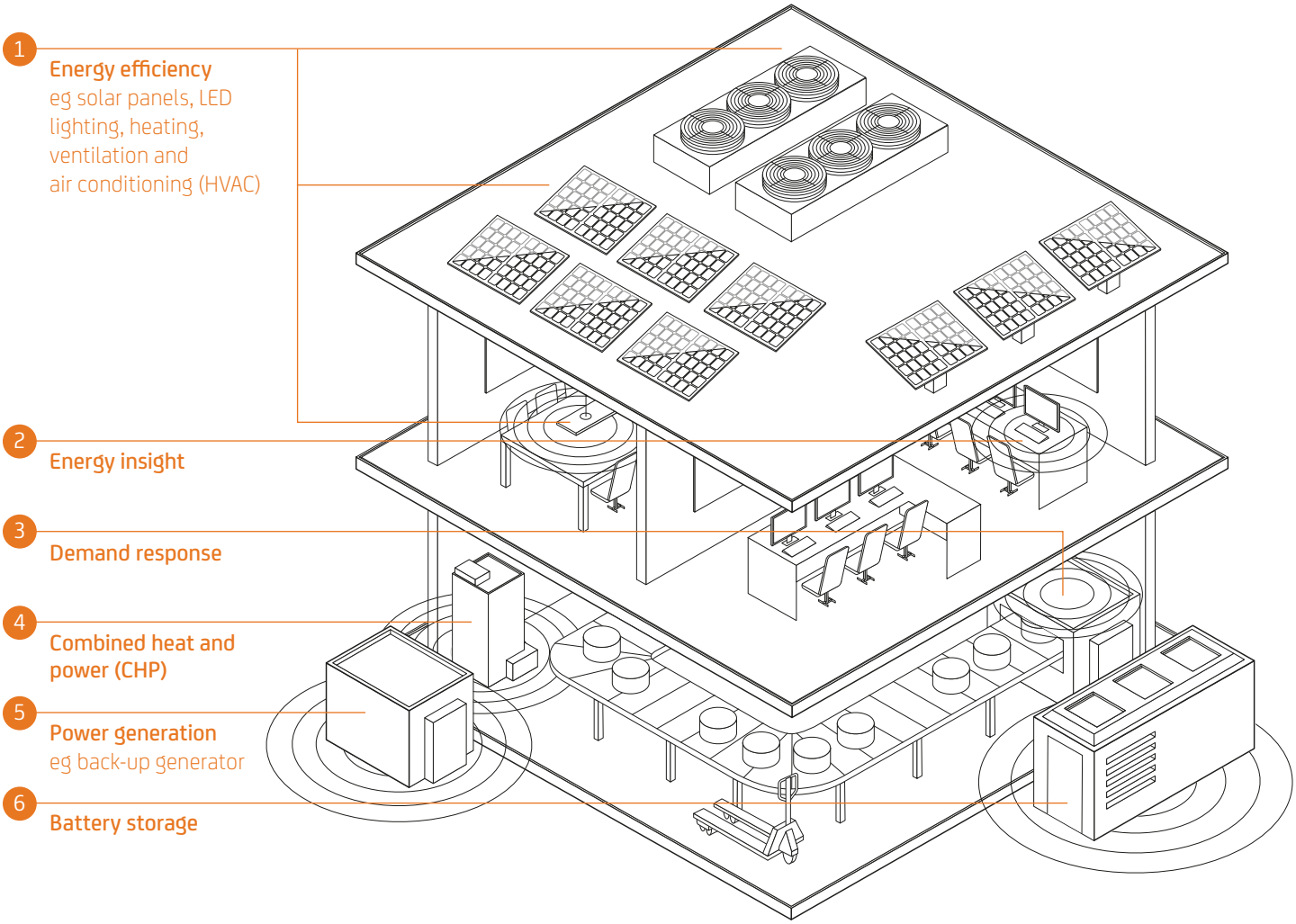
12%

Energy savings per annum

Energy technologies in action

Wherever your business and whatever its energy needs, we'll help you power your ambitions. Using a combination of centralized and distributed energy technologies, we'll put you in control of the right energy solutions, in the right place and at the right price.

Distributed energy solutions are now more affordable, efficient and secure than before



Our products

Centrica Business Solutions provides end-to-end energy services across a range of areas including:

Energy Insight
Monitor energy use across all your equipment and devices and use the granular insight to reduce waste, save cost and improve your operational efficiency.

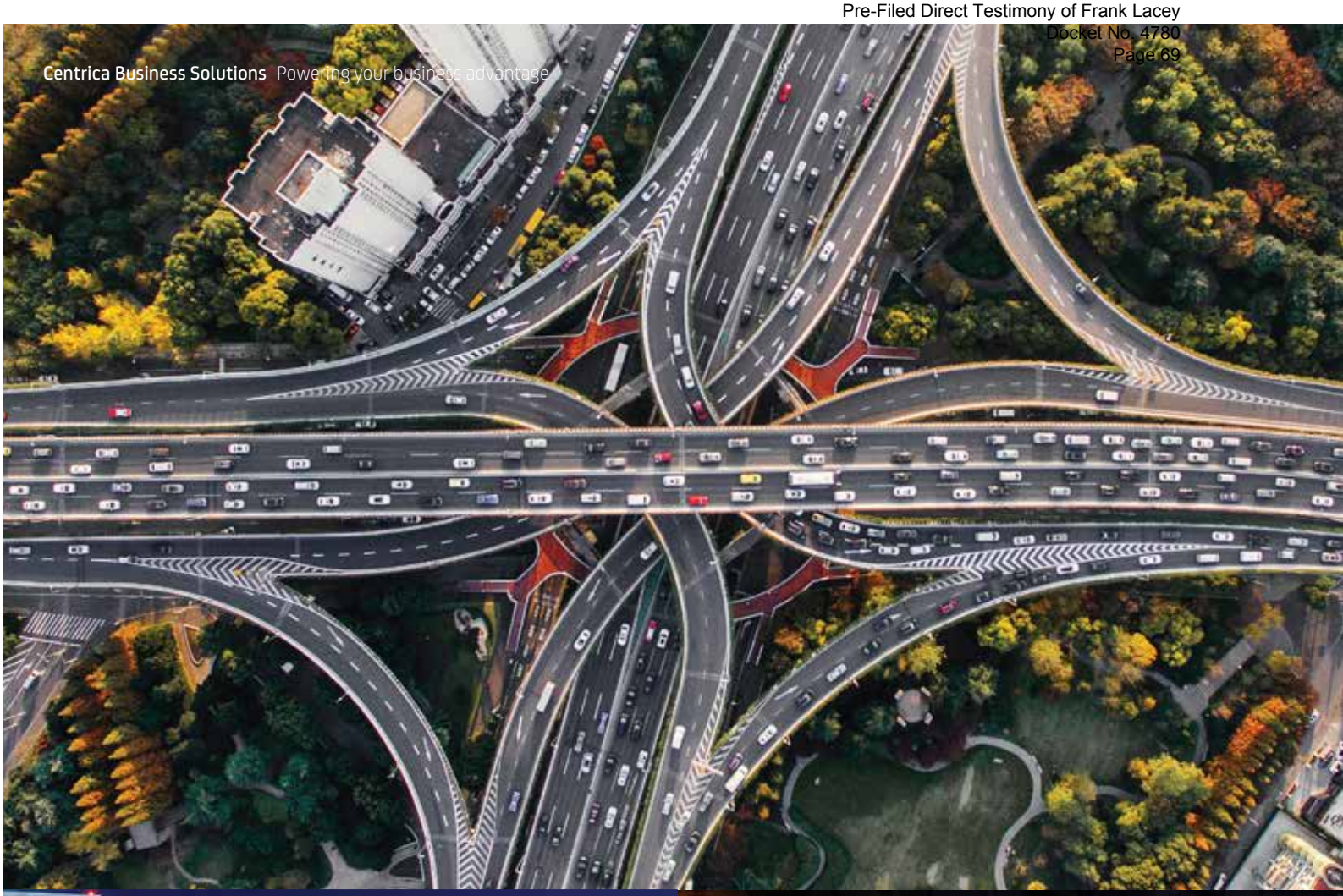
Energy Efficiency
Save energy over the long-term and improve your operational efficiency. We'll audit your estate and use the intelligence to form a comprehensive energy savings strategy.

Demand Response
Generate revenue by reducing your energy use at peak times with intelligent technology that helps you balance supply and demand and manage consumption.

Combined Heat and Power
Save on energy costs, reduce CO2 and make your business more resilient by generating your own electricity and heat on site in a single, efficient process.

Battery Storage
Store electricity in low demand periods and use it during high-cost peaks with battery technology. Or sell it back to the grid to generate revenue.

Power Generation
Improve your resilience with back-up power generation. Generate extra revenue for your business by supplying the grid at peak times.



Power built around you

Centrica Business Solutions can work with you to provide the right combination of innovative energy solutions and expert advice to deliver the energy strategy your business needs.

"Centrica is in the vanguard of shaping the future – with the customer at the heart of what we do and what we offer."

Iain Conn, Group Chief Executive, Centrica

Customized to your business

Your goals may be to manage costs, improve operational efficiency, enhance resilience or reduce CO_2 emissions. We'll understand your business needs, using our expertise, experience and products (ours and others) to design the solution that's right for you.

Easy to work with

From pilots to comprehensive rollouts, our energy specialists make energy management simple – cutting through complexity with straightforward solutions that help you grow your business and drive your business vision forward.

Simpler to manage

We combine new insights, new technologies and new ways of working to join up the dots seamlessly, putting you in control. Our energy management platform gives you clear oversight of performance and allows you to manage everything in one place.

Sustainable growth opportunities

Our global experience and understanding of the regulatory environment means we can help you map your energy landscape, and identify where risks and opportunities lie.

Solid financials

Centrica Group's scale, reach and knowhow means we can offer a range of commercial options to match your budget and cashflow – and secure your energy ambitions. We'll also work with you to justify the upfront investment.

Keeping you ahead

In the changing energy landscape, we are leaders in developing and acquiring new technologies and integrating them into our offer. We'll help you take advantage of innovation in energy to stay ahead.

Deep industry expertise

We have deep expertise in a range of industries and sectors including healthcare, commercial real estate, public sector, retail and leisure, manufacturing and education.

$910m

The amount we are investing in distributed energy by 2020.

The power of partnership

Whatever the challenge of your business needs, wherever you are located, we'll help you make the most of distributed energy to improve your operational performance, increase your resilience and drive your business vision forward.

Working with you

We have a tried and tested three-stage approach to engaging with our customers, to deliver the best solutions for their organization.

Explore First, we'll get to understand your business including your business objectives. We'll map your sites and analyze the performance, efficiency and resilience of your existing energy systems.

Plan Then, we'll identify options to improve your existing energy system and help you achieve your objectives. We'll score the options and develop an action plan based on the whole life-cycle, including build, maintenance, measurement and financial planning.

Act Finally, we'll partner with you to implement the solution, helping you with every aspect of the build, from commissioning and permissions, to financing and communication.

1,500

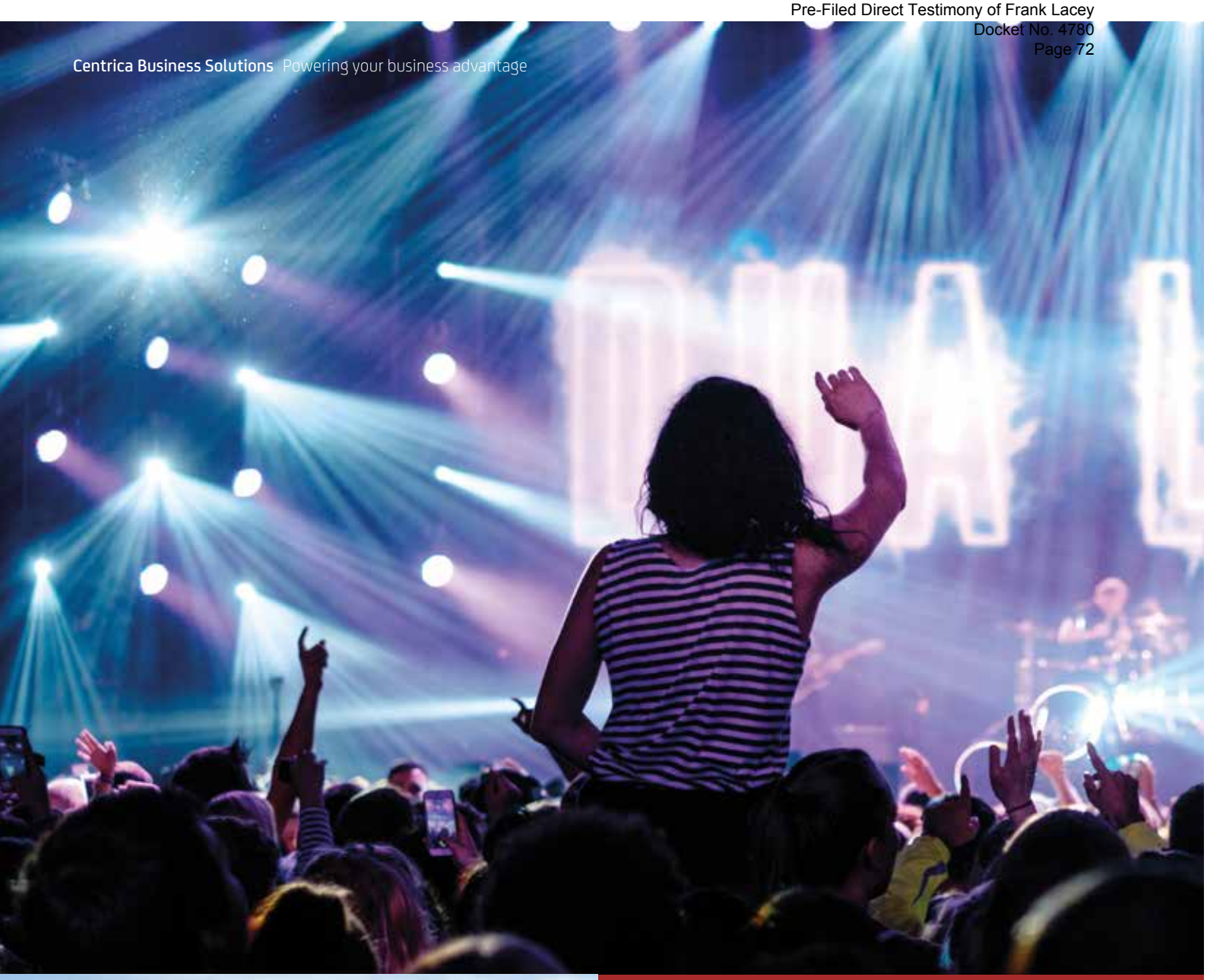
1,500 long-term contracts and active solutions running in 13 markets across Europe, the Middle East and North America. Backed by Centrica's distributed energy investment and solid financials

12,000

12,000 Centrica engineers and technicians globally

"We're changing the way we relate to our business customers and delivering what they really need: improved operating efficiency, increased resilience and the ability to achieve their business vision sustainably."

Jorge Pikunic, Managing Director, Centrica Business Solutions



About us

Centrica Business Solutions is part of Centrica – a global energy and services company dedicated to satisfying the changing needs of its customers. With the acquisition of specialist businesses Panoramic Power, ENER-G Cogen International, NEAS Energy and REstore, we have expertise in cutting-edge energy insight and prediction, combined heat and power systems, and energy asset management and demand-response aggregation. As a result, we're helping more and more customers gain competitive advantage from energy, building intelligent end-to-end energy solutions that power their ambitions. Through Centrica, we also provide energy trading services and supply energy through British Gas in the UK, Bord Gáis in Ireland and Direct Energy in North America.

"The electricity landscape is a prime example of the Fourth Industrial Revolution as it undergoes a transformation, becoming more complex than ever before with rapidly evolving technologies, declining costs, and shifting regulatory landscapes. Three trends in particular are converging to produce game-changing disruptions: electrification, decentralization and digitalization."

World Economic Forum – *The Future of Electricity: New Technologies Transforming the Grid Edge.* 2017.

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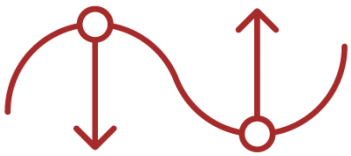
DOWNLOAD OUR GUIDE ((/us/sites/g/files/qehiga201/files/documents/CentricaBusinessSolutions_Brochure.pdf) (439).

Energy Insight

Monitor energy use across all your equipment and devices and use the granular insight to reduce waste, save cost and improve your operational efficiency.

FIND OUT MORE

(/us/our-solutions/products/energy-insight)



Demand Response

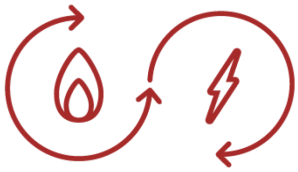
Generate revenue by reducing your energy use at peak times with intelligent technology that helps you balance supply and demand and manage consumption.

FIND OUT MORE

(/us/our-solutions/products/demand-response)

centrica Business Solutions

DOWNLOAD OUR GUIDE ((/us/sites/g/files/qehiga201/files/documents/CentricaBusinessSolutions_Brochure.pdf) (439).



Combined Heat and Power (CHP)

Save on energy costs, reduce CO2 and make your business more resilient by generating your own electricity and heat on site in a single, efficient process.

FIND OUT MORE

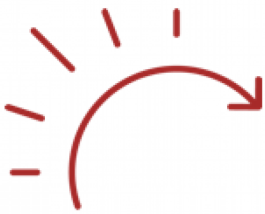
(/us/our-solutions/products/combined-heat-and-power)

Rudox Power Generation

Improve your resilience with back-up power generation on site to support your business and your energy strategy.

FIND OUT MORE

(/us/our-solutions/products/power-generation)



Solar and Battery Storage

Reduce your reliance on the grid and maximize your energy strategy with solar power generation and battery storage.

FIND OUT MORE

(/us/our-solutions/products/solar-and-battery-storage)

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centrica (/us/)
Business Solutions

Energy Efficiency

Save energy over the long-term and improve your operational efficiency. We'll audit your facility and use the intelligence to form a comprehensive energy saving plan.

FIND OUT MORE

(/us/our-solutions/products/energy-efficiency)

Direct Energy Business, our sister company, delivers smarter strategies for your energy supply and optimizes your energy footprint.

LEARN MORE (/us/our-solutions/products/power-and-natural-gas-supply)

Power in your hands

Distributed energy explained

DOWNLOAD OUR GUIDE (/us/sites/g/files/qehiga201/files/documents/CentricaBusinessSolutions_BrochureP.pdf)

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Get Free Texas Electricity Every Weekend

No electric provider in Texas offers more free weekend hours!* Sign up and lock in a fixed electric rate, plus $100 in VISA® prepaid cards!

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You are viewing *our most popular* plans for **Greenway/Upper Kirby**. Update Location

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Live Brighter 12

Get a fixed energy rate that's locked in for an entire year.

11.7¢/kWh

ORDER NOW

More Info EFL

Connect to Control 24

Connect to your home from wherever you are, plus get 24 months of electricity.

11.7¢/kWh

ORDER NOW

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Free Power 100

Free electricity every weekend for 12 months** + $100 in VISA® prepaid cards!***

12.1¢/kWh

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More Info EFL

Free Power Weekends 24

Free electricity every weekend for 24 months**

12.1¢/kWh

ORDER NOW

More Info EFL

Valid for new residential customers only. Rates above reflect average usage of 2,000 kWh/month. Please see the Electricity Facts Label for other pricing information.

Why Direct Energy?

If you're looking to switch electricity companies in TX, check out our Texas electric rates and read on to see why Direct Energy is right for you and your family.

Live Chat

Track Your Usage by Appliance with Direct Your Energy

Your appliances are talking, and we're listening. Direct Energy wants you to better understand your electricity usage so you can make adjustments to lower costs and potentially save! Our Direct Your Energy tool gives you cost breakdowns by appliance so you can see where your money is going, and more.

Enjoy Convenient Account Management and Service

Your Online Account Manager is your online home for your Direct Energy account. Pay your bill, set up auto pay and paperless billing, and more!

Our Direct Energy Facebook community is the largest of its kind. We provide useful energy savings tips, and you can easily reach us Monday through Friday for help with any problems. You can also ask for a hand with your Texas energy plan on Twitter or call our service team at 1-855-461-1926.

Reduce Your Use and Save!

At Direct Energy, we want you to use less of what we sell, and we'll reward you when you do! Sign up for Reduce Your Use Rewards to earn a 10% bill credit for reducing your Texas energy use at our request. Give the Texas electricity grid a break when it needs it the most!

Get Social with Us

We're not just on Facebook and Twitter. Our robust social media community extends to Instagram, Pinterest and more. We provide you with industry news, energy tips, games, and even sweepstakes! Follow us on your favorite platforms, and always stay connected to what's happening in and around Direct Energy.

*No provider offers more free weekend hours electricity claim as of April 12, 2018 when compared to other retail electric providers offers listed on the powertochoose.org website. Subject to change.

**Offer valid for new residential customers in Oncor and Centerpoint service areas only. Provisioned smart meter required. Certain eligibility requirements, fees, taxes, terms and conditions apply. Cancellation fees may apply.

***The $100 in Visa Prepaid Cards will be issued in two installments. The first $50 prepaid card will be sent after 6 months of receiving electricity supply with Direct Energy. The second $50 prepaid card will be sent after 12 months of service. Cancelling your service early will disqualify you from receiving the second prepaid card. The card is issued pursuant to a loyalty, reward or other promotional program. Expiration dates, Terms and Conditions may apply. Card cannot be redeemed for cash, except where required by law. For complete details visit www.MyPrepaidCenter.com/site/visa-promo. Prepaid card is issued by MetaBank®, Member FDIC, pursuant to a license from Visa U.S.A. Inc. Direct Energy is not affiliated with MetaBank or Visa U.S.A. Inc. Visa is not a sponsor, endorser or participant of this promotion.

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Direct Energy.

Get a Reliable Handyman for HVAC, Plumbing, and Electrical Services in Texas

Direct Energy is your Trusted Home Services Provider

Services Available for 77046 Lookup By Zip SEARCH

Electrician Services By Mister Sparky

Contact Your Local Mister Sparky

281-394-0375 Email Mister Sparky

Street Address

21819 Katy Freeway, Suite B-102, Katy, Texas, 77450

HVAC Repair Services By One Hour HVAC

Contact Your Local One Hour HVAC

281-601-1498 Email One Hour HVAC

Street Address

4455 W. Sam Houston Pkwy N., Houston, Texas, 77041

Our plumbers, electricians and heating and cooling technicians are available 24 hours a day for expert repair, maintenance and installation services. Equipment breakdowns can be stressful and expensive, but our home protection plans help you avoid unplanned repair costs and give you peace of mind. We're there for you when you need us.

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Energy Saving Tips

Welcome to the Direct Energy Learning Center

You have questions. Direct Energy is here to help. Our Learning Center provides expert knowledge on a wide range of home-related topics to help you be an informed consumer and take care of everyone under your roof. Each article is designed to guide you through your decision making process so you can make the best choices for you and your family.

Direct Energy can help you create a brighter home. Thanks for inviting us inside.

Reduce Your Use University - Ways to Save Energy

We want you to use less electricity. Yes, we mean it! It's better for our planet and on your wallet. Let Direct Energy show you manageable ways to help reduce your energy usage and costs that are simple enough to incorporate into everyday life.

What Temperature Should I Set My Thermostat in the Summer? | Energy Efficiency Tips for Summer | Make Your Move A Green One | Reduce Your Energy Use Outdoors

Read More

Your Energy Choice

Thanks to deregulation, you have a choice in your energy provider. You can select the company that's right for your home, budget, and values. The power is yours! Find our how deregulation works in your area and what to look for in a provider, plus get a better understanding of your rates, bill, and more.

History of Texas Deregulation | About the Texas Electricity Market | Who are the Players in the Texas Electricity Market? | Energy Glossary

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Home Improvement

Taking care of your home isn't always the most fun activity, but it's pretty important. Let us help you manage all those tasks, repairs, and maintenance work with these great tips for your plumbing, heating, and air conditioning!

7 Spring & Summer Tips For Your HVAC System | Why Is My Toilet Draining Slowly? | How Do I Take Care of My Air Conditioner in the Summer? | Why Should I Use a Dehumidifier?

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Modern Home - Smart Home Technology

Incorporating technology into your home doesn't have to be intimidating or decor adverse. It can make your home smarter, and your life more efficient with the right tools that make sense for your family and lifestyle. Discover the advantages of a connected home and the technologies to get you there. We'll guide you toward a beautiful home on the outside that's smart on the inside.

Leading Smartphone Apps for Your Smart Home | What is the Internet of Things? | Take Control of Your HVAC System with Your Smartphone

Read More

Green Living

Eco-friendly living has all kinds of benefits, and incorporating green practices into your home is easier than you think. Find ways to create sustainable practices everyday to build an environmentally-conscious home and brighter tomorrow.

How can I Keep Cool and Stay Green in Summer? | How Can I Have a Successful Green Move? | How Can I Be an Eco-Friendly Pet Owner?

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Weather Readiness & Storm Preparedness

The best way to avoid the harmful effects of a weather emergency is to be prepared before anything happens. Let Direct Energy help you with these preparations so that you can rest assured that everything will be in place when you need it most.

What's the Difference Between a Flash Flood Watch and Warning? | How Can I Prepare My Home for a Flood? | How Can I Prevent Wind Damage from a Storm to My Home?

Read More

Safety Tips

There is nothing more important than safe practices for your home. Direct Energy will help you protect loved ones by keeping you informed about energy-related emergencies and sharing what you need to know so that your home is always a safe haven.

Prolonged Power Outage Tips | Understanding the Fundamentals of Home Security | Be Mindful of Gas Safety | Defeat Summer Heat |

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Join us on:

HELPING CARNEGIE ROBOTICS FIND NEW WAYS TO INNOVATE WITH **A CUSTOMIZED ENERGY STRATEGY AND PANORAMIC POWER®**

Bringing energy innovation to a startup robotics maker

Carnegie Robotics is a startup company founded in 2010 that develops advanced robotics sensors and platforms for defense, agriculture, mining, infrastructure and energy applications. They operate out of a retrofitted 50,000 sq.ft. building in Pittsburgh's Lawrenceville neighborhood.

In 2014, they chose Direct Energy Business as their electricity supplier over several other retail suppliers. They chose us because "they really helped to educate me on what to look for and what to do and what not do," according to Bill Meanor, Facility Manager at Carnegie Robotics.

A customized purchasing strategy pays off

We were able to help Carnegie Robotics save on their energy costs by developing a customized purchasing strategy for electricity and natural gas. This strategy took into account their projected usage at the time as well as their expected business growth—and resulting expanded usage.

Seeing their operation like never before with Panoramic Power

In the summer of 2016, we brought our breakthrough Panoramic Power® solution to Carnegie Robotics. It allowed them to gain unprecedented insights into their energy usage. By installing tiny, self-powered wireless sensors onto their circuits, Carnegie Robotics could begin seeing exactly how much energy each piece of equipment, lighting and HVAC component was using.

Read the full story online at **directenergybusiness.com/carnegierobotics**

In 24 hours, they identified lighting banks that were in use when they didn't need to be.

"They came in and helped us look at our energy costs and seeing how we run our facility and have found ways to actually save us money, which really surprised me since most people are trying to get you to spend more money with them."

– **Bill Meanor**
Facility Manager
Carrnegie Robotics

Direct Energy Business | Panoramic POWER®


ELECTRIC SUPPLY


NATURAL GAS SUPPLY

STRATEGIC SERVICES


DEMAND REDUCTION

Direct Energy Business | directenergybusiness.com

REAL-TIME INSIGHTS NET ENERGY, COST SAVINGS FOR ANAHEIM DUCKS

PANORAMIC POWER DELIVERS ENERGY EFFICIENCY, EXTENDS LIFE OF EQUIPMENT

The Anaheim Ducks, a National Hockey League franchise based in California, sought a total energy management solution for its home: The Honda Center, an entertainment mecca that annually hosts hundreds of sporting events, concerts and other community attractions. The energy demands placed upon the Honda Center are as varied as the events themselves.

The Ducks, who power their 650,000-square-foot venue with a natural gas supply solution from Direct Energy Business, recently installed Panoramic Power® to gain insights on energy usage and efficiency down to the individual device level. With real-time data from Panoramic Power, the Ducks are delivering a quality customer experience at the Honda Center while lowering energy costs and extending the life of equipment.

Read the full story online at:
directenergybusiness.com/anaheim-ducks

> "Through our partnership with Direct Energy Business we're able to see where power is being consumed throughout the entire facility. This is going to allow us to target where the consumption is taking place and the bottom line is that this is going to make us a much more efficient organization. We appreciate what Direct Energy Business has done for us. In an era of ever increasing expenses Direct Energy Business came in and showed us how to actually decrease our expenses."

– Tim Ryan,
CEO, HONDA Center
COO, Anaheim Ducks

Direct Energy Business | directenergybusiness.com

CMR
Restaurants
Energy Management System

Chili's serves up energy efficiency in Mexico

CMR implemented a Panoramic Power PowerRadar energy management system to capture live energy data every 10 seconds.

Capturing live energy data to drive efficiency

CMR wanted to reduce its energy consumption without negatively affecting restaurant performance – and to arm local restaurant managers with the insight to better manage energy use, while reducing operational costs and environmental impact.

A network of sensors

Following a successful pilot in six outlets (generating an 8% energy saving), CMR worked with Panoramic Power channel partner, Solar 2 Green, to roll out the PowerRadar energy management system to 44 of its 65 Chili's restaurants.

Over 22 days, 1,300 sensors were installed (an average of 30/ restaurant). All the sensor kits were pre-packed separately and tagged for each deployment location. Each sensor collects data every 10 seconds. The data is transmitted via a separate GSM line, avoiding interference with the IT network.

The results

The program led to energy reductions at 32 of the 44 restaurants – impressive given a 7.6% rise in outdoor temperature versus the previous year, and a 3.5% increase in sales.

The net result was a 7.5% drop in energy, or 112,641kWh saved. For context, 112,641 kWh is the same amount of energy it would take to fully power 3.6 Chili's restaurants for an entire month; or, the equivalent of 79.2 Tons of CO_2 emissions.

32
RESTAURANTS
Reduced energy consumption at 32 restaurants

1,300
SENSORS
Installed 1,300 sensors in 22 days

7.5%
ENERGY DECREASE
7.5% energy saving 112,641 kWh

"Now, I see energy waste everywhere I look. This program has given us a level of awareness I never could have imagined. We'll not only improve our profit margins, but become better corporate citizens and better professionals."

Rafael Ruíz Muñoz, Corporate Brand Director, CMR Chili's

Why

The PowerRadar energy management system

- Energy Valuation Organization's (EVO) International Performance Measurement and Verification Protocol (IPMVP), creates a predictable energy consumption
- Data can be viewed through the PowerRadar mobile app allowing managers to make efficient and effective decisions
- Data captured every 10 seconds

MANHATTAN PLAZA
Property

NYC high rise reaps annual savings of $350K

Centrica Business Solutions provides operation and maintenance services to ensure Manhattan Plaza and RELATED Companies' Combined Heat and Power (CHP) units achieve better uptime and greater savings.

CHP not being optimized to expectation

Manhattan Plaza, a RELATED Companies property, installed six CHP units from another vendor. It soon became clear that the units were not providing the better uptime, higher savings and maintenance capabilities that were expected.

Smooth takeover of CHP responsibilities

Centrica Business Solutions was selected to lead the re-design and then take over the operation and maintenance of the CHP plant as part of a five-year agreement, which projected to reduce costs by $350,000 annually.

In phase one, the existing system was evaluated and compared to how Centrica Business Solutions would have theoretically designed a system for that specific location. Working with the RELATED facilities management team, design changes were recommended and subsequently implemented.

In phase two, Centrica Business Solutions took over operation and maintenance of the 840 kWs of electrical power generation and ensured that all other CHP related plant equipment was maintained as needed, to keep the CHP/trigeneration system running smoothly.

The results

By utilizing its expert knowledge of CHP natural gas engine performance, Centrica Business Solutions was able to reduce gas consumption and increase power generation, while simultaneously improving system uptime. This resulted in cost savings for the building.

The units at Manhattan Plaza are now operating at their highest level of productivity in recent history with >90% uptime, and savings are on course to meet expectations and establish all-time high cost savings. Manhattan Plaza has also reduced its carbon footprint by more than 20%.

$350k	20%	80%	90%
SAVINGS	AND RISING	AND RISING	AND RISING
Annual savings from CHP upgrade and maintenance	Overall reduction in carbon footprint	Total system efficiency	Uptime, the highest level of productivity

"Savings achieved due to the operation and maintenance of the plant, help us to stabilize our costs and give our tenants the assurances they need that during varied weather conditions, they will have electricity, heat or cooling available."

Paul Rode, SVP, Engineering & Energy Management
RELATED Management Company

Why

Centrica Business Solutions maintenance services:

- Customized or tailored service solutions
- Emergency services 24/7/365
- Fixed-price servicing, maintenance and service plans for added peace of mind

centrica
Business Solutions

CITY OF PITTSBURGH ADVANCES **TOTAL ENERGY MANAGEMENT** AND SUSTAINABILITY GOALS

BRINGING NEW ENERGY INSIGHTS TO PITTSBURGH

The City of Pittsburgh sought a total energy management solution for its City County Building, a century-old landmark that hosts a cutting-edge data center on its sixth floor. The city already works with Direct Energy Business on a joint electricity and renewable energy solution, and now turns to Panoramic Power, the company's signature device-level energy monitoring solution.

The city installed more than 70 sensors and detectors throughout the sixth floor—the building's major energy consumer—and they're using real-time data insights to improve day-to-day operations and communication.

Armed with Panoramic Power, the City of Pittsburgh has uncovered opportunities to reduce energy consumption and costs, and has made energy efficiency a shared goal across departments. The city's sustainability team now collaborates with public works, electricians and facilities management to share actionable data and develop joint energy management solutions.

ESTIMATED SAVINGS ANNUALLY

HVAC
$3,942

LIGHTING
$1,518

Read the full story online at **directenergybusiness.com/city-of-pittsburgh**

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