STRATEGIC ENERGY ASSESSMENT 2020-2026:

AN ANALYSIS OF THE DRAFT STUDY

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About the Strategic Energy Assessment

- Established by law in 1998
- Replaced the Advance Plan process (IRP)
- Updated every two years, looking out over 7 years
- PSC proscribed from issuing orders based on report’s contents and conclusions
In the Commission’s Own Words

“The SEA is a study prepared by the Commission ... that profiles the state’s electricity system. Topics include the adequacy and reliability of electric supply and transmission, the affordability of customer rates and bills, and initiatives towards the environmentally responsible delivery of electric services.”
About this edition of the SEA
(5-ES-110)

• Data gathered from utilities in late 2019, before the onset of COVID-19

• During the current SEA cycle, the PSC transitioned from a Walker-appointed majority to an Evers-appointed majority

• None of the current Commissioners participated in the 2018 SEA
Important numbers

Electricity sales (2019) -- 69,185,670 MWH – holding steady

Average non-coincident peak demand per month ranges from ~9,500 MW in April to ~13,500 MW in July (page 7)

Maximum monthly peak forecasted to increase from 14,023 in 2020 to 14,601 in 2026 (page 9)

Current reserve margin expected to remain below 10% through 2026
Job 1 for a Strategy Document

ASK THE RIGHT QUESTIONS!
What questions does the SEA ask?

- Does Wisconsin have adequate supplies of electricity through 2026?
- Are there any reliability issues affecting Wisconsin electric providers?
- How do Wisconsin’s electric rates compare with those of other states?
- What is the status of Wisconsin’s clean energy programs/policies?
What other questions could the SEA ask and answer?

- What has transpired at the PSC since the previous SEA was issued?

- What are the important regulatory issues that arise from the energy resource transition now underway?

- Are there regulatory developments and supply innovations occurring in neighboring states that may be relevant to the Wisconsin electric industry? (Hint: community solar, interconnection code updates)

- Are there significant customer/local government initiatives that are affecting utility supply decisions?
What’s missing from this SEA

- References to broad issues and key concepts: climate change, public health impacts, stranded assets, third party financing, decentralized grid, building electrification, net zero energy
- Policies: Energy Priorities Law, interconnection rules (PSC 119)
- State and local government actions: State Executive Orders, clean energy commitments
- A narrative flow to help identify emerging themes and trends
Observations on the Draft SEA

- Defensive in tone
- Lacking in policy context
- Incurious stance towards changes in the industry
- Reliant on outdated information and stale concepts, especially with respect to renewables
- Heavy utility-centric orientation creates blind spots

Result: an assessment that seems frozen in time and disconnected from the world outside of Wisconsin.
What has the PSC done since previous SEA?

• Approved four solar farms totaling ~700 MW
• Approved utility ownership of two solar farms totaling 450 MW
• Approved two MGE applications to expand shared solar, RER
• Approved Focus on Energy’s 3\textsuperscript{rd} Quad Plan (2019-2022) – authorizing $22 million in RE incentives
• Approved Cardinal-Hickory Creek transmission line
• Approved Nemadji Trail gas plant
• Approved a capital recovery settlement triggered by permanent shutdown of Pleasant Prairie
• Approved several utility-provided EV charging services
What is pending before the PSC today?

- Five solar CPCN applications totaling 950 MW
- Alliant application to acquire 675 MW of solar generation
- MGE application to build 20 MW solar farm for RER program
- Ongoing EV investigation (5-EI-156)
- Parallel generation/PURPA docket (5-EI-157)
There are several problems with this map.

1) It depicts a number of coal-fired power plants that were retired several years ago (Alma, Pulliam, and Pleasant Prairie).

2) There are no solar farms depicted, including the Engie-owned arrays serving Dairyland Power Cooperative.

3) It does not show out-of-state wind farms supplying power to WI utilities.
33 installations
35 MWAC capacity
Wind Farms Supplying WI Electric Providers

- 12 operating in WI: 737 MW
- 2 permitted in WI: 164 MW
- 10 operating out-of-state: 865 MW
- 2 out-of-state under construction: 202 MW
That’s where we were in 2018. With the retirement of Pleasant Prairie that year, the coal fraction has shrunk to about 40% today.
Increased deployment of natural gas and zero-carbon energy resources have been influenced by environmental considerations as well as declining prices. As the Emissions chapter outlines in greater detail, a number of electric providers in Wisconsin have set goals to reduce carbon dioxide emissions from their generation sources, and report that increased deployment of natural gas and zero-carbon energy resources will be two primary approaches to pursuing those goals. The growing emphasis on reducing emissions through shifts in generation has corresponded with a de-emphasis on initiatives to install emissions control equipment on existing generation facilities. While Wisconsin electricity providers have spent more than $3 billion on emissions control projects since 2000, no such projects are currently in progress or planned for future years.

OK so far as it goes, but what does this “increased deployment” mean for existing coal-fired power plants? These two dots are pleading to be connected, but the document does not go there.
Three comments:

1. **Coal generation today is close to 2026 forecast levels**

2. **Virtually no increase in windpower anticipated**

3. **All future RE growth is anticipated to come from solar**
These are clearly uneconomic plants. However, the SEA’s coal forecast does not factor in Edgewater 5’s scheduled retirement (in 2022), and there is no retirement date set for South Oak Creek.

### WEPCO/WP&L Coal Plants on the Bubble

#### Capacity Factors – Actual v. Authorized

(Authorized percentages in parens)

<table>
<thead>
<tr>
<th>Month</th>
<th>SOC 5</th>
<th>SOC 6</th>
<th>SOC 7</th>
<th>SOC 8</th>
<th>Edge5</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>42.2</td>
<td>15.1</td>
<td>80.2</td>
<td>36.3</td>
<td>48.7</td>
</tr>
<tr>
<td></td>
<td>(69.6)</td>
<td>(93.3)</td>
<td>(67.4)</td>
<td>(99.9)</td>
<td>(87.6)</td>
</tr>
<tr>
<td>February</td>
<td>7.0</td>
<td>10.5</td>
<td>65.0</td>
<td>5.4</td>
<td>42.9</td>
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<tr>
<td></td>
<td>(85.2)</td>
<td>(93.7)</td>
<td>(95.4)</td>
<td>(77.8)</td>
<td>(78.5)</td>
</tr>
<tr>
<td>March</td>
<td>0.0</td>
<td>0.0</td>
<td>74.0</td>
<td>0.0</td>
<td>-0.8</td>
</tr>
<tr>
<td></td>
<td>(91.0)</td>
<td>67.8</td>
<td>(5.4)</td>
<td>(0.0)</td>
<td>(72.3)</td>
</tr>
<tr>
<td>April</td>
<td>0.0</td>
<td>0.0</td>
<td>-0.9</td>
<td>27.1</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>(75.6)</td>
<td>(64.8)</td>
<td>(60.6)</td>
<td>(10.5)</td>
<td>(61.9)</td>
</tr>
<tr>
<td>May</td>
<td>0.0</td>
<td>0.0</td>
<td>7.6</td>
<td>16.2</td>
<td>9.8</td>
</tr>
<tr>
<td></td>
<td>(67.7)</td>
<td>(55.7)</td>
<td>(64.4)</td>
<td>(60.8)</td>
<td>(53.3)</td>
</tr>
</tbody>
</table>

Key: SOC = South Oak Creek
Edge5 = Edgewater 5

Sources:
6630-GF-114, 6680-GF-110
An unasked question: Is there enough solar under development to fill the capacity hole created by shutting down additional coal plants?
## Solar projects approved by the PSC

<table>
<thead>
<tr>
<th>Project name</th>
<th>County</th>
<th>MWAC</th>
<th>Developer/Utilities</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Creeks</td>
<td>Manitowoc</td>
<td>150</td>
<td>NextEra Energy (WPS + MGE)</td>
<td>Under construction Online 12/2020</td>
</tr>
<tr>
<td>Badger Hollow</td>
<td>Iowa</td>
<td>300</td>
<td>Invenergy WPS, MGE, WEPCO)</td>
<td>Under construction Online 4/2021-12/2022</td>
</tr>
<tr>
<td>Point Beach Solar</td>
<td>Manitowoc</td>
<td>100</td>
<td>NextEra Energy</td>
<td>Approved 12/2019 Online 10/2021</td>
</tr>
<tr>
<td>Badger State Solar</td>
<td>Jefferson</td>
<td>149</td>
<td>Ranger Power</td>
<td>Approved 1/2020 Online 11/2022</td>
</tr>
</tbody>
</table>

699 MW total
## Solar CPCN projects under review

<table>
<thead>
<tr>
<th>Project name</th>
<th>County/ Municipality</th>
<th>MWAC</th>
<th>Developer</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paris Solar</td>
<td>Kenosha (Paris)</td>
<td>200</td>
<td>Invenergy</td>
<td>Anticipated decision date 11/2020</td>
</tr>
<tr>
<td>Wood County Solar*</td>
<td>Wood (Saratoga)</td>
<td>150</td>
<td>Savion Energy</td>
<td>Anticipated decision date 12/2020</td>
</tr>
<tr>
<td>Grant County Solar*</td>
<td>Grant (Potosi + Harrison)</td>
<td>200</td>
<td>Next Era Energy</td>
<td>Anticipated decision date 1/2021</td>
</tr>
<tr>
<td>Onion River*</td>
<td>Sheboygan (Holland)</td>
<td>150</td>
<td>Ranger Power</td>
<td>Anticipated decision date 2/2021</td>
</tr>
<tr>
<td>Darien Solar</td>
<td>Walworth</td>
<td>250</td>
<td>Invenergy</td>
<td>CPCN application filed</td>
</tr>
</tbody>
</table>

950 MW total  

* Included in Alliant’s Solar CA
What other projects are under development?

*Not reviewed by PSC*

<table>
<thead>
<tr>
<th>Project name</th>
<th>County/ Municipality</th>
<th>MWAC</th>
<th>Developer</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richland County Solar*</td>
<td>Richland (Buena Vista)</td>
<td>50</td>
<td>Savion Energy</td>
<td>CUP granted 4/2019 – part of Alliant CA</td>
</tr>
<tr>
<td>North Rock Solar*</td>
<td>Rock (Fulton)</td>
<td>50</td>
<td>Geronimo Energy</td>
<td>CUP granted 3/2020 - part of Alliant CA</td>
</tr>
<tr>
<td>Jefferson County Solar*</td>
<td>Jefferson (Jefferson)</td>
<td>75</td>
<td>Ranger Power</td>
<td>Application not yet filed - part of Alliant CA</td>
</tr>
<tr>
<td>Western Mustang Solar</td>
<td>Pierce</td>
<td>74</td>
<td>Ranger Power</td>
<td>CUP decision forthcoming</td>
</tr>
<tr>
<td>Sugar River Wind</td>
<td>Green (Juda)</td>
<td>65</td>
<td>EDF Renewables</td>
<td>CUP granted 9/2019 – approval upheld by PSC</td>
</tr>
<tr>
<td>Red Barn Wind</td>
<td>Grant (Clifton + Wingdale)</td>
<td>99</td>
<td>PRC Resources</td>
<td>CUP granted 7/2019</td>
</tr>
</tbody>
</table>

249 MW solar 164 MW wind *Included in Alliant’s Solar CA*
Transmission Planning

This transmission map on page 23 is a missed opportunity. What would really be useful here is a map that shows how Wisconsin’s transmission backbone is connected to regional grid. The rest of the MISO region should not be treated as terra incognita.
Regional wind power

<table>
<thead>
<tr>
<th>State</th>
<th>Operating (in MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>10,664¹</td>
</tr>
<tr>
<td>Illinois</td>
<td>5,659²</td>
</tr>
<tr>
<td>Minnesota</td>
<td>3,843³</td>
</tr>
<tr>
<td>Michigan</td>
<td>2,357</td>
</tr>
<tr>
<td>Indiana</td>
<td>2,317</td>
</tr>
<tr>
<td>Missouri</td>
<td>959</td>
</tr>
<tr>
<td>Ohio</td>
<td>864</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>737</td>
</tr>
</tbody>
</table>

Owing to its low cost, wind power is the fastest growing source of electricity in the MISO region outside Wisconsin. Wind energy accounts for more than 40% of the electricity generated in Iowa today. This growth is lowering wholesale electricity prices in many parts of the MISO region. Wind power development continues to strongly influence regional transmission planning. This should be highlighted in the SEA. It is not.

As of June 2020
Source: American Wind Energy Ass’n
Stale thinking on renewables and reliability

Regarding balancing supply and demand

“Renewable resources can present more complications for maintaining the balance than baseload resources ... which are more consistently available at all times of the day.” (page 33)
Load growth is non-existent

Trends in Customer Sales

“In 2008, Wisconsin electricity sales fell in response to the recession. While sales have increased every year since 2014 ... total electricity sales in 2018 remained one percent lower than sales in 2007” (page 37).

Update: Electricity sales in 2019 (69,185,670 MWh) were 2% lower than in 2018 (70,938,077 MWh).
Actual and Projected Annual Electric Energy Efficiency Expenditures 2018-2026

Chapter 5 – Clean Energy Programs and Policies (page 59)
Other items the SEA should address

The SEA’s discussion of energy efficiency is limited to the Focus on Energy program. The document does not contain any discussion of trends and initiatives occurring elsewhere in the United States. No mention is made of building electrification programs or net zero energy buildings.
Renewable Portfolio Standard

Renewable electricity supplying Wisconsin utilities

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Sales (in MWh)</th>
<th>Amount supplied by renewable energy (includes green pricing programs)</th>
<th>RE %</th>
<th>In-State %</th>
<th>Out-of-State %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>69,185,670</td>
<td>7,705,536</td>
<td>11.1</td>
<td>5.3</td>
<td>5.8</td>
</tr>
<tr>
<td>2018</td>
<td>70,938,077</td>
<td>7,638,136</td>
<td>10.8</td>
<td>5.0</td>
<td>5.8</td>
</tr>
<tr>
<td>2017</td>
<td>68,978,813</td>
<td>8,378,864</td>
<td>12.1</td>
<td>5.3</td>
<td>6.8</td>
</tr>
<tr>
<td>2016</td>
<td>69,724,917</td>
<td>7,719,363</td>
<td>11.1</td>
<td>5.1</td>
<td>5.9</td>
</tr>
<tr>
<td>2015</td>
<td>68,698,826</td>
<td>7,486,945</td>
<td>10.9</td>
<td>5.2</td>
<td>5.6</td>
</tr>
<tr>
<td>2014</td>
<td>69,191,661</td>
<td>7,946,692</td>
<td>11.5</td>
<td>5.5</td>
<td>6.0</td>
</tr>
<tr>
<td>2013</td>
<td>68,768,680</td>
<td>7,396,276</td>
<td>10.8</td>
<td>5.1</td>
<td>5.6</td>
</tr>
</tbody>
</table>

Renewable Electricity as a Percentage of Electricity Sales, by Utility - 2019

<table>
<thead>
<tr>
<th>Electric Provider</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern States Power - Wisconsin</td>
<td>24.7%</td>
</tr>
<tr>
<td>Dairyland Power Cooperative</td>
<td>16.1%</td>
</tr>
<tr>
<td>Wisconsin Power &amp; Light</td>
<td>13.5%</td>
</tr>
<tr>
<td>WPPI Energy</td>
<td>13.0%</td>
</tr>
<tr>
<td>Madison Gas &amp; Electric</td>
<td>12.3%</td>
</tr>
<tr>
<td>Wisconsin Public Service Corp.</td>
<td>6.7%</td>
</tr>
<tr>
<td>Wisconsin Electric Power Co.</td>
<td>5.4%</td>
</tr>
<tr>
<td>WISCONSIN TOTAL</td>
<td>10.7%</td>
</tr>
</tbody>
</table>

RPS-compliant electricity only
Approved Solar Additions in Wisconsin and Expected Renewable Energy Generation and Percentage

<table>
<thead>
<tr>
<th>Solar Facility Additions</th>
<th>Expected In-Service</th>
<th>Expected Renewable Annual Generation (MWh)</th>
<th>Statewide Renewable Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Statewide: 7,638,136</td>
<td>10.8%</td>
</tr>
<tr>
<td>Badger Hollow</td>
<td>2020</td>
<td>630,720</td>
<td></td>
</tr>
<tr>
<td>Two Creeks</td>
<td>2020</td>
<td>315,360</td>
<td></td>
</tr>
<tr>
<td>Richland County Solar Farm</td>
<td>2021</td>
<td>104,069</td>
<td></td>
</tr>
<tr>
<td>Point Beach</td>
<td>2021</td>
<td>210,240</td>
<td></td>
</tr>
<tr>
<td>Badger State</td>
<td>2022</td>
<td>313,258</td>
<td></td>
</tr>
<tr>
<td>Statewide 2023: 71,000,000</td>
<td></td>
<td>Statewide: 9,211,783</td>
<td>13.0%</td>
</tr>
</tbody>
</table>

It takes 350 MW of utility-scale solar generation to produce 1% of Wisconsin electricity sales at present levels.

Over the planning period, solar capacity will likely increase by 300-600 MW annually. By the end of 2026, Wisconsin should have more than 3,000 MW of solar in operation.
The left chart (on page 67) shows that total capacity offered by WI community solar programs increased 87% from 2017 to 2020, (7 MW). The chart on the right shows that, in Xcel Energy’s MN territory, there is now 699 MW of solar capacity serving Xcel subscribers, two orders of magnitude more capacity. There is no reference in the SEA to MN’s community solar law, or its results to date.
Distributed Energy Resources (DERs)

At 258 MW(DC), DER capacity accounts for 1.66% of total statewide capacity. Solar accounts for 38% of total capacity and 95% of installations (6,466 in total).

Draft SEA – pages 67-69
Quite a lot missing in this section

No references to:
- Parallel generation docket (5-EI-157)
- Third-party ownership
- Interconnection standards (PSC 119)

- One sentence on net metering: “Net metering arrangements enable eligible customers to receive bill credits for providing excess energy production from their generation back to their electric provider.”
Solar is outpacing other DER resources, increasing at about 15-20 MW/year. However, solar’s growth has been masked by larger declines in biogas, landfill gas, and wind capacity.
Electric Vehicles

- A comparatively robust discussion of policy options in this section
- No discussion on other state policies and actions, however
- Only place in SEA where third-party ownership is referenced.

Many commented in the investigation that third-party ownership of public EV charging stations should not require the owner to be regulated as a public utility. However, the potential application of the statutory definition of a public utility to an EV charging station...
Chapter 6 – Electric System Emissions

Figure 6-1: Comparison of CO₂ Emissions by End Use in Wisconsin vs. National Average

Draft SEA – page 72
A Blinkered, Frustrating Discussion

- Information presented in this chapter comes from utility responses to data requests
- Lack of research and discussion of utility initiatives elsewhere in the region
- No explanation given for WI utility CO2 reduction goals
- No policy context provided, including Gov. Evers’ executive orders
- A historical view is provided, but SEA punts on projections
- Energy efficiency is given short shrift
Coal plant retirements are accelerating to the west of us. By 2021, fossil fuels will account for only 33% of Xcel’s resource mix.
“Now” was back in 2017

Reducing Carbon Affordably
Upper Midwest Energy Mix

Now
- 25% renewable
- 55% carbon-free

2021
- 40% renewable
- 67% carbon-free
Result: An Underwhelming Projection

Unfortunately, this draft seems more intent in keeping its head down than in making the case that steeper CO2 reductions is the more likely outcome.
What Should Our Comments Contain?

- Statement of interest by the organization(s)

- Critique of document section relating to org’s interest
  - (Example: What! No mention of climate change?)

- Recommendations for future lines of inquiry + actions
  - (Example: Integrate carbon reduction goals in PSC-administered programs such as Focus on Energy)
Who Submitted Comments in 2018?

- WI Utilities Ass’n (1-page)
- Customers 1st Coalition (EV’s)
- Citizens Utility Board
- Industrial Customer Groups
  - (IEG + WPC)
- RENEW
- American Transmission Co.
- A few anti-ATC voices
- Save Our Unique Lands (SOUL)
- Radloff Group
- FRWD (utility front group)
QUESTIONS?

MICHAEL VICKERMAN, RENEW WISCONSIN
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