

PEOPLE OF WISCONSIN VS. PSC COMMISSIONERS

WHAT WI PSC COMMISSIONERS GOT DEAD WRONG re *CARDINAL HICKORY CREEK*

ECONOMICS

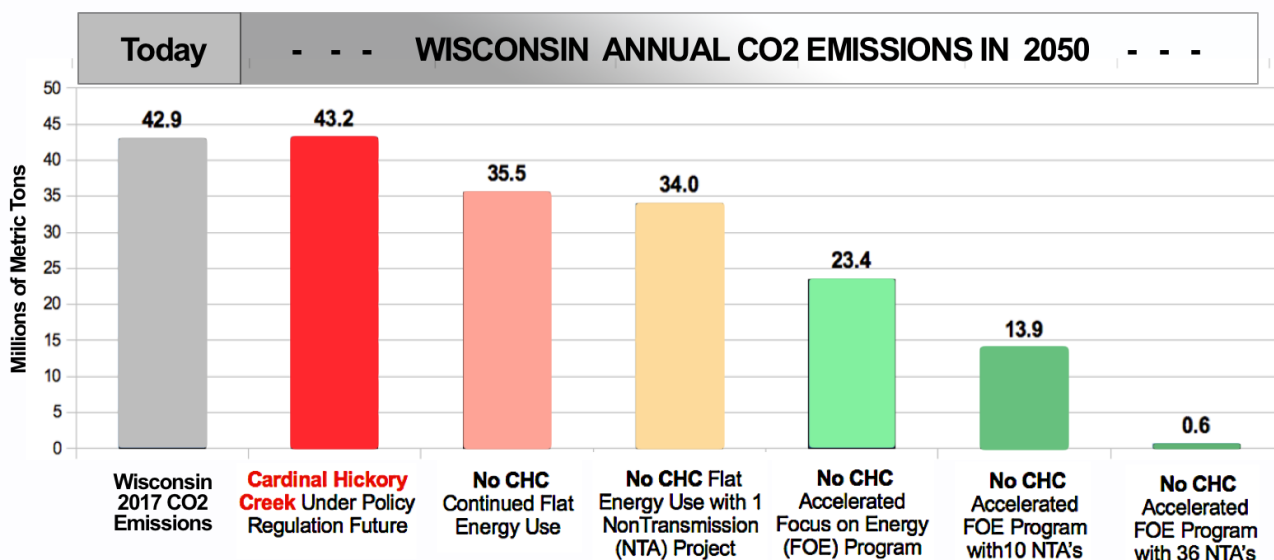
The Cardinal Hickory Creek (CHC) transmission line does not meet absolute, *minimum* economic standards of Wisconsin law § 196.49(3)(d)3t and regional utility (MISO) criteria. Economic and engineering staff serving under the PSC Wisconsin Commissioners concluded that CHC would not pay for itself, as required, but rather *add to electric bills in 8 of 11 future scenarios they examined*. The underlying economic planning for CHC designed by transmission builders, with support of PSC Commissioner Huebsch, was found to impose *\$200-\$282 billion in new power plants costs, assume steadily increase in electricity use for the next 40 years* and it severely limits electric customer access to savings & CO2 reductions from energy efficiency and home solar.

With these costs Commissioners failed to mention factored in, the impact per household is about \$20 per month, *on average*, the equivalent of an instantaneous, \$20 per month hike from 2023-2063.

WI Electric Customer 40 Year Expense	Millions	Residential Customers (Millions)	Commercial Customers (Millions)	Industrial Customers (Millions)
WI Share of New Power Plants Assumed	43,200	13,392	14,688	15,120
CHC Cost from Payment Schedules	330	102	112	116
Additional Electricity Use Assumed	42,000	13,020	14,280	14,700
Refund Builders Application Costs	28	9	10	10
Subtotals	\$85,558	26,523	29,090	29,945
CHC Energy & Reliability Savings PSC Staff	-27.84	-9	-9	-10
Total Cost for CHC, New Plants & Additional Energy	\$85,530	\$26,514	\$29,080	\$29,936
Cost Per Month Per WI Customer, 40 Year Average (Dollars)	\$58.64	\$20.60	\$172.26	\$11,007.01

CO2 EMISSIONS

PSC Commissioner Valcq grossly mis-stated when she described CHC as the “cornerstone,” for Wisconsin to reach zero carbon emissions by 2050. When actual, transmission builders’CO2 reductions, 36 metric tons over 40 years, are adjusted *for the assumed increase in electricity use*, state CO2 emissions *would increase over time*. The below table shows CO2 emissions in 2050 from data in the case including alternatives presented by SOUL of Wisconsin’s Non-Transmission Alternative (NTA) engineer, Bill Powers:



IMPROVEMENTS TO EXISTING TRANSMISSION LINES ARE SUPERIOR

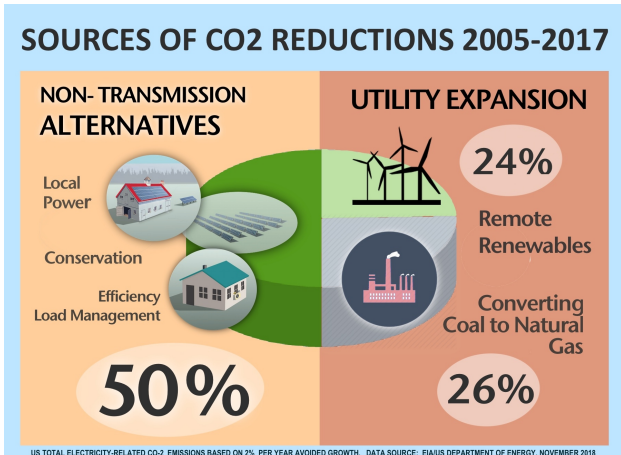
Disturbingly and without explanation, the PSC Commissioners swept past findings of PSC staff Engineers and their profound implications on all Wisconsin energy planning. PSC Staff discovered the CHC application *hid* long-overdue improvements for two, 70 year old, transmission lines at the Mississippi River crossing. The hiding prevented the public from considering a much lower cost alternative without environmental impacts.

Staff found that making the improvement without CHC would double power carrying capabilities for only \$900,000 and so developed a *full alternative to CHC* called the Base With Asset Renewal Alternative (BWARA). It is exceptionally superior to CHC by all measures. It costs 1/360th as much as CHC, it matches the reliability performance of CHC, it comfortably meets state economic requirements it encourages wide implementation of Non-Transmission Alternatives which would save ratepayer billions while maximizing CO2 reductions.

WHAT PUBLIC INTERVENORS GOT 100% RIGHT:

Energy Efficiency and Non-Transmission Alternatives do Serve Public Interests:

Commissioners' reasoning also ignored the findings of 45 citizen, government and organizational intervenors and twelve national experts who detailed the maximized savings and CO2 reductions of efficiency and other Non-Transmission Alternatives. The U.S. Dept. of Energy analyzed CO2 emission reductions since 2005. They determined that 50% of the CO2 emissions reductions came from energy efficiency and other Non-Transmission Alternatives. Despite electric customers spending hundreds of billions more on new gas power plants and far away renewable energy, these utility-profiting dollars performed no better than direct actions by customers.



Residential Use

Spending Options	Monthly Elect. Bill 2018	Electric Bill After 30 Years	Average Savings / Loss Per Mo	Savings / Loss Over 30 Years
Do Nothing	\$100	\$226	Reference	Reference
Double Energy Efficiency	\$100	\$161	\$27	\$9,819
Double EE+Solar	\$100	\$34	\$91	\$32,873
Off Grid Solar + EE	\$100	\$0	\$86	\$30,958
UTILITY EXPANSION CARDINAL HICKORY CREEK	\$100	\$277	-\$20	-\$7,263

Dairy Farm Use

Spending Options	Monthly Elect. Bill 2018	Electric Bill After 30 Years	Average Savings / Loss Per Mo	Savings / Loss Over 30 Years
Do Nothing	\$280	\$631	Reference	Reference
Double Energy Efficiency	\$280	\$441	\$81	\$29,062
Double EE+Solar	\$280	\$34	\$286	\$102,834
Off Grid Solar + EE	\$280	\$0	\$211	\$75,860
UTILITY EXPANSION CARDINAL HICKORY CREEK	\$280	\$782	-\$59	-\$21,419

NOTES: The reference or "Do Nothing" case assumes Cardinal Hickory Creek and other expansions are not pursued with rates and fees increasing at 2.7% per year or .25% less compared to 2007-2017 historical increase of 2.96%/year. The Doubled Energy Efficiency Non-Transmission Alternative assumes a net -.6% / year reduction in use per year based doubling established 2016 Focus on Energy program performance. The Doubled EE + Solar is a grid-tied, on-site array earning retail credit. Cost for the average residential installation is \$15,000 for a 6kW array. Cost for the dairy operation array is \$47,000 for a 20 kW installation. Both arrays are sized to meet 100% of use in year 15. 30 year savings include the cost of the solar arrays. The Double Energy Efficiency + Off Grid Solar NTA involves a \$27,000 investment for a residential 6kW array w/battery storage and a \$85,000 solar array for a farm-located 20 kW array w/ battery storage. The Cardinal Hickory Creek case includes the transmission line with assumed power plant additions, .3% per year growth in use with rates/fees increasing .25% per year above 2007-2017 historical trend of 2.96%/year. Efficiency and Solar create savings from reduced use and avoided rate and fee increases.

In-Progress Primer of PSCW Commissioner Mistakes in Approving the Cardinal Hickory Creek Transmission Line.

Note: There may be an updated version at http://bit.ly/Commissioners_Mistakes

On August 20, 2019, the decision-making heads of the Wisconsin Public Service Commission (PSC)¹ met to discuss and vote upon a proposed, high-profile, 345 kV expansion transmission line spanning from substations on the outskirts of Madison, Wisconsin and Dubuque, Iowa. Taking its name from these substations, *Cardinal-Hickory Creek (CHC)*, was formalized nine years ago in a study funded by for-profit utility interests of Midwest ISO or “MISO.”²

Very unlike energy planning used *most* states³ which always compares benefits and costs from efficiency improvements to reduce use when considering generation and transmission additions, the *growth presumption* of MISO “planning,” appears right in its name, MISO *Transmission Expansion Planning* (MTEP). While energy use in the Midwest has been flat or dropping for 10 years, MTEP planning still begins by speculating hundreds of billions in new power plants that customers would pay for. Then it freezes out spending options to reduce electricity use and develop end user generation such as rooftop solar (more below).

To help sell this spending exercise as energy planning, MISO adopted *Guiding Principles* while introducing to the world what would become *Cardinal Hickory-Creek (CHC)* among 17 other expansion lines to the world in 2011⁴. Here are the three, guiding principles that MISO stipulated in 2011 for CHC to be measured by:

MISO’S THREE, PRINCIPLE-LESS GUIDES

Economics. The Midwest regional transmission system is a spider web like network of larger (high voltage) and smaller (low voltage) transmission lines. MISO principle *requires* transmission additions to the system like CHC to, *minimally* pay for their own construction and operation costs over the course of 40 years by creating *energy cost savings*. These savings arise from adding a small amount of efficiency to *the entire system* to meet demand, not just the area where a line is located. Demand in Wisconsin has been trending downward since 2007⁵.

Due to the large number of high-capacity transmission lines added in recent years⁶, the amount of grid *in-efficiency* remaining to improve is quite small. The value of potential *energy cost savings* is now on the order of pennies per month per residential customer over the 40 years required to collect sufficient funds⁷.

Customers should be highly skeptical of any *investment* that might only *pay for itself* over 40 years, but essentially. MISO had no choice but to require the absolute minimum of a 1:1 benefit for CHC. Utilities gamble that no one will read deep enough into their principles to uncover this fact.⁸ Energy efficiency, for example, has given ratepayers well documented 3:1 returns for over 20 years.

MISO’s MTEP economic forecasting is then adopted by transmission builders because it simulates advantageous growth under energy *future scenarios* to beef up future energy use estimates and show potential increases of the 1:1 ratio. As further explained below, PSC staff found that CHC does meet MISO or Wisconsin minimal requirements in 8 of the 11 future scenarios they tested.

Reliability. In *principle*, MISO requires big projects like CHC to also improve system reliability, but “keeping the lights on” comes from avoiding disturbances to smaller distribution lines. It is rare for power outages to be caused by transmission line failure because they are more robust in structure and are closely monitored by transmission operators/owners. Now, with flat use and many existing lines are coming due for updating, adding a new, big transmission line to improve reliability tends to be very cost ineffective. This is what the Wisconsin Public Service Commission engineering staff determined for CHC. They found that *just* rebuilding, three older low lines that transmission builders proposed should be rebuilt *at the same time as CHC* would realize the same reliability improvements at a tiny fraction of the cost and environmental costs.

Nothing is 100% reliable, even transmission lines. When tragedy strikes, reliability comes from *redundancy* in parallel transmission lines and from multiple power plants as defined by North American Electric Reliability Corporation, not MISO. MISO refused to update planning to define one, unmet, existing NERC requirement that CHC could address.

Environmental improvements are the vaguest of all MISO principles. In 2010, MISO could argue new lines could help states meet its renewable portfolio standards (RPS), but those have been met.

If MISO’s utility interests were serious about the environment the organization could have established a very simple principle: new lines that expand the system must create *net* CO2 emission reductions over time. Tragically, while MISO’s 40 year planning projects net increases in CO2, the public desire for reduction is so strong suggestive phrasing like CHC would, “increase access,” and, “create new pathways” is interpreted as accountable. Actual CO2 impacts are described below.

PSCW COMMISSIONERS FAIL ECONOMICS

The open meeting called by Wisconsin Commissioners at the Madison, Wisconsin headquarters on August 20, 2019 to, “discuss points on the decision matrix,” packed the main hearing room and overflow rooms with video screens. As Commissioners, supposedly, had not talked with other or debated the issue before this meeting, people came from all corners of the state to witness, first hand, Commissioners discussing not only CHC, but their Commissioners’ visions for Wisconsin’s energy future through rigorously comparing utility-funded planning and public proposed alternative planning as required by state statute under *contested case hearing* process⁹.

When Commissioners immediately rushed to announce their final votes, (3-0 in favor of CHC), the wind was knocked out of every person in the room, including PSC staff. Not only did commissioners limit their explanations to a handful of crafted phrases, it became abundantly clear they had prepared strategy to not reference or give any credence to any proposals or facts that could be used against their decision during appeal.

Instead of taking societal advantage of four years of substantive public discussion resulting in record numbers of public intervenors, public comments, hearing testimony and lower cost alternatives to consider, the meeting was a flop, by design. Worse, at ratepayer cost of \$28.3 million for utilities and intervenors to make their cases, this one meeting provided the entirety all public, PSC discussion around CHC and our energy future as Commissioners turned, brutally, to fend off appeal using joint resources with utilities.

Before diving more deeply into the ramifications, it behooves every concerned citizen in the Midwest, from fixed income retirees to climate change activists, to understand the phraseologies commissioners used to bypass fact and confuse the press and the public. The tricky phrasing floats on top a deeper wrongs committed by Wisconsin lawmakers starting in 1998 that encourage and reward Commissioners for simply not caring about ratepayers or conduct of energy planning.

Out of the gate, Wisconsin PSC Commissioner Mike Huebsch described CHC as a bargain because Wisconsin ratepayers would pay, “**only 15% of the cost.**” adding that CHC’s, “**economic benefits outweigh the costs.**” Commissioner Ellen Nowak later echoed his second point. Taking these phrases in order:

- There are very profound economic downsides to the 85% price cut bargain through MISO’s regional “cost-sharing” mechanism which more accurately called, **regional cost burdening**.¹⁰ The very high costs for regionally defined expansion lines heaped on Wisconsin ratepayers, mostly of them built in other states, have averaged \$428 million per year since 2005 with noticeable leap in 2011.¹¹ With insight that persists today, MISO regional cost-burdening was immediately challenged in the courts by attorney generals of Illinois and Michigan as ploy to hide ratepayer costs for the largest ever transmission buildout within an invisible, steady stream of increments over 40 years. The court, like Wisconsin Commissioners, did not stop to consider whether MISO provided ratepayers *accountability* for their billions. On whim, Judge Posner took MISO’s remote wind power bait whole, “The best guess is that it [electricity market demand for wind power] will grow fast and confer substantial benefits on the region served by MISO by replacing more expensive local wind power, and power plants that burn oil or coal, with western wind power.” In surmising, ‘replacement’ Posner joined 99.99999% of the public with no clue of how the electricity market works but supercharged it nonetheless.
- Time has proven the Attorney generals dead right. Regionally-burdened transmission spending has clipped along at \$2.2 billion per year, or \$420 million per year on averaged for all Wisconsin ratepayers cloaked under 40 year, high-interest debt.¹² From 2008 to 2016, transmission and distribution spending has grown 5% per year.¹³ While the cost of MISO-traded power plunged nearly in half from 5.6 cents per kWh in 2005 to 2.9 cents per kWh in 2015, in order to meet expansion costs, Wisconsin ratepayers watched rates climb faster than inflation.¹⁴ Fixed facility Fees leap 9.2% from 2012-2016 crushing efforts of conservation minded ratepayers¹⁵. Alliant in Iowa is required to itemize these regional transmission service and tags it at 19% of residential electric bills¹⁶.
- All of the commissioners chose believe the utilities’ data instead of contradictory findings laboriously produced by their own PSC staff, persons¹⁷ bound by agency mission to equally regard utility and ratepayer interests¹⁸. After assessing utility estimates and assumptions three, separate times, PSC staff engineers concluded, the opposite of the Commissioners’ claim, the economic data does not forecast CHC to meet minimal state law and regional utility (1:1) requirements. They found that the *potential, estimated* energy cost savings from CHC for Wisconsin electric customers do not exceed construction and operation costs in 8 of the 11 future scenarios they evaluated¹⁹. Did the Commissioners know that facts on record show that CHC is *most likely* to not pay for itself as required by MISO policy and Wisconsin statute?
- Regionally, PSC staff found that projected energy cost savings for regional customers were considerably less than cost in 2 of 3 future scenarios²⁰. Staff added that regional utilities that the one AAT scenario that does not forecast utility bill increases was described²¹ as least likely by the transmission builders.

- WI Commissioners did risk mentioning dollar amounts. In cross examination concerning CHC payment schedules, it was determined that costs collected from ratepayers for CHC over 30 years would total around \$2.2 billion, regionally with \$330 million due from Wisconsin.²²
- By stating in the *present tense* that, “economic benefits outweigh the costs,” Commissioner Huebsch signals disinterest in *actual economic performance despite a* request filed in the case by 7 Wisconsin legislators asking the Commissioners to test the economic performance records from prior WI expansion lines *during the CHC proceeding*²³.
- Commissioners also failed to mention that CHC costs are a drop in bucket. MISO planning assumes \$200-\$272 billion in new power plants about half of which is fossil fuel generation.²⁴ At MISO’s 15% allocation rate to Wisconsin rate, ratepayer burden of these costs would be more than \$30 billion to be paid over coming decades .
- While Commissioners uttered nothing that could harm their decision in court, the public deserves to know that all five technical experts representing public intervenors concluded that economic benefits from Non-Transmission Alternatives (NTAs) would be far more cost-effective than CHC. SOUL Engineer Bill Powers presented two, lower cost, optimized NTA packages based on adding solar to thousands of home, with and without battery storage using Focus on Energy rebates and municipality based distributed solar + storage systems like those developed in Minster, OH. He estimated these investments would return \$1.5 and \$4.6 billion, benefit to cost ratios *greater than 20:1*.

PSCW COMMISSIONERS SKIRT RELIABILITY

While randomly inserting the word, “reliability” from time to time, PSCW Commissioners never addressed this key factor even though it is the most common reason transmission improvements are made. Wisconsin has ranked in the top tier states for reliability since 2014²⁵ Given the extra attention that reliability received during the technical proceedings, particularly by PSC staff, its omission in Commissioner discussion is stunning any measure.

During the technical proceedings PSC engineering and economic staff arduously reviewed the transmission builders’ economic and reliability assumptions/software modeling. This led to resounding discoveries about transmission system and energy planning consequences for Wisconsin. They determined that over the next 20 years, about 20-22%²⁶ of the transmission lines in Wisconsin (starting with those built in the 50s and 60s) will be rebuilt and/or have their lifespans extended with Non-Transmission Alternatives (NTAs). Crucially, when rebuilding these older lines, the amount of power each can transport doubles. This awareness caused staff to thoroughly assess the potential reliability and economic improvements of just rebuilding older lines in Southwest Wisconsin without adding CHC.

PSC Staff findings were so revelatory they led engineering staff to propose *a low voltage alternative to CHC* requiring less than \$900,000 to rebuild three, low voltage transmission lines with projected reliability improvements comparable to those of the \$330 million CHC line with benefit to cost ratios of 1.2 and 20:1²⁷ Intervenors reviewed and widely supported these findings noting that the staff’s *Base With Asset Renewal Alternative (BWARA)* would out perform CHC under any examined future scenario if the unspent millions were invested in Non-Transmission Alternatives.

No public serving discussion of the CHC application before the Commission could suppress discussion of this Alternative . Compared to CHC, the BWARA Alternative costs 1/360th as much.

Powers' most expensive Non-Transmission Alternative, at half the cost of CHC, is estimated to deliver \$3.8 billion in energy related savings, opposed to bill increases from CHC.

Recognizing the prudence of making the BWARA upgrades, now, and conservatively holding off on the CHC expansion for a while, PSC staff conducted analysis at request of intervenors and found that delaying CHC a few years actually *improved* the project's energy cost savings potential.

PSC COMMISSIONERS BAIL ON THE ENVIRONMENT

As Wisconsin law and MISO criteria establish no measurable, environmental targets that expansion lines must meet, transmission builder literature uses incomplete phrasing to prompt readers to fill in the gaps with their own lofty goals or to assume accountability is buried deep in the paperwork. Having appeared at a press conference announcing a 100% renewable energy target date for Wisconsin days prior²⁸, Commissioner Valcq's presentation was bounding with such phrases the day she shared her reasoning with the public.

Whether through MISO or FERC²⁹, utility interests³⁰ make the rules determining how fossil fuel or renewable generation is utilized within the Midwest electricity market and corresponding transmission system. These utility interests are not frictionless group. They have frequent disputes before FERC and in the courts over market policies, turf and spending emphasis.

Because market policies directly affect use and retirement of utilities' power plants, it is the for-profit parties that haggle policy out while state officials mostly watch from the sideline. PSC commissioners are then relegated to make decisions within the bounds of these, resistant-to-change market rules.

When any use of the entire transmission system is involved, any environmental goal set by government must be carefully designed to work within hard fought market policies or become wishful cheerleading. For all of its shortfalls in incorporating customer or "end user" priorities, MTEP energy planning, like that transmission builders used to promote CHC, shows Commissioners what is and is not possible within this tough setting.

Thus, when Commissioner Valcq equated CHC as a cornerstone of a zero carbon future, the validity of this equation is not measured by her will, that of other state officials but by the precise *economically driven*, environmental accommodations that the *MISO energy planning used to promote CHC* could actually support over the planning period of 40 years (2023-2063).

Because MTEP energy planning is ill very equipped to anything like a zero carbon future and because states are a minor players in shaping MISO MTEP energy planning, the worst political move Wisconsin and PSC commissioners can make is to praise a utility product like CHC, as-is, instead of negotiating for better environmental performance.

In political reality, it is only when our Commissioners consider MISO products like CHC do Commissioners assume powers to influence and negotiate for MISO market policies to realize improved environmental outcomes.

All goals considered, when Wisconsin Commissioners choose CHC and to not side with customer interests and quantifiable environmental accountability, they arrested the development of environmentally friendly state and regional energy planning at the same time. Following is a look at the Commissioners' reasoning and afterwards a look at how far expansion planning can and cannot towards 100% renewable energy in 2050.

Former state lawmaker, now PSC Commissioner Huebsch reckoned a day that, “**wind [power] in Iowa charges batteries in Appleton,**” because CHC, “**would support greater use of renewable energy.**” Commissioner Nowak described a balanced, “**need for the [renewable?] energy,**” adding that CHC, “**would help reduce CO2 emissions.**” Nowak rattled off annual CO2 emission numbers which no intervenors recognized especially as the only number transmission builders provided are totals over 40 years.

Commissioner Rebecca Valcq made a longer statement:

[Cardinal Hickory Creek would be the cornerstone of an “all of the above,” approach.] “This all of the above approach is not only for the type of energy produced, but for where the energy comes from. We need clean energy resources built right here in Wisconsin but we also need access to those resources in other states. The only way to access sources of clean power outside of Wisconsin is with transmission. For me, the risks of not building this line and being wrong, are just too great. I’m voting for the project to ensure energy reliability in our the region and access to lower cost clean energy can be achieved.”

How would these goals play out within the MISO MTEP energy planning they endorse by approval of CHC?

COMMISSIONER’S VALCQ’S DEAL FOR YOU

A good way to see how far utility expansion energy planning can take Wisconsin is to apply Commissioner Valcq’s statement that CHC represents a “cornerstone” to reaching 100% renewable energy in the year 2050³¹. We can use facts from the case, known regional wind power performance data and records of prior consumer spending.

MISO’s independent monitor, Potomac Economics³², determined that 5.2% of the power consumed in the Midwest market in 2011 was wind power³³. Since 2005, utility commissions in the Midwest have obligated electric customers spend about \$4 billion per year on expansion transmission lines³⁴ and remote wind generation. At this sizable rate of spending over 13 years, wind power had only reached 8% by 2018. ³⁵ To attain these consumption percentages, MISO wind power increased from 10,000 MW in 2012 to 19,080 MW in June, 2019 or a MW growth rate of 9.6% per year. Conveniently, if one applies this same growth rate to growth in wind turbines from 2020-2050, this would realize 368,650 MW of wind power, or 100% of 2050 regional electricity use if our energy use stayed the same. ³⁶

To make the cost conservative, lets make the expansion spending rate from 2030 to 2050 more efficient than it was 2005 to 2018 by including the replacement turbines at 20 years and utility-scale storage.

At this very conservative spending rate, the cost of applying CHC/MISO planning³⁷ as Valcq’s cornerstone to 100% renewable energy in 2050 would run about \$980 billion, in 2019 dollars³⁸. With 42 million ratepayers paying for this, each (classless) electric customer’s share would be \$23,000 or ***an addition of \$65 per month*** on averaged electric bills over the 30 year period.

As for siting the approximate 140,000 new wind generators, there are only so many prime wind development areas left; larger spacing between turbines becomes a factor. Assuming state of the art wind turbine efficiency, the required 368,650 megawatts of added turbines would occupy about 110,000 square miles of land, ***an area twice the size of Wisconsin.***³⁹

A very small percentage of consumers might gulp and justify \$65 extra per month for the next 30 years, but the problem is the expansion plan is fundamentally non-competitive, the market would not even allow Valcq's CHC cornerstone vision to happen.

ALTERNATIVES THAT MISO MUST IGNORE

Already, for economic and environmental reasons, we see "distributed" generation on homes, farms, businesses and local community solar installation steadily growing.

The obvious competition is a Wisconsin household with average use taking \$13,600 from the \$23,000 due from the Commissioner's plan to spend it, instead, on 6 kW, grid-tied solar array with profound economic and instantaneous environmental advantages. The array would generate savings by avoiding use of the CO2 problem, grid power, and make that household carbon neutral today, not in 2050. Because electricity cost increases at least 2.5% per year, after the \$38 monthly cost of the solar array, the household would realize net monthly savings of \$120 per month. If the solar household responds, as many do, with enlightened conservation and efficiency, it will have enough unused solar power in few years to charge an electric vehicle and make it carbon neutral as well.

But remember, MISO CHC planning assumes energy use will increase! Over 30 years, at the utility interests' assumed energy growth rate of .5% per year, the utility bill non-solar home electric bills will average \$200 a month, \$320 per month more than the solar home. If this difference is applied to 10% of Wisconsin households going solar using better focus on energy incentives, it would put \$29 billion into Wisconsin local economies over 30 years without creating a single dollar of utility debt.

In embracing CHC, Valcq and her fellow commissioners are prolonging utility dependence, the opposite of the, "all of the above approach" under which customers increasingly participate in energy efficiency, load management and distributed generation.

WHO WILL PAY THE DEBT?

Wisconsin, Following other states, will eventually abandon the utility expansion path for sheer economic reasons. The right-sizing path from combining transmission/distribution line rebuilds with Non Transmission Alternatives (energy efficiency, modern load management, and community and home/business solar+storage) will soon be lowering need for new power plants and transmission. Striking these additions will make paying off 55-65% debt load ⁴⁰ in electric bills a thing of the past but we'll still have debt to pay off from prior PSC capital approvals.

To be clear, the main reason the solar savings in the estimate above are there is because the solar households are credited (net metered) full retail rate for the grid power they do not use. Some WI utilities inappropriately refer to efficient, solar homes as "free-loading" because they pay down utility debt at a slower pace⁴¹.

This issue is not the fault of solar customers who actually pay for the grid (not taxpayers or utility stockholders). The blame rests squarely on utility fears and Wisconsin lawmakers who are making us use last century rate structures that prevent utilities from being rewarded for promoting distributed solutions. States with modern rate strictures are racing ahead in CO2 emission reduction, have vibrant, distributed/local energy economies and their state utilities are making just as much

money from the modern rate structures and they did under old ones. For comparison, Massachusetts has the same number of customers and solar potential as Wisconsin. By 2017, under a modern rate structure, Massachusetts had developed 1500 MW of distributed solar and WI had realized only 15 MW.

Just as important, modern rates structures discourage social and economic injustice that the CHC+2050 100% wind power decision promotes. Wisconsin families who are unable to make efficiencies and “go solar” get slapped with a greater share of the Commissions compelled debt. Under modern rate structures, advantages and burdens are reallocated and utilities are rewarded to not add to future debt. This is the path out of our nightmare an into to environmentally effective spending.

TO REDUCE OR TO NOT REDUCE CO2

We saw that CHC as *cornerstone* of energy planning cannot get us, affordably or desirably, to “zero carbon” by 2050, but how far would CHC get us according to our transmission builders estimated CO2 reductions?

The data text and table obtained from the transmission builder from discovery, below⁴², is shown in entirety. It contains more optimistic figures for CHC than those submitted by witness Anne Smith for the applicants as explained in SOUL’s Reply Brief⁴³.

The Applicants estimated the reduction in CO₂ emissions from Wisconsin power plants over the 40-year life of the Cardinal-Hickory Creek Project. The results of this analysis are shown in the table below:

Future	40-year CO ₂ Emissions Reduction in Wisconsin (Million Tons)
AAT	98
EF	20
PR	40
PR + Foxconn	42
PRLE	39

Note that transmission builders do not state that emission reductions *are attributed to CHC*, but rather changes in Wisconsin power plants with CHC in operation. Also note that the reductions are stated as *gross change*, that is, not factoring *in increases in electricity use* that transmission builders assume in their economic planning, “Futures.”

The table, below, factors in the electricity growth over 40 years and compares *net changes* in Wisconsin CO2 emissions under CHC’s three futures, Powers Engineering Non-Transmission Alternative #2 and existing and accelerated WI Focus on Energy programs.⁴⁴

Energy Future Comparisons	40 YEAR CO2 WI UTILITY / CHC EMISSION REDUCTIONS SUBMITTED BY CHC APPLICANTS (Million Short Tons)	AS METRIC TONS (Million Metric Tons)	PERCENTAGE ANNUAL INCREASE/ DECREASE IN ENERGY USE	40 YEAR TOTAL WI USE (MWH)	40 YEAR NET CO2 GAIN OR LOSS (Million Metric Tons)	40 YEAR WI NET CO2 GAIN or LOSS IN YEARS (2017 CO2 level)
CHC- Advanced Alternatives	98	88.9	0.6	3,277,702,011	280.5	6.5
CHC – Policy Regulations	40	36.29	0.5	3,197,952,695	262.5	6.1
CHC- Existing Fleet	20	18.14	0.4	3,120,499,049	212.0	4.9
Flat Electricity Use	n/a	n/a	n/a	2,860,565,904	0	0
Powers Non-Transmission Alternative #2	n/a	33.1	-0.11	0	-33.1	-0.77
WI Focus On Energy – Current Funding	n/a	175.3	-0.5	2,860,565,904	-175.3	-4.09
WI Focus On Energy - Accelerated	n/a	548.63	-1.0	2,240,998,994	-548.6	-12.8

Wisconsin ratepayers and environmentalists can now understand why transmission builder materials never write in simple words that CHC would lower Wisconsin’s net CO2 emissions over time.

In contrast, note that the single, optimized NTA for Wisconsin developed by Powers Engineering at half the cost to Wisconsin ratepayers and no expense, regionally, would reduce CO2 the equivalent of nearly one year. Tens of these projects are feasible in Wisconsin either alone, or in tandem with aging substations prolonging their economic life spans. Because NTA’s are based on Focus on Energy incentives with known CO2 reductions and provide *billions* in avoided energy costs, it is evident why states are electing this path over utility *expansion* in energy planning. In recent Institute for Local Self-Reliance grading of state policies helping or hindering distributed renewable energy development, two of Wisconsin’s neighbors scored high while Wisconsin got a “F.”⁴⁵

The very significant CO2 reductions from Focus on Energy emphasis are fully consistent with a report⁴⁶ issued by the US Department of Energy observing that from 2005 to 2017, Non-Transmission Alternatives⁴⁷ have been responsible for 50% of the total US CO2 emission reductions. Note that *accelerating* Wisconsin’s Focus on Energy to a rate suggested by the American Council for an Energy-Efficient Economy would reduce the equivalent of 19 years of Wisconsin CO2 *compared* to CHC-PR.

The Department also found that after billions and billions spent, only 24% of the CO2 reductions came from development utility-scale renewables. Given the natural gas emphasis in CHC/MISO “planning” it comes as no surprise to see that CO2 reductions from converting coal power plants to natural gas plants outpaces CO2 reductions from renewables at 26%. The Union of Concerned Scientists strongly advocates against building fossil fuel burning natural gas plants in the name of CO2 reduction due to a long list of environmental concerns.⁴⁸ Like all utility scale plants, they politically and economically very difficult to shut down because the mortgages ratepayers assume for them last as long as 75 years.

SUMMARY

CHC would add to electric bills. Based on PSC staff findings, building CHC would break state law⁴⁹ and MISO’s, 1:1 benefit to cost ratio requirement for economic-based transmission lines to

deliver enough energy cost savings to offset costs. PSC engineering staff showed, using the utilities' 2017 modeling updated 2019 knowns, that CHC is projected by *utility planning* to deliver in sufficient energy cost savings in 8 of 11 future scenarios for Wisconsin electric customers. The same was found for approximately 39 million cost-burdened regional customers in 2 of 3 future scenarios.

CHC would slap WI ratepayers with \$229 million in reliability overcharges. The staff of the Public Service Commission of Wisconsin determined that making overdue rebuilds of three transmission line facilities built in the 1950s at cost of \$900,000 resolves all, identified, potential reliability issues. The advantages of upgrading the transmission lines crossing the Mississippi River from Iowa have been known since 1998. They appeared as low voltage alternatives to Wisconsin's second expansion line in 2007.⁵⁰ Did transmission building companies delay this logical improvement to bolster feeble need for CHC? 40 year payment schedules for CHC total \$2.2 billion, not the advertised, \$67 million. With regional cost burdening, Wisconsin ratepayer would assume about \$330 million with ratepayers in 11 other states paying \$1.78 billion.

CHC would be an accelerator of CO2 emissions for 40 years. The cornerstone assumption of all transmission expansion planning and is increased energy use. This unnecessary waste counteracts zero carbon targeting. With the power plants they foresee and CHC in operation from 2023-2063, transmission builders CO2 projections are carbon reductive they are carbon additive. Due to increasing electricity use, even the misnamed, "Advanced Alternative Technology (AAT)" is predicted to add 280 million tons of CO2 based on Wisconsin, 2017 CO2 levels. That increase means is 6.5 years of added, unnecessary CO2 emissions compared to today.

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- 1 <https://psc.wi.gov/Pages/AboutPSCW/Commissioners.aspx>
- 2 See https://en.wikipedia.org/wiki/Midcontinent_Independent_System_Operator About 24 of MISO's paid members are enabled to vote when the Planning Advisory Committee (PAC) approves transmission planning. Interests represented by these voting parties are no longer accessible on MISO's website. A 2017 annotated list of PAC members indicates 3 members representing "End Users," 2 represent high use industrial organizations. A majority of votes are controlled by interests that profit from new capital utility expansion spending, http://bit.ly/MISO_PAC_Members_2017 A considerable number of PSCW commissioners have held positions within OMS, the governmental arm of MISO including current Commissioner Mike Huebsch.
- 3 See Map, <https://microgridknowledge.com/wp-content/uploads/2013/11/Figure-1-1024x790.jpg> Until 1998, Wisconsin was a leader in a early form of Integrated Resource Planning (IRP). Under IRP law, utilities are required to demonstrate to ratepayers that adding a new transmission line or power plant would cost less than spending the same amount on energy efficiency, load management or customer/community based distribute generation. Wisconsin Lawmakers eliminated this accountability in 1998 and replaced it with biannual Strategic Energy Assessments" which reports basic utility data, analyzes 1 or 2 issues but not make any recommendations or conduct any short or long term energy planning. Utility interests supporting removal of IRP law argued that was better process to conduct energy planning on a, "case by case basis" where contesting parties (public intervenors) would be able to ask for such comparisons whenever a new transmission line or power plant was proposed. Thus, with the PSC acting as a *neutral observer* in these cases, lawmakers placed the responsibility of consumer interest energy planning entirely on Public Intervenors. In the "contested case hearings," for each utility spending proposal, intervenors face much larger utility resources and these costs are ultimately paid for ratepayers. In CHC, the PSC granted transmission builders at least \$28 million to mount their case against public intervenors. Intervenors were granted less than \$300,000 to hire experts and legal counsel. [SOUL of Wisconsin did not accept funds from the state, utilities or customers to intervene in CHC, rather funds donated by concerned individuals].
- 4 MISO MTEP 2011, p.5 <https://puc.sd.gov/commission/dockets/electric/2013/EL13-028/appendixb4.pdf>
- 5 <http://soulwisconsin.org/Resources/FootnoteHarbour.pdf#page=48>
- 6 Seven in Wisconsin, alone, <http://soulwisconsin.org/Resources/FootnoteHarbour.pdf>
<http://soulwisconsin.org/Resources/FootnoteHarbour.pdf#page=44>
- 7 For CHC, MISO's required 1:1 benefit to cost ratio computes to about ½ cent per month for the average residential consumer in Wisconsin.
- 8 To help establish that MISO had no intention of improving these minimal requirements, citizen intervenor Chris Klopp exhibited a MISO draft in progress showing no substantive changes. Transmission builders objected and asked that the information not be allowed in the record but the judge agreed with Klopp. See Part B, <http://apps.psc.wi.gov/pages/viewdoc.htm?docid=368896>
- 9 See footnote 3.
- 10 An 2009, unsigned, report titled, "Executive Committee Final Report," from pro transmission expansion "initiative" calling itself the, UPPER MIDWEST TRANSMISSION DEVELOPMENT INITIATIVE reports on p.3, "Cost allocation for the needed transmission is contentious. Arguably the largest hurdle to new construction is how the costs get distributed. In the absence of an equitable formula, projects will not get built, or parties not benefiting from the projects will end up paying for them."
<https://static1.1.sqspcdn.com/static/f/168835/8783831/1285949527063/UMTDISummaryReportFinal.pdf> Despite MISO repeating in every MTEP plan since 2010 that UMTDI was spearheaded by state governors, no governors' office, no state utility commission or MISO has ever claimed responsibility for the *initiation* of this group or report. In cross examination of MISO witness Michael Ellis, he said that he quite aware of UMTDI happenings but could not cite a single instance of any representative from any governors' office come to MISO to express such interests.
- 11 <http://soulwisconsin.org/Resources/FootnoteHarbour.pdf#page=27>
- 12 <http://soulwisconsin.org/Resources/FootnoteHarbour.pdf#page=27>
- 13 PSCW SEA, 2024, <http://soulwisconsin.org/Resources/FootnoteHarbour.pdf#page=51>
- 14 MISO Data from Market Monitor, Potomac Economics , rates from EIA, <http://soulwisconsin.org/Resources/FootnoteHarbour.pdf#page=40>
- 15 Data from La Crosse Tribune, <http://soulwisconsin.org/Resources/FootnoteHarbour.pdf#page=13>
- 16 <http://soulwisconsin.org/Resources/FootnoteHarbour.pdf#page=15>
- 17 "OUR VISION IS OF A WORLD WHERE: COMMISSION EMPLOYEES are recognized for their contributions and are empowered to use their skills and abilities to realize the vision in an innovative, purposeful, team-oriented work environment." Vision statement from PSC-WI website, 2011, http://bit.ly/PSCW_vision_2011
- 18 From Mission statement, PSC-WI website September, 2019, "*To carry out our mission, the PSC Protects the interests of both investors and customers and ensures that securities issued by utilities meet the needs of utilities;*"
<https://psc.wi.gov/Pages/AboutPSCW/HistoryAndMission.aspx> See also Vision statement from PSCW website April, 201, "*TO MEET THIS VISION WE WILL: PROTECT the public and consumer interests, and simultaneously allow utilities to manage their businesses without undue interference, enabling them to excel in serving their customers;*"

- http://bit.ly/PSCW_vision_2011
- 19 Final Environmental Impact Statement (18,444 KB), pdf p. 148, <http://apps.psc.wi.gov/pages/viewdoc.htm?docid=366195>
 - 20 Final Environmental Impact Statement (18,444 KB), pdf p. 149-150, <http://apps.psc.wi.gov/pages/viewdoc.htm?docid=366195>
 - 21 MTEP17 Futures Summary – Planning Advisory Committee – October 19, 2016, MTEP17 Future Weights, p. 38 <http://apps.psc.wi.gov/pages/viewdoc.htm?docid=358848>
 - 22 <http://apps.psc.wi.gov/pages/viewdoc.htm?docid=358841>
 - 23 *Request for Economic Performance Testing of Expansion of Transmission lines, March 18, 2018*, pdf p.17 <http://apps.psc.wi.gov/pages/viewdoc.htm?docid=367288>
 - 24 Capital Expansion Costs: See, *MTEP17: Cumulative Present Value Costs (2016-2031)* pdf p.37 Generation Mix: See, *MTEP17 Energy Comparisons by Future: 2016 vs. 2031*, pdf p.34, both: <http://apps.psc.wi.gov/pages/viewdoc.htm?docid=364979>
 - 25 For example, based on power outages, Wisconsin ranked #7 in 2018. US World & News Report 2018 State Energy Rankings, <http://soulwisconsin.org/Resources/FootnoteHarbour.pdf#page=37>
 - 26 ATC 2019 10-Year Assessment Preliminary Needs, Asset Management Renewal Plans – T-Line, p.21 <http://apps.psc.wi.gov/pages/viewdoc.htm?docid=365099>
 - 27 Surrebuttal Testimony of Alexander J. Vedvik, PSC, p. 10, “*Using the CBM methodology, the base with asset renewal produced gross energy cost savings to Wisconsin transmission customers of approximately \$2.02 million. Using the APC methodology, the base with asset renewal produced gross energy cost savings to Wisconsin transmission customers of approximately \$18.94 million.*”
 - 28 CHC Intervenor’s press release of about the occasion, http://bit.ly/RenewWI_2050_20190816
 - 29 Federal Energy Regulatory Commission, https://en.wikipedia.org/wiki/Federal_Energy_Regulatory_Commission
 - 30 For balance of MISO voting members, see footnote 2.
 - 31 See WSJ, Note that MGE, Alliant and WIPI stated at the Customers First! Power Lunch on August 27 that they plan to reach this goal before 2050.
 - 32 <https://www.potomaceconomics.com/markets-monitored/miso/>
 - 33 2011 State of the Market Report for the MISO Electricity Markets, pdf p.48, “[MISO]wind resources now account for 7.1 percent of installed capacity and 5.2 percent of generation.” <https://www.potomaceconomics.com/wp-content/uploads/2017/02/2011-State-of-the-Market-Report.pdf>
 - 34 \$2.3 billion per year, <http://soulwisconsin.org/Resources/FootnoteHarbour.pdf#page=27>
 - 35 2018 State of the Market Report for the MISO Electricity Markets, Table 1: Capacity, Energy Output, and Price-Setting by Fuel Type, pdf p.27, https://www.potomaceconomics.com/wp-content/uploads/2019/06/2018-MISO-SOM_Report_Final2.pdf
 - 36 For MISO’s (classless) electric customer consuming 100% renewable energy from wind power plants in the year 2050 at the same energy consumption level at 2018. <https://www.misoenergy.org/about/media-center/corporate-fact-sheet/> The 2012-2020 growth rate in installed MW was 9.6% Based on historic MISO peak of 127,125 MW peak and a 16% reserve and wind capacity factor of .40, a 100% offset with wind power/storage (with no system losses) would require 368,650 MW of wind generation. At a turbine cost of \$1.5 million per MW, escalating the current \$2.3 billion per year transmission costs at MISO’s assumed 2.5% annual rate, applying the same amount to battery storage and replacing turbines at the end of the 20 year life cycle, total costs, including a modest return of 20% to investors, comes to about \$980 billion. These figures assume flat energy use and no increase in the number of MISO’s 42 million (classless) customers; 700 kWh per mo; .1437 per kWh escalated at MISO’s 2.5% rate as conventional generation is retired.
 - 37 MISO CHC planning is far stretch from Valcq’s “all of the above” model. Lengthy cross examination of ATC and MISO witnesses in the proceeding established that MISO’s MTEP17 planning underscoring CHC assumes, even in the misnamed, Advanced Alternative Technology future there would be no growth in distributed solar. Further, to reduce competition from increased spending efficiency spending, the AAT future places a 10% cap on state programs like Focus on Energy.
 - 38 As MISO is the largest electric market in the US, the estimate is fairly consistent with Wood Mackenzie analysis, “The transition to a fully decarbonized U.S. power system using currently available technologies would cost \$4.5 trillion, according June’s Wood Mackenzie analysis. That could mean nearly \$2,000 per U.S. household per year for 20 years.” [https://www.woodmac.com/press-releases/decarbonising-us-power-grid-may-cost-us\\$4.5-trillion/](https://www.woodmac.com/press-releases/decarbonising-us-power-grid-may-cost-us$4.5-trillion/)
 - 39 “[R]esearch at Johns Hopkins University by Charles Meneveau suggests that large turbines in an array need to be spaced 15 rotor diameters apart, increasing the above examples to 145-197 acres required per installed megawatt in an array.” https://scholar.google.com/citations?hl=en&user=FkxIZR4AAAAAJ&view_op=list_works&sortby=pubdate Wisconsin has 57,158 square miles of land
 - 40 <http://soulwisconsin.org/Resources/FootnoteHarbour.pdf#page=42>
 - 41 Utilities “fix” is to not change rate structure, but to pay solar customers wholesale costs of .03 / kWh instead of a rate

- that recognizes that consumers have equal right to energy investment.
- 42 APPLICANTS' RESPONSE TO S.O.U.L. OF WISCONSIN, INC.'S FIRST DOCUMENT AND DATA REQUESTS, excerpted on p. 2 of <http://apps.psc.wi.gov/pages/viewdoc.htm?docid=357719>
 - 43 Reply Brief on Behalf of SOUL of Wisconsin, p. 8, <http://apps.psc.wi.gov/pages/viewdoc.htm?docid=372750>
 - 44 Impacts on electricity use of the current Focus on Energy program are assumed over 40 years to continue maintaining flat use. The 1% per year reduction figure is conservative based on studies of WI energy efficiency study in the docket. In 2017, Wisconsin utilities were responsible for 42.8 Million Metric Tons of CO₂, which is roughly 1/12th of the amount emitted within the MISO region.
 - 45 <https://ilsr.org/2019-community-power-scorecard/>
 - 46 Carbon dioxide emissions from the U.S. power sector have declined 28% since 2005, EIA, <https://www.eia.gov/todayinenergy/detail.php?id=37392>
 - 47 Collectively, all end user improvements from state and federal efficiency programs, dwelling improvements and load management and distributed generation have steadily reduced use of power about 2% per year.
 - 48 *Environmental Impacts of Natural Gas*, UCC <https://www.ucsusa.org/clean-energy/coal-and-other-fossil-fuels/environmental-impacts-of-natural-gas>
 - 49 196.49(3)(d)3t: "For a high-voltage transmission line that is designed for operation at a nominal voltage of 345 kilovolts or more, the high-voltage transmission line provides usage, service or increased regional reliability benefits to the wholesale and retail customers or members in this state and the benefits of the high-voltage transmission line are reasonable in relation to the cost of the high-voltage transmission line."
[https://docs.legis.wisconsin.gov/document/statutes/196.491\(3\)\(d\)3t](https://docs.legis.wisconsin.gov/document/statutes/196.491(3)(d)3t).
 - 50 "LowVoltage: rebuilding theLore-Turkey River-Cassville-NelsonDewey 161kV line." pdf p. 7 Final Order for Paddock-Rockdale 345 kV <http://apps.psc.wi.gov/pages/viewdoc.htm?docid=96410>