MICROPLANET
ENERGY EFFICIENT TECHNOLOGIES

April 17, 2009

Mr. David W. Danner
Secretary & Executive Director
Utilities and Transportation Commission
PO Box 47250
1300 South Evergreen Park Drive SW
Olympia, WA 98504-7250

RE: Comments of MicroPlanet regarding Review of PURPA Standards in the Energy Independence and Security Act of 2007 - Docket U-090222

Dear Mr. Danner:

MicroPlanet Technology Corp. ("MicroPlanet") appreciates the opportunity to submit comments in connection with the review by the Washington Utilities and Transportation Commission ("WUTC" or "Commission") of its PURPA rules for compliance with the new smart grid PURPA provisions enacted through the Independence and Security Act of 2007 (the "Act").

Introduction

MicroPlanet is pleased that the Commission is inquiring into smart grid issues because a cornerstone of our return to prosperity should be a program designed to establish energy independence, with a focus on improving the efficiency of our electrical grid, reducing energy losses and speeding the adoption of renewable energy sources.

A seldom reported fact is that up to 67 percent of our electricity we generate from fossil fuels is wasted from the point where it is generated and enters the grid to the point where it is consumed by the end-user, according to the Department of Energy. That means if we can save a kWh on the consumption side by making the grid more efficient, we avoid the need to generate 3 kWhs. We know from more than 25 worldwide studies completed in the last 3 years, that making the grid "smarter" with digital tools that monitor and manage loads while dynamically balancing voltage levels on distribution feeders can save energy, lower electricity bills and reduce greenhouse gas emissions.

Many companies seek to expand generation from wind, solar and other renewable sources. These are a critical component in our quest for energy independence. However, we should not overlook the low hanging fruit: improving the energy efficiency of our existing grid.

<u>Background on MicroPlanet</u>

MicroPlanet provides a proven smart grid technology for utility, commercial and residential applications that provides real energy savings from the first day it is installed. The technology works by dynamically raising or lowering and balancing the incoming voltage at the point of consumption to maintain an optimal voltage level.

When incoming voltage is high, these systems allows customers to reduce energy consumption and lower their electric bills without changing behavior patterns. Where voltage is low, MicroPlanet's products can raise it, enabling utilities to improve service quality for their customers quickly and cost effectively.

In areas where there is a substantial amount of renewable generation, these same products will dynamically adjust the voltage up or down on a cycle by cycle basis, to keep it at a stable, optimal setting. This is a crucial - but often overlooked - part of the smart grid technology. <u>MicroPlanet technology can help speed the adoption of renewable energy sources by significantly improving grid stability</u>.

Managing voltage efficiently can reduce consumption and enhance power quality. Most utility grids were designed in an era of low energy costs. The primary directive was to make sure that the power was available 24/7. By design, utilities often distribute electricity from their substations at the highest allowable voltage to insure that those at the end of the line get at least 114 volts. However, the optimal voltage for most businesses and residences is 114 volts; if it is higher, energy is wasted for most types of electrical loads. Lowering and stabilizing voltage also allows electrical devices to run cooler and last longer. Unfortunately, the average American business and home receives their electrical power at 120+ volts. Seventy percent of the utility industry's customers receive more electricity voltage than they need and can effectively utilize. In over 600 installations around the world over the last 10 years, we have seen that stabilizing and lowering voltage reduces energy consumption from 5-12%, while improving power quality.

MicroPlanet's technology provides the following specific smart grid benefits:

Energy Conservation. MicroPlanet's products reduce kWh consumption by an average of 5% to 12% in residential and commercial locations by dynamically managing incoming voltage to optimal levels. The normal operating range of electrical service in the US is between 114 volts and 126 volts. Due to the design of the electrical grids, utilities deliver voltage higher than necessary to most customers to ensure that those furthest from the substation receive the minimum standard of 114V. Since most electrical equipment, including air conditioning, appliances and lighting are designed to operate efficiently at 110-114 volts, power delivered higher than 114V is typically dissipated as heat and wasted. This translates into larger than necessary electricity bills, higher operating costs for utilities and increased greenhouse gas emissions resulting from the production of surplus electricity.

Peak Reduction. Peak electrical demand is primarily driven by air conditioning and lighting loads in warmer climates and heating and lighting in colder climates. Independent testing shows that AC systems operate at a higher efficiency as the voltage is decreased to 114V. Most lighting and motor loads behave in a similar manner. Dynamically managing voltage to optimal levels increases efficiency and substantially lowers peak consumption (demand). MicroPlanet systems can be set to lower voltage automatically at peak periods, or centrally controlled to adjust load as necessary.

Grid Stability. With rapid penetration of photovoltaics, wind and other renewable energy sources, the amount of voltage fluctuation on the grid is steadily increasing. Increases in voltage due to reverse power flow are the becoming a limiting factor for penetration of renewable generation. Traditional utility mechanical tap changers are not capable of managing rapidly changing voltage fluctuations. MicroPlanet's distributed regulation technology allows for rapid expansion of renewable generation by maintaining a stable, optimum level of voltage at the point of consumption.

Decrease System Losses. The United States Environmental Protection Agency (EPA) estimates that 60 to 80 billion kWh annually can be attributed to transformer losses. These losses cost end users $3 to $4 billion nationwide. Transformers have two major components that drive losses, the core and the coils. Core losses are related to magnetizing or energizing the core. These no-load losses are present the entire time the transformer is powered on, regardless of the load. Core losses are roughly constant from no load to full load. They represent a continuous cost for the life of the transformer. A common 75kVA commercial transformer has about 400W in no-load losses. MicroPlanet systems can be used in conjunction with feeder line tap changers to lower the delivery voltage and significantly reduce no-load and core losses. MicroPlanet technology can boost the delivery voltage to within the ANSI C84.1 levels and allow the delivery voltage to be at a minimum level for the distribution transformer, thus reducing no-load losses. MicroPlanet's distributed regulation technology is more than 99.3% efficient throughout the load curve.

Flicker Control. MicroPlanet systems have an isolated power controller for continuously regulating voltage utilizing IGBT (Insulated Gate Bipolar Transistors). The output supports bi-directional power flow, with regulation dynamically managed on a cycle by cycle basis. This enables power quality improvements on the low voltage side of the transformer and is a new option for resolving voltage flicker issues caused by large cyclic loads and motors on a weak feeder.

Low Voltage Mitigation. Low voltage is a common industry problem that impacts customers and utilities. EPRI estimates that up to 6.5 percent of U.S. homes consistently receive voltage out of the compliance range. Before the availability of MicroPlanet systems, the options for utilities trying to resolve voltage service issues were expensive and time-consuming. Typical solutions are installing larger transformers, extending the primary feeder, upgrading local power lines and building a new substation. Micro-Planet's products offer a less expensive solution for boosting voltage with the ability to be rapidly deployed at specific locations on a feeder line.

Phase Balancing. The efficient performance of electrical equipment, especially motors and controllers, is substantially affected by phase imbalance. An imbalance of more than 3% may cause overheating of components and intermittent shutdown of controllers. Unbalanced phases will often result in overheating and excess energy usage. In addition, many solid-state motor controllers and inverters include components that are especially sensitive to voltage imbalances. MicroPlanet's Commercial 3-Phase systems dynamically manage all phases to the optimum voltage level, correcting for voltage imbalance, saving energy and extending motor life.

Responses to Commission Inquiries

MicroPlanet generally supports the treatment of energy efficiency as a priority resource and the adoption of rate-setting mechanisms to effect that priority, but will limit its comments here to the portions of the Commission's inquiry that relate to "smart grid" issues – Parts I.C and I.D of the Commission's inquiry.

State Consideration of Federal Smart Grid Requirements

Standard 18, Part A. Through "Part A" of Standard 18, the Act contains the following amendment to PURPA:

(18) CONSIDERATION OF SMART GRID INVESTMENTS.—
(A) IN GENERAL.—Each State shall consider requiring that, prior to undertaking investments in nonadvanced grid technologies, an electric utility of the State demonstrate to the State that the electric utility considered an investment in a qualified smart grid system based on appropriate factors, including—
(i) total costs;
(ii) cost-effectiveness;
(iii) improved reliability;
(iv) security;
(v) system performance; and
(vi) societal benefit.

The Commission's questions regarding Part A, and MicroPlanet's comments on them, are as follows.

1. What constitutes a "qualified smart grid system?"

Response: From the text of the Act, it is difficult to discern the meaning of "qualified" or "system" in this context.[1] It might refer to a system for which the Commission may allow rate recovery. Alternatively, it might be a system that satisfied any applicable standards for interoperability, etc. The text is also problematic because it requires consideration of investment in a qualified "system" prior to investment in "nonadvanced grid technologies" – *i.e.*, a system is posited as an alternative to technologies. This phrasing overlooks the important fact that systems are comprised of component technologies, and some components may function well both in relatively traditional or "nonadvanced" applications and in cutting-edge or "smart" applications.

MicroPlanet believes that its technology is a "smart grid" technology because it enables a utility system to deliver 5-12% more power from existing generating resources without any change in generation dispatch or customer behavior. MicroPlanet technology is also compatible with other types of grid devices, such as smart meters. Nevertheless, MicroPlanet's technology may be considered a smart grid component, not a complete smart grid system.

MicroPlanet urges the Commission to take a flexible approach to this aspect of Part A by adopting rules that allow system components as well as entire smart grid systems to "qualify"

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[1] The Act does not define a "qualified" smart grid "system." It provides a sweeping description of a "smart grid" in the policy statement set forth in Section 1301 (Page 121 STAT. 1784), which suggests that the Commission likewise should take a broad view of what may constitute a "qualified smart grid system":

> It is the policy of the United States to support the modernization of the Nation's electricity transmission and distribution system to maintain a reliable and secure electricity infrastructure that can meet future demand growth and to achieve each of the following, which together characterize a Smart Grid:
>
> (1) Increased use of digital information and controls technology to improve reliability, security, and efficiency of the electric grid.
>
> (2) Dynamic optimization of grid operations and resources, with full cyber-security.
>
> (3) Deployment and integration of distributed resources and generation, including renewable resources.
>
> (4) Development and incorporation of demand response, demand-side resources, and energy-efficiency resources.
>
> (5) Deployment of "smart" technologies (real-time, automated, interactive technologies that optimize the physical operation of appliances and consumer devices) for metering, communications concerning grid operations and status, and distribution automation.
>
> (6) Integration of "smart" appliances and consumer devices.
>
> (7) Deployment and integration of advanced electricity storage and peak-shaving technologies, including plug-in electric and hybrid electric vehicles, and thermal-storage air conditioning.
>
> (8) Provision to consumers of timely information and control options.
>
> (9) Development of standards for communication and interoperability of appliances and equipment connected to the electric grid, including the infrastructure serving the grid.
>
> (10) Identification and lowering of unreasonable or unnecessary barriers to adoption of smart grid technologies, practices, and services.

and to base qualification upon a determination by the Commission on a case-by-case basis. The determination could be issued in connection with the IRP process. This approach will enable the Commission to avoid problems created by the phrasing of the provision while effectuating its intent to ensure that utilities do not perpetuate investment in technologies that are becoming obsolete.

2. Are the technologies that constitute a "qualified smart grid system" commercially available? If so, how might adoption of today's smart grid technology affect adoption of future technology refinements?

Response: Components of smart grid systems, such as MicroPlanet's technology, are commercially available. Each component of a proposed system should be evaluated on its own merits for a determination of its anticipated interoperability with future technology refinements.

3. The IRP rule currently requires the lowest reasonable cost set of resources to be determined after a "detailed and consistent analysis of a wide range of commercially available sources." Does this requirement already encompass "qualified smart grid systems?"

Response: MicroPlanet believes this requirement should be interpreted to encompass smart grid systems and smart grid components that are already commercially available. In order to hasten the implementation of cost-effective smart grid measures, wish to clarify that the analysis required by the IRP rule must (1) include a detailed review of smart grid components and systems; and (2) treat as "commercially available" those smart grid measures that are reasonably expected to become commercially available over the planning period covered by the IRP.

4. What level of screening and analysis of smart grid investment would constitute a demonstration to the Commission?

Response: The level of screening and analysis will depend upon the amount of the proposed investment, and the extent to which it may result in a lost opportunity or stranded investment. If the investment in the "nonadvanced" technology does not represent a substantial expenditure, or if it will not foreclose refinements to the grid, the risk to ratepayers is lower than with a large capital expenditure that would foreclose other promising options. MicroPlanet notes that its technology is effective with a wide range of traditional and smart distribution grid technologies, and therefore investment in MicroPlanet technology would present minimal risk of stranded investment or foregone opportunity.

5. Are the six factors listed an adequate set for reviewing smart grid investments? Should additional factors be included? If so, what additional factors? What, if any, rules should govern measurement and evaluation of these listed or additional factors?

Response: MicroPlanet believes that additional factors should include several that have been identified in the NARUC/FERC guidance to DOE for purposes of awarding funding.[2] In particular, the Commission should add to its list of factors:

- Whether the technology will provide for interoperability in the absence of approved standards (*e.g.*, adherence to existing open standards, secure upgradeability once standards approved);
- Whether the technology will minimize the possibility of stranded investment in smart grid equipment by designing for the ability to be upgraded;
- Whether the utility has fully considered projects on both the transmission and distribution system;
- Whether the utility has considered a range of technologies, not just advanced metering; and
- Whether the utility has considered technologies that provide both system-wide and customer benefits.

Standard 18, Part B. Through "Part B" of Standard 18, the Act contains the following amendment to PURPA:

(B) RATE RECOVERY.—Each State shall consider authorizing each electric utility of the State to recover from ratepayers any capital, operating expenditure, or other costs of the electric utility relating to the deployment of a qualified smart grid system, including a reasonable rate of return on the capital expenditures of the electric utility for the deployment of the qualified smart grid system.

The Commission's notice states that, "Pursuant to statute and case law, the Commission allows for the recovery of all prudently incurred costs and capital investment including an opportunity to earn a reasonable rate of return. Consequently, the Commission has already determined how to implement the policies stated in PURPA Standard 18(B). Nevertheless, commentators are encouraged to offer views about whether additional policies or practices are necessary." [Footnote omitted.]

As discussed in connection with Part A above, MicroPlanet urges the Commission to provide utilities with an advance determination of whether a certain technology is a "qualified" smart grid technology. The Commission should also clearly articulate a policy to allow rate recovery of costs associated with evaluating a wide range of smart grid technologies. Such evaluation costs could include costs associated with pilot projects in appropriate circumstances.

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[2] NARUC/FERC Smart Grid Collaborative, "Proposed Funding Criteria for the ARRA Smart Grid Matching Grant Program and the ARRA Smart Grid Demonstration Projects," April 2009.

Standard 18, Part C. Through "Part C" of Standard 18, the Act contains the following amendment to PURPA:

(C) OBSOLETE EQUIPMENT.—Each State shall consider authorizing any electric utility or other party of the State to deploy a qualified smart grid system to recover in a timely manner the remaining book-value costs of any equipment rendered obsolete by the deployment of the qualified smart grid system, based on the remaining depreciable life of the obsolete equipment.

The Commission's questions regarding Part C, and MicroPlanet's comments on them, are as follows.

1. What constitutes a "qualified smart grid system?"

Response: As discussed in Part A, this should be a case-by-case determination.

2. Is there a distinction between replacing existing equipment with a "system" versus the replacement of some existing equipment with individual components?

Response: In MicroPlanet's view there is no distinction.

3. Are the technologies that constitute a "qualified smart grid system" commercially available? If so, how might adoption of today's smart grid technology affect adoption of future technology refinements?

Response: See discussion of these issues in Part A above – these questions cannot be answered in the abstract and instead should be made on a case-by-case basis.

4. What constitutes "obsolete equipment"?

Response: MicroPlanet does not have a view on this question.

5. Should a cost effectiveness test be applied to the equipment replacement before recovery of book-value costs are allowed?

Response: In general, MicroPlanet believes that cost effectiveness tests should be applied to all utility investments.

6. How would net salvage value be accounted for under this standard?

Response: MicroPlanet does not have a view on this question.

7. How would this standard conform to used and useful standards?

Response: To the extent that the Washington State used and useful standard is inconsistent with recovery of costs of obsolete grid equipment, it may be preempted by Standard 18, Part C of the Act.

Standard 19. Standard 19 requires that utility customers be provided with certain information by their utilities. MicroPlanet agrees that current law and utility practice adequately address the requirements of Standard 19. If, however, retail time-of-use pricing or time-based automatic demand reduction programs are implemented, additional information would have to be provided.

Conclusion

MicroPlanet appreciates the opportunity to provide comments in connection with the Commission's evaluation of how to implement the new provisions of PURPA relating to smart grid implementation. We would be pleased to respond to any questions that may arise about our comments or our technology.

Very truly yours,

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