Cullen
Weston
Pines
& Bach
A Limited Liability Partnership

Attorneys at Law
122 West Washington Avenue
Suite 900
Madison, Wisconsin 53703
(608) 251-0101
(608) 251-2883 Fax
www.cwpb.com

Lee Cullen
Lester A. Pines
Steven A. Bach
Alison TenBruggencate
Carol Grob
Linda L. Harfst
Curt F. Pawlisch
Jordan Loeb
Tamara B. Packard

Elise Clancy Rudolph
Nicholas E. Fairweather
Kira E. Loehr
Theresa R. Gabriel
Jeffrey L. Vercauteren

Of Counsel:
Cheryl Rosen Weston

February 17, 2009

<u>VIA ERF</u>

Mr. John Shenot
Policy Advisor, Commissioners' Office
Public Service Commission of Wisconsin
610 North Whitney Way
P.O. Box 7854
Madison, WI 53707-7854

Re: Investigation on the Commission's Own Motion Regarding Advanced Renewable Tariff Development — Docket No. 05-EI-148

Dear Mr. Shenot:

Included below are Comments of RENEW Wisconsin and Clean Wisconsin in response to the Commission's request for responses in the above-referenced docket. These comments were prepared with the assistance of Cullen Weston Pines & Bach LLP and L&S Technical Associates.

RENEW Wisconsin and Clean Wisconsin appreciate the opportunity to comment in this docket and look forward to working with the Commission and other docket participants further on this important subject.

Sincerely,

Kira E. Loehr
Attorney for RENEW Wisconsin and Clean Wisconsin

BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Investigation on the Commission's Own Motion Regarding Advanced Renewable Tariff Development	Docket No. 05-EI-148

COMMENTS OF RENEW WISCONSIN AND CLEAN WISCONSIN

RENEW Wisconsin and Clean Wisconsin appreciate the opportunity to provide comments regarding Advanced Renewable Tariff Development and recognize the effort Commission staff employed in formulating the questions in this investigation. Hopefully tariff recommendations will result from this docket that encourage greater utilization of Wisconsin's renewable resources, reduce our environmental impact and create long-term, secure distributed energy supplies and employment. To ensure that this initiative moves the distributed renewable energy market forward on a sustained basis, we respectfully suggest that the next step in this process is to model the impacts of such an undertaking on rates and technology deployment, using the expertise that has been developed in Wisconsin since the issue first surfaced in 2005.

I. ADVANCED RENEWABLE TARIFFS WILL PROVIDE SUBSTANTIAL BENEFITS TO THE CITIZENS OF WISCONSIN.

Renewable Energy Buy-Back Rates, Renewable Energy Producer Payments (REPPs), Feed-In Tariffs (FITs) and Advanced Renewable Tariffs (ARTs) are different names for premium rates designed to encourage customer-owned installations of renewable distributed generation. These enhanced buyback rates have been used in Europe to stimulate considerable growth in small-scale production of distributed renewable electricity. These premium rates use a methodology based on the production costs of the applicable renewable energy technologies and sizes. Thus, the price differs for solar, wind, biomass, biogas and other renewable generators.

The citizens of Wisconsin will derive many benefits from investments in small renewable distributed generation, including, but not limited to:

1. Improving the Environment.
    a. Reducing impacts of electricity generation on Wisconsin air and water resources.
2. Reducing Risks to Ratepayers.
    a. Minimizing expose to fuel cost volatility.
    b. Minimizing expose to overcapacity situations.
3. Enhancing Reliability and Energy Security.
    a. Minimizing electric service disruptions due to supply or distribution.
    b. Diversifying the types of generation facilities, fuels, resources, and fuel suppliers.
    c. Reducing peak load.
    d. Adding flexibility for changes in costs, political situations, and economics.
4. Social Benefits.
    a. Expanding customer choice for electric generation.
5. Local Employment.[1]
    a. Increasing local employment in the service and manufacturing sectors.
    b. Providing expertise in developing and utilizing distributed generation equipment.
6. Local Resources.
    a. Using local resources to provide fuel and services.
    b. Utilizing waste heat while generating electricity.
7. Increasing Efficiency.

[1] Metrics based on "Focus on Energy Statewide Evaluation, Economic Development Benefits: Interim Economic Impacts Report," March 31, 2003, by PA Government Services, indicate a value of one full-time job year created per 224,408.8 kilowatt-hours of energy saved or generated. Analysis was developed applying the REMI model of Wisconsin; REMI is a de facto standard for regional economic policy analysis modeling.

a. Reducing transmission and distribution losses, which the U.S. Energy Information Administration estimates averaged almost 7 percent of gross electricity production in 1999; in the hot weather of summer peak periods, losses can exceed 15 percent.

b. Reducing the costs of transmission and distribution in electricity prices, which add approximately 25 to 50 percent to the delivered cost of power.[2]

Small-scale renewable distributed generation requires an enhanced tariff structure to expand and grow beyond its current state of development. This rationale is based on the barriers distributed generators face in a centralized power environment. Past energy policy has had the effect of creating a landscape of economic effects that thwart investment in renewable energy capacity, making progress dependent on future emission, environmental and tax policies. Uncertainty about future policies is likely to cause investors to delay investment in renewable energy until such policies become clear, coherent, and economically rational. The current policy landscape is especially slanted toward larger installations (100 MW or greater) because of their economies of scale. If Wisconsin is to nurture a distributed generation market, the logical place to intervene is through utility buyback rates. All current utility buyback rates for distributed generation, except a few recent experimental rates, provide marginal compensation for distributed generation. This situation is especially acute for variable output renewable generators that supply energy, but not capacity, such as wind and solar electric (in single installations).

The construction and operation of centralized power systems are based on the assumption that the development and financing of these generators will be under the ownership and control of a centralized authority. The changing regulatory environment of the electric industry may represent a step toward a long-term trend of decentralizing electric generation. The emergence of independent distributed generation will significantly affect the overall development of the

[2] Congressional Budget Office, Prospects for Distributed Electricity Generation (September 2003).

power systems in the future. Uncertainties in predicting the rate of adoption of these technologies and doubts about the suitability of applying traditional valuation approaches make assessments and comparisons between central and distributed generation difficult.

A. It is Difficult for Small Distributed Generators to Sell Power to an Electric Provider Through a Competitive Solicitation Process.

The prices accepted from a competitive solicitation process are not useful for determining tariff pricing for small renewable distributed generators. Competitive solicitation is aimed at larger projects that have greater economies of scale and lower energy production costs. Additionally, small projects may not be eligible to participate in a competitive proposal solicitation because electric providers will not review bids from small projects when they need to acquire a large amount of capacity. Therefore, electric providers set minimum size proposal requirements. For example, We Energies' *Renewable Energy Request for Proposal – 2003-2004: Wind Energy,* December 18, 2002, requested proposals for projects between 20 and 200 megawatts of nameplate capacity of wind generation. Small distributed generators are presented with additional barriers in a competitive solicitation process. These include, but are not limited to, the high cost of proposal development, excessive financial security requirements, and the complexity of the contracting process.

B. Utility Planning for Energy and Capacity Resources is Accomplished Separately from Distribution System Planning, and Neither Generally Considers Distributed Generation.

Without truly integrated resource planning in Wisconsin, it is difficult to be consistent with the state's energy policy in promoting efficient use of energy resources. The primary goal seems to favor the acquisition of least-cost resources, but not necessarily the most appropriate ones. Confidentiality of distribution system data precludes small distributed generators from knowing which sites may be of premium value to an electric provider. Therefore, little or no value is given to any deferral of distribution system upgrades.

C. There is No Market-Based Pricing Mechanism for the Value Added by Renewable Energy.

Midwest Independent System Operator (MISO) market-based pricing, *e.g.*, day-ahead locational marginal pricing (LMP), is not a sufficient basis for renewable tariff prices. This pricing system has little to do with the costs of building renewable generation today and much to do with legacy coal plants of the past. Legacy coal plants reflect long-past, fully amortized construction costs and they do not have emission profiles that are acceptable for new power plant construction today. The day-ahead LMP is too variable and does not provide enough value for small renewables development. MISO pricing does not capture the value of distribution system losses that accumulate based on distribution distance. MISO price variability makes it difficult or impossible to finance a small-scale generator project. The electric rates for small renewables should be based on small renewable generation costs and should be set so as to produce an acceptable rate of return to the generator.

Private sector investment and competition in distributed infrastructure development will require expanded pricing mechanisms to allow for resources that are less damaging to the environment but more expensive than conventional generation. Underlying the rationale for using a cost-based approach is the assumption that a purpose of the ART is to promote local development and jobs, along with geographic dispersion of distributed generation. We have a choice whether we want a political decision to be made about valuing distributed generation, or whether we want to shape our energy future through leadership in regulatory measures. As the Commission stated in its last Strategic Energy Assessment:

> The Commission believes that the new Wisconsin Energy Efficiency and Renewable Energy Act (2005 Wisconsin Act 141) . . . presents an excellent opportunity for utilities and state-owned facilities to showcase new renewable energy applications. . . . This could be achieved through innovative rate approaches and other service offerings by the utilities. The Commission encourages the state electric utilities to incorporate such service offerings in their rate case applications.[3]

ART EXPERIENCE TO DATE IN WISCONSIN AND ELSEWHERE.

1. Wisconsin utilities for whom the Commission has previously approved an experimental ART are asked to respond to Questions 1.a. through 1.e.

1-a. *How did the utility decide upon the design and price of each ART?*

1-b. *What effect did each ART have in terms of number of participating customers, enrolled capacity, and actual generation?*

1-c. *To date, how would the total cost to the utility of each ART compare to market rates for electricity and market rates for electricity generated from renewable resources?*

1-d. *What effect, if any, have ARTs had on utility rates, voluntary "green power" prices, and utility returns?*

1-e. *What contribution has each ART made toward utility compliance with renewable portfolio standard obligations?*

2. Research and Experience Outside Wisconsin.

2-a. *Can you identify any research or reference documents that you believe will enhance the Commission's understanding of ART design issues and/or the actual documented effects of ARTs outside Wisconsin? Please provide enough information for Commission staff to locate such documents; it is not necessary to provide copies.*

For purposes of our response, we are applying the terms Advanced Renewable Tariffs, Feed-In Tariffs (FITs), Renewable Feed-In Tariffs, Renewable Buy-Back Rates, and Renewable Energy Producer Payments (REPPs) as having the same meaning. We intend all of these terms to generally refer to a provision by which an electric or gas utility is required to purchase renewable energy from a customer or entity with a qualifying project within the utility's electric

[3] Public Service Commission of Wisconsin, *Strategic Energy Assessment Draft Report: Energy 2012*, Docket 5-ES-103 (PSC REF# 55441) (June 2006).

or gas service area. ARTs require that utilities utilize standard contracts with "offers" that characteristically differ by technology and size. The term "standard offer contract" generally means that the terms and conditions offered by a utility for purchasing energy from qualified renewable energy projects are uniform and do not require individual negotiation.

Both European Union and non-EU countries in Europe currently use some form of FITs, including Albania, Austria, Cyprus, the Czech Republic, Denmark, Estonia, France, Germany, Greece, Ireland, Italy, Lithuania, Luxembourg, Macedonia, the Netherlands, Portugal, Slovakia, Slovenia, Spain, Switzerland, Turkey, and Ukraine.[4] Feed-in tariffs have also been developed in non-European countries, including Algeria, Brazil, Israel, and South Korea.[5]

A European Commission analysis determined that feed-in tariffs are the most successful policy type for support of electricity from renewable resources.[6] Recent analyses from Germany[7] and Spain[8] have concluded that the rapid expansion of renewable electricity has decreased wholesale spot market prices. Model-based analysis of the 2008 EU Policy Package on Climate Change and Renewables can be found at http://ec.europa.eu/environment/climat/pdf/climat_action/analysis.pdf. Appendices to the model-based Analysis of the 2008 EU Policy Package on Climate Change and Renewables are at http://ec.europa.eu/environment/climat/pdf/climat_action/analysis_appendix.pdf. Several other sources provide good overviews of European FITs, featuring more extensive coverage of the German approach, including:

---

4 *Evaluation of Different Feed-In Tariff Design Options*, German Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

5 Martinot, E. (2008). *Renewables 2007 Global Status Report* (Paris: REN21 Secretariat and Washington, DC: Worldwatch Institute).

6 Commission of the European Communities. (2005). *The support of electricity from renewable energy sources*.

7 Bundesministerium für Umwelt Naturschutz und Reaktorsicherheit. (2007a). *Erfahrungsbericht 2007 zum Erneuerbaren-Energien-Gesetz (EEG)*. Berlin, Germany; Sensfuß, F., & Ragwitz, M2007). *Analysis of the price effect of renewable electricity generation on spot market prices*. Karlsruhe, Germany: Fraunhofer Institut System- und Innovationsforschung.

8 Sáenz de Miera, G., Del Río González, P., & Vizcaíno, I. (2008). Analysing the impact of renewable electricity support schemes on power prices: The case of wind electricity in Spain. *Energy Policy, 36*(9), 3345-3359

1. Paul Gipe's website with extensive FIT info and links: http://www.wind-works.org.
2. *Electricity from Renewable Sources: What does it Cost?*, German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU): http://www.bmu.de/files/pdfs/allgemein/application/pdf/brochure_electricity_costs.pdf.
3. Cost information and grid parity calculations for the German FIT, EEG Cost Model for PV over 20 years through the German Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz – EEG). Source: Excel spreadsheet provided upon request, personal communication, Marcus Maedl, marcus@at-es.com.
4. *Hawaii Feed-in Tariff Case Studies*, Douglas Hinrichs, Sentech, for the Hawaii Clean Energy Initiative (September 2008) includes a detailed overview of European FITs: http://www.wind-works.org/FeedLaws/USA/hawaii_feedin_tariff_case_studies.pdf
5. *Feed-in Tariffs and Renewable Energy in the USA*, Wilson Rickerson, et al., (May 2008) reviews the experience of six states (California, Michigan, Hawaii, Minnesota, Illinois, and Rhode Island) which have introduced FIT legislation, and surveys FIT proposals in eight other states (Florida, Maine, Massachusetts, New York, New Jersey, Vermont, Oregon, and Wisconsin): http://www.boell.org/docs/Feed-in%20Tariffs%20and%20Renewable%20Energy%20in%20the%20USA%20-%20a%20Policy%20Update.pdf.
6. *What Can the U.S. Learn from European Feed-In Tariffs?*, Interstate Renewable Energy Council: http://www.masstech.org/renewableenergy/public_policy/DG/resources/2007-05-08-Rickerson-Feed-in-Tariffs-IREC.pdf.

Specific details of ART legislation in several jurisdictions follow:

California

In February 2008, the California Public Utilities Commission initially approved tariffs to support the development of up to 480 megawatts (MW) of renewable generating capacity from small facilities in California. The feed-in tariffs provide a 10-, 15-, or 20-year fixed-price, non-negotiable contract to participating small renewable generators, sized up to 1.5 MW. SB 380 formally extended the feed-in tariff to all customers of electrical corporations and expanded the statewide feed-in tariff capacity cap to 500 MW.[9] *See* Interim Decision Regarding Extension of Tariff/Standard Contract to Other Customers of SDG&E, D.08-09-033, September 18, 2008, http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/91159.pdf.

Gainesville Regional Utilities, Florida

Gainesville's Solar Tariff Ordinance No. 080566 and tariff schedule go into effect March 1, 2009. Ordinance: http://www.gru.com/Pdf/AboutGRU/News/FIT/2009%20FIT%20Ordinance%20CLEAN.pdf; Tariff Schedule: http://www.gru.com/Pdf/AboutGRU/News/FIT/Solar%20Feed%20In%20Tariff%20Schedule%20one%20sheet%20summary%202-2-09.pdf.

Hawaii

On October 20, 2008 the Governor of Hawaii, Linda Lingle, the Department of Business Economic Development and Tourism, the Division of Consumer Advocacy of the Department of Consumer Affairs, and the Hawaiian Electric Company (HECO) signed an agreement to implement a feed-in tariff policy in 2009. The agreement specifically binds HECO to implement a series of feed-in tariffs to "dramatically accelerate the addition of renewable energy from new sources." The parties further agreed that the feed-in tariff "should be designed to cover the

---

[9] Senate Bill 380 (California Statutes of 2008, Chapter 544), codified in Public Utilities Code Section 399.20, *available at* http://www.info.sen.ca.gov/pub/07-08/bill/sen/sb_0351-0400/sb_380_bill_20080826_enrolled.pdf.

renewable energy producer's costs of energy production plus some reasonable profit." The agreement commits Hawaii to complete regulatory review by March, 2009 and to implement the resulting feed-in tariffs by July 2009.[10] For other background information see *Hawaii Feed-in Tariff Case Studies*, Sentech for the Hawaii Clean Energy Initiative (September 2008), *available at* http://www.wind-works.org/FeedLaws/USA/hawaii_feedin_tariff_case_studies.pdf.

Illinois

HB 5855 was introduced in 2008, with tariffs similar to those in Germany and closely matching those proposed in Michigan. *See* http://www.wind-works.org/FeedLaws/USA/Illinois RepresentativeIntroducesBillforARTs.html.

Indiana

HB 1622, the Advanced Renewable Energy Tariffs Act, received first reading January 16, 2009 and was referred to the Committee on Commerce, Energy, Technology and Utilities. *See* http://www.in.gov/legislative/bills/2009/PDF/IN/IN1622.1.pdf.

Michigan

HB 5218 requires that advanced renewable tariffs be based on the cost of generation plus a fair profit. The bill describes how to calculate a fair profit by the use of the Profitability Index Method. *See* http://www.legislature.mi.gov/%28S%28321ira45x3oms3555uplhliu%29%29/ mileg.aspx?page=getObject&objectName=2007-HB-5218 (bill text); http://www.dleg.state.mi. us/mpsc/electric/renewables/gipe.pdf (background information).

Minnesota

Similar to Michigan's HB 5218, HF 3537 bill would create a system of feed-in tariffs with prices for an array of renewable energy technologies. The tariffs proposed in HF 3537 are comparable to those in Germany. HF 3537 also proposes wind tariffs differentiated by wind

[10] http://www.wind-works.org/FeedLaws/USA/HCEI%20%20accord%20signed-2008-oct-20.pdf

resource intensity similar to those in France. These tariffs have a structure to limit excessive profit from windy sites while not disadvantaging output from projects at less windy areas. *See* https://www.revisor.leg.state.mn.us/bin/bldbill.php?bill=H3537.0.html&session=ls85. Further information on Minnesota ART design can be found at: *Minnesota Feed-In Tariff Could Lower Cost*, John Farrell, http://www.newrules.org/de/feed-in-tariffs.pdf.

Rhode Island

H 7616, the Rhode Island Renewable Energy Sources Act, was introduced February 26, 2008. *See* http://www.rilin. state.ri.us/billtext08/housetext08/h7616.htm.

COSTS OF PRODUCING ELECTRICITY FROM RENEWABLE RESOURCES

3. What might it cost the typical customer of a Wisconsin electric utility to construct/install a new renewable energy system using each of the following technologies? What might the typical customer's lifetime operation and maintenance costs be? Please be explicit about sources of data, assumptions, and how costs might vary based on system size, location, or other variables.

3-a. *Solar Photovoltaics (PV)*

- A 5-kW PV system will have a turn-key installed cost of approximately $9,050/kW; O&M is ~$300/kW for an inverter replacement every 10 years.
- A 30-kW PV system will have a turn-key installed cost of approximately $7,950/kW; O&M is ~$300/kW for an inverter replacement every 10 years.[11]

3-b. *Wind*

- A new wind turbine in the 8-kW to 10-kW range will have a turn-key installed cost of approximately $6,755/kW; annual O&M is ~1% of system cost.
- A new wind turbine in the 50-kW to 70-kW range will have a turn-key installed cost of approximately $5,330/kW; annual O&M is ~1% of system cost.[12]

[11] Based on average installed costs of 2008 Focus on Energy projects. There is economy of scale for larger systems.

- A new 600-kW wind turbine will have a turn-key installed cost of approximately $2,840/kW; O&M is ~$0.015/kWh annually.
- A new 1.5-MW wind turbine will have a turn-key installed cost of approximately $3,000/kW; O&M is ~$0.015/kWh annually.[13]

3-c. *Landfill Gas*

- A new 1.6-MW engine-generator at a landfill with existing gas collection system and gas conditioning equipment will have a turn-key installed cost of approximately $1,020/kW (including switchgear/controls); O&M is ~$0.025/kWh annually.[14]

3-d. *Biogas other than Landfill Gas*

- An anaerobic digester CHP farm system with a 362-kW engine-generator will have a turn-key installed cost of approximately $3,443/kW; installed costs include all energy-related equipment (*e.g.*, pumps, anaerobic digester tank(s), digester tank mixer(s), influent and effluent piping systems, digester controls, biogas cleanup equipment, gas flare, engine-generator, engine heat exchanger system (including radiator), engine-generator controls, switchgear, and power transformer); O&M is ~$0.02/kWh annually.
- Anaerobic digester systems at industrial or municipal wastewater treatment plants can cost more per kilowatt to install but are difficult to characterize due to the specific implementation requirements of feedstocks and facilities.[15]

3-e. *Biomass*

- Smaller biomass CHP systems typically involve at least an automated feedstock subsystem, biomass boiler, backpressure steam turbine, water conditioning subsystem,

[12] Based on average installed costs of 2008 Focus on Energy projects.
[13] Based on average system installed costs from NREL and personal communication with wind project developers.
[14] Based on average system installed costs of Focus on Energy projects.
[15] Based on average system installed costs of Focus on Energy projects.

ash removal subsystem, heat exchanger-radiator system, and switchgear. There is little experience in Wisconsin with small systems, thus uncertainty in cost estimates.

- Turn-key costs for a 3.1-MW biomass boiler-backpressure turbine unit have been recently estimated to be as high as $6,800/kW; O&M is ~$0.025/kWh annually.[16]

3-f. *Hydroelectric*

- A 650-kW hydroelectric generator, at an existing dam site, will have a turn-key installed cost of approximately $884/kW; O&M is ~$0.01/kWh annually.[17]

3-g. *Any other renewable electricity technologies for which data are available*

4. How much energy (in kilowatt-hours (kWh)) will be produced over the useful life of a typical customer-owned renewable energy system in Wisconsin using each of the following technologies? Please be explicit about sources of data, assumptions, and how production might vary based on system size, location, or other variables.

4-a. *Solar*

- A 5-kW solar electric system in Wisconsin will generate about 6,370 kWh/year (1,274 kWh/kW). A 30-kW solar electric system in Wisconsin will generate about 34,164 kWh/year.[18] Solar electric modules can be installed in a south-facing, unshaded, area on a building or on a ground-mounted rack.

4-b. *Wind*

- Wind resources are very site-specific and the performance of a given wind turbine varies with tower height (the higher the tower, the more energy will be produced). It is difficult to characterize a wind turbine's performance unless the wind resource at the site has been

[16] Combined Heat and Power (CHP) Level 1 Feasibility Analysis, Prepared for Company A, Anytown, USA, EPA CHP Partnership.
[17] Based on average system installed costs of Focus on Energy projects.
[18] Based on average installed costs of Focus on Energy 2008 projects.

properly assessed and the tower height is known. The performance of wind turbines can be broken into three performance bands:

- Small wind turbines (less than or equal to 20 kW), funded by Focus on Energy in 2008, have each generated between 1,020 kWh/kW and 2,620 kWh/kW. These systems are typically installed on 120-foot towers.
- Mid-sized wind turbines (20 kW to 100 kW), funded by Focus on Energy in 2008, have each generated between 1,206 kWh/kW to 2,275 kWh/kW. These systems are typically installed on a 120-foot or 140-foot tower.[19]
- Large wind turbines (greater than 100 kW): A 600-kW wind turbine, operating at a 24% capacity factor in Wisconsin, can generate approximately 1,260,000 kWh/year; a 1.5-MW wind turbine, operating at a 24% capacity factor in Wisconsin, can generate approximately 3,150,000 kWh/year.

4-c. *Landfill Gas*

- A 1.6-MW engine-generator at a landfill site producing adequate gas can generate approximately 12,600,000 kWh/year.[20]

4-d. *Biogas other than Landfill Gas*

- A 362-kW engine-generator at a dairy farm with enough cows can generate approximately 2,360,000 kWh/year.[21] The addition of substrates (*e.g.*, food processing wastes) can substantially increase biogas production, requiring a larger engine-generator to produce substantially more electricity. It is difficult to quantify additional generation due to the project-specific variability of added substrate composition and volume.

[19] Based on average installed costs of Focus on Energy 2008 projects.
[20] Based on average installed costs of Focus on Energy projects.
[21] Based on average installed costs of Focus on Energy projects.

__4-e.__ Biomass

- Electricity generation from a 3.1-MW biomass boiler-backpressure turbine unit is estimated at 24,500,000 kWh/year. Exact data is not readily available for smaller units.

__4-f.__ Hydroelectric

- A 650-kW hydroelectric turbine with sufficient head and flow rate and operating substantially in run-of-river mode (with some impoundment of water) can generate approx. 3,236,800 kWh/year.[22]

__4-g.__ Any other renewable electricity technologies for which data are available

ART POLICY ISSUES

5. What should the goals and objectives of an ART policy be?

__5-a.__ What would you consider to be the primary purpose of an ART policy? Is the primary purpose to accelerate renewable energy installations, lower the cost of renewable energy, help utilities meet renewable portfolio standard (RPS) obligations, increase the diversity of installed renewables, reduce greenhouse gas emissions, or something else?

The primary purpose (goal) of an ART policy is to stimulate the rapid and sustainable development of renewable energy from a diverse mix of energy resources. ARTs create a dependable revenue support mechanism enabling developers and investors to deploy new projects and create a vibrant Wisconsin renewable energy marketplace. ARTs provide a means for residents to contribute to Wisconsin's renewable energy goals. ART policy encourages the number of distributed renewable projects at or close to energy loads, thereby reducing transmission and distribution energy losses, to the benefit of other customers and utilities.

ARTs provide a means for achieving the following policy recommendations of the Governor's Task Force on Global Warming.[23]

---

[22] Based on average installed costs of Focus on Energy projects.
[23] Governor's Task Force on Global Warming, Final Report to Governor Jim Doyle, July 2008.

Advanced Renewable Tariff Development

This policy recommends that the PSC establish tariffs to stimulate the deployment of renewable generation projects smaller than 15 MW. Utilities would be required to enter into long term, fixed price contracts to purchase all of the electricity produced by customer-owned renewable generation systems at favorable rates. The policy recommends that these advanced renewable tariffs should be based upon the specific production costs of each particular generation technology, include a return comparable to the utilities' allowed returns, and be fixed over a period of time that allows for full recovery of capital costs. If PSC does not currently have authority to establish these tariffs through rate-making, the policy recommends legislation to grant such authority.

Enhanced Renewable Portfolio Standard (RPS)

This proposal would increase the state's RPS in current law to 10% by 2013, 20% by 2020 and 25% by 2025. Of the required 20% by 2020 and 25% by 2025, minimums of 6% by 2020 and 10% by 2025 would have to come from Wisconsin-based renewable resources.

ARTs also provide a means for achieving Governor Doyle's renewable energy initiatives:

Clean Energy Wisconsin – A Plan for Energy Independence[24]

25 by 25 – Generate 25 percent of our electricity and 25 percent of our transportation fuel from renewable fuels by 2025. This goal will be accomplished through increasing production of renewable fuels and power, and improving the deployment of energy-efficient technologies.

However, we are not on track to meet the latter objectives. While there has been apparent progress, there still remain significant barriers to the widespread use of distributed generation. Economic returns on these energy investments are expanding beyond the technology pioneer phase to the early adopter phase. With this wider use comes the attendant need to show economic returns beyond implementing demonstrations. Customers need greater economic returns to continue making renewable energy investments.

If Wisconsin is to nurture a distributed generation market, the place to intervene is through utility buyback rates. All current utility parallel generation rates, except a few recently implemented and a few proposed experimental rates, provide marginal compensation for

[24] Clean Energy Wisconsin – A Plan for Energy Independence, Spring 2008, http://cleanenergy.wi.gov.

distributed generation. This situation is especially acute for variable output renewable generators that mostly supply energy, like wind and solar electric. ARTs will be a support mechanism of public policy that moves renewable energy generation projects that may not be currently cost-effective, into a future state where renewable energy technologies are mature enough to be cost-effective. Thus, the objective of ARTs should be to accelerate renewable energy installations.

Because ARTs with standard offer contracts are less complex and less risky for generators than competitive RPS solicitations, they can increase the ability of smaller projects or developers to participate in helping the state meet its RPS and greenhouse gas emission reduction goals. ART standard offer contracts generally decrease transaction costs for both buyers and sellers and are more transparent to administer than individual negotiated contracts. Another benefit is that policy makers have the option of constructing ARTs in a targeted fashion to encourage specific types of projects and technologies.

When comparing an emerging technology to conventional options, it is well understood that cost reductions of a commercial technology are achieved through experience as installed capacity or production volume grows. The relationship between cost and experience is represented by an experience curve (learning curve). In order to bring any renewable resource into the marketplace, stimulation has been required in the early stages of development.

There are many mechanisms to stimulate the adoption of technologies. Many of the current methods have enough deficiencies, even when used in combination, so that they are incapable of moving renewable technologies to a level of maturity where they would be independently cost effective. The drawbacks of current stimulants employed include:

1. Limits to program size or eligibility (*e.g.*, Focus on Energy incentives, utility special tariffs, RPS, USDA Rural Energy for America Program);

2. A lack of predictability and continuity (*e.g.*, lapsing production tax credits, revisions to investment tax credits and grants);
3. A bias toward large, profitable corporations (*e.g.*, production tax credit);
4. Excessive competition (*e.g.*, federal Clean Renewable Energy Bonds);
5. Time constraints caused by once-a-year offerings (*e.g.*, USDA Rural Energy for America Program); and
6. Cumbersome and unrealistic rules (*e.g.*, ownership not transferable for the life of the project without penalty and requirement of loan guarantee even if lender does not require it, as in proposed rules for USDA Rural Energy for America Program).

A principal operational characteristic of ARTs is that prices are set by a political process, while market forces determine the installed capacity. Those competitive market forces bring down the cost of production in relation to installed capacity. In an RPS, political processes determine the installed capacity, while prices are set by market processes. The RPS encourages renewable resources already close to market maturity and competitiveness. To fully capture the complementary role of ARTs in renewable energy development, ART projects should be allowed to contribute to the utilities' RPS obligations. There are certainly distinct distributed social and economic benefits from local ownership of renewable energy generation, such as reduced greenhouse gas emissions, renewable energy jobs, stabilization of energy costs for businesses and farms, and offset of utilities' distribution losses.

5-b. *Considering the primary purpose of the ART policy, what short- and long-term goals might be appropriate? In other words, how should the success of an ART policy be measured?*

The ART short-term goal should be measured by the extent to which it drives new renewable energy generation. If the tariff is set too low to provide adequate returns to eligible projects, it may have little effect on stimulating development of new renewable energy generation. If it is set too high, larger projects may quickly absorb the available capacity to a great extent, minimizing the delivery of benefits from a wider range of project development. The long-term goal should be to narrow the price gap between renewable generation costs, in the aggregate, compared with fossil generation. A successful ART should shift competitive pressure from generators to manufacturers and suppliers of renewable energy generation equipment.

The metrics for the success of an ART policy in the short- and long-term goals should include tracking project costs, numbers of installations across categories of technologies, technology sizes, and geographic diversity. These metrics can be simply accomplished as an additional component filed with annual utility reports.

5-c. *Should the Commission establish ARTs for all electric utilities regulated by the Commission, all investor-owned utilities or all Class A utilities? Why or why not?*

The Commission should order all utilities regulated by the Commission to offer ARTs with an appropriate program level that does not disadvantage small utilities. Germany initially limited its FIT cost distribution within each utility service territory but eventually adopted a broader socialization system. Michigan's proposed ART legislation has provisions that equalize the costs across the state's utilities. The Commission should further investigate this option.

5-d. *What role, if any, should small, customer-owned renewables play in helping utilities meet RPS obligations? Should utilities seek to meet RPS obligations at the lowest possible price, or should other factors be considered? What ART structure would best complement an RPS?*

Since RPS solicitations have done little for generation less than 15 MW, this approach fills a perceived gap. As such, it would augment the RPS and therefore help contribute to meeting the quantity goals, accelerating the pace of development toward 25 percent by 2025, without delay. As it involves smaller generators, the ultimate rate impact concerns over the longer time frame are mitigated. An ART can be structured so that distributed generation can contribute to helping utilities meet RPS obligations.

5-e. ***What role, if any, should small, customer-owned renewables play in helping utilities reduce greenhouse gases? Should utilities seek to reduce greenhouse gases at the lowest possible price, or should other factors be considered? What ART structure would best incentivize the reduction of greenhouse gases?***

Small, customer-owned renewable generation should contribute in part to reducing greenhouse gas emissions. Utilities will be assisted in meeting their greenhouse gas reductions if the environmental attributes associated with a renewable generator are given to a utility in exchange for an ART. The Clean Energy Wisconsin Plan for Energy Independence[25] states:

> Renewable power has a substantially cleaner impact on the environment than conventional fossil fuels. Renewable energy requires no mining, drilling, or transportation of fuel, and does not generate radioactive or other hazardous or polluting waste. For example:
>
> • It takes 500 times more water to produce one kilowatt-hour of electricity from coal than from wind power.
>
> • Zero greenhouse gases are emitted from wind or hydro generated power while power generated from fossil fuel generates an average of 1.5 lbs of greenhouse gases per KWh.
>
> • Sulfur dioxide emissions from wind or hydro generated power are zero while fossil fuel power generates 0.008 lbs per KWh on average.

6. What are desirable and appropriate design structures?

6-a. ***Should the ART directly target new capacity and new generation?***

The ART should only reward new capacity and new generation, including added capacity and generation to existing projects, with a structure that rewards immediate project development, rather than a structure that encourages customers to "wait and see" if they get a better tariff in the future. There will ultimately need to be rules that govern the circumstances of phased projects, additions, rehabilitation, and upgrading of projects. Phased projects should be able to connect in phases, subject to limitations of system connection capacity and provided that all phases are completed and in-service within three years of the contract signing date or a period determined

[25] Clean Energy Wisconsin – A Plan for Energy Independence, Spring 2008, http://cleanenergy.wi.gov.

by the Commission. Once the first phase of the project is in service, the project should be eligible to generate revenue. Any additions of capacity otherwise meeting all the rules and provisions of an ART, where original contract signing provisions have elapsed, should be metered separately and receive the ART in effect at that time.

6-b. *How can ART payment levels be structured such that producers are not under compensated or overcompensated over the duration of the contract?*

A standard procedure could be used where a "Profitability Index" is used to set payment levels for individual technologies across different scale groupings to ensure rapid deployment of renewable sources of generation, and at the same time to prevent excessive profits and unnecessary costs to ratepayers. If used, profitability indexes of the various technologies would initially need to be reviewed at a frequency of at least every three years to ensure any major changes in costs could be used to make adjustments. *See* Question 15: Basis for Setting Tariff Price (*i.e.*, rate digression).

6-c. *Is long-term forecasting of renewable technology economics reliable enough to offer price guarantees? How should long-term forecasting affect ART structures?*

Forecasting is an unnecessary and inappropriate means to determine the economics of "price guarantees" (tariffs). Since a tariff could be locked in for 10 to 15 years, the economics of the project (costs) will be known upfront. Tariff levels should be sufficient to facilitate the project when contracts for committing to building a project are made at the beginning of a project. Forecasting is not a very transparent way to assess appropriate tariff levels since the models are typically either proprietary or expensive. "Long-term" forecasting increases uncertainty in the usefulness of the results.

6-d. *How should the availability of financial incentives for renewable technologies through the Focus on Energy program and voluntary utility programs affect decisions regarding ART payment amounts?*

The Focus on Energy program and voluntary utility programs are not applicable or available to all electric utility customers in Wisconsin. It may be simpler for the Focus on Energy program and the voluntary utility programs to make decisions regarding their funding policies for projects, given a known ART level. Since those programs would also likely be under the direction of the Commission, such policies would not be difficult to implement. While the Focus on Energy program has funding formulae for systems greater than 20 kW, it is not obligated to fund at that level. Most programs, including Focus and voluntary utility programs are budget-limited. They do not fund all renewable technologies or projects throughout all levels of the distributed generation spectrum. As an example, Focus on Energy does not fund wind turbines larger than a rated capacity of 100 kW or solar projects larger than 50 kW. Focus on Energy also cannot fund biomass or biogas projects at locations served by a large percentage of municipal utilities. Focus may be implementing other objectives as part of a funding process that is technology specific. Solar projects are funded by Focus if performed by a NABCEP-certified installer, while similar solar projects not funded by Focus would be required by state law to use a licensed electrician.

Funding sources in Wisconsin have historically constructed collaborative approaches to cap overall customer incentives at levels from 25% to 50%, depending on the customer classification, such as non-profit. We Energies' voluntary solar program collaborated with Focus on Energy and is such an example. USDA Rural Development and Focus on Energy have also cooperated on general funding policy. The Wisconsin Energy Independence Fund grants and loans were designed to not overlap with the Focus on Energy funding and are another example.

Some customers, with limited available equity for financing projects, may need to secure a grant in order to obtain financing from their lender. They may also need an ART in order to successfully meet finance obligations. This is typical in cases where a renewable system is planned to coincide with a business expansion, which is a frequent business approach in practice.

7. Other Policy Questions

7-a. *Are there any legal issues which constrain the Commission's ability to develop and implement an ART policy?*

While certain utilities may voluntarily introduce ARTs at the time of rate case filings, the Commission can develop an ART policy and order all utilities under its authority to fulfill their obligation to offer ARTs. The Commission can also order that ARTs are uniform in terms and conditions. Utilities not regulated by the Commission may decide to voluntarily participate, given their interest in the benefits of developing renewable resources. However, they would not be required to participate. Therefore, it is uncertain what mechanisms the Commission would employ to implement a uniform statewide ART policy.

7-b. *What effects might ARTs have on jobs, fossil fuel imports, and agriculture?*

Employment

Based on Germany's experience, Sigmar Gabriel, the Federal Minister for the Environment, Nature Conservation and Nuclear Safety, indicates that the German FIT increased competition in the electricity market, reduced dependency and the economic risks of rising energy prices, and stimulated innovation, investment, and employment. He indicates that employment from renewable energy rose 50% over a 3-year period, now providing work for nearly 250,000 people.[26]

[26] *Electricity from Renewable Sources: What does it Cost?*, German BMU, http://www.bmu.de/files/pdfs/allgemein/application/pdf/brochure_electricity_ costs.pdf.

In Wisconsin we are already seeing the effects of a potential increase in employment based on the demand for training and education. Wisconsin Technical Colleges are offering myriad courses, such as the wind technician course at Lakeshore Technical College. There has also been a substantial increase in installer courses and testing for NABCEP certification offered by the Midwest Renewable Energy Association (MREA). Participation numbers for individual workshop courses offered by the MREA went from 434 in 2004 to 1,983 in 2008, an increase of roughly four and a half times in four years. Over half are first time participants; never having taken MREA workshop courses previously and 35% were from outside Wisconsin.[27]

Through ongoing efforts in infrastructure building by Focus on Energy, Department of Agriculture, Trade and Consumer Protection (DATCP), Wisconsin Department of Commerce (DOC), and other initiatives, Wisconsin is positioned to quickly make an ART more effective:

- Uniform interconnection rules, procedures and applications;
- Education and training programs in place;
- Measurement and Verification programs in place for various technologies;
- Support programs from DATCP, DOC, and the Office of Energy Independence (OEI);
- Historically high funding (3rd nationally) from USDA renewable grant/loan program;
- Collaboration between Focus, renewable businesses and utilities in efforts such as Wisconsin Distributed Resources Collaborative (WIDRC).

Fossil Fuel Imports

Between 45% and 70% of the energy used to generate electricity is currently lost in conventional power plants in the form of unused "waste heat." Renewable cogeneration projects increase the utilization of fuel up to 90%, with the avoided use of natural gas or propane offsetting fossil fuel imports and CO_2. Most biogas systems are operated in cogeneration mode

[27] Information provided by Zara Scharf, MREA Site Assessment Coordinator, zara@the-mrea.org.

and would specifically provide material benefits in Wisconsin food processing industries, wood, or fiber processing and dairy operations.

Community Ownership

ARTs support local ownership of renewable energy generation, allowing homeowners, farmers, and small investment groups to easily connect their projects to the grid and receive a reasonable return on their investment. In Denmark, almost 90% of the wind turbines are owned by landowners and co-ops. Local ownership can smooth the effort of project development by reducing opposition, thereby increasing the utilization of renewable energy systems. Other companion initiatives can increase the value of renewable energy systems by enabling low-income households to participate. As an example, along with the Province's feed-in tariffs, Ontario's Community Power Fund provides financing for community-owned projects.[28]

Sustainability

While there is concern regarding demands for use of biofuels contributing to mining of soils and driving up agricultural land prices, Wisconsin has an existing, underutilized supply of organic waste from agriculture, including forestry, that can supply not only energy production, but accessory products, such as chemicals, fertilizer, and building products. There is a possible synergistic use of waste products for energy and, in-turn, energy-derived waste heat and products for overall greater benefit and efficiencies. The Cashton Greens Business Park in Cashton, Wisconsin is an example of a development designed to capture such synergies.

[28] http://www.cpfund.ca.

7-c. *Should utilities allow customers to voluntarily choose to purchase electricity generated from a specific technology (e.g., solar PV)?*

No, such preferences would be extremely complicated to engineer from an administrative perspective. If customers have such preferences they are able to either own their own system or purchase their energy through a utility green power program, with known renewable sourcing.

ART DESIGN ISSUES

8. Overall Tariff Structure

8-a. *Should ARTs offer a fixed price (e.g., $0.10/kWh), a fixed premium (e.g., $0.04/kWh above the Locational Marginal Price), a hybrid of the two structures, or some other structure?*

An ART should be a fixed price. Setting feed-in tariffs at a premium on top of market prices diminishes the ability of fixed-price contracts to serve as a hedge against rising electricity prices. This problem also occurs when feed-in tariff payments are pegged to any other indicators, such as the Consumer Price Index, which increase or vary widely over time.

All of the utility-owned generation stations currently participating in the MISO market were approved by a regulatory agency, enabling their owners to recover their capital costs through rates. All of MISO's independently owned generating units were built on the strength of a long-term power purchase agreement with a utility off-taker. Would all of the generating stations in MISO have been constructed if the financial markets suspected that the prospects for recouping their original investment were less than 100%? The answer, clearly, is no.[29]

Simply, under an "energy-only" market, the prices in the market must exceed short-run marginal costs enough to allow a generation unit owner the opportunity to recover their capital investment. Short-run marginal costs only include energy and congestion costs; they do not

[29] The Case for Advanced Renewable Tariffs in Wisconsin, A Discussion Paper prepared for the Wisconsin Distributed Resources Collaborative, January 12, 2006 DRAFT, M. Vickerman, J. Anthony.

assume capital costs since it is assumed the system is fixed. For a potential renewable generator to proceed, wholesale prices must be expected over time to provide profits greater or equal to the capital costs associated with a new investment. Prices in real world markets, especially during congested periods when reliability is stressed, have not been high enough or occur long enough for this result to occur. For mature renewable projects that have been in operation long enough to recover capital costs, a hybrid tariff structure might be attractive. For small new generators, its uncertainties would dampen, if not deter, investments.

The negatives associated with a hybrid approach include:

- Uncertainty that renewable generators will receive a return of capital costs;
- Difficulty in forecasting project cash flow;
- Difficulty for lenders estimating project returns, thus difficulty of finance;
- Probability that billing software used by utilities will need major modifications at great cost to accommodate tracking not only possible variable fixed rates, but rider premiums that change on a daily basis; and
- Costs of implementing a hybrid system might outweigh any prospective cost-savings to ratepayers.

<u>An ART should be determined on the basis of the costs of generation, plus a reasonable profit.</u>

For all renewable technologies, except solar electric and small wind, the break-even analysis method is suggested for determining ART prices (tariffs). The break-even point occurs when the ART price ($/kWh) paid for energy generated (kWh), over the period of analysis, makes costs equal to income. A separate method for setting solar electric and small wind ART prices will have to be determined.

Definitions:

Variable Costs (V), \$ [*e.g.*, O&M]

Fixed Costs (F), \$ [*e.g.*, installed cost, loan payments, equity payments, insurance, management fee, profit]

Tariff Rate (R), \$/kWh

Energy Units (E), kWh

V, F, and E are summed for the period of the analysis, typically the loan period (ΣV, ΣF and ΣE).

$R = (F/E) + (V/E)$

8-b. ***How might an ART be designed to incorporate components of both a fixed price structure and a fixed premium structure?***

The ART structure should be as simple as possible; therefore it should not be designed to incorporate components of both a fixed price structure and a fixed premium structure.

8-c. ***Should customers be able to choose between a fixed rate and a fixed premium when signing an ART contract?***

The ART structure should not be designed to incorporate components of both a fixed price structure and a fixed premium structure; therefore, customers should only be able to negotiate a more complex rate structure outside of an ART offering, such as a PPA.

9. Program Size Limitations

9-a. ***Should the Commission limit the total program size of all ART offerings for the state as a whole, for individual utilities, and/or for specific technologies? If so, why?***

The Commission should initially limit the program size of ART offerings for each individual utility. We are suggesting that the program costs for each utility be recovered from the ratepayers of all sectors.

9-b. *If the Commission limits total program size, what should the basis be for such limits? Should limits on ARTs be based on participation levels, installed capacity, actual generation, RPS obligations, costs, or something else? Should limits on ARTs be fixed amounts or proportional to total capacity, generation, costs, etc.?*

Relying on preliminary analysis that should be evaluated more fully either as a part of this docket or a successor docket, we recommend limiting the total ART program to 3% of each utility's electricity sales benchmarked to 2007 sales. PV and small wind should be limited to 0.25%, leaving 2.75% to be fulfilled by all other renewable technologies. Increasing the program size can be reevaluated at three-year intervals by the Commission.

Wisconsin IOU Rates, 2007 (Source: EIA)

Utility	Sector	Number of Consumers	Revenue ($1,000s)	Sales (MWh)	Average Retail Price (c/kWh)
MG&E	Res	118,959	113,161	833,549	13.58
MG&E	Com	18,553	201,275	2,236,505	9.00
MG&E	Ind	49	17,495	279,967	6.25
MG&E	**All**	**137,561**	**331,931**	**3,350,021**	**9.91**
NSP	Res	206,386	178,075	1,902,776	9.36
NSP	Com	39,918	203,005	2,764,494	7.34
NSP	Ind	92	83,312	1,562,015	5.33
NSP	All	246,396	464,392	6,229,285	7.45
WEPCO	Res	968,454	897,034	8,246,285	10.88
WEPCO	Com	106,693	825,723	9,025,538	9.15
WEPCO	Ind	2,982	573,543	8,682,833	6.61
WEPCO	**All**	**1,078,129**	**2,296,300**	**25,954,656**	**8.85**
WP&L	Res	393,691	395,707	3,539,611	11.18
WP&L	Com	55,701	226,214	2,370,268	9.54
WP&L	Ind	1,001	329,487	4,933,930	6.68
WP&L	**All**	**450,393**	**951,408**	**10,843,809**	**8.77**
WPSC	Res	370,222	335,079	2,826,796	11.85
WPSC	Com	53,383	340,390	4,013,504	8.48
WPSC	Ind	218	211,083	3,971,924	5.31
WPSC	**All**	**423,823**	**886,552**	**10,812,224**	**8.20**

Example: 3% ART Allocation

Utility	Program 3% All kWh	Program 2.75% Non-PV/SmWind kWh	Program 0.25% PV/SmWind kWh	Program 0.25% PV/SmWind kW
MG&E	100,500,630	92,125,578	8,375,053	7,354
NSP	186,878,550	171,305,338	15,573,213	13,675
WEPCO	778,639,680	713,753,040	64,886,640	56,978
WP&L	325,314,270	298,204,748	27,109,523	23,805
WPSC	324,366,720	297,336,160	27,030,560	23,736

To ensure that this initiative moves the distributed renewable energy market forward on a sustained basis, we respectfully suggest that the next step in this process would be to model the likely impacts of such an undertaking on rates and technology deployment, using the expertise that has been built up in Wisconsin since the issue first surfaced in 2005.

9-c. *If program size limits are imposed, should enrollment be on a "first come, first served" basis or based on some other criteria?*

As the intent of an ART is to drive installations to occur as soon as possible, with fair access, a "first come, first served" basis is the best approach. Projects with a standard offer contract should have a time limit to begin generating or lose their place in an ART queue.

10. Covered Renewable Energy Technologies

10-a. *Are there any specific technologies for which utilities should be required to offer ARTs?*

ARTs should be offered for all renewable resources as referenced in Wisconsin Act 141 and as defined in s.196.378 (1) (h),[30] or any successor statute. If one anticipates that market

[30] **s. 196.378 (1)(h) "Renewable resource" means any of the following:**
1. A resource that derives electricity from any of the following:
a. A fuel cell that uses, as determined by the commission, a renewable fuel.
b. Tidal or wave action.
c. Solar thermal electric or photovoltaic energy.
d. Wind power.
e. Geothermal technology.
g. Biomass.
1m. A resource with a capacity of less than 60 megawatts that derives electricity from hydroelectric power.
2. Any other resource, except a conventional resource, that the commission designates as a renewable resource in rules promulgated under sub. (4).

forces will to a large extent determine the installed capacity from an ART offering, all renewable electricity generating technologies should be eligible. There are technologies that are more ubiquitously implementable in both urban and rural settings, however we prefer to not make recommendations on requiring specific technologies.

10-b. *On what basis should the Commission decide whether it is appropriate to offer an ART for a given technology?*

We would, in this area, make a distinction in the choice of wording regarding "technology" versus "resource." Solar energy is a renewable resource type, and photovoltaic technologies versus solar concentration technologies are distinct technology types. The Commission should conduct a review to determine the range of technologies appropriate for ART standard offers. PSC 119 sets standards for interconnection safety and all renewable systems interconnected to a Wisconsin utility must meet those agreed upon standards. That said, a common requirement of Focus on Energy and USDA renewable project funding is that the technology to be implemented must be commercially available. We would suggest not picking and choosing based on commercial availability, but simply employing the requirements of PSC 119 to avoid issues with either unreliable or experimental R&D or RD&D projects.

10-c. *Should the ART be technology-specific or apply to a generic definition of renewables?*

ARTs should be resource technology-specific and size-specific to reflect different generator capital and operational costs.

(ar) "Biomass" means a resource that derives energy from wood or plant material or residue, biological waste, crops grown for use as a resource or landfill gases. "Biomass" does not include garbage, as defined in s. 289.01 (9), or nonvegetation−based industrial, commercial or household waste, except that "biomass" includes refuse−derived fuel used for a renewable facility that was in service before January 1, 1998.

11. Individual Project Size Limitations

11-a. *What project size limits, if any, are appropriate for each technology, and why?*

The Governor's Task Force on Global Warming Final Report of July 2008 recommends that the PSC establish tariffs to stimulate the deployment of renewable generation projects smaller than 15 MW. Tariffs should be enacted for each technology at size ranges up to 15 MW, with appropriate lower rates for the largest projects to reflect economies of scale.

It would be sensible to implement a tariff structure that is not in wide variance from those proposed in surrounding states, so that Wisconsin does not become an island of "non-opportunity" in relation to Michigan, Indiana, Minnesota, and Illinois. If projects are limited to sizes significantly below 15 MW, it is most likely that larger projects will be broken into discrete units to qualify for size limitations. It would be more advantageous that larger projects are not forced into expending additional capital costs to break up into several smaller units. Such projects would be more cost effective and logically qualify if tariffs range up to 15 MW, even though they would typically expect to receive a lower ART rate. In order to mitigate rate impacts, project size limits could initially be set at 1 MW for PV.

11-b. *Should project size limits be uniform across utilities?*

Yes, in addition to avoiding creating islands of "non-opportunity" with other states, we also want to steer clear from creating them within the state. It would be difficult to justify to local communities that state regulations might be limiting renewable energy development to certain areas of the state, in effect, economically punishing other areas. For generators and renewable businesses, a lack of uniformity undoubtedly creates less opportunity, additional administrative burdens and less transparency.

12. Contract Duration

12-a. *Should utilities offer the same duration for all ART contracts regardless of technology?*

Yes. If several durations of contracts are offered, all utilities should offer the same contract lengths and any renewable technologies should be able to opt in to the contract length of their choosing, thereby obtaining the appropriate contract length for their circumstance.

12-b. *What is the optimum duration for ART contracts and why?*

Generators should have a choice of either 10- or 15-year contracts, since those choices coincide closely with commercial loan terms. While other ARTs do offer 20-year contracts, we are not advocating contracts of that length. Electric generators should be allowed one of two choices for the amount of electricity they sell to a utility: (1) all electricity is sold or (2) excess electricity is sold after serving the generator's own load.

13. Cost Recovery

13-a. *Why and under what circumstances might it be appropriate for ART costs to be recovered through ordinary rates paid by all customers or a class of customers? For purposes of answering this question, assume "ART costs" means all costs from administration of the ART.*

It is appropriate that ART costs be recovered through ordinary rates paid by all customer classes that receive benefits from an ART. If certain classes of customers do not contribute to an ART, the overall benefits are reduced. While we believe that ART costs be recovered through ordinary rates paid by all classes of customers receiving benefits from the tariff, if a specific class of customer does not contribute, then that class of customer should also either be ineligible for an ART rate or receive a proportionately reduced rate on any renewable energy project. That approach, in itself, reduces the simplicity of an ART. It also introduces confusion and possible gaming of regulations for a class of customers that may have been excluded from full participation. It not only shifts the weight of ART costs, but also reduces the ART opportunities.

In relation to recovering the utility costs of administering an ART, we recommend that the Commission entertain the option of a percentage ceiling on utility administrative costs in proportion to the number of projects. The Commission should also delineate, or at least characterize, utility administrative costs that qualify as legitimately ART-related.

13-b. *Why and under what circumstances might it be appropriate for ART costs to be recovered through a utility's voluntary renewable energy program?*

As stated in 11a., if ARTs for certain technologies are developed which, when employed at high penetration levels, would place undue cost burdens on ratepayers, those technologies should either be capped as a proportion of a program or be partially funded by voluntary utility programs. Ratepayer impact can be managed through determining how aggressive or conservative the price is set for each technology.

13-c. *Should utilities have the discretion to choose the best means of cost recovery for each specific tariff, or should the Commission seek a uniform approach?*

The Commission should delineate a small set of options for cost recovery, with the caveat that when cost recovery cannot be accommodated by one means, it will need to be supplemented or accomplished through ordinary rates.

14. Renewable/Environmental Attributes

14-a. *Should ownership of associated renewable and environmental attributes (such as Renewable Energy Credits or greenhouse gas offsets) be consistent across all ARTs?*

Yes, however the Commission should be clear regarding which attributes are included so that if new credits are introduced in the future, there will be no confusion regarding ownership. The credit ownership policy should be consistent across all ARTs in Wisconsin. Some credits are available regardless of a renewable project being implemented. The Commission will need to establish clear rules for such circumstances. In addition, sales of renewable attributes should be tracked and applied to ART cost-recovery, for the benefit of utility ratepayers.

14-b. *Should ARTs be established with separate prices depending on which party owns the renewable and environmental attributes?*

Such a policy introduces additional complexity and administrative costs related to tracking environmental attributes. A project that desires to own its renewable and environmental attributes should negotiate a contract outside the ART framework.

15. Basis for Setting Tariff Price

15-a. *For a given technology, should there be any differentiation in ART prices based on design characteristics (e.g., vertical versus horizontal axis wind turbines), fuel source (e.g., biomass crops versus wood waste), or location (e.g., terrestrial versus offshore wind)?*

We do not consider technology design characteristics a basis for differentiation in ART prices. Fuel source and location may be a basis for encouraging development of specific resources that are deemed to emerge as cost-effective options. Some resources are likely to be developed only at scales greater than Wisconsin's definition of distributed generation, currently 15 MW. If the ART is limited to distributed generation and is not intended to cover typical IPP projects, offshore wind would likely not be done as a distributed generation project.

15-b. *For a given technology, should ART prices decline as project size increases? If so, should size bands be created or should the price decline in linear proportion to size? How might the Commission decide on appropriate size bands?*

Project size bands could roughly follow the definition of DG facility categories.[31] Size categories are listed according to nameplate ratings for each connection to the electric provider's distribution system:

Category	DG Facilities
Category 1	20 kW or less
Category 2	Greater than 20 kW and not more than 200 kW
Category 3	Greater than 200 kW and not more than 1 MW

[31] Wis. Admin. Code § PSC 119.02.

Category 4 Greater than 1 MW and not more than 15 MW

Although nameplate rating is one measure of possible categorization, not all facilities with the same nameplate rating will produce the same amount of energy. We suggest a categorization based on PSC 119 as well as technology type. Prices should be set to reflect differences based on project costs and economies of scale.

15-c. *Should ART payment levels include any form of a capacity payment in addition to energy payments? Does your answer vary by technology? Could an auction or tender-based system for renewable capacity payments (similar to Forward Capacity Markets) help increase economic efficiency and/or reduce risk on behalf of the investor?*

For transparency, ease of administration and predictability, the ART should be a straight energy-based kWh payment for all technologies.

15-d. *Should ART prices be set at a level such that a typical participating customer will earn a positive return on their investment in renewable energy? If so, what might be an appropriate return?*

ART prices should be set at a level which enables a participating customer to earn a return on their investment or there is no point in offering an ART. An appropriate return would be a percentage similar to profits allowed for Wisconsin utilities. Several states specify a "reasonable return" in proposed ARTs. The offerings for technologies should be graduated and sensitive to project scale, and be sufficient to drive investment.

15-e. *Should utilities offer separate prices for on-peak and off-peak generation or a single blended ART price? Should the utility or the customer be allowed to decide on their preferred approach?*

Wind energy generation will be particularly disadvantaged by a time-differentiated ART. While a blended ART price offers simplicity, lowers administrative cost and is more transparent, perhaps customers are best served by being allowed to decide on their preferred approach.

15-f. *Should ART contracts include an automatic adjustment in the price based on inflation?*

Without an automatic adjustment in the ART contract price based on inflation, fixed and variable costs can greatly reduce project viability on a timescale of 10 or 15 years. In operation, inflation would automatically devalue the price over time. A modest allowance for inflation should be a standard feature of ARTs. The inflation should be calculated by the Commission. Michigan has proposed a tariff that is indexed to 60% of inflation; that is, tariffs will increase annually at a rate of 60% of inflation to protect long-term capital investments such as renewable sources of electricity generation.

15-g. *If the Commission does not require utilities to offer uniform contract duration for all ARTs, should utilities offer different prices for different contract durations?*

If there are choices, such as we have recommended, of a 10- or 15-year contract term, the returns would be adjusted to reflect adjustments due to calculated project economics.

15-h. *If any fixed premium ARTs are established (rather than fixed cost ARTs), should the premium be over and above the Locational Marginal Price, or should it be tied to some other number? Since a fixed premium would result in a variable price, should there be a price cap or other measures to prevent unacceptable profits or losses?*

We do not believe that an effective ART can be constructed as a premium over a widely varying amount as indicated by historical MISO LMP data. While feed-in tariffs have been shown to be the most successful policy type for support of electricity from renewable resources, tariffs that employed a variable factor were less successful and more risky, and ended up being more costly overall than fixed-cost tariffs.

15-i. *Should ART prices be automatically reduced annually (or periodically) to reflect the maturation of technologies and the need for renewables to become cost competitive without price supports (digression)?*

Initial ART prices should set the floor for the duration of a project's standard contract, with provision for modest adjustment for inflation. While it is reasonable to set subsequent durations of ART contract prices based on each technology's projected experience curve, the reality of maturation and lowering of costs does not always follow projections. There should be mandatory periodic review if rate digression is adopted. In Germany, the parliament adjusted the feed-in tariff digression rates twice over an eight-year period.

15-j. *Are there any benefits to customers unrelated to electricity generation that should be reflected in the tariff prices?*

While additional non-energy benefits from certain projects will accrue, they should not be reflected in adjustments to tariff prices. Likely benefits accruing from renewable energy project development could include job creation in areas designated as "high unemployment zones," environmental remediation benefits, greater capital investment, alleviation of air emission restrictions and renewable manufacturing start-ups. Those other benefits should be addressed by tax benefits or other incentives in independent, complementary initiatives.

16. Other

16-a. *Are there any other ART design considerations the Commission should consider?*

ARTs are Necessary to Attract Renewable Energy Investment

Unless Wisconsin implements more aggressive renewable policy strategies, such as ARTs, renewable energy investment will remain unattractive on both local and national levels. Ernst & Young's Renewable Energy Group authors quarterly global renewable energy attractiveness indices delineated for individual countries. The indices for the United States also incorporate rankings for top states in an all-renewable index.[32] Factors such as power off-take attractiveness (25%) and market growth potential (25%) figure higher than resource quality (18%) and other factors such as tax climate, installed base, and current project size. Wisconsin

[32] United States Renewable Energy Attractiveness Indices – US Highlights, Quarter 3, 2008, Ernst & Young, http://www.cleantechsandiego.org/reports/3Q_2008_United_States_Renewable_Energy_Attractiveness_Indices.pdf.

ranks 17th, behind Oklahoma, slipping from 16th in the previous quarter, with an overall index rating of 62. Wisconsin is not ranked in the top-ten long-term indices for wind and solar.

Utilities are Prepared for Distributed Generation

The Commission opened a general investigation on the implementation of cogeneration and small power production rates and rules in Docket No. 05-ER-11. This investigation was to establish guidelines, for all electric utilities, on cogeneration and small power production rates and rules which would be used in future rate proceedings. Net energy billing was also included in this docket. At the same time, the Commission opened Dockets Nos. 05-ER-12 and 05-ER-13 to update buy-back rates which were then in effect. The filing date of all three of these dockets was June 21, 1983. Much has changed since the Commission first developed guidelines for power production rates and rules in 1983. Over the intervening decades, distributed generation technologies have progressed through a "learning curve" of product development and equipment refinement. With the assistance of adopted industry standards, technological improvement has yielded enhanced product reliability. Technical barriers are no longer an impediment to the utilization of distributed generation.

Since 1983, utility acceptance of distributed generation has also grown with the emergence of "green" power markets. Customer demand for these technologies has spurred both utility-scale projects and customer-owned projects. Utilities have not only had a chance to become more familiar with the technologies but have also become comfortable with integrating them into their environmental enhancement programs. Customer-owned applications are currently providing solutions to a range of specialized power needs. Utilities now have experience with some of the most innovative distributed generation sites in Wisconsin.

ARTs Should be Considered for Natural Gas Production from Anaerobic Digesters

Biogas produced from anaerobic digesters can be combusted with on-site generators to produce electricity or conditioned to pipeline natural gas standards and injected into natural gas pipelines. Traditional approaches to encourage renewable energy production from anaerobic digesters have focused on biogas combustion for electricity, but the production of renewable natural gas for pipeline distribution is an important emerging technology that offers additional opportunities and advantages over electrical production for some anaerobic digester sites in Wisconsin. Factors that may favor renewable natural gas production and pipeline distribution of biogas include the following: anaerobic digester sites with greater access to high-capacity natural gas pipelines than three-phase electrical distribution lines, locations with air quality permitting or logistical challenges for direct combustion, the potential for greater net biogas energy conversion efficiency with the combustion of renewable natural gas at utility-scale combined cycle or cogeneration facilities, and the potential for reduced operations and maintenance for gas conditioning equipment compared to internal combustion generators. The Commission should consider advanced renewable tariffs for natural gas production from anaerobic digesters with an appropriate conversion factor to equalize this technology with the direct combustion and electrical production alternative.