

Meeting Agenda/Action Items

Meeting Name: Electric Generation & Supply Workgroup,
Governor's Task Force on Global Warming
Date: September 10, 2007
Time: 9:00 am – 3:00 pm
Location: PSC Pecatonica Conference Room
610 North Whitney Way, Madison

Members (* in attendance, # absent, T teleconference, P partial attendance)

	Name		Name		Name
	Peter Taglia, Co-chair Clean Wisconsin		Kathy Lipp, Co-Chair Alliant Energy		Lori Sakk, PSC State Agency Support
	David Bender Sierra Club		Forrest Ceel IBEW		John Clancy Godfrey & Kahn
	Dennis Dums Citizen's Utility Board		Perry Baird Wisconsin Federation of Cooperatives		Andy Kellen Wisconsin Public Power, Inc
	Charles Matthews Wisconsin Energy Corp.		Phil Montgomery, Representative Wisconsin Assembly		Adam Raschka, Staff Representative Montgomery
	Scott Neitzel Madison Gas & Electric		Tom Smies Wisconsin Public Service Corp		Todd Stuart Wisconsin Industrial Energy Group
	Jim Turnure Xcel Energy		Michael Vickerman RENEW Wisconsin		Lynn Wilson Plum Creek
	Tom Damassa, John Larsen, WRI				

Agenda for 09/10/07

Item No.	Subject	Approx. Time	Presenter
1.	Welcome and Review of Agenda	9:00	All
2.	Updates from Task Force / Rules on Lobbying		Lipp/Taglia/Callisto
3.	Review Goals for Workgroup		Lipp/Taglia
4.	Public Input: Policy Issues List	10:00	
5.	Review and Evaluate Policy Summaries <ul style="list-style-type: none"> • Nuclear – Restatement of Policy Issues • Renewables – Restatement of Policy Issues • Transmission Summaries <ul style="list-style-type: none"> ○ System Expansion ○ Line loss reduction • Carbon Performance Standards • Combined Heat and Power 	10:30	Kellen Bender
6.	Break / Lunch	12:00	
7.	Policy Summary Review (continued)	12:15	
8.	Additional Public Input	2:30	
9.	Next Meeting Assignments	2:45	Lipp/Taglia
10.	Adjourn	3:00	

Open Action Items from Prior Meetings

Item No.	Open Date	Description	Assigned To	Target Date
1.	7/25	Rules on Lobbying Time for Work Group Activity	Callisto	8/27
2.	8/27	Re-draft the nuclear issue summary	Kellen	9/10
3.	8/27	Re-draft the RPS portfolio summary	Bender	9/10
4.	8/27	Summarize emissions forecasts from WRI; prepare template to be used to tally policy recommendations from other summaries	Lipp	9/10

Future Meetings

Item No.	Date	Time	Description
1.	9/11	9:00 a.m. – 12:00 p.m.	Tentative – to be used for continued discussion if our meeting agenda on September 10 is not completed
2.	9/18	9:00 a.m. – 3:00 p.m.	
3.	9/26	9:00 a.m. – 3:00 p.m.	
4.	9/27	TBD	
5.	9/28	TBD	

State Policy Options to Reduce Greenhouse Gas Emissions

Selected as Initial Options for Further Consideration during August 6 meeting

Policy		Prefer	Could Work	Not Likely	Not Worth Considering	
Generation and Delivery (Supply-Side) Subgroup		Don't Know	1	2	3	4
1)	Enhance State Renewable Portfolio		9	4	1	
W5	Assessment of Technical and Economic	combine with Option 1				
O1	Renewable energy incentive similar to New	combine with Option 1				
O3	Explore partnership with Michigan to utilize	combine with Option 1				
2)	Creation of state-financed fund for use of local renewable energy resources by governmental entities, schools, and nonprofits		3	6	4	1
3)	Tax or other incentives for consumers and businesses for renewable electricity (e.g., PTC, ITC)		3	9	2	
4)	State and local tax and rate incentives for utilities investment in renewable resources	1	4	5	3	1
6)	Renewable/clean energy feed-in tariffs	1	5	5	1	2
F4	Exploring other options for making siting of renewable energy easier	1	8	5		
W1	PSC Permitting Option for Wind Projects Under 100 MW	combine with Option F4				
W2	Zoning law changes to facilitate renewable distributed generation such as PV solar system and small wind generators					
H2	Increase use of low-head hydroelectric on Mississippi River dams		4	8	1	1
8)	Increase nuclear power generation		8	1	1	4
N1	Repeal nuclear moratorium		7	3		4
9)	Distributed generation regulatory reform (real-time pricing, net metering, interconnection, standby rates)		6	5	3	
12)	Transmission system upgrades to reduce line losses and to support new renewables/low-emitting generation		8	5	1	

State Policy Options to Reduce Greenhouse Gas Emissions

Selected as Initial Options for Further Consideration during August 6 meeting

Policy		Prefer	Could Work	Not Likely	Not Worth Considering
Generation and Delivery (Supply-Side) Subgroup	Don't Know	1	2	3	4
14) Incentives to improve energy efficiency of existing power plants		8		3	3
16) Change CPCN (Certificate of Public Convenience and Necessity) approval process for new generation to recognize GHG impacts	1	3	6	2	2
17) Develop tracking system for renewable energy certificates and/or energy efficiency certificates	1	4	6	1	2
18) Carbon performance standards for electricity generation and/or procurement	1	5	3	5	
12) Transmission system upgrades to reduce line losses and to support new renewables/low-emitting generation		8	5	1	
19) Energy Efficiency Portfolio Standard (EEPS)	1	7	4	2	
25) Incentives for CHP and boiler construction and upgrades	1	5	6	2	
22) Technical assistance to electric plants to assess CHP technology and oversee installation	1	4	5	2	2
26) Expand transmission capacity for wind power		5	7		2
20) Require utilities to factor CO2 into procurement and planning	1	7	5		1
C9) Power Plant Retirement Planning Process	Considered part of 20				
C10) Assessment of Potential to Cost-Effectively Retire Certain Existing Coal Fired Plants in Wisconsin to reduce GHG Emissions. This may be a consideration already subsumed in Option 18) Carbon performance standards, and Option 20) Utility's factoring CO2 into procurement and planning.	Considered part of 20				

State Policy Options to Reduce Greenhouse Gas Emissions

Selected as Initial Options for Further Consideration during August 6 meeting

Policy		Prefer	Could Work	Not Likely	Not Worth Considering
Generation and Delivery (Supply-Side) Subgroup	Don't Know	1	2	3	4
C2 Implement an annual review process to determine the progress made by the generation sector in reducing GHG emissions. This may be a consideration already included in Option 18 and Option 20.		3	10	1	1
C7 Greenhouse gas emission reductions from electrical and utility infrastructure (Reduce CH4 emissions from gas pipelines, SF6 emissions from high voltage equipment). Reduce targets over time as a percentage of energy use.	5	3	6		1
F3 Change or modify utility shared revenues to encourage siting of GHG reduction projects	1	3	7	2	
F5 Expand incentives and rate structures for distributed CHP in commercial/high density residential including monetization of reduced transmission infrastructure requirements	1	2	7	5	
H1 Transfer hydroelectric water quality certification authority from the DNR to PSC	6	2	2	3	2
H3 Remove 60 MW cap on hydro power facilities to qualify as renewable	1	4	4	1	3
H4 Incorporate large Hydro (Canada) power purchases as a source of supply	1	4	5		4
O2 Standardization of DG equipment performance testing and rating standards consistent with other states such as California			6	7	1

Wisconsin Global Warming Task Force Workgroup Template For Presentation Policy Options

1. **Workgroup:** Electric Generation & Supply Working Group
2. **Policy Name:** Transmission system expansion to support new renewables/low-emitting generation
3. **Policy Type:** Legislation amending existing transmission siting statutes, with regulatory implementation and enforcement. This policy can only impact in-state transmission projects. Coordination with other state and federal regulatory agencies is required to fully implement this policy.

4. **Affected Sectors, Sub-Sectors and/or Entities:**

Sector: Electric utility - Supply

Sub-Sector: Transmission owning companies

5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Transmission access enables the use of the following options to reduce CO2:

Dispatch WI combined cycle units before coal units = 6.8 million metric ton

CO2 reduction (as soon as electric transmission system can accommodate re-dispatch and coal contracts can be adjusted)

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Canadian Hydro (500 Mw) = 3.1 million metric ton CO2 reduction (2020)

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Western Wind (500 Mw @ 40% capacity factor) = 1.5 million metric ton CO2

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reduction (2027 – 2037; assumes 20 to 30 years to build network to deliver western wind resources) [ATC are you OK with this?]

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Wisconsin Wind (500 Mw @ 27.5% capacity factor) = 1.0 million metric ton CO2 reduction (2015-2017)

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6. **Estimated Costs:** State administrative costs will be negligible. Other material cost impacts include increased electric revenue requirements.

Dispatch WI combined cycle units before coal units increases fuel and O&M costs by \$338.6 million/yr (2007\$) (excludes changes in allowance costs, congestion and loss charges). The estimated cost to remove CO2 with this option is \$50/tonne (metric).

In addition (not included in CO2 removal cost), an investment of \$XXX to YYY million needs to be made in the existing Wisconsin electric transmission system.

(ATC: \$0 additional electric transmission system investment required to run existing combined cycle units as base load)

No significant investment is expected to be made in the existing Wisconsin natural gas transmission system in order to allow base load operation on Wisconsin's combined cycle units.

Canadian hydro cost – may (could be lower based on market conditions) be priced at all in cost (owning and operating) of either a new combined cycle unit or a nuclear unit. The real levelized cost of a combined cycle unit and a nuclear unit is approximately \$69.1/Mwh and \$77.1/Mwh respectively, whereas the 65%/35% coal/combined cycle energy cost is approximately \$38.9/Mwh (ties to assumption that coal/combined cycle CO2 emission rate is 1,850 lb/Mwh). Compared to the 65%/35% coal/combined cycle energy cost, 500 Mw of Canadian hydro would increase annual production costs by \$ 112.4 to 142.2 million/year. The estimated cost to remove CO2 with this option is in the range of \$36 - 46/tonne (metric).

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Comment [DKC1]: I suggest changing this to \$50 million. We would need additional transmission lines or shunt compensation (static and dynamic) to replace the lost reactive capability of the large coal plants.

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Transmission Capacity – Low Carbon Resources – Draft 2007-09-04 - Rev01

In addition (not included in CO2 removal cost), approximately \$XXX to YYY million needs to be invested in the existing electric transmission system in order to import Canadian hydro into Wisconsin. (ATC: not knowing where in Canada, this is virtually impossible to estimate. \$3,000,000,000 for 750 miles of 345 kV at \$4,000,000 per mile, where \$4M assumes both 345 kV costs and underlying high voltage upgrades.) **[ATC assume MH delivers power to US border.]**

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Western Wind – Western wind (40% capacity factor) real levelized capital and O&M cost (includes incremental congestion and losses between the “west” and Wisconsin) is approximately \$56.2/Mwh whereas the 65%/35% coal/combined cycle energy cost is approximately \$38.9/Mwh (ties to assumption that coal/combined cycle CO2 emission rate is 1,850 lb/Mwh). Compared to the 65%/35% coal/combined cycle energy cost, 500 Mw of Western wind would increase annual production costs by \$30.3 million/year. The estimated cost to remove CO2 with this option is \$21/tonne (metric).

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In addition (not included in CO2 removal cost), this option assumes adequate transmission is built in the Midwest. Approximately \$XXX to YYY million needs to be invested in the existing Midwest electric transmission system in order to import western wind into Wisconsin. (ATC: \$1,000,000,000 for 250 miles of 345 kV at \$4,000,000 per mile) **[ATC should this be viewed as an estimate for each 500 Mw increment of Western Wind for WI?]**

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Wisconsin Wind – Wisconsin wind (27.5% capacity factor) real levelized capital and

O&M cost is approximately \$84.2/Mwh. Compared to the 65%/35% coal/combined cycle energy cost, 500 Mw of Wisconsin wind would increase

annual production costs by \$54.6 million/year. The estimated cost to remove CO2 with this option is \$54/tonne (metric).

In addition (not included in CO2 removal cost), approximately \$XXX to YYY

million needs to be invested in the existing Wisconsin electric transmission system in order to significantly increase the use of wind generation in Wisconsin.

. (ATC: \$100,000,000 reflecting 500 MW times an installed transmission cost of \$200,000 per MW on the ATC system. ATC's recent Attachment FF filing caps reimbursement at \$400,000 per MW, but the ATC average has been under \$100,000 per MW. [Not sure what the last sentence is saying. Are you trying to get to the net investment after refund to generator? Maybe we should estimate the entire cost since someone has to pay it.]

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The CO2 removal cost estimates exclude:

1. The electric transmission related costs such as allocation of construction costs, congestion and marginal losses. **[This item may be modified to exclude construction costs if construction cost estimates are available]**
2. Changes in fossil allowance costs.

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The construction costs related to investment in new natural gas transmission capacity into and within Wisconsin. **[This item may be removed if cost estimates are available or it is determined not to be an issue]**

3. The operational impacts associated with control for scenarios with large amounts of wind generation in the region.

4. Capacity cost savings associated with the dependable capacity rating associated with the option.

7. **Specific Description of Policy Proposal:** The Public Service Commission of Wisconsin (PSCW) enforces the current administrative rules that pertain to the site selection and construction of new transmission lines in Wisconsin. Legislation needs to be adopted that will allow for revision to the current rules in order to:
- o Streamline the transmission line permitting process.
 - o Allow for acquisition of transmission line right away prior to need (whether it is re-dispatch of existing fossil assets or development of new distributed renewable resources).

In addition the state needs to continue to work with neighboring states and the federal government to expedite the needed development of the transmission network in the Midwest so that Wisconsin can expand its access to high capacity factor wind resources and/or Canadian hydro generation and at the same time be vigilant that Wisconsin ratepayers do not bear an unfair portion of the development costs.

8. **Timetables, Duration and Stringency Option:** Since this policy has two tiers (intra state and interstate/federal) there are two time tables. For the intra state transmission projects the policy timetable is dependent on the Wisconsin legislative process. The timetable for the interstate/federal tier is very difficult to

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estimate and is affected in part by what other states will be doing to comply with existing RPS and climate change initiatives. The duration is until the law is changed. This policy should be regarded as stringent as a result of PSCW enforcement authority, subject to judicial proceedings that may strengthen landowner rights.

9. **Explanation of Rough Estimate of GHG Reductions:** The re-dispatch from coal to combined cycle unit calculations were based on reports developed by the State of Wisconsin and EIA 906/920. Standard estimates of CO2 emission rates (lb/MMBtu) and heat rates (Btu/Kwh) for coal and combined cycle generating technologies were used. The estimate of coal that could be replaced with combined cycle generation assumed at least a 40% minimum load level for coal generation at all times and 12 weeks per year at full output is required 80 hours/week for transmission/generation capacity needs. Canadian hydro, western wind and Wisconsin wind assumed that their output would replace 65% coal and 35% combined cycle output.

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10. **Rough Estimate of Costs for Selected Years:** For the material costs associated with the re-dispatch of generation from coal to combined cycle the following costs were assumed:

Parameter	Coal Unit	Combined Cycle Unit
Fuel Cost - \$/MMBtu	2.0	8.0
Variable O&M - \$/Mwh	2.0	4.0

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The following costs were assumed for the development of material costs associated with Canadian hydro (tied to combined cycle and nuclear unit costs) and wind resources:

Parameter	Wind	Combined Cycle	Nuclear
Capital Cost	\$2,364/kw Escalated 2010 cost	\$818/kw Overnight 2007 cost	\$3,760/kw Overnight 2007 cost
Fixed O&M	\$28.51/kw-yr 2005\$	\$8.54/kw-yr 2007\$	\$115/kw-yr 2007\$
Variable O&M	None	\$3.6/Mwh 2007\$	\$11/Mwh 2007\$
Heat Rate	None	6.68 MMBtu/Mwh	10.7 MMBtu/Mwh
Fuel Cost	None	\$8.0/MMBtu 2007\$	\$1.022/MMBtu 2014\$

The capital cost for the wind project is based on an internal capital cost estimate that reflects current market conditions.

[Basis for the estimated transmission investment costs for the various resource options.]

- 11. Barriers to Implementation:** Landowners may strongly oppose this policy change. It could be extremely difficult to coordinate this policy with the policies of neighboring states and the federal government. The material cost impacts could cause financial harm to industries whose rates are impacted by changes in energy costs.
- 12. Other Factors:** There could be duplication within the policy options (re-dispatch, Canadian hydro, wind development) mentioned that are impacted by the transmission system expansion option. For instance, the re-dispatch option could change the mix (coal and combined cycle) of the resources that are impacted by the Canadian hydro and wind options (i.e. the lb CO₂/Mwh may be lower due to the re-dispatch) resulting in Canadian hydro and wind having less of an impact on CO₂ reduction.

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Another factor that needs to be considered is the assumption related to what the rest of the world is doing regarding CO2 reduction. If the rest of the world is not reducing CO2, the MISO central dispatch of the Midwest may result in Wisconsin coal generation being reduced and instead of increasing Wisconsin combined cycle generation, other Midwest coal generation could be increased resulting in increased imports into Wisconsin creating higher congestion and marginal loss costs for Wisconsin without the expected reduction in CO2 emissions.

**Wisconsin Global Warming Task Force Workgroup
Policy Draft 2**

1.Workgroup: Utility Energy Conservation and Efficiency

2.Policy Name: Enhanced Renewable Portfolio Standard (RPS)

3.Policy Type: Legislation amending existing RPS, setting new minimum renewable standards, and providing regulatory implementation and suggesting policies supportive of the revised RPS.

4.Affected Sectors, Sub-Sectors and/or Entities:

Sector: Electric utility

Sub-Sector: Distribution utilities

5.Estimated Greenhouse Gas Emissions:

Required Renewable Generation in 2025 in million MWh for a given growth rate and RPS target (using 2003 WI generation of 57.4 million MWh).

Annual Growth Rate From 2003:	0%	1%	1.5%	2.13%
Current Law (10%)	5.7	7.1	8.0	9.1
15%	8.6	10.7	11.9	13.7
20%	11.4	14.2	16.0	18.2
25%	14.3	17.8	19.9	22.8

Emissions Avoided by RPS (U.S. tons of CO2-eq) using WI average recent fleetwide emissions of 1850 Lbs CO2-e/MWh and assuming zero emissions from RPS generation.

Annual Growth Rate From 2003:	0%	1%	1.50%	2.13%
Base Emissions With No RPS	43,100,000			68,800,000
Current Law (10%)	5,272,500	6,567,500	7,400,000	8,417,500
15%	7,955,000	9,897,500	11,007,500	12,672,500
20%	10,545,000 (24.4% reduction from 2003)	13,135,000	14,800,000	16,835,000 (20.5% <u>increase</u> from 2003)
25%	13,227,500 (30% reduction from 2003)	16,465,000	18,407,500	21,090,000 (11% <u>increase</u> from 2003)

Required Renewable Generation in 2025 in million MWh for a given growth rate and RPS target (using 2003 WI electrical sales of 67.2 million MWh according to WI DOA Energy Stats 2006).

Annual Growth Rate From 2003:	0%	1%	1.50%	2.13%
10%	6.7	8.4	9.3	10.7
15%	10.1	12.5	14.0	16.0
20%	13.4	16.7	18.6	21.4
25%	16.8	20.9	23.3	26.7

Emissions Avoided by RPS (Millions of U.S. tons of CO₂-eq) using WI average recent fleetwide emissions of 1850 Lbs CO₂-e/MWh and assuming zero emissions from RPS generation.

Annual Growth Rate From 2003:	0%	1%	1.50%	2.13%
Current Law (10%)	6.2	7.7	8.6	9.9
15%	9.3	11.6	12.9	14.8
20%	12.4	15.5	17.3	19.8
25%	15.5	19.3	21.6	24.7

6. Estimated Costs:

Without load growth, a 25% RPS by 2025 (18.75 billion kWh in 2025 from renewable), requires 6,000 MW of installed wind. This assumes 15 of the 18.75 billion kWh/yr is from wind with a capacity factor of 29%.

If a 2% load growth is assumed, statewide load in 2025 would be 100 billion kWh/yr, requiring 25 billion kWh to meet a 25% RPS. If 21 billion kWh is from wind, 8,300 MW of installed wind capacity at a 29% capacity factor would be required by 2025.

The cost to install wind generation is approximately \$1,670 to \$2,000/kW, based on the national average and WEPCO’s cost projects for its Blue Sky project, respectively. Assuming construction costs stay relatively stable, an investment of \$560,000,000 to \$923,000,000 per year in wind infrastructure investments in Wisconsin would be required.

7. Specific Description of Policy Proposal:

- Current law requires 10% renewable energy (sales) by 2015.
- This policy would increase the standard to 25% by 2025.
- Current law would continue through 2015, at which time an additional 1-2% of renewable energy sales would be required annually.

- Current law would continue for implementation and enforcement by the PSCW, including any authority to adjust the standards based on hardship

Definition of renewable

Current law defines “renewable resource” as 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 [Wis. Stat. § 196.378(4)].

Wis. Stat. § 196.378(1)(h)

This policy may change the definition of renewable resource to allow one or both of the following:

- Combustion of natural gas, provided an equal or greater amount of biogas (by heat content) is placed into the natural gas pipeline, even if at a different location.
- Combustion of natural gas, provided that the utility displaced an equal or greater amount of natural gas use through solar water heating.

8. **Timetables, Duration and Stringency Option:** The timetable is included in the proposal.

9. **Barriers to Implementation:** Changes are necessary to the existing law. Additionally, increased investment in renewable energy resources is required. Large electric customers may oppose this change on the assumption that it will increase electricity costs. Increased costs may be partially or completely off-set by:

- Avoided GHG costs
- Economies of scale for large renewable energy projects
- Constant, low operation costs for most renewable resources
- Increasing fuel and waste disposal costs for non-renewable resources

10. **Other Factors:** The 25% RPS by 2025 may require additional regulatory incentives. The Work Group discussed the following regulatory policy changes as generally supporting a 25% RPS. A 25% RPS by 2025 should also consider the following:

- a. **Windpower Siting Reform:** Providing a uniform siting standard for wind generation in Wisconsin to avoid overlapping local regulations and PSC regulations. This may involve PSC

regulations establishing standards for local government regulation of wind projects. Currently, generation projects under 100 MW are subject to local regulation, including land use controls. This local regulation has either slowed, or has the appearance to investors of slowing development of smaller-scale wind projects in Wisconsin.

- b. **Solar Energy Renewable Credit Program:** This policy would provide credits to individuals or businesses who produce solar energy. Utilities would either be required to purchase a minimum number of credits, or be allowed to purchase such credits to count towards the RPS. New Jersey has a program that requires solar power, through credits, to provide 0.01% of sales in 2004-05 to 2.12% in 2015-16. There is a cap at \$300 per MWh on the cost of credits.
- c. **Transmission System Expansion to Support Renewables:**

Wisconsin Global Warming Task Force Workgroup Template For Presenting Policy Options

1. **Workgroup:** Utility Generation Workgroup
2. **Policy Name:** Windpower Permitting Reform
3. **Policy Type:** Legislation and PSC rulemaking
4. **Affected Sectors, Sub-Sectors and/or Entities:** Public Service Commission, utilities, counties, municipalities and towns, wind energy industry.
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** 925,000 tons/yr reduction by 2015, 1.387,500 tons/yr reduction by 2020, and 1.85 million tons/yr by 2025.
6. **Estimated Costs:** No cost to utilities. With more project applications to review, an increase in the PSC's workload is likely, which may result in additional administrative expenses. However, siting reform is likely to reduce costs borne by developers in dealing with local opposition, including increases in installation costs caused by permitting delays as well as direct litigation costs.
7. **Specific Description of Policy Proposal:** Legislation would contain the following elements: (1) definitions of large and small wind energy systems; (2) a requirement on the PSC to draft uniform standards for siting large and small wind energy systems; (3) creation of an optional process for PSC review of projects under 100 MW that have large wind energy systems; (4) a mechanism for allowing parties to appeal a decision rendered by a local jurisdiction to the PSC; (5) extending Chapter 227 judicial review provisions to wind projects permitted by local jurisdictions, including the ability to appeal a decision under 100 MW;

and (6) a prohibition on local ordinances restricting meteorological test towers.

These provisions would essentially require the PSC to promulgate standards for local review, such as setback distances and sound output, and apply them to both agency-reviewed projects as well as those reviewed by local land use authorities.

8. **Timetables, Duration and Stringency Option:** Once the legislation is enacted, the PSC would have a specified period of time to adopt emergency rules establishing uniform standards for permitting wind projects. These standards would apply to PSC-reviewed wind projects as well as those reviewed by local jurisdictions. These rules would remain in effect indefinitely.
9. **Explanation of Rough Estimate of GHG Reductions:** The 2015 estimate is based on the assumption that 440 MW of windpower would be placed in service in Wisconsin that otherwise would not have been built due to restrictive ordinances adopted by local jurisdictions to placate opponents to a specific wind project. Four hundred forty MW of windpower operating at a capacity factor of 26% should produce one million MWH per annum, which in turn should reduce emissions by 925,000 tons a year. I conservatively estimate that another 440 MW of windpower will be built on Wisconsin land between 2015 and 2025, with half of that to occur by 2020. I am optimistic that additional wind capacity will be built in the waters off Wisconsin. However, it is unclear whether the PSC would have permitting authority over generation projects built in the Great Lakes, so I cannot provide attribute GHG reduction savings from offshore wind development to this policy.

Emissions Avoided by Reforming Wind Energy Permitting Process (U.S. tons of CO₂-eq) using WI average recent fleetwide emissions of 1850 Lbs CO₂-e/MWh and assuming zero emissions from all wind generation.

Year	Annual Output (in MWh)	Emissions Savings
2015	1,000,000	925,000
2020	1,500,000	1,387,500
2025	2,000,000	1,850,000

10. **Rough Estimate of Costs for Selected Years:** The savings from reduced preconstruction costs should outweigh any additional costs to the PSC from any increase in the number of wind project applications to review.
11. **Barriers to Implementation:** The only barrier to adoption would be political will, or lack thereof, at the state level.
12. **Other Factors:** The wind energy siting reform proposal tracks closely with the large livestock siting law adopted two years ago.

Wisconsin Global Warming Task Force Workgroup Template For Presenting Policy Options

1. **Workgroup:** Electric Generation Workgroup
2. **Policy Name:** Advanced Renewable Tariffs (10-year fixed price tariffs to stimulate the deployment of renewable generation projects under 15 MW).
3. **Policy Type:** Definitely a PSC proceeding. Authorizing legislation may be necessary.
4. **Affected Sectors, Sub-Sectors and/or Entities:** Public Service Commission, utilities, customer-generators, independent power producers, renewable energy installation contractors and equipment manufacturers.
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** If utilities supplied 2% of their sales with distributed renewable resources by 2020 (above current requirements), and 3% by 2025, this would result in reductions of 1.5 million tons/yr by 2020, and 2.25 million tons/yr by 2025.

1. Estimated Greenhouse Gas Emissions:

Effect of Advanced Renewable Tariffs on Wisconsin Renewable Electricity Supply in million MWh for given growth rates (based on 2003 WI electricity sales of 67.2 million MWh).

Annual Growth Rate From 2003:	0%	1%	1.5%	2.1%
Current Law (10%)	6.7	7.6	8.0	8.6
10 +1 % (2015)	7.4	8.4	8.8	9.5
10 +2% (2020)	8.0	9.6	10.4	11.4
10+ 3% (2025)	8.7	10.7	12.1	13.8

Emissions Avoided by Advanced Renewable Tariffs (U.S. tons of CO₂-eq) using WI average recent fleetwide emissions of 1850 Lbs CO₂-e/MWh and assuming zero emissions from all RPS generation.

Annual Growth Rate From 2003:	0%	1%	1.50%	2.13%
Base Emissions With No RPS	43,100,000			68,800,000
Current Law (10%)	5,272,500	6,567,500	7,400,000	8,417,500
10 + 1% (2015)	5,325,225	7,296,492	8,262,100	9,456,472
10 + 2% (2020)	5,378,477	7,774,777	8,847,263	10,189,079
10 + 3% (2025)	5,432,262	8,284,414	9,473,870	10,978,442

6. **Estimated Costs:** Rising from \$5 million/yr in 2009, annual costs peak at \$33.million/yr in 2018, and decline to \$15 million/yr by 2025. At its maximum, the overall rate impact is less than 0.5% of gross utility revenues.
7. **Specific Description of Policy Proposal:** The advanced renewable tariff proposal has two elements: (1) a requirement on utilities to offer advanced renewable tariffs to qualifying generators within their service territories; and (2) a set of goals for increasing the contribution of distributed renewable generation to a utility’s system mix. Suggested goals are 2% by 2020 and 3% by 2025. For the purposes of this proposal, advanced renewable tariffs are 10-year fixed-rate tariffs pegged at the generation source’s production costs in Year 1. These technology-specific tariffs would be uniform across utility boundaries. Unless the price of conventional fuel declines, the margin between the advanced renewable energy tariff and the utility’s avoided cost will narrow during the 10-year period. When the 10-year term ends, the utility can purchase that energy at its avoided-cost based rate. Utilities would have the option of rate-basing these generation sources

or reselling some or all of the electricity acquired through these tariffs through their voluntary renewable energy programs, as We Energies' current practice with its special solar tariff.

Utilities that establish Advanced Renewable Tariffs are purchasing not only the energy from qualifying generators but also the renewable energy credits that are created. A utility may apply generation purchased under these tariffs toward its current Renewable Portfolio Standard or any successor renewable energy obligation, unless the output is resold through a voluntary renewable energy program at retail. After the 10-year fixed rate tariff ends for a particular generator, a utility may continue to apply that generation toward any successor renewable energy requirement.

8. **Timetables, Duration and Stringency Option:** If the PSC believes it has the authority it has the authority to establish advanced renewable energy tariffs without legislation, it could convene a proceeding at any time to determine the production costs of various distributed renewable resources such as solar, wind, small hydro, landfill gas, biogas, and other biomass sources. To achieve a 2% target by 2020, utilities would, in the aggregate, need to purchase 1.5 billion kWh per year of qualifying generation through these rates by 2020. To achieve a 3% target, the utilities would need to purchase another 750 million kWh/year. Spread out over a 17-year period beginning in 2009, annual increases would average between 100 and 150 million kWh.
9. **Explanation of Rough Estimate of GHG Reductions:** The 2020 estimate assumes the displacement of 1.5 billion kWh/yr of conventional generation with

carbon-free or carbon-neutral generation. The 2025 estimate assumes the addition of 750 million kWh/yr on top of the quantity leveraged by the 2020 target. It is assumed that 1 billion kWh of carbon-free or carbon-neutral generation in Wisconsin will result in a reduction of 1 million metric tons of CO₂ from the electrical sector.

10. **Rough Estimate of Costs for Selected Years:** The cost per unit of electricity acquired would be highest in 2009 (Year 1) (approximately 5 cents/kWh). The overall cost per year will increase from Year 1 until it reaches a peak of \$33 million/year in 2018 (Year 10). It will then decline each year to \$15 million/yr in 2025. In the cost estimate below, it is assumed that the marginal difference between energy purchased through an advanced renewable tariffs and energy purchased through the standard parallel generation rate will decline by 0.25 cents per year. Note: these numbers reflect nominal values and do not take inflation into account.

<u>Year</u>	<u>Amount</u>	<u>Incremental Margin</u>	<u>Annual Cost</u>
2009	100,000,000 kWh	5 cents/kWh	\$5,000,000
2010	200,000,000	4.75	\$9,500,000
2011	300,000,000	4.50	\$13,500,000
2012	400,000,000	4.25	\$17,000,000
2013	500,000,000	4.0	\$20,000,000

2014	600,000,000	3.75	\$22,500,000
2015	750,000,000	3.50	\$26,250,000
2016	900,000,000	3.25	\$29,250,000
2017	1,050,000,000	3.0	\$31,500,000
2018	1,200,000,000	2.75	\$33,000,000
2019	1,350,000,000	2.50	\$31,250,000
2020	1,500,000,000	2.25	\$29,250,000
2021	1,650,000,000	2.00	\$27,000,000
2022	1,800,000,000	1.75	\$24,500,000
2023	1,950,000,000	1.50	\$21,750,000
2024	2,100,000,000	1.25	\$18,750,000
2025	2,250,000,000	1.00	\$15,000,000

11. **Barriers to Implementation:** It is not clear whether legislation would be required to provided the PSC with the authority to set advanced renewable tariffs and impose targets on utilities.

12. **Other Factors:** The Wisconsin Distributed Resources Collaborative (WIDRC) has spearheaded a voluntary effort to develop a consensus proposal for establishing Advanced Renewable Tariffs. This group has been meeting steadily on this issue since early 2006 to work out various methodological and economic issues associated purchasing renewable electricity from customer-generators. The current proposal before the body recommends a biogas tariff of 10 cents/kWh for systems up to 500 kW, and nine cents/kWh between 500 kW and one megawatt. This initiative has prompted two separate utility proposals this year to establish

technology-specific tariffs, and they are both under consideration by the PSC. One, offered by Madison Gas & Electric, would buy back solar-generated electricity from its customers at a rate of 25 cents/kWh. The other, proposed by Xcel-Northern States Power, proposes a biogas rate of 7.3 cents/kWh and a wind energy rate of 6.6 cents/kWh. It is interesting to note that while these proposed tariffs are higher than the utilities' respective parallel generation rates, they are below the production costs of the technology to be incentivized. Their success in stimulating customer-sited distributed renewable generation wholly depends on other financial support external to the utility tariff, such as federal tax credits and Focus on Energy incentives.

Wisconsin Global Warming Task Force Workgroup Template For Presentation Policy Options

1. **Workgroup:** Electric Generation and Supply

2. **Policy Name:** Relax restrictions on construction of new nuclear plants

3. **Policy Type:** Legislation revising statutory restrictions on approval of new nuclear plants

4. **Affected Sectors, Sub-Sectors and/or Entities:**
 - Sector: Electric utility
 - Sub-Sector: Distribution utilities

5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Compared to current statewide average CO₂ emissions for electric generation, a single new 1100 MW nuclear unit (such as the Westinghouse AP-1000) would reduce greenhouse gas emissions by approximately 6.9 million metric tons per year. A 1500 MW unit (such as the General Electric ABWR) would reduce emissions by approximately 9.4 million metric tons per year.

6. **Estimated Costs:** See Section 10.

7. **Specific Description of Policy Proposal:** Under Wisconsin’s “nuclear moratorium” law (§ 196.493, Wis. Stats.), the Public Service Commission (PSC) may not authorize the construction of a nuclear plant unless it finds that a facility will be available for the disposal of high-level waste from all Wisconsin nuclear plants, and that the proposed plant is economically advantageous to ratepayers based on specified factors. This proposed policy would not mandate or encourage new nuclear plant construction, but would relax this statutory restriction. Specifically, the policy would revise § 196.493 to allow the PSC to authorize the construction of a nuclear plant, under specified conditions described below, without making these findings.

Concern has been expressed over whether Wisconsin utilities would actually pursue new nuclear plants, given the decisions by these utilities to sell their existing nuclear plants. If Wisconsin utilities do not pursue new nuclear plants, the primary beneficiaries of a relaxation of the restrictions in § 196.493 would likely be merchant generating companies. A merchant generating company could potentially sell the output of a new nuclear unit to out-of-state customers. In this case, Wisconsin consumers would not benefit from the plant, and greenhouse gas emissions associated with serving Wisconsin load would not be affected. To address this concern, the conditions under which the PSC could approve the construction of a new nuclear plant by an entity other than a utility without making the determinations in § 196.493 would include the requirement that:

1. Wisconsin utilities must be granted the right of first refusal to purchase the output of the proposed plant.
 2. At least [75] percent of the capacity of the proposed plant must be contracted to Wisconsin utilities under long-term power purchase agreements.
 3. All green attributes must go to the Wisconsin utilities to which the plant output has been contracted.
8. **Timetables, Duration and Stringency Option:** Construction of a new nuclear plant could be approved at any time following enactment of the proposed legislation. Under the current statute, approval of a new nuclear plant would likely be delayed until a federal waste repository is in operation. The Department of Energy currently does not expect the Yucca Mountain repository to be available to receive waste before 2017, at the earliest.
9. **Explanation of Rough Estimate of GHG Reductions:** The estimated GHG reductions in Section 5 are based on an estimated statewide average GHG emission rate of 1,850 lbs per MWh and an assumed capacity factor of 85% for the new nuclear unit.
10. **Rough Estimate of Costs for Selected Years:** The lack of recent nuclear plant construction experience in the United States makes it difficult to estimate the cost of constructing a new plant. If new nuclear plants prove more costly than

available alternatives, such plants will presumably not be pursued and the proposed policy will have no effect on ratepayer costs. If, on the other hand, new nuclear plants prove more economical than available alternatives, the proposed policy will potentially reduce ratepayer costs relative to a status quo in which the nuclear option is not available.

11. **Barriers to Implementation:** The primary barrier to implementation of this policy is the need for legislation to amend § 196.493. Opposition is likely since the proposed amendment would potentially result in the generation of additional nuclear waste in Wisconsin prior to the availability of a permanent waste repository.

12. **Other Factors:** Uncertainty regarding the cost and timing of new nuclear plants makes it difficult to project the emission reductions that may be achieved as a result of this policy, or the cost of achieving these reductions. However, the only relatively near-term prospect for large-scale, carbon-free baseload generating capacity other than nuclear is coal with carbon capture and storage (CCS). This option also faces significant uncertainties regarding technology, cost and timing, as well as legal and regulatory issues that must be addressed to allow the implementation of geologic sequestration. As a result, the [majority of the] working group members believe nuclear power should be available as an option in Wisconsin.