CUB CITIZENS UTILITY BOARD

Citizens Utility Board of Wisconsin, Inc.
Thomas Content - Executive Director

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July 25, 2018

VIA ERFS

Ms. Steffany Powell Coker
Secretary to the Commission
Public Service Commission of Wisconsin
4822 Madison Yards Way
Madison, WI 53705

RE: Strategic Energy Assessment for the Years January 1, 2018 through December 31, 2024
Docket No. 05-ES-109

Dear Ms. Powell Coker:

Attached please find the Citizens Utility Board's comments on the Draft Strategic Energy Assessment in the above-referenced docket. CUB appreciates the opportunity to provide these comments.

Sincerely,

Tom Content
Executive Director

BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Strategic Energy Assessment for the Years January 1, 2018, Through December 31, 2024 — Docket No. 5-ES-109

COMMENTS OF THE CITIZENS UTILITY BOARD OF WISCONSIN

July 25, 2018

I. INTRODUCTION

The Citizens Utility Board (CUB) appreciates the opportunity to provide comments on the draft Strategic Energy Assessment (Draft SEA) for the years 2018 through 2024, and thanks Public Service Commission (PSC or Commission) staff for the work done to compile the document. CUB supports efforts to make information regarding energy issues and regulation accessible to Wisconsin's residents and businesses, and the Draft SEA is one way for the PSC to share this important information with the public. As CUB has noted in the past, there has been discussion over the years regarding "who" is the audience or audiences for the SEA. Given that the SEA is required by statute and much of the information in it is already known by individual utilities, CUB submits that a primary audience for the document is the people of Wisconsin. However, CUB also notes that the last SEA (Docket 5-ES-108) and the Draft SEA have gradually increased the quantity of data and analysis presented. CUB applauds Commission staff's work in compiling the additional information regarding rates, distributed energy resources (DER) and grid modernization, and hopes that this information (and any other information the Commission deems relevant in the future) will continue to be provided in future SEAs.

The essential purpose of the SEA is to evaluate the adequacy and reliability of Wisconsin's current and future electrical capacity and supply. (Draft SEA, p. 1) With that in

mind, CUB offers the following comments, providing some observations on the "adequacy and reliability" of the system based on the data and conclusions contained in the draft, and proposing refinements, clarifications, and improvements to the information the Draft SEA presents. Specifically, CUB's comments focus on the following topics:

- Adequacy of Wisconsin's Electric Supply
- Programs to Control Peak Electric Demand
- Distributed Energy Resources
- Sales, Rates, and Affordability
- Grid Modernization
- Integrated Resource Plan Reporting

The Draft SEA also contains a discussion of the Focus on Energy (Focus) statewide energy efficiency and conservation program. CUB has commented upon and voiced its support for Focus in a number of prior Commission proceedings and so will not repeat those arguments here. However, CUB would like to briefly note that the Draft SEA indicates that Focus continues to provide substantial ratepayer benefits for every dollar spent on the program. Furthermore, as discussed briefly below, given changes to Wisconsin's resource adequacy picture relative to past SEAs, CUB would support an expansion of Focus funding in future state budgets.

II. COMMENTS

A. The Adequacy of Wisconsin's Electric Supply will Require Careful Management to Meet Forecast Loads.

The Draft SEA shows that in general Wisconsin has sufficient electric supply to meet planning reserve margins (PRM) through 2024, with a possible short-lived shortfall in 2019. (Draft SEA, p. 4) However, in contrast to prior SEAs, the Draft SEA suggests that Wisconsin is

no longer in an "excess" capacity position where available supply significantly exceeds PRM requirements. (Draft SEA Table 1, p. 8) Indeed, at the time of the drafting of these comments, Madison Gas & Electric (MGE) and Wisconsin Public Service Corporation (WPSC) have filed a joint application to acquire new solar generation resources to address claimed future capacity shortfalls.[1]

For nearly a decade,[2] the SEA has concluded that Wisconsin's high electricity rates relative to nearby states were driven significantly by "earlier" investment in new capacity resources. Due to the "lumpy" nature of utility-scale capacity additions, these investments pushed Wisconsin into an "excess" capacity position, with the hope that sales of energy of into the market would provide benefits for Wisconsin customers. For example, the SEA published in 2014 stated:

> "Wisconsin remains ahead of many other states with respect to its investment in new electric generation and transmission facilities needed to address future service reliability, and it is well positioned in the near future to meet its energy demand needs. Wisconsin entered a construction cycle earlier than other states in the Midwest partly because its economy was stronger than in surrounding states. This required generation plants and transmission facilities to be constructed beginning in the late 1990s and continuing through recent years for which utilities now seek to obtain cost recovery … Wisconsin's current fleet of coal plants are well positioned to produce favorable energy sales into the MISO market which will benefit Wisconsin's ratepayers."[3]

The additional implication was that markets sales benefits, coupled with capacity investments other states would eventually need to make, would bring neighboring states' electricity costs closer to parity with Wisconsin utility customers' costs. While SEA 2022 dropped this narrative, the unfortunate fact for Wisconsin's customers remains that this

[1] *Joint Application of Madison Gas and Electric Company and Wisconsin Public Service Corporation for Approval to Acquire Ownership Interests in Solar Electric Generating Facilities*, Docket 5-BS-228 (PSC REF#: 343600)
[2] *Strategic Energy Assessment 2020*, p. 31, Docket 5-ES-107 (PSC REF#: 220557); *Final Strategic Energy Assessment 2018*, p. 38, Docket 5-ES-106 (PSC REF#: 176432); *Final Strategic Energy Assessment 2016*, p. 38, Docket 5-ES-105 (PSC REF#: 145514); *Strategic Energy Assessment 2014 - Final Report*, p. 43, Docket 5-ES-104 (PSC REF#: 110982).
[3] *Strategic Energy Assessment 2020*, p. 31, Docket 5-ES-107, Published October 3, 2014 (PSC REF#: 220557)

convergence in electricity rates did not materialize, and Wisconsin has consistently exceeded the Midwest average since 2003, with the state being surpassed only by the state of Michigan among nearby states. (Draft SEA Tables 14-17, pp. 60-61) While these comments will discuss rates and affordability in more detail below, CUB notes the historic impact of new capacity investments on rates, as it appears the state may be entering a new "build" phase.

The tightening of Wisconsin's available capacity relative to PRM requirements elevates the importance of capacity resource planning. If, as the Draft SEA suggests, Wisconsin utilities may need to make future capacity additions to their supply portfolios, CUB believes the goal should be to ensure that any such additions do not cause a return to a point where ratepayers are paying for generation capacity unreasonably in excess of what is required to meet resource adequacy needs. To be sure, the data the utilities supplied for the purposes of preparing the SEA gives the Commission, stakeholders, and members of the public a glimpse at the utilities' future resource plans. However, CUB believes that Wisconsin's current regulatory framework and reporting requirements do not provide a particularly strong disincentive against providing piecemeal information regarding the specifics of the utilities' resource plans. As an example, the Draft SEA identifies a handful of new generation projects or acquisitions anticipated to be proposed to meet future capacity needs. However, not included in that list is the proposed acquisition of 350 megawatts (MW) of utility-scale solar photovoltaic (PV) generation by MGE and WPSC noted above.

CUB does not claim that MGE and WPSC's proposed PV investment is unreasonable. Indeed, the Commission has yet to evaluate that question, and it is entirely possible the proposed acquisition may provide an opportunity to decrease rates for some customers. CUB would like to point out, however, that this application was filed little more than six months after the utilities

filed data for the SEA. Furthermore, although this proposal is currently before the Commission, stakeholders, the public, and more importantly the Commission, lack any knowledge as to what proposals may come next. Moreover, it was widely anticipated in the stakeholder community that Wisconsin Electric Power Company (WEPCO) would be one of the utilities seeking to purchase a share of the PV facilities MGE and WPSC have proposed to acquire. From CUB's perspective, and likely that of other ratepayer and stakeholder groups, this raises the question of whether WEPCO still seeks to acquire utility-scale solar PV generation capacity, as the Draft SEA suggests. (Draft SEA, p. 25)

Again, CUB emphasizes that it does not intend to question the reasonableness of any of the above-identified utility proposals in these comments. Rather, these examples merely illustrate that significant information asymmetry exists between what information the Commission has at its disposal in any one proceeding, versus the information each utility possesses regarding its investment plans. As the Draft SEA notes, "The regulated utility ratemaking process is intended to simulate a free market for monopoly utilities." (Draft SEA, p. 42) Rates authorized by the Commission are ultimately driven by a utility's expenses and capital investments. In turn, individual utility capital investments, particularly investments in capacity, do not occur within a vacuum, but instead as part of an integrated plan to meet a utility's requirements for providing utility service. According to economic theory, information asymmetry can lead to market failures and less efficient or otherwise sub-optimal outcomes. If the Commission is unable to consider a particular capital investment proposal within the context of a utility's broader resource plan, whether by omission or procedural impediment, there is the risk that Wisconsin's ratepayers will pay more for electricity than necessary.

CUB recognizes that the Commission's practice has often been to grant the utilities significant discretion regarding their business decisions. Within the context of the forward-looking capacity picture presented by the Draft SEA, however, CUB suggests the Commission would be better served by having greater and more regular access to detailed information regarding the utilities' resource plans. If at some point it is determined that Wisconsin utilities need to make capacity additions to their supply portfolios, CUB reiterates that the goal should be to ensure any such additions do not cause a return to a point where ratepayers are paying for generation capacity significantly in excess of what is required to meet resource adequacy needs.

B. Programs to Control Peak Electric Demand

As discussed in the Draft SEA, direct load control (DLC) and interruptible load programs (collectively Load Control programs) provide a mechanism by which utilities can manage their peak demand, and by extension peak demand costs. While not a one-for-one substitute for owned generation, these Load Control programs provide the utility with a short-term, limited option[4] on a capacity resource that can be used to manage critical reliability events where demand temporarily exceeds available supply. Additionally, many interruptible load programs provide an option for the utility to call economic events during periods of high energy prices where the customer is not required to curtail their load, but is subject to rates typically pegged to wholesale market prices if they elect to "buy-through" the event. This option provides a tool for utilities to further manage their power supply costs. Utilities are typically also capped on how many hours of economic events can be called.

As a practical matter, customers enrolled under a Load Control program receive a rate reduction relative to firm, or "standard" service rates. This discount is provided either as an

[4] Load Control programs are commonly subject to minimum contract terms of one to three years with a maximum number of hours that any one resource can be called up called upon by the utility.

explicit credit for curtailable demand subscribed under the program, or as a reduction in the rate the customer is billed for non-firm usage. This produces lower revenues from customers subscribed to utility Load Control programs compared with a customer with similar usage that is not enrolled in a Load Control program. This revenue reduction must be made up by increasing the rates billed to non-participating customers. In essence, the impact of this revenue shift can be considered the price that all other customers pay for the capacity resource Load Control program customers provide.

CUB acknowledges that Load Control programs can serve as a cost-effective way to manage peak demand and peak demand costs, provided that the value of the interruptible capacity is set appropriately so that the cost borne by non-participating customers is commensurate with the value the interruptible load provides. CUB has historically raised concerns in rate case proceedings that Load Control customers are effectively "over-compensated" relative to the value provided and will not repeat those arguments here. However, CUB has additional observations based on its review of the Draft SEA.

Wisconsin utilities reported approximately 800 MW of combined capacity available in 2017 under currently authorized Load Control programs, with that amount varying historically between 720 MW and 1,112 MW of combined interruptible capacity between 2003 and 2017. (Draft SEA Table 5, p. 17) Over that same period, the Draft SEA suggests the amount of load called upon for interruptions across all Load Control programs varied between 44 MW (2017) and 352 MW (2005). However, based on CUB staff's past experience in evaluating these programs, it is unclear whether the amount of load used represents a coincident value, or simply an aggregation of the load called upon in different events throughout the year. For example, it was reported that Wisconsin utilities called upon 152 MW of interruptible load in 2013. It is

unknown from the data provided whether this represents one or more interruptions of 152 MW, or whether it represents four separate interruption events of 38 MW each, with each event affecting different customers. CUB believes that the likelihood a utility will call upon a particular Load Control customer, or MW of DLC or interruptible load, should be considered when the Commission evaluates the appropriateness of these programs going forward. CUB suggests that in future SEAs and other relevant proceedings, granular data be collected regarding individual Load Control events, including when they occurred, their duration, and how much load was called upon in each event.

Additionally, a review of the utility-specific data provided in this SEA docket[5] suggests that all of the DLC load used from 2015-2017 is attributable to the cooperative utilities, and that all of the Interruptible Load used over the same period is attributable to a single large investor-owned utility. Furthermore, as it is CUB's understanding that a reliability interruption event has not been called since 2006, most if not all of this Interruptible Load — which again is attributable to one utility — has been called upon only for economic events. This means that all of the other utilities with authorized Load Control programs have not actively utilized them to control peak demand-related costs over this time period.

CUB is unaware whether there is an impediment — be it the authorized terms of the specific programs, an administrative barrier, or an economic consideration — preventing other utilities from calling upon their Load Control resources to help control costs. Whatever the case, if Load Control programs are to serve as a viable and cost-effective means of managing utility peak demand, CUB suggests that the Commission evaluate the design and administration of

[5] Strategic Energy Assessment Report Data, https://apps.psc.wi.gov/vs2017/SEA_Report/SEAQuery.aspx, (accessed July 24, 2018)

these programs in future proceedings to ensure that non-participating customers are receiving benefits commensurate with the prices paid in rates for Load Control resources.

C. Distributed Energy Resources

CUB again thanks Commission staff for continuing to include detailed information regarding the adoption of distributed energy resource (DER) throughout Wisconsin. The evolution of DER technologies, particularly with respect to continued improvements in the economics or cost-effectiveness of such resources, may provide an opportunity to leverage DER to meet future resource adequacy requirements or lower overall utility costs, much in the same way that Load Control programs are currently intended to function. CUB notes that MGE and WPSC's application to acquire utility-scale solar PV is supported in part by the peak capacity value the proposed resources can provide to the utilities.[6] To date, none of the tariffs or programs applicable to customer-owned DER account for the value of capacity those resources may provide to the utility, either through offsets to the customers' load during peak times, or through exports to the distribution system. While CUB does not expect that the typical customer-sited solar PV installation will achieve the 74 percent peak capacity factor claimed for the projects MGE and WPSC propose to acquire, certainly the capacity value is not zero, and most certainly not for all customer-owned DER.

While CUB would not support rate programs that provide undue cross-subsidies to customer-owned DER, CUB believes that Wisconsin utilities are currently missing out on an opportunity to leverage customer-owned DER to meet their resource requirements in a least-cost way. Particularly, as Wisconsin's rates continue to climb while the cost of DER continues to fall,

[6] *Joint Application of Madison Gas and Electric Company and Wisconsin Public Service Corporation for Approval to Acquire Ownership Interests in Solar Electric Generating Facilities*, pp. 18-19, Docket 5-BS-228 (PSC REF#: 343600)

more utility customers will invest in DER technologies. Utility rates must be properly structured so as to recognize not only the costs, but also the benefits associated with DER integration. If Wisconsin electric utilities are to operate in a more resource-constrained world (at least compared to historic) then CUB believes all cost-effective resources should be considered and pursued where appropriate. CUB suggests that the Commission evaluate Wisconsin utilities' DER rate offerings in future rate proceedings to ensure that those programs appropriately recognize both the energy and capacity value DER can provide to the utility and all utility customers.

D. Sales, Rates, and Affordability

Over time the SEA has gradually included more information and greater discussion of electricity rates in Wisconsin. Beginning with SEA 2018, Commission staff has included a discussion of regulations and policy changes that would or could have an impact on electric rates. SEA 2020 brought the addition of information regarding average residential monthly bills and energy consumption. With the Draft SEA, Commission staff has greatly expanded the discussion of rates and affordability, adding information regarding energy intensity, revenue requirement drivers, purchased power costs, and household burden. CUB thanks Commission staff for its work in providing this additional information and analysis. CUB supports additional transparency and appreciates that context is important when considering electricity rates and the affordability of utility service. CUB would like to provide additional information for consideration and offers the following observations.

While reductions in average usage per customer have contributed to average residential electric bills remaining relatively flat, CUB remains concerned that continued increases in electricity prices will cause utility bills to exceed those of nearby states and the Midwest average.

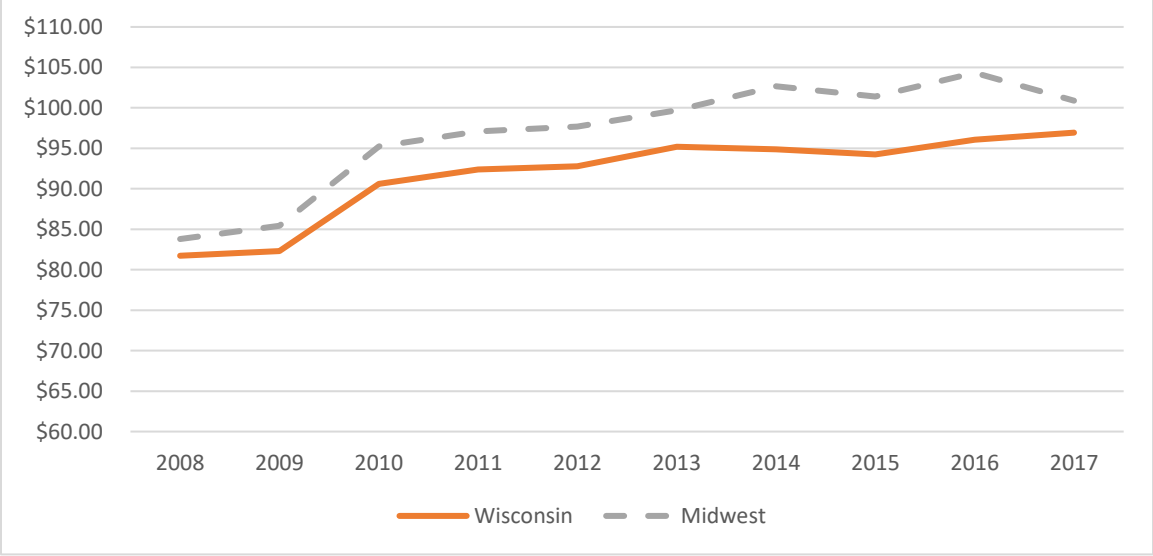
For example, 2017 data from the United States Energy Information Administration suggests that the gap between the Midwest average may be closing, in which case Wisconsin will lose competitiveness gains made since the Great Recession (Figure 1, infra; Draft SEA Figure 35, p. 62) In particular, CUB is concerned that:

- It will become increasingly difficult for Wisconsin ratepayers to sustain the year-over-year reductions in household electricity usage as "low-hanging-fruit" measures are exhausted. Additional funding for the Focus on Energy program may be necessary to allow the state to sustain average usage reductions.
- Other states without the same history of investment in energy efficiency and conservation may begin to catch up as they make greater investments in efficiency and conservation. This would likely cause Wisconsin's average electricity bills to become increasingly uncompetitive with nearby states.
- As portions of the economy are increasingly electrified (e.g. transportation) the price per kilowatt-hour (kWh) of electricity will be even more important. In 2017, Wisconsin customers once again paid the second highest overall price for electricity, with commercial and industrial customers paying the highest price of all neighboring Midwest states. (Tables 1-4, infra) In fact, Wisconsin customers overall pay an 11 percent premium for electricity compared to the Midwest average, with residential customers paying a 15 percent premium over the Midwest average. (Table 5, infra) Were it not for the state of Michigan, all Wisconsin customers would pay the highest price for electricity among these states.
- Beyond the residential class, it is important to note that the Draft SEA continues to show business customers in Wisconsin are paying the highest rates among the eight

Midwestern states highlighted in the report. CUB's advocacy for small utility customers makes it all the more imperative to highlight that the prices businesses pay are a concern from a competitiveness and economic development standpoint, and that high electricity rates represent just one of several cost pressures Main Street businesses and small manufacturers face.

- While overall decreasing energy intensity allows Wisconsin businesses greater control over their energy costs, the Draft SEA (Draft SEA Figure 18, p. 42) evaluates the energy intensity of all non-residential electricity usage and does not consider variations between non-residential usage classes (e.g. commercial vs. industrial), nor does it consider possible differences across industries (e.g. heavy manufacturing, light manufacturing, food processing, farming, retail, brewing & distilling, etc.). CUB encourages Commission staff to perform additional analyses in future SEAs that evaluate a cross-section of the state's various commercial and industrial sectors.

Figure 1 Average Residential Monthly Bill in Wisconsin and the Midwest[7]



[7] Electricity Data Browser, U.S. Energy Information Administration, https://www.eia.gov/electricity/data/browser/ (Accessed July 24, 2018).

Table 1 Residential Average Rates in the Midwest and U.S. (in cents)[7]

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
ILLINOIS	8.42	10.12	11.07	11.27	11.52	11.78	11.37	10.63	11.91	12.50	12.54	12.70
INDIANA	8.22	8.26	8.87	9.50	9.56	10.06	10.53	10.99	11.46	11.57	11.79	11.95
IOWA	9.63	9.45	9.49	9.99	10.42	10.46	10.82	11.04	11.16	11.63	11.94	12.60
MICHIGAN	9.77	10.21	10.75	11.60	12.46	13.27	14.13	14.59	14.46	14.42	15.22	15.47
MINNESOTA	8.70	9.18	9.74	10.04	10.59	10.96	11.35	11.81	12.01	12.12	12.67	13.19
MISSOURI	7.44	7.69	8.00	8.54	9.08	9.75	10.17	10.60	10.64	11.21	11.21	11.27
OHIO	9.34	9.57	10.06	10.67	11.31	11.42	11.76	12.01	12.50	12.80	12.47	12.37
WISCONSIN	10.51	10.87	11.51	11.94	12.65	13.02	13.19	13.55	13.67	14.11	14.07	14.68
MIDWEST	8.78	9.24	9.78	10.29	10.78	11.19	11.54	11.70	12.09	12.43	12.61	12.81
U.S. AVG.	10.40	10.65	11.26	11.51	11.54	11.72	11.88	12.13	12.52	12.65	12.55	12.90

Table 2 Commercial Average Rates in the Midwest and U.S. (in cents)[7]

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
ILLINOIS	7.95	8.57	9.25	9.04	8.88	8.64	7.99	8.14	9.26	9.02	9.02	8.87
INDIANA	7.21	7.29	7.82	8.32	8.38	8.77	9.14	9.60	9.96	9.78	10.01	10.30
IOWA	7.29	7.11	7.18	7.55	7.91	7.85	8.01	8.44	8.67	8.92	9.17	9.62
MICHIGAN	8.51	8.77	9.17	9.24	9.81	10.33	10.93	11.06	10.87	10.55	10.64	11.02
MINNESOTA	7.02	7.48	7.88	7.92	8.38	8.63	8.84	9.42	9.85	9.44	9.86	10.58
MISSOURI	6.08	6.34	6.61	6.96	7.50	8.04	8.20	8.80	8.90	9.16	9.26	9.32
OHIO	8.44	8.67	9.23	9.65	9.73	9.63	9.47	9.35	9.83	10.07	9.97	9.97
WISCONSIN	8.37	8.71	9.28	9.57	9.98	10.42	10.51	10.74	10.77	10.89	10.77	11.08
MIDWEST	7.62	7.91	8.38	8.58	8.83	9.05	9.11	9.37	9.75	9.71	9.81	9.97
U.S. AVG.	9.46	9.65	10.26	10.16	10.19	10.24	10.09	10.26	10.74	10.64	10.43	10.68

Table 3 Industrial Average Rates in the Midwest and U.S. (in cents) [7]

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
ILLINOIS	4.69	6.61	7.34	7.01	6.82	6.42	5.80	5.94	6.85	6.67	6.51	6.37
INDIANA	4.95	4.89	5.46	5.81	5.87	6.17	6.34	6.70	6.97	6.86	6.97	7.39
IOWA	4.92	4.74	4.81	5.27	5.36	5.21	5.30	5.62	5.71	5.90	6.05	6.31
MICHIGAN	6.05	6.47	6.73	6.98	7.08	7.32	7.62	7.72	7.68	7.02	6.91	7.32
MINNESOTA	5.29	5.69	5.87	6.26	6.29	6.47	6.54	6.98	6.72	7.02	7.37	7.73
MISSOURI	4.58	4.76	4.92	5.42	5.50	5.85	5.89	6.29	6.36	6.44	7.12	7.06
OHIO	5.61	5.76	6.20	6.72	6.40	6.12	6.24	6.22	6.77	7.02	6.98	6.69
WISCONSIN	5.85	6.16	6.51	6.73	6.85	7.33	7.34	7.40	7.52	7.58	7.49	7.79
MIDWEST	5.24	5.66	6.08	6.35	6.32	6.39	6.44	6.65	6.96	6.94	6.99	7.11
U.S. AVG.	6.16	6.39	6.96	6.83	6.77	6.82	6.67	6.89	7.10	6.91	6.76	6.91

Table 4 All Sectors Average Rates in the Midwest and U.S. (in cents) [7]

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
ILLINOIS	7.07	8.46	9.23	9.15	9.13	8.97	8.40	8.26	9.36	9.40	9.38	9.33
INDIANA	6.46	6.50	7.09	7.62	7.67	8.01	8.29	8.73	9.06	8.99	9.22	9.61
IOWA	7.01	6.83	6.89	7.37	7.66	7.56	7.71	8.07	8.15	8.35	8.55	8.92
MICHIGAN	8.14	8.53	8.93	9.40	9.88	10.40	10.98	11.21	11.03	10.76	11.05	11.39
MINNESOTA	6.98	7.44	7.79	8.14	8.41	8.65	8.86	9.41	9.52	9.53	9.99	10.53
MISSOURI	6.30	6.56	6.84	7.35	7.78	8.32	8.53	9.04	9.11	9.44	9.74	9.83
OHIO	7.71	7.91	8.39	9.02	9.14	9.03	9.12	9.20	9.73	9.98	9.84	9.71
WISCONSIN	8.13	8.48	9.00	9.38	9.78	10.21	10.28	10.51	10.57	10.73	10.67	11.05
MIDWEST	7.19	7.60	8.07	8.46	8.69	8.89	9.02	9.26	9.60	9.68	9.82	10.00
U.S. AVG.	8.90	9.13	9.74	9.82	9.83	9.90	9.84	10.07	10.44	10.41	10.27	10.54

Table 5 Percentage Difference in Average rates Between the Midwest and U.S.[7] **(negative numbers indicate higher rates in Wisconsin)**

	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	ALL SECTORS
ILLINOIS	-16%	-25%	-22%	-18%
INDIANA	-23%	-8%	-5%	-15%
IOWA	-17%	-15%	-23%	-24%
MICHIGAN	5%	-1%	-6%	3%
MINNESOTA	-11%	-5%	-1%	-5%
MISSOURI	-30%	-19%	-10%	-12%
OHIO	-19%	-11%	-16%	-14%
MIDWEST	-15%	-11%	-10%	-11%
U.S. AVG.	-14%	-4%	-13%	-5%

While the information in the Draft SEA related to household burden and affordability provides CUB with a small degree of comfort, CUB also notes that the Draft SEA presents affordability metrics only on a statewide basis. As noted in the Draft SEA, bills and rates vary across Wisconsin utilities. (Draft SEA Figures 30-31, p. 56) Similarly, economic conditions vary from one utility service territory to another, and indeed can also vary greatly within a single utility service territory — particularly when a single utility covers a large and diverse swath of the state. CUB commends Commission staff on this initial effort to evaluate the affordability of Wisconsin electricity rates. CUB believes that these types of affordability metrics are a valuable

tool for evaluating the reasonableness of utility rates. CUB suggests that future SEAs provide affordability metrics by utility. Further, CUB recommends that similar metrics be considered during utility rate proceedings so as to provide the Commission, stakeholders, and the public with greater information as to how Wisconsin utilities are performing. Finally, CUB is aware that work is underway as a collaboration between the U.S. Department of Energy Grid Modernization Laboratory Consortium and Pacific Northwest National Laboratory to develop similar affordability metrics, (Appendix A) with the understanding that the development of non-residential metrics is planned for the future. CUB encourages the Commission and Commission staff to explore additional opportunities to evaluate the affordability of Wisconsin's electricity rates for all customers in the future.

Finally, CUB suggests that future SEAs also include information regarding utility disconnections, late pay, slow pay, and other customer bill payment information for all customer classes. This information would provide additional valuable context for evaluating the affordability of Wisconsin's utility rates and would keep with the spirit of the enhancements Commission Staff has already made to the Draft SEA.

E. Grid Modernization

CUB thanks Commission staff for including a new section on grid modernization in this SEA. Grid modernization has the potential to, among other benefits, enhance grid reliability, reduce peak loads, boost energy efficiency, and reduce customer costs.[8] To maximize these benefits and avoid unneeded costs, it is necessary to evaluate the existing landscape and properly lay the groundwork for future modernization efforts.

[8] Grid Modernization and the Smart Grid, U.S. Dept. of Energy, https://www.energy.gov/oe/activities/technology-development/grid-modernization-and-smart-grid (Accessed July 23, 2018).

The Commission has already made important steps in assessing grid modernization efforts in Wisconsin and how they can be expanded. The Commission's survey of grid modernization priorities and inventory of utility actions (Draft SEA, p. 74) help lay a solid foundation for future work. Utilities have also engaged in grid modernization on their own, upgrading CIS, installing AMI, and exploring innovative rate design. These actions should be encouraged and assessed to ensure they are cost-effective and implemented on schedule.

CUB encourages the Commission to pursue other options to explore and develop grid modernization. In particular, greater data analysis could be greatly beneficial. A periodic resource plan encompassing generation, transmission and distribution could help modernize the grid in Wisconsin and provide many other benefits, such as ensuring resource adequacy, deploying an increasingly diverse resource base, and reducing utility and customer costs.

As the new sections on grid modernization and cybersecurity, and the expanded section on DER indicate, new resources are quickly emerging or looming on the horizon. In addition to distribution-side generation, electric vehicles and renewable generation are increasingly common, and energy storage is quickly becoming cost-competitive. Further, as mentioned above, the state seems to be entering a period of increased capital expenditure. In this environment, it is not practical to view generation, distribution, and transmission as separate silos. Yet this is the current reality of Commission decision-making, where utility information exists in disparate dockets and other locations, such as fuel cost plan filings, rate case filings, CA and CPCN filings, SEA filings, Security and Exchange Commission filings, and presentations to investors. Consequently, the Commission must make decisions in a vacuum, lacking relevant information when considering utility applications. A more holistic approach is necessary to aid the

Commission, take advantage of grid modernization opportunities, and manage upcoming challenges.

1. Regular reporting of utility integrated resource plans to the Commission would support a more complete review of future utility investments.

The SEA, for all intents and purposes, replaced the Advance Plan statewide integrated resource planning process under which the Wisconsin utility industry had previously functioned. In comments on a number of prior SEAs, CUB has argued in favor of the Commission reinstituting a statewide integrated resource planning process.[9] CUB will not repeat those arguments here, and in fact is not advocating that the Commission take such action at this time.[10] Rather, CUB proposes that the Commission consider a periodic integrated resource plan (IRP) filing requirement for individual utilities, which would serve as an informational tool the Commission could reference in multiple dockets. This resource filing would aggregate utility information and give the Commission an idea of each utility's plans for the near future. Such filings could occur on an annual or biennial basis, shortly after the beginning of the calendar year.[11] The plans could also follow the same general forecast time horizon as utilized in the SEA,

[9] See *Comments of The Citizens Utility Board* in Docket No. 5-ES-107 (PSC REF#: 213433), *Joint Comments of the Citizens Utility Board and Clean Wisconsin* in Docket No. 5-ES-106 (PSC REF#: 172038) and Docket No. 5-ES-105 (PSC REF#: 144070), *Comments of the Citizens Utility Board* in Docket No. 5-ES-104 (PSC REF#: 77840), and *Joint Comments of the Citizens Utility Board, Clean Wisconsin, and RENEW Wisconsin* in Docket No. 5-ES-103 (PSC REF#: 49932).

[10] CUB is mindful that the statute mandating advance planning was repealed in 1998 and replaced by the current Strategic Energy Assessment statute. CUB's proposal is a non-binding reporting requirement, and thus the Commission would have authority to require these plans pursuant to several existing statutes, including Wis. Stat. §§ 196.02(4), 196.025(3), and 196.49(3)(a)-(b). CUB is not prescribing the method by which utility plans should be put in practice and recognizes that the Commission may find new legislation and/or rule making is necessary to implement an IRP process. Rather than dictating the means to pursue this end, CUB simply wishes to convey in these comments that integrated planning could provide substantial benefits and should be considered.

[11] CUB is aware that many if not all Wisconsin investor-owned utilities present detailed, multi-year capital investment plans during the year-end meeting of the Edison Electric Institute. As such, a periodic integrated resource plan filing requirement would not require unduly duplicative work on the part of the utilities, as such resource plans and supporting analyses are already being performed. Instead, the filings with the Commission would need only be repackaged and adjusted to conform to the specific informational requirements set forth by the Commission.

but with attention to gathering detailed resource acquisition plans over the upcoming three years. Because they would serve an informational function, the plans would be non-binding. As such, a utility could revise its plan as necessary, provided that it explain how and why the plan had changed.

A utility's forward-looking resource plan would give the Commission a broad view of the utility's existing generation and distribution resources, as well as its future projects. The plan would be a combination of information the utility presumably already compiles as a by-product of prudent utility operations and planning, or is required to file by law, and would likely require little in the way of new analysis. A basic IRP could include, but not be limited to, the following:

- Load forecasts for the planning period, including a base forecast and forecasts under different future scenarios (e.g. high growth, low growth, increasing fuel prices, increased DER penetration, etc.)
- The utility's potential resource mix to meet its supply need. This would include describing current assets, planned construction or acquisitions, planned retirements or repowering, demand-side management or DER programs, and power purchases. This section could also contain an alternatives analysis, based on different load forecasts.
- An explanation as to why the utility's planned resource mix is the most cost-effective use of available resources.

Unlike the prior Advance Plan, the IRP filings contemplated here would not involve a statewide planning process but rather would be limited in scope to each utility's individual resource plan. Depending on the procedural specifics, there could be an opportunity for a public hearing and a comment period. This would allow stakeholders to file comments on the utility's plan and the inputs that generated the plan. Instituting a formal IRP filing requirement would not

require particular findings of fact regarding the reasonableness of an IRP, only a Commission determination that the information provided is complete.

The availability of formally filed, reviewed, and appropriately revised IRPs from Wisconsin's utilities would provide a valuable tool for not only the Commission, but also for utility stakeholders, and the public. As noted previously, Wisconsin may be entering a period of greater capacity constraints that may require additional utility investments to ensure continued provision of safe and reliable electricity service. Furthermore, innovative technologies that fall under the umbrella of grid modernization may offer opportunities for new forms of investment or changes in utility operations at the distribution level that could provide greater benefits to Wisconsin utility customers than those pursued under the traditional utility model. These changes increase the interconnectedness between generation, transmission, and distribution planning, and necessarily require that individual utility proposals be evaluated as parts of a greater whole. The Commission must be able to reasonably determine that a proposal is just and reasonable within the broader context of a utility's integrated resource plan to ensure the best outcomes for Wisconsin utility customers.

III. CONCLUSION

CUB appreciates Commission staff's work to prepare the Draft SEA and offer the opportunity for comments. The electrical utility industry faces a number of challenges and opportunities in the near future, but careful analysis and assessment — including the type of work conducted in this docket — will help the state manage risks and take advantage new technologies.

CUB's suggestions aim to assist the Commission in performing its duties of ensuring that reliable electricity is available statewide and that rates remain just and reasonable. Careful assessment of proposed capacity additions, as well as thoughtful evaluation of newer concepts such as Load Control programs and DER offerings, will help the state navigate this period of tighter capacity. Further, tracking electric rates and evaluating rates based on affordability metrics will help protect all ratepayers. Finally, a periodic utility resource plan reporting requirement would be an informational asset to the Commission, stakeholders, and the public.

Wisconsin continues to have relatively high average residential, commercial, and industrial electric rates compared with other Midwest states. A critical element in realizing the full economic benefit of the billions of dollars invested by ratepayers in utility generation, transmission, and distribution projects will be making Wisconsin's electric rates competitive with other Midwest states. Wisconsin's ability to fully leverage its utility infrastructure into a better economy, more jobs, and more affordable energy rates for Wisconsin residents will likely remain diminished until rate increases stop. If rates continue to increase the prospects for Wisconsin's rates falling in line with those in other Midwest states, or those other states "catching up" to Wisconsin, seem slim.

Inasmuch as the state has in place the energy infrastructure it needs for the foreseeable future, CUB believes that the number one priority of utilities and the Commission over the study period must be on utility cost-control, and that the over-arching goal of the Commission over the study period can be, and should be, on decreasing rate levels whenever possible.

Appendix A

GMLC Metrics Analysis Review Webinar: Affordability

Presentation Slide Deck

GMLC Metrics Analysis Review Webinar: Affordability

Project 1: Foundational Analysis for GMLC Establishment

(Metrics Analysis)

Dave Anderson
Pacific Northwest National Laboratory
February 23, 2017

Institutional Support

Metrics Analysis

High-Level Project Summary

Project Description

The objective of the project is to assess the feasibility and usefulness of metrics for measuring change in the evolving electricity infrastructure. The effort will develop metrics and associated methods to assess the power grid's evolution with respect to characteristics that are organized into the following 6 categories: reliability, resilience, flexibility, sustainability, affordability, and security.

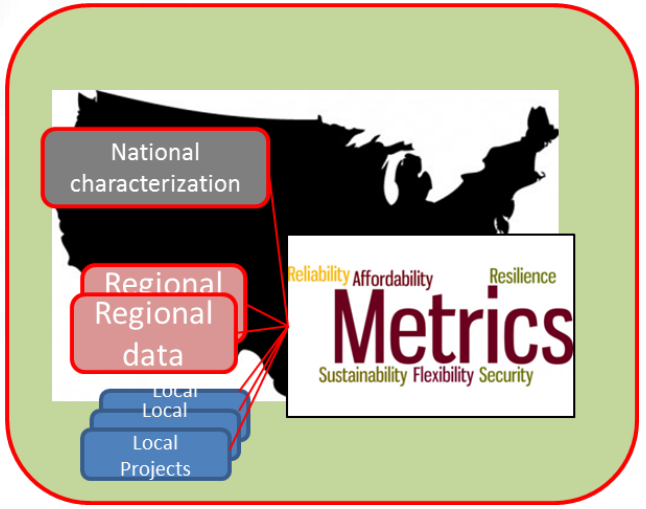
Expected Outcomes

- ✓ Report on metrics definition and approaches
- ✓ Validation of metrics and approaches with stakeholders and regional partners
- ✓ Development of metrics baseline
- ✓ Adoption of metrics
- ✓ Implementation plan for web-based dashboard

Project Participants and Roles

ANL – **Security and synthesis lead,** resilience contributor
BNL – Reliability contributor
LANL – Synthesis contributor
LBNL – **Reliability lead**
LLNL – **Flexibility lead**
NREL – **Sustainability and stakeholder engagement lead,** flexibility contributor
ORNL – Affordability contributor
PNNL – **Affordability lead** and project manager
SNL – **Resilience lead**

APPA, DHS, EIA, EPA, EPRI, FERC, NARUC, NERC, NRECA, ERCOT – working partners



Affordability

Outline

- Landscape: Existing situation and context – Affordable to whom?
- Metrics: Existing and emerging
- Approach: Focus on emerging
- Baseline metrics examples
- Challenges and limitations
- Next Steps: Use case proposals
- Stakeholder Input: Guidance on value and usefulness

Affordability

Landscape

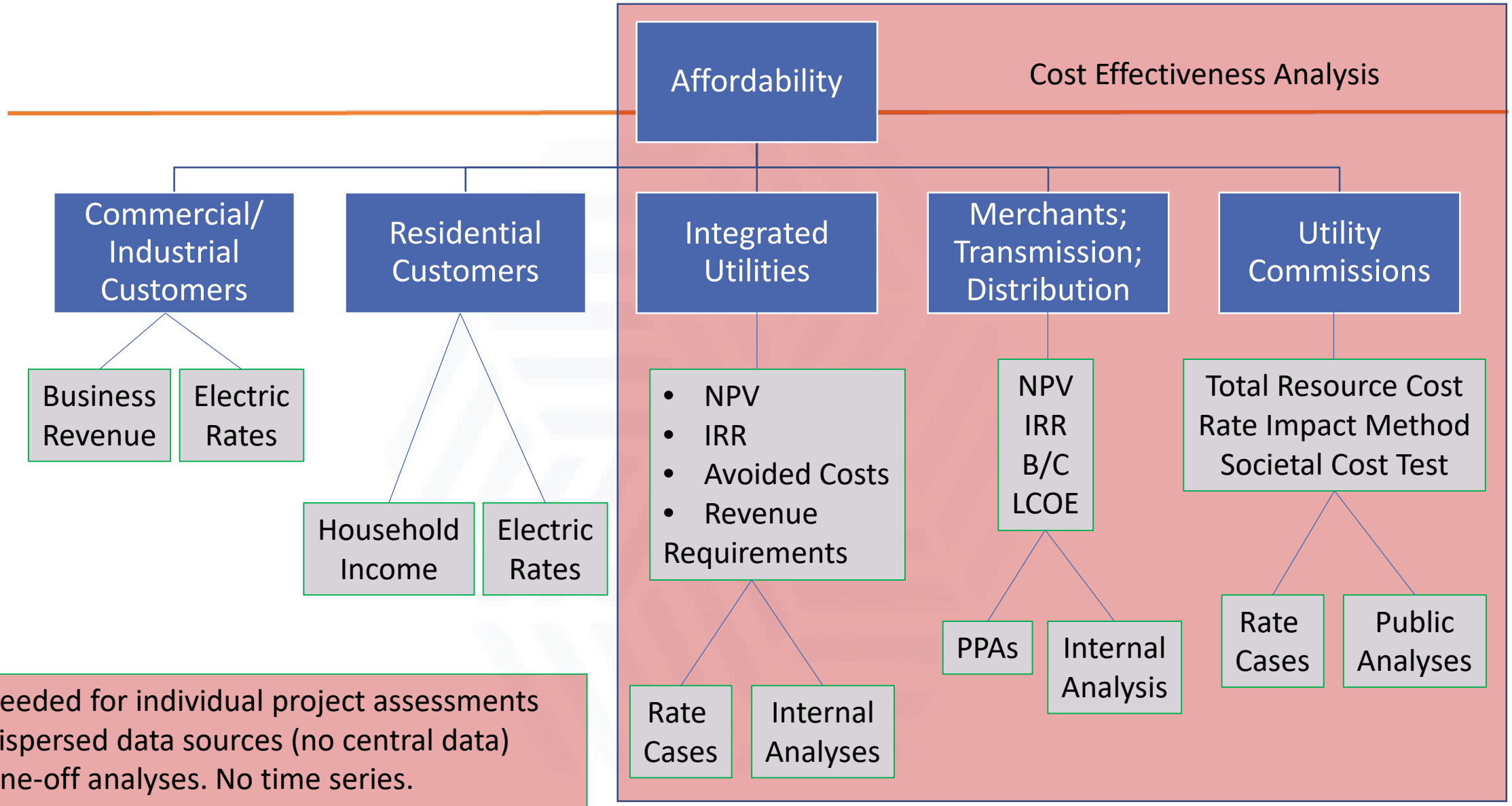
- Existing metrics address cost effectiveness of plant and equipment and policy options
- Cost effectiveness metrics are well-documented and widely adopted across the industry currently
- Emerging metrics address customer cost burden
- Cost burden metrics have been used in side analyses and for determining program participation eligibility, but are not widely adopted.

Affordability

Metrics

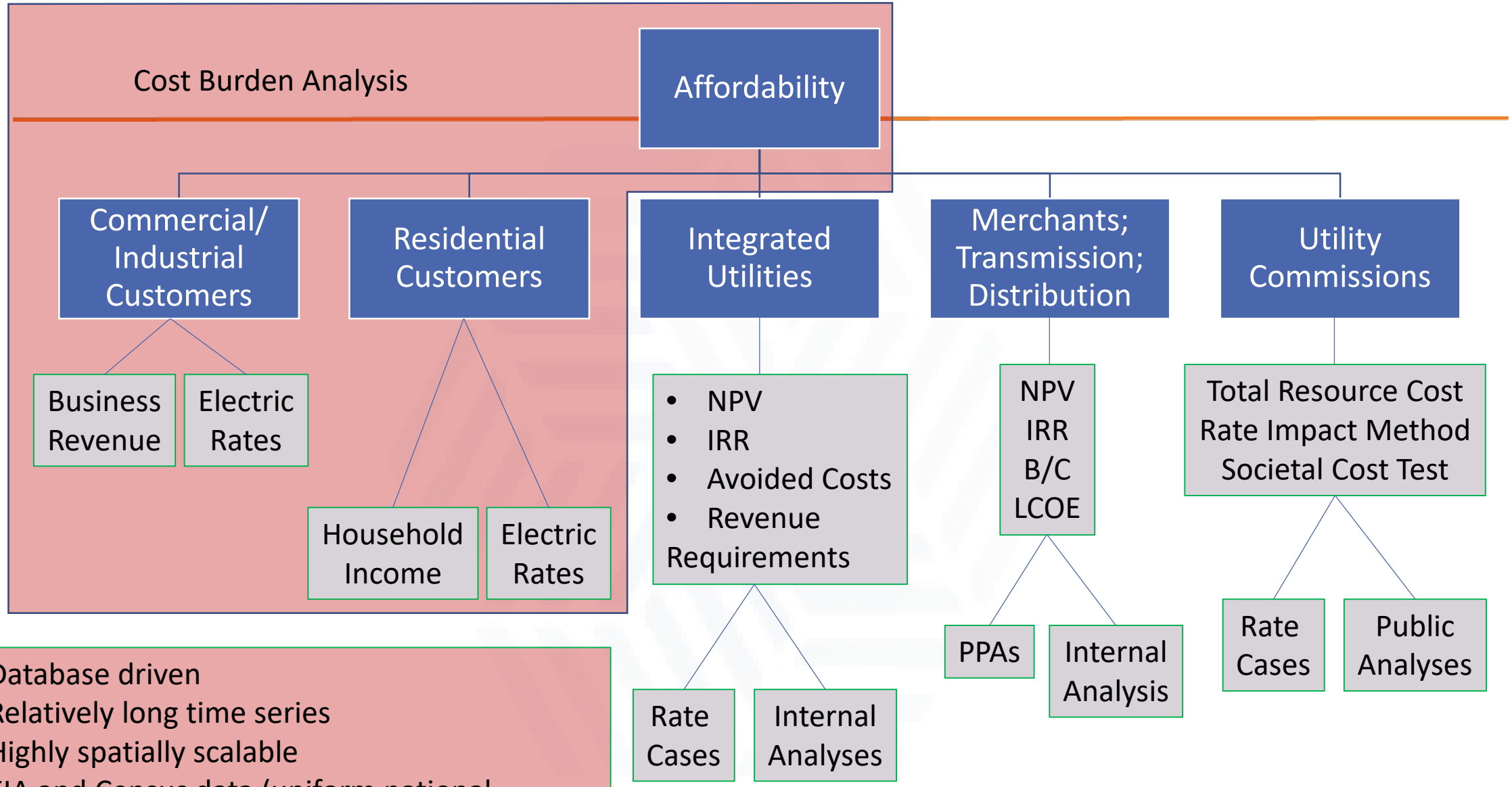
- Cost Effectiveness Metrics (mature)
  - Levelized Cost of Electricity
  - Internal Rate of Return
  - Simple Payback Period
  - Net Revenue Requirements
  - Avoided Cost
  - Others
- Cost Burden Metrics (emerging)
  - Customer electricity cost burden
  - Electricity affordability gap
  - Affordability gap headcount
  - Temporal indices of these metrics
  - Others?

Affordability Metrics by Stakeholder Group



- Needed for individual project assessments
- Dispersed data sources (no central data)
- One-off analyses. No time series.
- Spatial scales vary widely
- Approaches may vary widely

Affordability Metrics by Stakeholder Group



- Database driven
- Relatively long time series
- Highly spatially scalable
- EIA and Census data (uniform national approaches applicable at any scale)
- May be too generic for single project analysis

Affordability

Metric definitions: affordability gap metrics

$$\text{Household electricity cost burden} = \frac{\text{Annual net expenditure on electricity}}{\text{Annual household income}}$$

$$\text{Household electricity affordability gap} = \frac{\text{Household electricity cost burden}}{\text{Affordable cost burden threshold}}$$

$$\text{Household electricity affordability gap index} = \frac{\text{Affordability gap}_{(t+y)}}{\text{Affordability gap}_{(t)}}$$

Affordability

Metric definitions: affordability headcount metrics

$$\text{Weighted average burden} = \sum_{i=1}^{16} \left(\frac{Net\ electricity\ cost\ per\ household}{Average\ household\ income_i} \right) \left(\frac{households_i}{total\ households} \right)$$

$$\text{Unaffordable headcount} = \sum_{i=1}^{16} (households_i) > threshold\ burden$$

$$\text{Household electricity affordability headcount index} = \frac{\%\ \text{Unaffordable}_{(t+y)}}{\%\ \text{Unaffordable}_{(t)}}$$

i = Census ACS household income bin (16 bins)

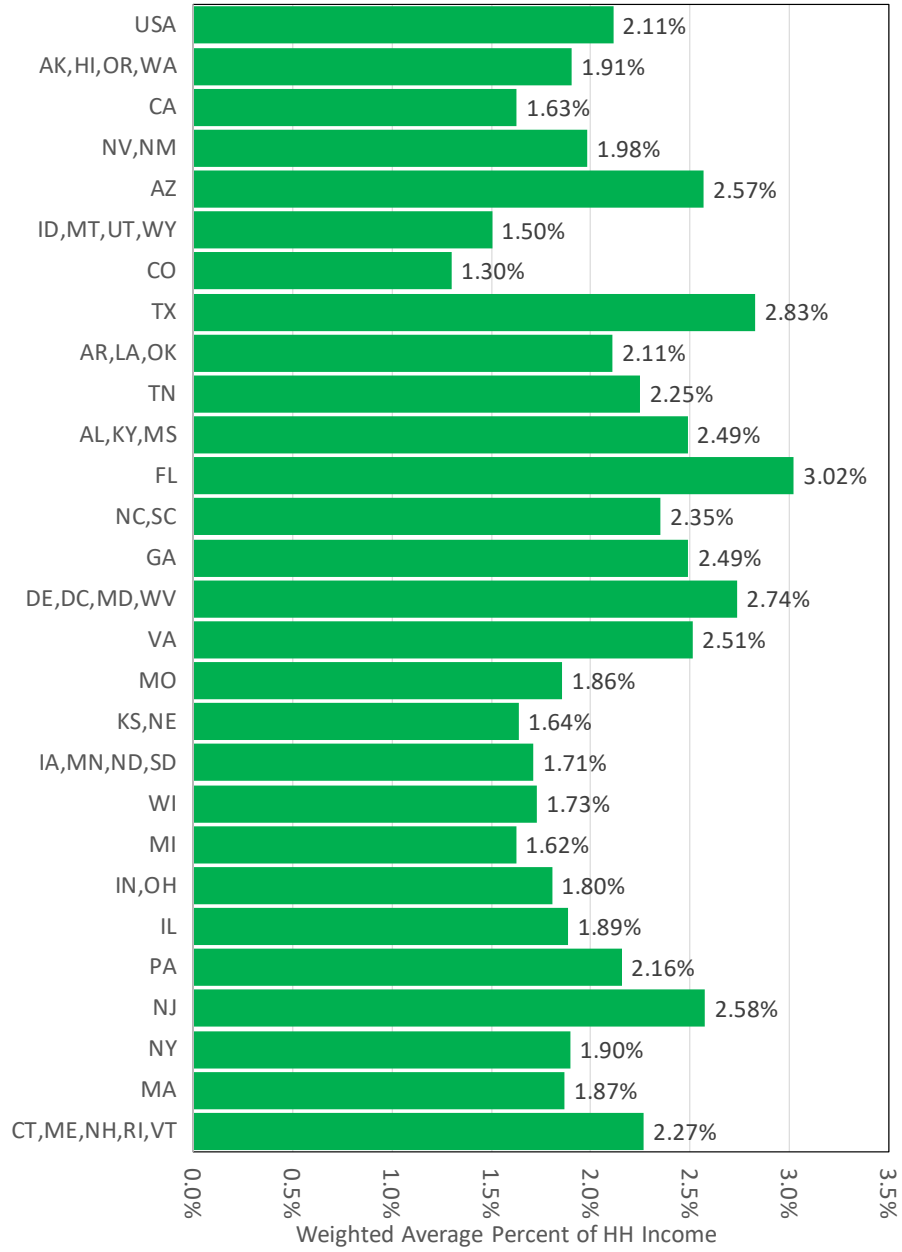
Affordability

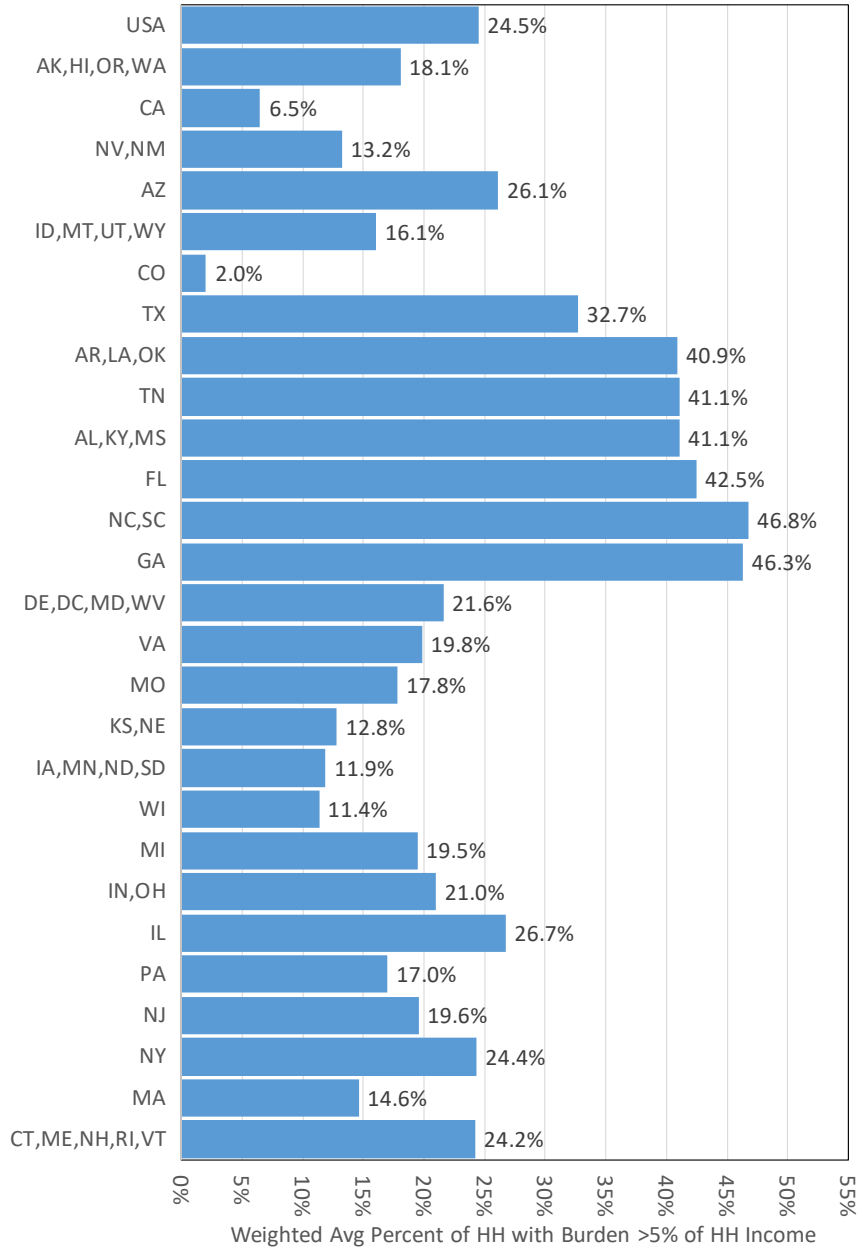
Approach: Data Availability

- Data sources for customer cost
  - EIA RECS Microdata – respondent-level electricity cost matched to state and multistate reporting regions
  - EIA Form 861 - utility service area and state aggregation of electricity sales revenue by customer class

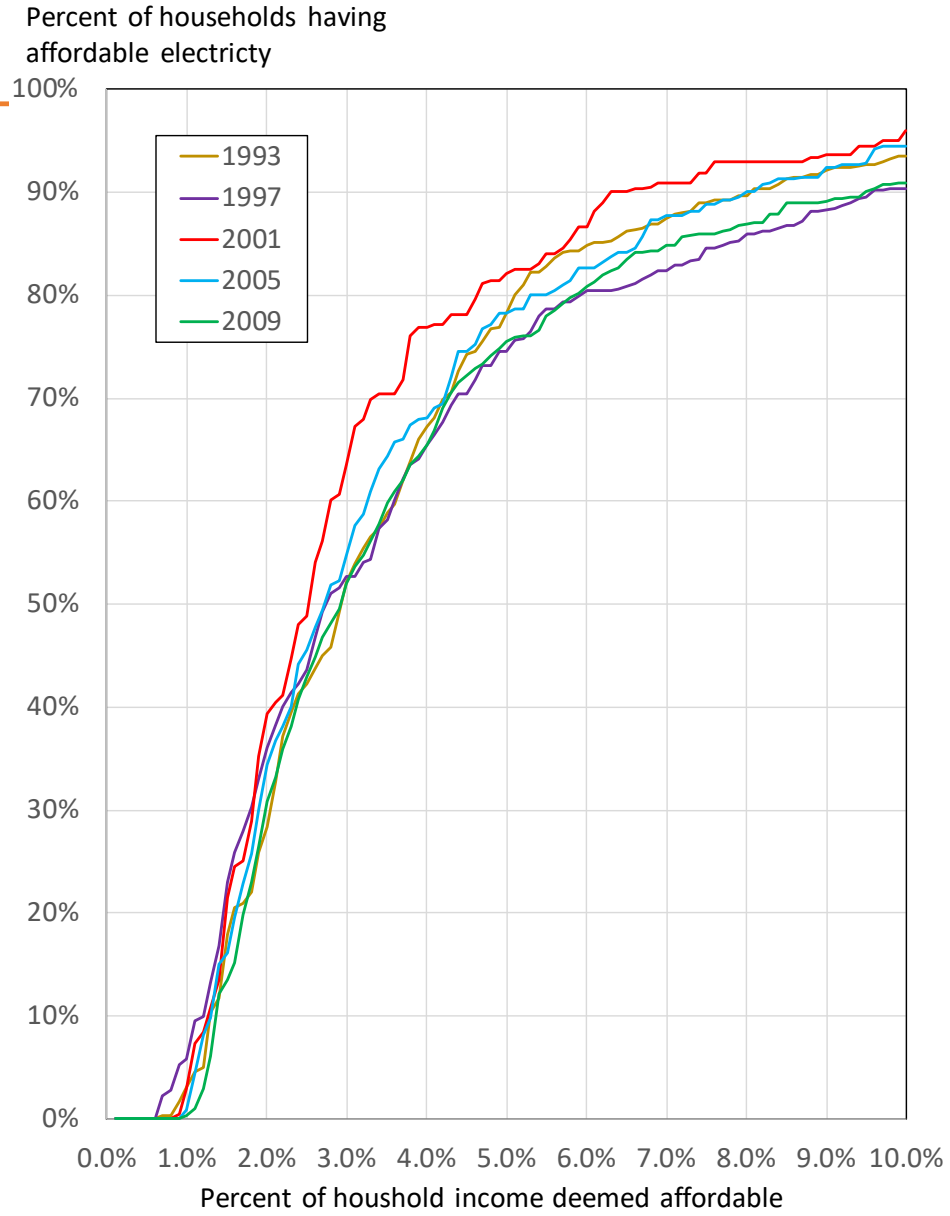
- Data sources for household income
  - Census American Community Survey – national, state, county, block group, etc. aggregation of annual household income into 16 bins
  - EIA RECS Microdata – respondent-level household income matched to state and multistate reporting regions

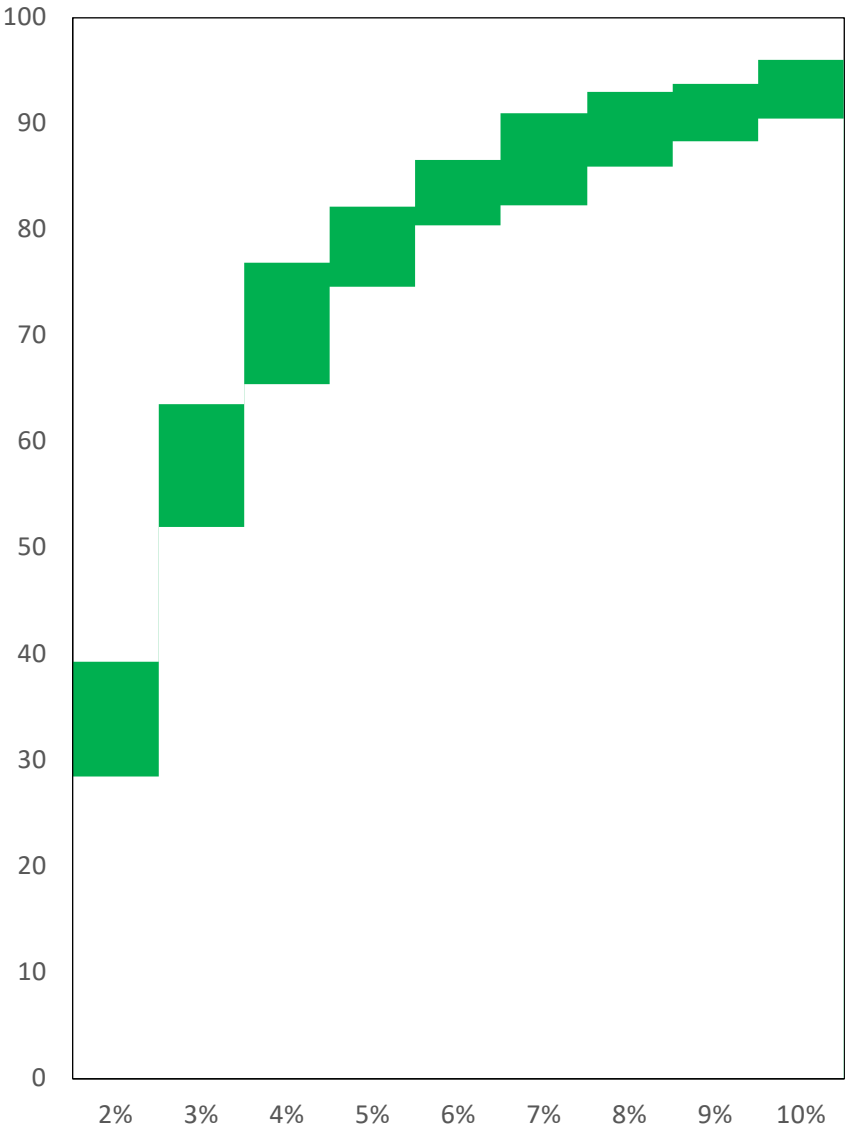
Baseline Information: Average customer cost burden and headcount (EIA 2009 RECS Microdata)





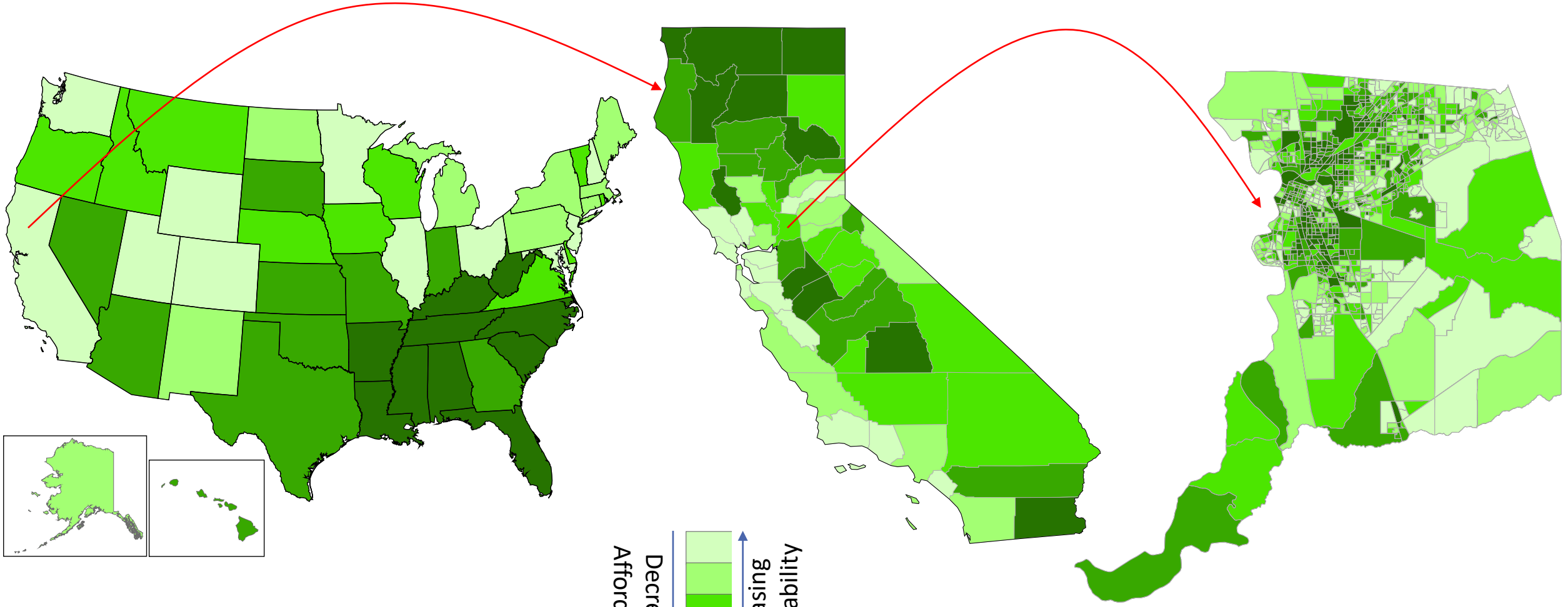
Baseline Information: Affordability Thresholds (EIA RECS Microdata)





Affordability

Baseline Information: Spatial Reporting



Derived using EIA Form 861 (2015 data) and 2015 Census ACS data

Affordability

Baseline Metrics: Alaska Village Use Case

Village	PCE code	Average Proportion of Income Spent on Electricity (Customer Burden)						Affordability Gap Factor @ 3% Threshold						Affordability Gap Index (2010=1)					
		2010	2011	2012	2013	2014	2015	2010	2011	2012	2013	2014	2015	2010	2011	2012	2013	2014	2015
Chefornak	332310	3.21%	3.00%	2.68%	2.86%	2.52%	2.28%	1.07	1.00	0.89	0.95	0.84	0.76	1.00	0.94	0.84	0.89	0.79	0.71
Shungnak	331650	4.28%	3.69%	3.71%	3.91%	3.85%	4.02%	1.43	1.23	1.24	1.30	1.28	1.34	1.00	0.86	0.87	0.92	0.90	0.94
AK Villages Weighted Average		3.08%	3.03%	3.01%	3.09%	3.10%	3.10%	1.03	1.01	1.00	1.03	1.03	1.03	1.00	0.98	0.98	1.00	1.01	1.01

Village	PCE code	Percent of HH with Unaffordable Electricity						Affordability Headcount Gap Index					
		2010	2011	2012	2013	2014	2015	2010	2011	2012	2013	2014	2015
Chefornak	332310	38.0%	36.1%	33.8%	38.6%	31.3%	22.7%	1.00	0.95	0.89	1.01	0.82	0.60
Shungnak	331650	44.4%	40.3%	30.9%	36.8%	37.5%	44.9%	1.00	0.91	0.69	0.83	0.84	1.01
AK Villages Weighted Average		32.1%	32.6%	32.5%	33.2%	32.9%	32.6%	1.00	1.02	1.02	1.04	1.03	1.02

Data source: unpublished 2016 Power Cost Equalization program data from Alaska Energy Authority
n=103 remote villages

Affordability

Approach: Potential uses

- Tracks general electricity affordability using a consistent approach for any geographic level
- Reports temporal and spatial aspects to customer electricity affordability
- Informs regulators about the distributional impacts of assigning costs to customer classes
- Provides consumers with additional information upon which the choice of electricity suppliers can be informed
- Others?

Affordability

Approach: Key challenges

- Cost burden metrics rely on household income by definition. Income is influenced by outside factors independent of grid issues.
- Absence of residence-level net electric bills forces the use localized average costs, rather than household specific costs.
- Annual cost burdens may miss acute burdens faced during the most costly months and could mask the extent of unaffordable electricity experienced at points during a year.
- Use of cost burden metrics for technology or policy analysis requires engaging some form of cost allocation or rate design model to accurately assign costs to customer classes. Example baseline metrics are lagging indicators of business as usual.
- The concept of affordability relies upon the notion of a threshold value “deemed” to be the affordable threshold. Literature shows that many alternative thresholds may be reasonable, depending on many factors.

Affordability

Year 1 Outcomes

- *Accomplishments to Date*

✓ Literature review of the affordability metric landscape

✓ Development of baseline cost burden metrics at various scales

✓ Elicit input from working partners and stakeholders

✓ Development of potential use cases for future metric validation

✓ Document initial baseline metrics approaches and example estimates

Future Work

Y2 and Y3

Institutional Support

- *Affordability next steps*

❑Develop meaningful use cases with stakeholders and working partners

❑Test approaches using public data against customer-level billing data

❑Research commercial and industrial customer affordability approaches

❑Publish baseline cost burden metrics based on public data sources

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Reviewer Questions

Technical Approach for Metrics

- Is the summary of the affordability metrics landscape for the metric category (including existing metrics and the current state-of-the-art) accurate based on your knowledge?
- Are the definitions of the newly proposed metrics clear and understandable?
- Are the calculation methods or processes for these metrics clearly identified and repeatable?
- Are the underlying data requirements clearly identified, and examples of existing sources, or new processes for gathering the data, provided?

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Reviewer Questions

Value of Metrics

- Is our work in affordability metrics needed and useful from your perspective? Why or why not?
- Which of the newly proposed affordability metrics do you think provide the highest value from your perspective? Which is the most valuable? the least?
- Do you anticipate that the value of the information that could be gleaned from these metric at least commensurate with the effort required to calculate and report them?
- Do you see any barriers that could inhibit broader adoption of the proposed affordability metrics? If so, what might they be?
- Are there any other issues related to the potential utility of the proposed metrics?
- What are the remaining gaps for affordability metrics - what metrics do you think would be useful to define and apply beyond the existing metrics and those defined as a part of this project? Of these gaps, which are the highest priorities to address from your perspective?

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Reviewer Questions

Additional Questions

- How can the proposed affordability metrics and methodologies inform grid modernization policy and investment decisions? What types of business decisions would the metrics be helpful in informing?
- How can the proposed affordability metrics and methodologies contribute toward being able to better track progress of grid modernization? Would retrospective reporting of the metric be useful in providing some sense of aggregate progress as the grid modernizes?
- What is the highest level of geographic aggregation that would be useful for reporting the proposed metrics?
- Is the use case/pilot test identified likely to demonstrate the value or utility of the defined metrics? If not, what other use case/pilot test might be more useful?

Institutional Support

Next Steps

- Reviewers
  - Please provide written feedback on the report in the template provided by 2/28
- Metrics Team
  - Incorporate feedback received into a version for DOE review by 3/31
  - Publication expected by Summer 2017