

EXHIBIT NO. _____

BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Long-Term)	
Forecast Report of Ohio Power Company)	Case No. 18-501-EL-FOR
And Related Matters)	

DIRECT TESTIMONY OF
TRINA HORNER
ON BEHALF OF
OHIO POWER COMPANY

Filed: September 19, 2018

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TRINA HORNER

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BEFORE
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1 **PERSONAL DATA**

2 **Q. PLEASE STATE YOUR NAME, POSITION AND BUSINESS ADDRESS.**

3 A. My name is Trina Horner. I am a Director at Navigant Consulting (“Navigant”) and I co-
4 lead the Regulatory sub-offering within Navigant’s Energy Practice. My business
5 address is 101 California Street, Suite 4100, San Francisco, California, 94111.

6 **Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND**
7 **BUSINESS EXPERIENCE.**

8 A. I hold a Bachelor of Arts in International Relations/Finance emphasis from the University
9 of California at Davis. Prior to joining Navigant in 2016, I have held various positions in
10 the regulated utility space, including Senior Director of Regulatory Affairs and Vice
11 President of Proceedings and Rates at Pacific Gas and Electric Company (PG&E). In
12 those roles I oversaw PG&E’s end-to-end regulatory case analytics team including
13 revenue requirement, cost allocation, customer load forecasting and rate design
14 development. I had primary responsibility for ensuring accurate quantitative and
15 qualitative analytics in support of regulatory filings, as well as oversight of regulatory
16 case management, key stakeholder outreach and compliance for the company’s entire
17 portfolio of state public utilities commission filings and testimony. Prior to my work at
18 PG&E I served as interim Environmental Affairs Officer at the East Bay Municipal
19 Utility District, and as a senior analyst and Chief of Staff to the President of the

1 California Public Utilities Commission (“CPUC”). My consulting experience at
2 Navigant has principally consisted of designing and assessing ratemaking options,
3 developing regulatory proposals, and evaluating tariff options for investor-owned and
4 municipal electric utilities. I also provide advice regarding regulatory compliance and
5 process.

6 **Q. HAVE YOU PREVIOUSLY FILED TESTIMONY IN A REGULATORY**
7 **PROCEEDING?**

8 A. Yes. I have testified and submitted testimony before the Federal Energy Regulatory
9 Commission (“FERC”) on behalf of the CPUC.

10 **PURPOSE OF TESTIMONY**

11 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

12 A. AEP Ohio retained Navigant to assess commercial and industrial (C&I) and residential
13 customer interest in, and attitudes toward, renewable energy generated in Ohio and
14 delivered by AEP Ohio. The purpose of my testimony is to sponsor Navigant’s
15 assessment, contained in the report “AEP Ohio voice of the Customer: Attitudes and
16 Expectations for Renewable Energy”, dated September 12, 2018 (“VOC Report”).

17 **Q. WHAT EXHIBITS ARE YOU SPONSORING IN THIS PROCEEDING?**

18 A. I am sponsoring the following exhibit:

- 19 • Exhibit TH-1 (AEP Ohio Voice of the Customer: Attitudes and Expectations for
20 Renewable Energy)

21 **AEP OHIO VOICE OF THE CUSTOMER REPORT**

22 **Q. WAS THE VOC REPORT PREPARED BY YOU OR UNDER YOUR**
23 **DIRECTION?**

1 Yes. The survey that is included in the VOC Report was designed and implemented
2 under the direction of Company witness Fry, as she explains in her direct testimony.

3 **Q. HOW DID NAVIGANT CONDUCT ITS ASSESSMENT OF CUSTOMER**
4 **EXPECTATIONS AND ATTITUDES FOR RENEWABLE ENERGY IN OHIO?**

5 A. Navigant conducted primary and secondary research across three areas for this study.
6 Primary research is new research that has not been conducted before; secondary research
7 involves the analysis of information that has already been collected. First, we examined
8 renewable energy policy trends primarily in Ohio, including both legislative and
9 regulatory developments in AEP Ohio's service territory (secondary research). Second,
10 we performed an analysis of AEP Ohio's business leader actions and commitments to
11 sustainability and renewable energy organizations, as well as outreach to business leaders
12 to better understand their perspectives on this topic (primary and secondary research).
13 Finally, we completed our assessment with a survey of residential and small commercial
14 & industrial customer perspectives on utility-sourced renewable generation above the
15 minimum currently required by state law (primary research). As explained by Company
16 witness Fry, the survey is a valid measurement tool that reflects the reasonable steps
17 available to both control against bias and generate statistically significant results in an
18 effort to accurately reflect the views of AEP Ohio's customers that are referenced in the
19 VOC Report.

20 **Q. WHAT ARE THE RESULTS OF NAVIGANT'S ASSESSMENT OF CUSTOMER**
21 **EXPECTATIONS AND ATTITUDES FOR RENEWABLE ENERGY IN OHIO?**

22 A. Navigant considered the statewide environment for renewable energy, reflecting on
23 legislative and regulatory developments relevant to AEP Ohio's service territory and

1 recent Ohio business leader commitments to sustainability and renewable energy. Results
2 from the online survey indicate that a strong majority of customers believe it is important
3 that AEP Ohio makes greater use of renewable energy above current levels. The survey
4 also revealed that a majority of residential customers and many small C&I customers are
5 willing to pay some additional amount on their electricity bills for AEP Ohio investments
6 in renewable energy. All of the factors examined by Navigant indicate that AEP Ohio
7 customers are planning for, and expecting to be served by, more renewable generation to
8 supply their energy needs going forward.

9 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

10 A. Yes.



AEP Ohio Voice of the Customer: Attitudes and Expectations for Renewable Energy

Prepared for:

AEP Ohio



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September 12, 2018

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DISCLAIMER

This report was prepared by Navigant Consulting, Inc. (Navigant) for Ohio Power Company ("AEP Ohio"). The work presented in this report represents Navigant's professional judgment based on the information available at the time this report was prepared. Navigant is not responsible for the reader's use of, or reliance upon, the report, nor any decisions based on the report. NAVIGANT MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESSED OR IMPLIED. Readers of the report are advised that they assume all liabilities incurred by them, or third parties, as a result of their reliance on the report, or the data, information, findings and opinions contained in the report.

EXECUTIVE SUMMARY

Renewable energy plays a growing role in the nation's energy supply and has gained significant support from customers in Ohio. In response, AEP Ohio is actively working to expand the renewable resources in its electricity portfolio beyond the minimum currently required by state law by proposing 900 MW of new renewable generation in Ohio comprised of 500 MW of wind generation and 400 MW of solar generation. As part of that effort, AEP Ohio retained Navigant Consulting, Inc. (Navigant or the research team) to assess commercial and industrial (C&I) and residential customer interest and attitudes toward renewable energy generated in Ohio and delivered by AEP Ohio.

Navigant considered the statewide environment for renewable energy, reflecting on legislative and regulatory developments relevant to AEP Ohio's service territory and recent Ohio business leader commitments to sustainability and renewable energy. The research team completed its assessment with a survey of residential and small C&I customer perspectives on utility-sourced renewable generation in August 2018. All of these factors indicate that AEP Ohio customers are planning for and expecting to be served by renewable energy moving forward. Awareness and support for wind and solar resources spans both residential and C&I customer classes.

Ohio customers and policymakers have a growing awareness of the need to modernize the electric grid and diversify consumers' energy supply. For example, the Public Utilities Commission of Ohio's (PUCO's) PowerForward initiative provides a roadmap to modernize the Ohio electric grid, including transforming the delivery of electricity and enhancing customer generation options. At the same time, C&I customers have driven demand for renewable generation across the US with ambitions to source their own operations with renewable energy resources and create local jobs and growth.

Many of these companies have headquarters or operations in Ohio, creating local demand for renewable generation. Navigant used a two-step process to identify those companies with a higher likelihood of interest in renewable energy given commitments to one or more leading sustainability organizations and then estimated the potential magnitude of that interest. The research team found that 75 of AEP Ohio's largest customers representing 8.8% of its C&I customer load have made such a commitment. Serving all of these customers with renewable generation would require the procurement of approximately 2,600 GWh of renewable generation.

To better understand small C&I and residential customers' perspectives on utility-sourced renewable generation, Navigant conducted an online survey with three AEP Ohio customer groups in August 2018: active Percentage of Income Payment Plan (PIPP) residential customers, residential non-PIPP customers, and small C&I customers.¹ The survey explored the following topics:

- Level of importance that future energy provided by AEP Ohio makes greater use of renewable energy generation (e.g., wind and solar) above the current mandatory minimum level of 4.5% of the generation mix
- Perceived benefits of utility investments in renewable energy
- Level of importance that AEP Ohio provide renewable energy that is produced within the state of Ohio

¹ To develop the sample of small C&I customers in AEP Ohio territory, Navigant defined small C&I as single meter customers with annual metered consumption less than 1,000,000 kWh/year.



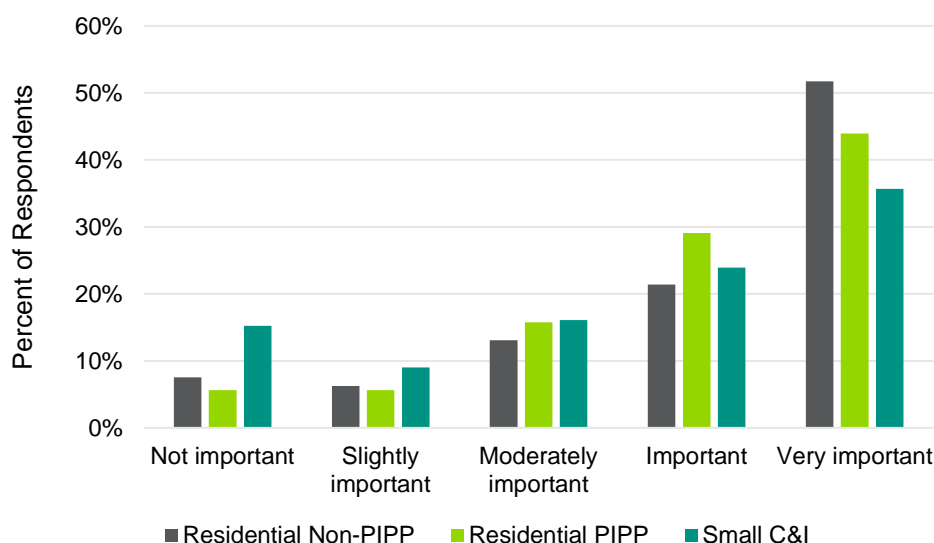
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- Support for paying a monthly bill increase associated with AEP Ohio's commitment to pursue development of 900 MW of new renewable generation, consisting of 500 MW of wind generation and 400 MW of solar generation
- Level of agreement with statements regarding AEP Ohio's efforts to reduce air pollution and invest in wind and solar energy generation

The survey also provided an opportunity for open-ended comments regarding AEP Ohio's commitment to pursue development of renewable energy generation.

Results from the online survey indicate that a strong majority of customers believe it is important that AEP Ohio makes greater use of renewable energy above current levels, as shown in Figure 1. At least half of the participants in each customer group also believe it is important that AEP Ohio provide renewable energy produced in Ohio.

Figure 1. Importance That AEP Ohio Makes Greater Use of Renewable Energy above Current Levels



Survey question response counts: residential non-PIPP n=7,498; residential PIPP n=660; small C&I n=664.

Survey question: AEP Ohio currently obtains 4.5% of its electricity from renewable sources such as wind and solar. AEP Ohio is looking to make investments to increase the percentage of electricity from wind and solar above this level. They are seeking input from customers regarding these investment choices. How important is it to you that energy provided to you in the future makes greater use of renewable energy generation (e.g., wind and solar)?

Source: Navigant online survey data

The survey also revealed that a majority of residential non-PIPP customers and many small C&I customers are willing to pay some additional amount on their electricity bills for AEP Ohio investments in renewable energy. For residential non-PIPP customers, 57%-60% of customers are willing to pay the maximum dollar range tested in the survey, which varied from \$0.75 to \$1.75. Another 15%-17% of residential non-PIPP customers are willing to pay something greater than zero but less than the maximum dollar range tested in the survey. Support for bill increases is relatively consistent across the dollar amounts tested in the survey for residential non-PIPP customers.



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The survey asked participants who stated it was slightly important to very important that AEP Ohio makes greater use of renewable energy what they view as the most important benefits. Respondents consistently identified creating a better world for future generations, reducing greenhouse gas emissions, and improving air quality as top benefits of procuring renewable generation.

1. INTRODUCTION

1.1 Background

Over the past decade, states across the country have continued to increase their Renewable Portfolio Standard commitments.² Additionally, a growing number of public and private organizations have committed to meeting their energy needs with renewable energy.³ This growth is driven by a combination of technology performance and cost declines, policy goals, environmental benefits, and consumer preferences. In the recently published report *Powering Ohio: A Vision for Growth and Innovative Energy Investment*, the authors opened with the following statement:⁴

“Ohio can attract billions in investment and create tens of thousands of good jobs by embracing clean energy, while building on Ohio’s traditional and emerging strengths. Decisions made in the coming years by political, business, and investment leaders will determine whether Ohio captures economic growth by developing a modernized energy economy, or risks losing valuable business to domestic and international competition.”

In alignment with these sentiments, AEP Ohio is actively working to expand the renewable resources in its electricity portfolio beyond the minimum currently required by state law, committing to pursue development of 900 MW of new renewable generation in Ohio. The total planned capacity is comprised of 500 MW of wind generation and 400 MW of solar generation. In conjunction with this effort, AEP Ohio retained Navigant Consulting, Inc. (Navigant or the research team) to conduct analyses of business and residential customer attitudes toward renewable energy generated and delivered in Ohio. This report identifies the findings from these efforts.

1.2 Report Approach and Organization

This report seeks to examine AEP Ohio customer expectations around renewable energy by assessing attitudes and behaviors of the utility’s energy customer segments as well as legal and regulatory requirements. Navigant’s assessment evaluates three areas:

- The statewide environment for renewable energy, reflecting on legislative and regulatory developments relevant to AEP Ohio’s service territory
- Ohio business leader commitments to sustainability and renewable energy
- Residential and small commercial and industrial (C&I) customer perspectives on utility-sourced renewable generation as measured through an online survey issued by Navigant⁵

² As of February 2017, 29 states and Washington, DC and three territories have a Renewable Portfolio Standard, <http://ncsolarcenterprod.s3.amazonaws.com/wp-content/uploads/2017/03/Renewable-Portfolio-Standards.pdf>.

³ As of September 2018, 140 of the largest global companies have joined RE100, committing to 100% renewable energy, <http://there100.org/>.

⁴ Synapse Energy Economics and Case Western Reserve University’s Great Lakes Energy Institute, *Powering Ohio: A Vision for Growth and Innovative Energy Investment*, June 2018, http://www.poweringohio.org/files/2018/05/Powering-Ohio_FINAL-WEB.pdf.

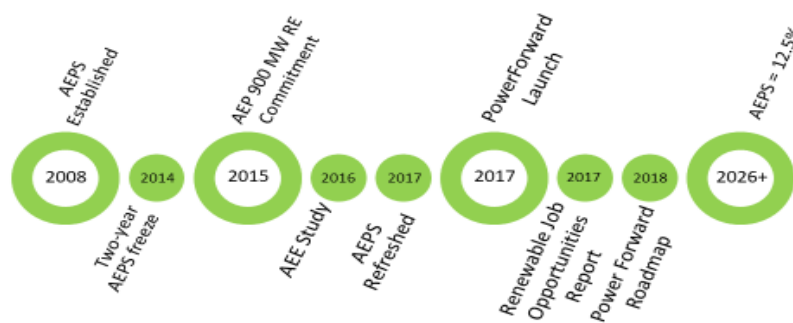
⁵ The survey questions are available in Appendix A.

2. OHIO RENEWABLE ENERGY POLICY TRENDS

Ohio customers and policymakers have become aware of the need to modernize the electric grid and diversify consumers' energy supply. The Public Utilities Commission of Ohio (PUCO) is actively considering options to modernize the electric the grid through its PowerForward initiative, including transforming the delivery of electricity and enhancing the customer experience. At the same time, C&I customers have driven demand for renewable generation across the US with ambitions to source their operations with renewable energy resources and create local jobs and growth. As the home to many of these companies, Ohio has created local demand for renewable generation.

Policymaker interest and activity in these issues has increased significantly in recent years, as shown in Figure 2 and described in greater detail in Section 2.1.

Figure 2. Renewable Energy-Related Policy Activities



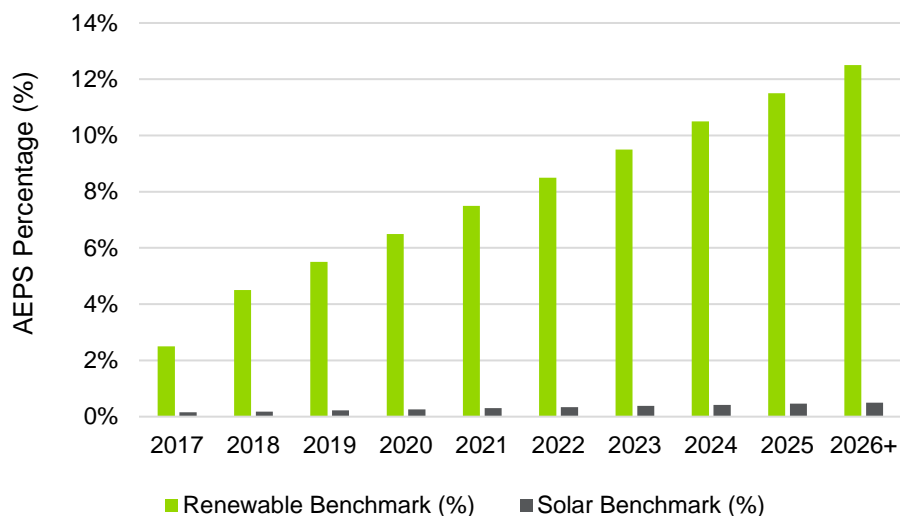
2.1 Legislative and Regulatory Action

In May 2008, Ohio enacted Senate Bill (SB) 221, instituting electric industry restructuring and implementing the Alternative Energy Portfolio Standard (AEPS). The AEPS mandates renewable energy procurement requirements for the state's electric distribution utilities and electric service companies. In May 2014, Ohio enacted a freeze of its alternative energy ramp-up schedule, holding the 2014 targets in place for 2 years⁶ until the schedule was reactivated in January 2017.⁷ Over the next 8 years, the AEPS renewable benchmark schedule projects an annual increase of 1%, reaching 12.5% by 2026 (shown in Figure 3).

⁶ SB 310 of 2014 froze the multi-year renewable ramp-up schedule for 2 years, removed the in-state requirement for renewable energy procurement, and pushed back the final renewable benchmark of 12.5% from 2024 to 2026.

⁷ In 2016, Governor Kasich vetoed House Bill (HB) 554, which would have made renewable energy standards optional for 2 more years.

Figure 3. AEPS Compliance Schedule



In 2015, AEP Ohio committed to pursue development of 900 MW of wind and solar generation in Ohio.⁸ Additionally, in 2016, the PUCO directed AEP Ohio to “perform an analysis regarding how to bring or encourage companies to establish renewable energy companies with headquarters and manufacturing plants in Ohio and how to transition the current power plant workforce to such job opportunities.”⁹ The study, completed in 2017, provided recommendations for state and local governments to drive renewable energy company and job growth. The research identified strategies to encourage renewable energy companies to locate in a state, assessed the current status of renewable energy companies and jobs in Ohio, and identified strategies to help employees transition from conventional energy to renewable energy careers.¹⁰

In 2017, the PUCO launched the PowerForward initiative, calling it a “review of the latest in technological and regulatory innovation that could serve to enhance the consumer electricity experience.”¹¹ In the August 29, 2018 PowerForward report, *A Roadmap to Ohio’s Electricity Future*, the PUCO charted a path forward for grid modernization, regulatory innovation, and customer engagement in energy choices.

While PowerForward is not directly focused on renewable generation, regulators have acknowledged that part of the enhanced experience is accommodating customers who want to access distributed and renewable technologies. As PUCO Chairman Asim Haque observed, “We are on the cusp of true transformation in the electric industry. Technology exists today that can change the way we use energy at

⁸ See the approved settlement in PUCO Case No.14-1693-EL-RDR.

⁹ Public Utilities Commission of Ohio, Opinion and Order, Case No. 14-1693-EL-RDR and Case No. 14-1694-EL-AAM, PPA Stipulation Section III.D.12.e.

¹⁰ Navigant, Ohio Renewable Energy Manufacturing & Company Establishment Analysis, December 13, 2017, Document Record page: <http://dis.puc.state.oh.us/DocumentRecord.aspx?DocID=cce526fa-8d29-4dfa-b07c-5dcee43ef233>.

¹¹ Ohio Public Utilities Commission, “PowerForward Ohio,” <https://www.puco.ohio.gov/industry-information/industry-topics/powerforward/>.



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work and home. Homeowners are increasingly trying to make their homes smarter, electric vehicle sales are rising, and businesses are asking how they can self-generate or buy clean power.”¹²

¹² Asim Haque (Chairman, PUCO) “Your Electricity Experience Must Advance,” *All for Ohio Blog*, Ohio Chamber of Commerce, April 4, 2018,

<http://allforohio.com/2018/04/04/your-electricity-experience-must-advance/>.



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3. CORPORATE LEADER EVALUATION

Large C&I customers seek to source their electricity supply from renewable energy to meet a variety of sustainability, financial, and branding goals. As of 2016, 71 Fortune 100 companies and 215 Fortune 500 companies had committed to a sustainability target, a renewable energy target, or both.¹³ Ohio houses facilities for 61% of the committed Fortune 500 firms and 73% of those in the Fortune 100. This includes 39 companies either headquartered in Ohio or that are among the state's 100 largest employers.¹⁴ Navigant's sustainability customer commitment analysis (discussed in Section 3.1) found that 34 of these 39 Ohio companies are AEP Ohio customers.

3.1 Sustainability Customer Commitment Analysis

Many of AEP Ohio's corporate customers have demonstrated a desire to incorporate renewable generation into their procurement and planning. As indicated in the *Powering Ohio: A Vision for Growth and Innovative Energy Investment* report, several of these Fortune 500 companies, including JPMorgan Chase & Co., Campbell Soup Company, General Motors, and Owens Corning, are among the Ohio companies investing in renewable energy.¹⁵ Navigant used a two-step process to identify companies with a higher likelihood of interest in renewable energy and then estimated the potential magnitude of that interest.

As detailed in Figure 4, Navigant's data processing approach involved filtering to exclude customers with an aggregated annual load less than 100,000 kWh and combining customer accounts from the same parent company. This reduced AEP Ohio's total C&I base from 187,248 C&I¹⁶ accounts to 11,043 C&I accounts. This remaining set of customers account for 93% of the reported annual electric load from C&I customers in AEP Ohio's territory.

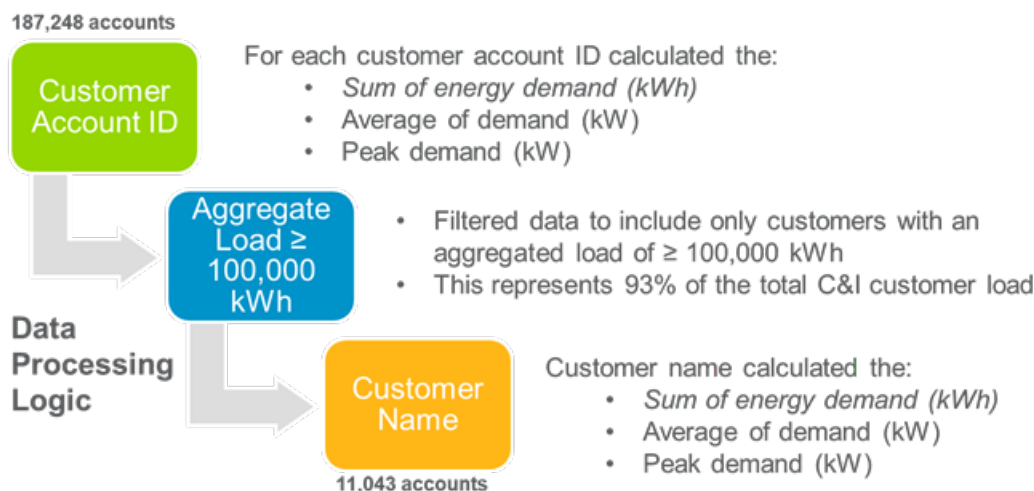
¹³ Advanced Energy Economy, *2016 Corporate Advanced Energy Commitments*, December 2016, <https://info.aee.net/growth-in-corporate-advanced-energy-demand-market-benefits-report>.

¹⁴ Synapse Energy Economics and Case Western Reserve University's Great Lakes Energy Institute, *Powering Ohio: A Vision for Growth and Innovative Energy Investment*, June 2018, http://www.poweringohio.org/files/2018/05/Powering-Ohio_FINAL-WEB.pdf.

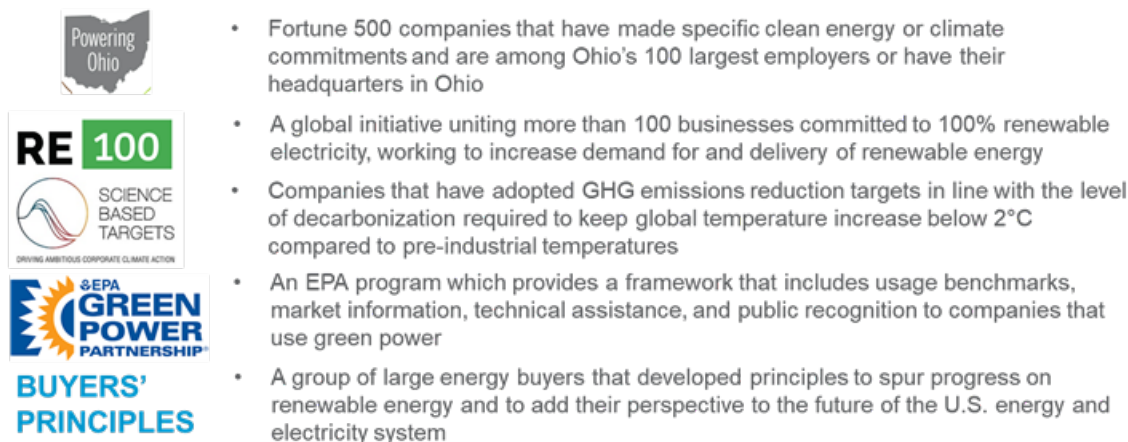
¹⁵ Synapse Energy Economics and Case Western Reserve University's Great Lakes Energy Institute, *Powering Ohio: A Vision for Growth and Innovative Energy Investment*.

¹⁶ Database information accessed on May 17, 2018 with entries current through April 30, 2018.

Figure 4. Data Processing Approach



Next, Navigant cross-referenced these AEP Ohio customers with companies that had made public commitments to purchase renewable energy through organizations like Renewable Energy 100, Science Based Targets, Green Power Partnership, and Corporate Renewable Energy Buyers' Principles, as well as the companies identified in the *Powering Ohio* report. As illustrated in Figure 5, a company's membership in or affiliation with sustainability commitment organizations can be an important step in demonstrating company commitment to sustainability and/or interest in accessing renewable generation as part of their energy supply.

Figure 5. Sustainability Commitment Organizations¹⁷

¹⁷ Synapse Energy Economics and Case Western Reserve University's Great Lakes Energy Institute, *Powering Ohio: A Vision for Growth and Innovative Energy Investment*, June 2018, http://www.poweringohio.org/files/2018/05/Powering-Ohio_FINAL-WEB.pdf; RE100, *Progress and Insights Report*, January 2018,

<http://media.virbcndn.com/files/97/8b2d4ee2c961f080-RE100ProgressandInsightsReport2018.pdf>;

Science Based Targets, "Companies Taking Action,"

<http://sciencebasedtargets.org/companies-taking-action/>;



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Using this account filtering and cross-referencing approach, Navigant found that 75 of AEP Ohio's C&I customers have made a commitment to or were identified in at least one of the organizations listed in Figure 5. These 75 companies comprise 8.8% of AEP Ohio's C&I customer load with over 2,600 GWh in annual energy usage. This annual usage would require the procurement of approximately 2,090 MW of solar PV capacity¹⁸ or 830 MW of wind capacity¹⁹ and is equivalent to the annual consumption of 244,000 households.²⁰

3.2 Outreach to Sustainably Minded Large Customers

Navigant reached out to the large C&I customers identified through the filtering process to better understand their perspectives on carbon emission reduction goals, renewable energy procurement goals, renewable procurement preferences and metrics, and level of support for various utility-scale renewable projects and offerings. With 29 customers responding to the questionnaire, several key themes emerged:

- Almost half the companies that participated in the questionnaire have explicit goals around carbon emission reductions and/or renewable energy procurement. Half of those companies with goals characterized their company commitment as extremely committed to meeting those goals.
- A majority of respondent companies indicated they prefer that a portion of their renewable supply be based on local/regional projects in Ohio, assuming no significant difference in price. A strong majority of these companies are supportive of competitively priced renewable energy generated in Ohio as part of their electricity mix.
- A strong majority of the respondent companies expressed support of a utility-scale renewable project developed by AEP Ohio if it were competitively priced and approved by the Ohio regulatory authorities.

These themes provide some insight into potential trends of larger business customer perspectives on these issues. However, this outreach should not be considered statistically representative of AEP Ohio's C&I customer base or even of its largest corporate customer base due to the targeted sample selection approach and relatively limited number of responses.

US Environmental Protection Agency, "Green Power Partner List," Green Power Partnership, <https://www.epa.gov/greenpower/green-power-partner-list>;
Corporate Renewable Energy Buyers' Principles, "Buyers' Principles Signatories," About Us, <https://buyersprinciples.org/about-us/>.

¹⁸ Assumes a system production of 1,250 kWh/kW, NREL System Advisory Model, Columbus Ohio.

¹⁹ Assumes a capacity factor of 35.90%, LBNL's Wind Technologies Market Report, Figure 39, Great Lakes Region 2016 Capacity Factor

²⁰ The capacity factors used in this analysis are average capacity factors for the Ohio region. The capacity factors of specific projects will vary, but these are sufficiently accurate for the purposes of this analysis.

4. RESIDENTIAL AND SMALL C&I CUSTOMER SURVEY

4.1 Survey Goals and Approach

In August 2018, Navigant conducted an online survey with residential and small C&I customers in AEP Ohio territory. The purpose of the survey was to better understand customer perspectives on utility-sourced renewable generation by exploring the following topics:

- Level of importance that future energy provided by AEP Ohio makes greater use of renewable energy generation (e.g., wind and solar) above the current mandatory minimum level of 4.5% of the generation mix
- Perceived benefits to utility investments in renewable energy
- Level of importance that AEP Ohio provide renewable energy that is produced within the state of Ohio
- Support for paying a monthly bill increase associated with AEP Ohio's commitment to pursue development of 900 MW of new renewable generation comprised of 500 MW of wind generation and 400 MW of solar generation
- Level of agreement with statements related to AEP Ohio's efforts to reduce air pollution and invest in wind and solar energy generation

The survey also provided an opportunity for open-ended comments regarding AEP Ohio's commitment to pursue development of renewable energy generation.

Navigant customized the online survey for the following three segments: active residential Percentage of Income Payment Plan²¹ (PIPP) customers, residential non-PIPP customers, and small C&I customers.²² Appendix A provides the survey questions.

4.1.1 Survey Participation

Navigant worked with AEP Ohio to randomly select and invite 120,000 residential non-PIPP customers, 20,000 residential PIPP customers, and 20,000 small C&I customers with email addresses to participate in the survey. AEP Ohio shared the survey email invitation with the randomly selected customers via the Exact Target platform. The survey was administered online by Navigant through the Qualtrics platform and was open from August 13 through August 24, 2018. Table 1 shows the survey sample requirements, email invitations sent, and completed AEP Ohio customer surveys by customer segment. Navigant achieved survey participation totals that greatly exceeded the sample size requirements for statistical significance.

²¹ Ohio Development Services Agency, "Percentage of Income Payment Plan Plus (PIPP)," Energy Assistance Programs, https://development.ohio.gov/is/is_pipp.htm.

²² To develop the sample of small C&I customers in AEP Ohio territory, Navigant defined small C&I as single meter customers with annual metered consumption less than 1,000,000 kWh/year.



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Table 1. Survey Targets and Completion Results

Metric	Residential Non-PIPP	Residential PIPP	Small C&I
Target Sample Size Requirement ²³	275	275	275
Survey Invitations Sent	120,000	20,000	20,000
Surveys Completed by AEP Ohio Customers ²⁴	7,498	660	664

4.2 Survey Results

This section presents the online survey results, including customer perspectives on the importance of increased renewables in AEP Ohio territory, perceived benefits of utility investment in renewable energy, importance of renewable energy produced within Ohio, support for a monthly bill increase associated with AEP Ohio's development of renewable energy, and the customer's level of agreement with statements related to reducing air pollution and utility investments in wind and solar energy. This section concludes with a summary of the open-ended comments offered by survey participants about these topics.

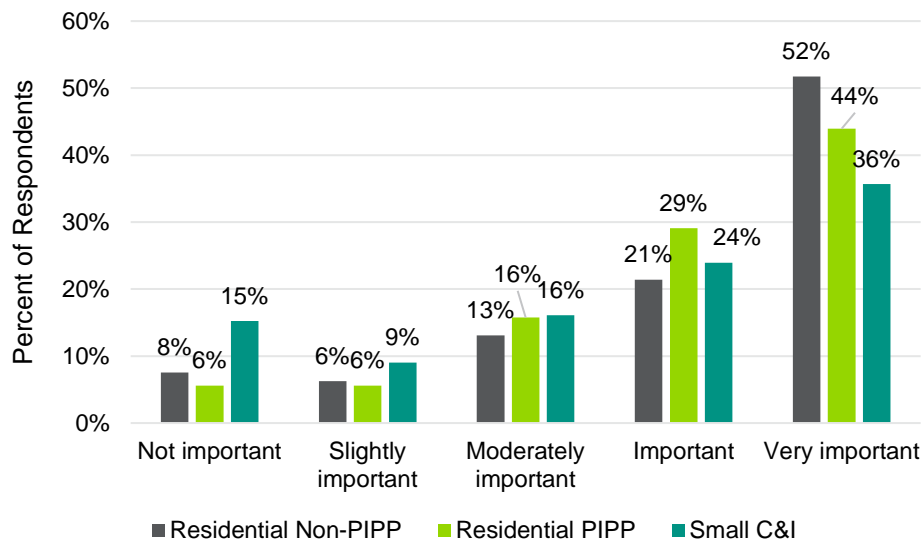
4.2.1 Importance of Increased Renewable Energy

Navigant provided survey participants with information on the current percentage of electricity AEP Ohio obtains from renewable sources (4.5%) and asked how important it is to them that energy provided in the future makes greater use of renewable energy.

Figure 6 shows the results for residential non-PIPP, residential PIPP, and small C&I customers. Nearly three-quarters of residential non-PIPP (73%) and residential PIPP (73%) participants feel it is important or very important that AEP Ohio makes greater use of renewable energy generation. The majority (59%) of small C&I participants also feel it is important or very important that AEP Ohio makes greater use of renewable energy generation.

²³ Navigant designed the sample size requirements to achieve 90% confidence and 10% precision assuming a coefficient of variation of 1.0.

²⁴ The total excludes customers who were screened out if they stated that they were not an AEP Ohio customer at the time of the survey.

Figure 6. Importance That AEP Ohio Makes Greater Use of Renewable Energy Above Current Levels

Survey question response counts: residential non-PIPP n=7,498; residential PIPP n=660; small C&I n=664.

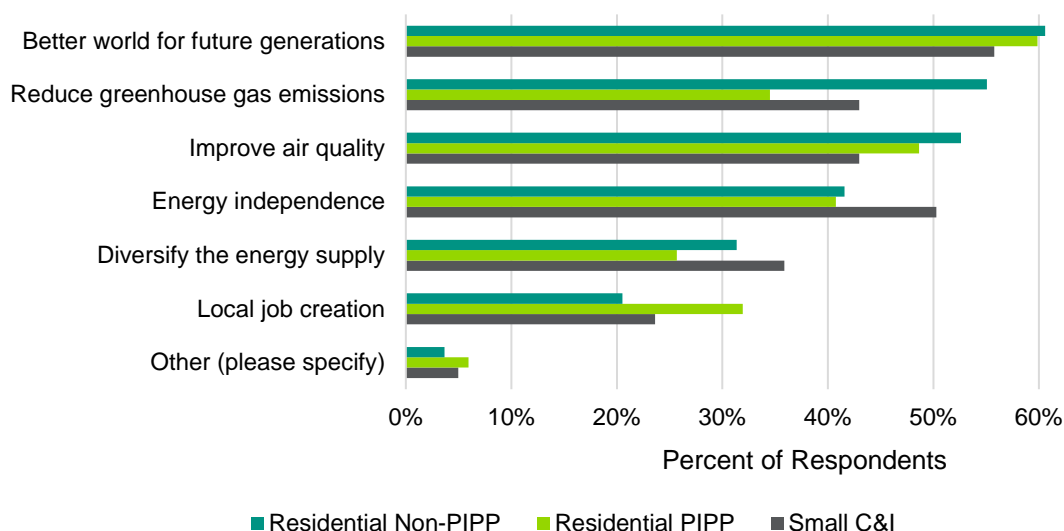
Survey question: AEP Ohio currently obtains 4.5% of its electricity from renewable sources such as wind and solar. AEP Ohio is looking to make investments to increase the percentage of electricity from wind and solar above this level. They are seeking input from customers regarding these investment choices. How important is it to you that energy provided to you in the future makes greater use of renewable energy generation (e.g., wind and solar)?

Source: Navigant online survey data

4.2.2 Renewable Procurement Drivers

For participants who stated that it was slightly important to very important that AEP Ohio makes greater use of renewable energy, the survey asked what they view as the most important benefits to utility investments in renewable energy. Participants could select up to three benefits.

Figure 7 shows how often each group selected each benefit. The most common benefits selected by residential non-PIPP customers include a better world for future generation (61%), reduced greenhouse gas emissions (55%), and improved air quality (53%). Residential PIPP customers selected local job creation as a benefit of renewable energy more often than residential non-PIPP and small C&I customers. Small C&I customers selected energy independence as a top benefit more often than residential non-PIPP and residential PIPP customers.

Figure 7. Most Important Benefits to Utility Investments in Renewable Energy

Survey question response counts: residential non-PIPP n=6,931; residential PIPP n=623; small C&I n=563.

Note: Only participants who stated that greater use of renewables was slightly important to very important were asked this question. Percentage total exceeds 100% for each group since participants can select up to three benefits.²⁵

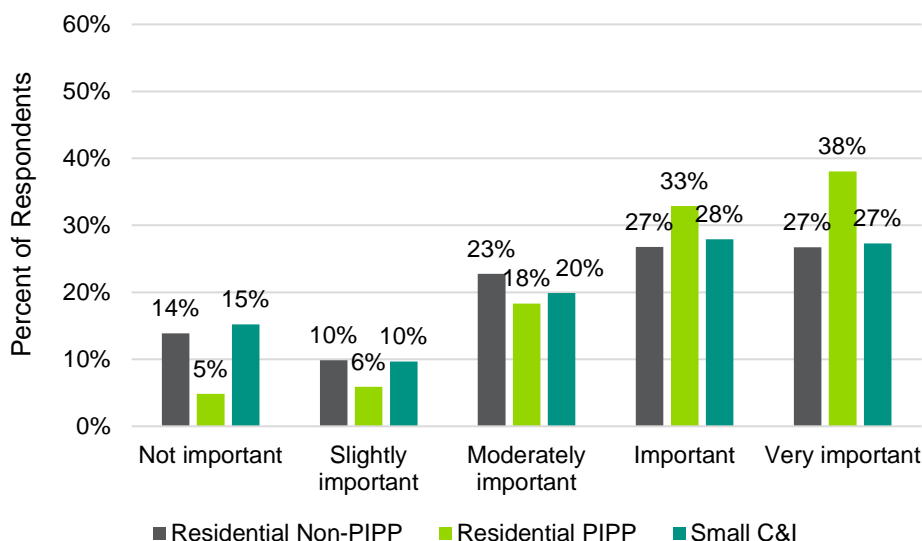
Survey question: What do you view as the most important benefits to utility investments in renewable energy? Select up to three.

Source: Navigant online survey data

4.2.3 Importance of In-State Renewables

Navigant asked online survey participants how important it is to them that AEP Ohio provide renewable energy produced in the state of Ohio. At least half of the participants in each group feel that it is important or very important that AEP Ohio provide renewable energy that is produced in Ohio. Generally, the importance of in-state renewable generation is less strong than customers' overall perspective that AEP Ohio should increase its portion of energy from renewables. Residential PIPP customers feel more strongly about this issue than other groups: 71% of residential PIPP participants stated that it was important or very important that AEP Ohio provide renewable energy produced within the state of Ohio.

²⁵ Of residential non-PIPP respondents, 79% selected three benefits, 6% selected two benefits, 14% selected one benefit, and 0% selected no benefits. Of residential PIPP respondents, 70% selected three benefits, 7% selected two benefits, 23% selected one benefit, and 0% selected no benefits. Of small C&I respondents, 71% selected three benefits, 8% two benefits, 19% selected one benefit, and 2% selected no benefits. Respondents were not required to select a benefit.

Figure 8. Importance That AEP Ohio Provides Renewable Energy Produced in Ohio

Survey question response counts: residential non-PIPP n=7,497; residential PIPP n=660; small C&I n=664.

Survey question: How important is it to you that AEP Ohio provide renewable energy that is produced within the state of Ohio?

Source: Navigant online survey data

4.2.4 Customer Support for Monthly Bill Increases

Navigant explored customers' willingness to pay an increase on their monthly electricity bills for AEP Ohio to increase the proportion of renewable energy in its electric mix, through the development of 900 MW of new renewable generation in Ohio. The research team excluded residential PIPP customers from survey questions related to bill increases because their bills are based on a percentage of income and, therefore, would not be affected by the development of renewables. The following sections present the results for residential non-PIPP and small C&I customers.

4.2.4.1 Residential Non-PIPP

Residential non-PIPP customers were asked if they would support paying an increase on their monthly electricity bill and were randomly shown a starting range of a \$0.50-\$0.75, \$0.75-\$1.00, \$1.00-\$1.25, or \$1.25-\$1.50 increase per month. If the customer stated they would support paying the randomly selected amount, then the survey asked if the customer would be willing to support paying a higher range increased by \$0.25. If the customer said they were not willing to pay the starting range shown, the survey asked if the customer would support paying either a lower range reduced by \$0.25, something less than the lower range shown (in which they were asked what amount they would find acceptable), or nothing at all.

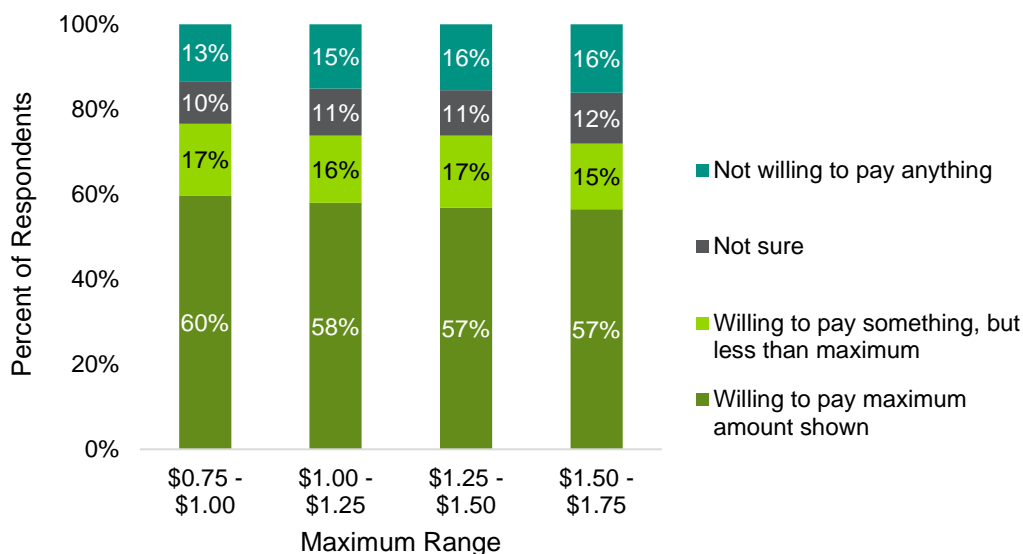
Figure 9 presents the residential non-PIPP results. The results show that for all residential non-PIPP customers, up to 16% of customers are not willing to pay anything, 10%-12% of customers are unsure, 15%-17% are willing to pay something greater than zero but an amount less than the total dollar range shown, and 57%-60% are willing to pay the maximum dollar range shown, which ranged from \$0.75 to



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\$1.75. The results show that the level of customer support for bill increases is relatively consistent across the dollar amounts tested, suggesting that the difference between a \$0.75/month and \$1.75/month increase may be insignificant for the customers who are willing to pay more.

Figure 9. Residential Non-PIPP Willingness to Pay Results



Survey question response count: residential non-PIPP n=7,498.

Source: Navigant online survey data analysis for Questions 6-9, as shown in Appendix A

Table 2 presents the residential non-PIPP results in table format, including the randomized starting, maximum, and lower range of prices shown to each customer group and the number of customer participant responses gathered for each price range group.

Table 2. Residential Non-PIPP Willingness to Pay Totals

Starting Range	\$0.50-\$0.75	\$0.75-\$1.00	\$1.00-\$1.25	\$1.25-\$1.50
Maximum Range	\$0.75-\$1.00	\$1.00-\$1.25	\$1.25-\$1.50	\$1.50-\$1.75
Lower Range	\$0.25-\$0.50	\$0.50-\$0.75	\$0.75-\$1.00	\$1.00-\$1.25
Not willing to pay anything	13%	15%	16%	16%
Not sure	10%	11%	11%	12%
Willing to pay something, but less than maximum	17%	16%	17%	15%
Willing to pay maximum range	60%	58%	57%	57%
Total Percentage	100%	100%	100%	100%
Total Respondents	1,873	1,874	1,881	1,870

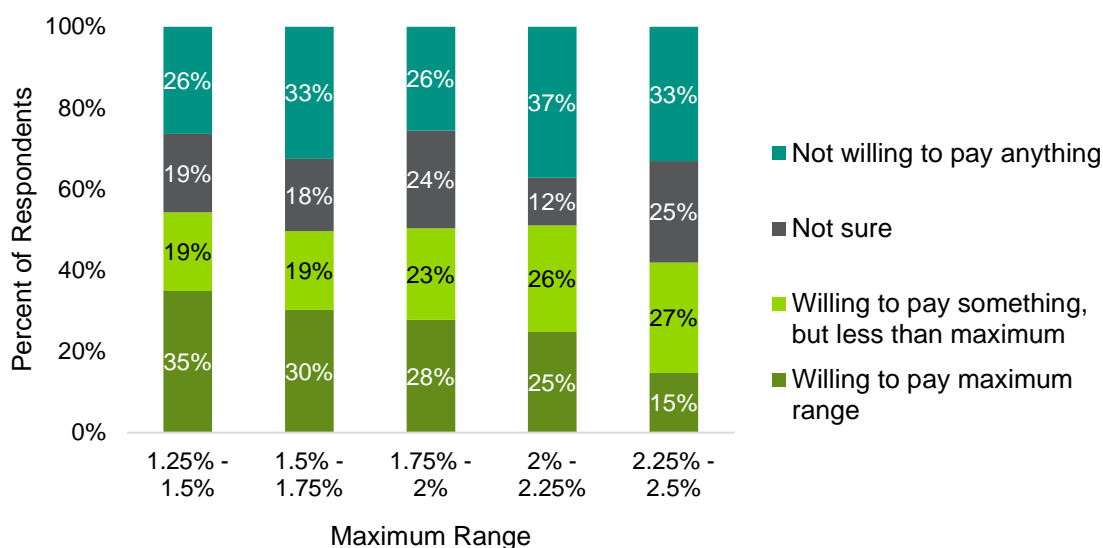
Survey question response count: residential non-PIPP n=7,498.

Source: Navigant online survey data analysis for Questions 6-9, as shown in Appendix A

4.2.4.2 Small C&I

Small C&I customers were asked if they would support paying an increase on their monthly electricity bill and were randomly shown a range of a 1%-1.25%, 1.25%-1.5%, 1.5%-1.75%, 1.75%-2%, or 2%-2.25% increase per month.²⁶ If the customer stated they would support paying the randomly selected amount, then the survey asked if the customer would be willing to support paying a higher range increased by 0.25%. If the customer said they were not willing to pay the starting range shown, the survey asked if the customer would support paying either a lower range reduced by 0.25%, something less than the lower range shown (in which they were asked what amount they would find acceptable), or nothing at all.

Figure 10 presents the small C&I results. The results show that small C&I customers are less willing than residential customers to pay a bill increase for the initiative and that the level of support for bill increases is more sensitive to the amount of the bill increase. For bill increases up to 1.5%, approximately one-quarter (26%) of small C&I customers are not willing to pay anything, 19% of customers are unsure, 19% are willing to pay something greater than zero but less than the maximum range shown, and approximately one-third (35%) are willing to pay the maximum range of 1.25-1.5%. At the higher ranges tested (up to 2.5%), the number of customers willing to pay drops to 15%, with 33% of customers not willing to pay anything, 25% not sure, and 27% willing to pay something but less than the maximum.

Figure 10. Small C&I Willingness to Pay Results

Survey question response count: small C&I n=664.

Source: Navigant online survey data analysis for Questions 6-9, as shown in Appendix A

Table 3 presents the small C&I results in table format, including the starting, maximum, and lower range of percent increases shown to each customer group and the number of customer participant responses gathered for each price range group.

²⁶ Navigant used percentages instead of absolute dollar amounts due to the large variation in monthly bills for small C&I customers.



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Table 3. Small C&I Willingness to Pay Totals

Starting Range	1%-1.25%	1.25%-1.5%	1.5%-1.75%	1.75%-2%	2%-2.25%
Maximum Range	1.25%-1.5%	1.5%-1.75%	1.75%-2%	2%-2.25%	2.25%-2.5%
Lower Range	0.75%-1%	1%-1.25%	1.25%-1.5%	1.5%-1.75%	1.75%-2%
Not willing to pay anything	26%	33%	26%	37%	33%
Not sure	19%	18%	24%	12%	25%
Willing to pay something, but less than maximum	19%	19%	23%	26%	27%
Willing to pay maximum range	35%	30%	28%	25%	15%
Total Percentage	100%	100%	100%	100%	100%
Total Respondents	129	129	133	127	136

Survey question response count: small C&I n=664.

Source: Navigant online survey data analysis for Questions 6-9, as shown in Appendix A

4.2.5 Preferences for AEP Ohio Efforts to Reduce Pollution and Invest in Renewable Energy

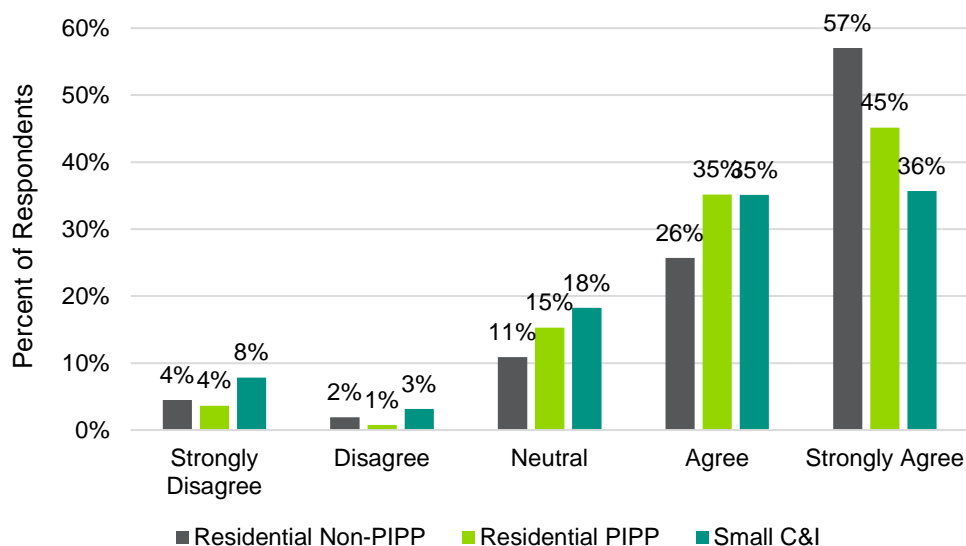
Navigant asked participants about their level of agreement with two statements that were aimed at assessing the following:

- Customer perspectives on whether AEP Ohio should proactively take steps to reduce the amount of air pollution and greenhouse gas emissions resulting from its operations
- Customer preference for maintaining current energy bills versus AEP Ohio investments in wind and solar energy

4.2.5.1 Air Pollution and Greenhouse Gas Emissions

All participants were asked to indicate their level of agreement with the following statement: *AEP Ohio should proactively take steps to reduce the amount of air pollution and greenhouse gas emissions resulting from its operations.* Customers could indicate their level of agreement on a 1-5 scale, where 1 is strongly disagree and 5 is strongly agree. Figure 11 presents the results for residential non-PIPP, residential PIPP, and small C&I customers. A majority of all participant groups agree that AEP Ohio should proactively reduce its air pollution and greenhouse gas emissions:

- 83% of residential non-PIPP customers agree or strongly agree
- 80% of residential PIPP customers agree or strongly agree
- 71% of small C&I customers agree or strongly agree

Figure 11. Level of Customer Agreement that AEP Ohio Should Proactively Reduce its Air Pollution and Greenhouse Gas Emissions

Survey question response counts: residential non-PIPP n=7,498; residential PIPP n=660; small C&I n=664.

Survey question: On a 5-point scale in which 1 means "Strongly disagree" and 5 means "Strongly agree", how would you rate your agreement with the following statement: AEP Ohio should proactively take steps to reduce the amount of air pollution and greenhouse gas emissions resulting from its operations.

Source: Navigant online survey data

4.2.5.2 Maintaining Bills or Increasing Percentage of Renewable Energy

Survey participants were asked to indicate their level of agreement with one of the two following statements:

- Maintaining my current energy bill amount is more important than AEP Ohio investing in wind and solar energy.
- AEP Ohio investing in wind and solar energy is more important than maintaining my current energy bill amount.

To avoid potential response bias, both statements were tested; customers were shown one of the two statements at random.

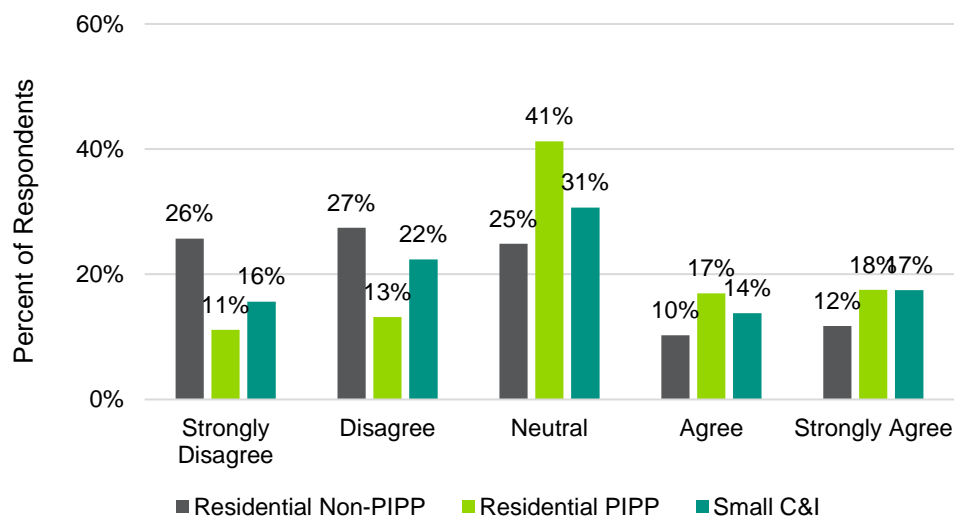
Figure 12 presents the results for residential non-PIPP, residential PIPP, and small C&I customers when randomly asked if they agree that maintaining current bill amounts is more important than AEP Ohio investments in renewable energy. Figure 13 presents the results when the other set of participants were randomly asked if they agree that AEP Ohio investing in wind and solar energy is more important than maintaining current energy bill amounts. Figure 14 shows responses for both questions, combining responses for agree and strongly agree and disagree and strongly disagree.



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Overall, the results of these tradeoff preference questions indicate that residential non-PIPP customers believe that AEP Ohio investing in wind and solar energy is more important than maintaining current bill amounts. Regardless of how the question was framed, residential non-PIPP customers provided a consistent response in favor of renewable energy. Residential PIPP customer responses are mixed and differ based on how the question is framed. However, PIPP customer bills would not change because their bills are based on income. Small C&I perspectives are also mixed, though there is a slight preference toward investing in renewables over maintaining current bill amounts.

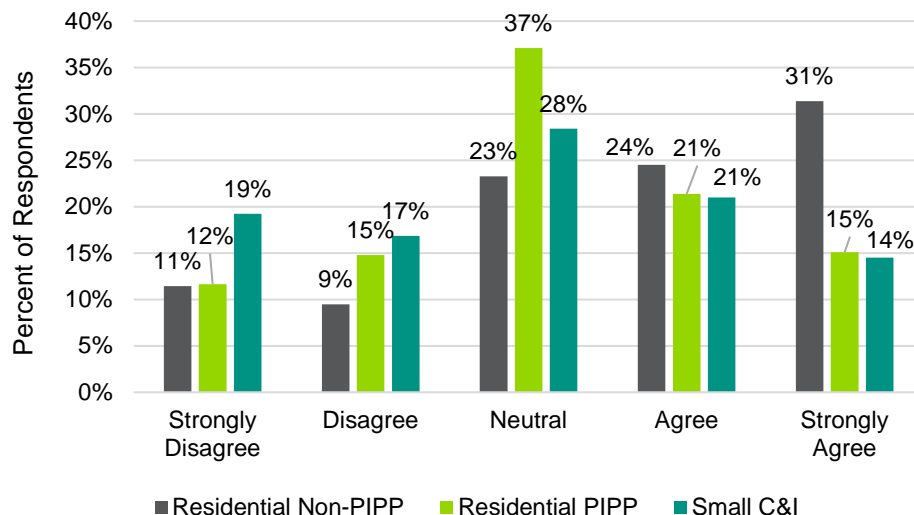
Figure 12. Level of Customer Agreement that Maintaining Current Bill Amounts Is More Important than AEP Ohio Investing in Wind and Solar Energy



Survey question response counts: residential non-PIPP n=3,681; residential PIPP n=342; small C&I n=326.

Survey question: On a 5-point scale in which 1 means "Strongly disagree" and 5 means "Strongly agree", how would you rate your agreement with the following statement: Maintaining my current energy bill amount is more important than AEP Ohio investing in wind and solar energy.

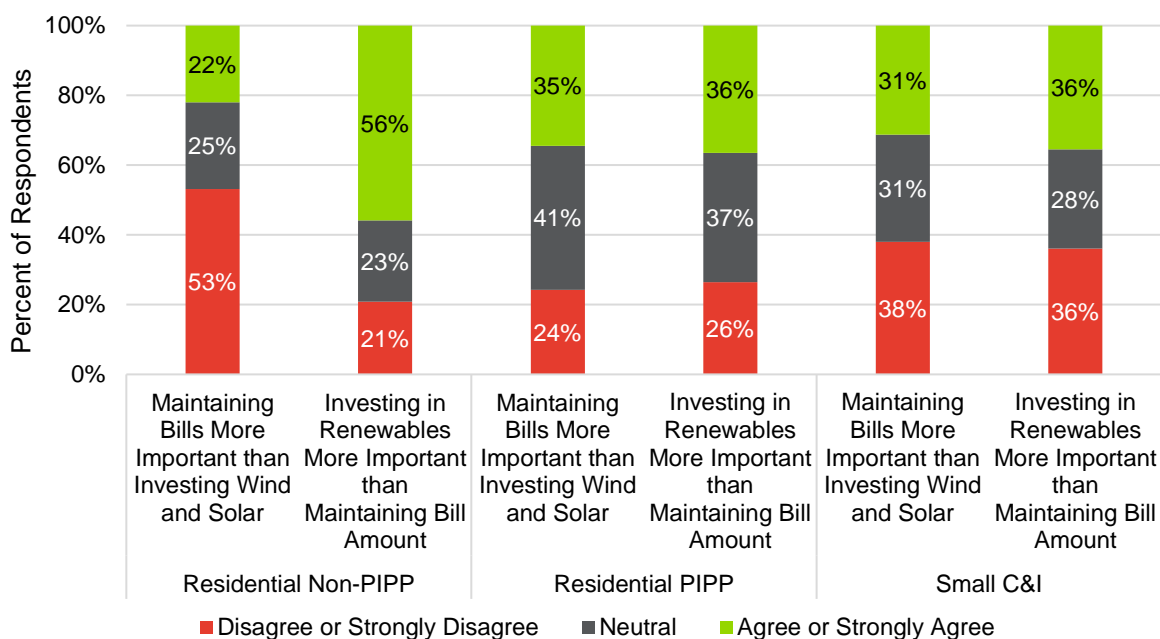
Source: Navigant online survey data

Figure 13. Level of Customer Agreement that AEP Ohio Investing in Wind and Solar Energy Is More Important than Maintaining Current Bill Amounts

Survey question response counts: residential non-PIPP n=3,817; residential PIPP n=318; small C&I n=338.

Survey question: On a 5-point scale in which 1 means "Strongly disagree" and 5 means "Strongly agree", how would you rate your agreement with the following statement: AEP Ohio investing in wind and solar energy is more important than maintaining my current energy bill amount.

Source: Navigant online survey data

Figure 14. Customer Preference for Maintaining Current Bills or AEP Ohio Investing in Wind and Solar Energy

Survey question response counts: residential non-PIPP n=7,498; residential PIPP n=660; small C&I n=664.

Source: Navigant online survey data

4.2.6 Customer Comments

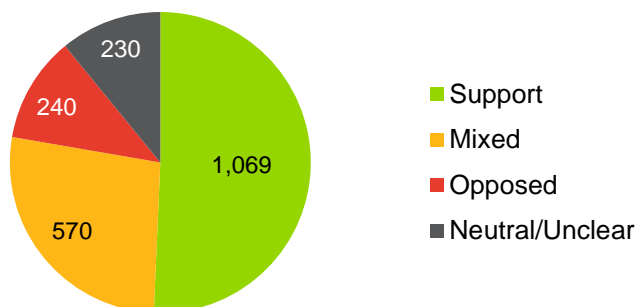
Navigant asked customers if they have any comments regarding AEP Ohio's development of renewable energy generation that they would like to share. The research team analyzed these comments, categorizing each of the comments as supportive, mixed, neutral/ unclear, and opposed. The team further organized the comments to identify the top themes represented by each of the four comment categories.

Navigant's reporting on the distribution of open-ended comment categories and themes is not meant to be representative of AEP Ohio's customer base. The qualitative analysis intends to explore the general themes and the more nuanced perspectives shared by the survey participants.

4.2.6.1 Residential Non-PIPP Comments

Navigant received 2,109 open-ended comments from residential non-PIPP survey participants. Of the 2,109 comments, over half (1,069 comments) were supportive of AEP Ohio's development of renewable energy. A little over one-quarter of the responses were mixed (570 comments), while 11% (230 comments) were neutral or unclear. The remaining 11% (240 comments) were opposed to the development of renewable energy. The distribution of comments is shown in Figure 15.

Figure 15. Residential Non-PIPP Comments by Category



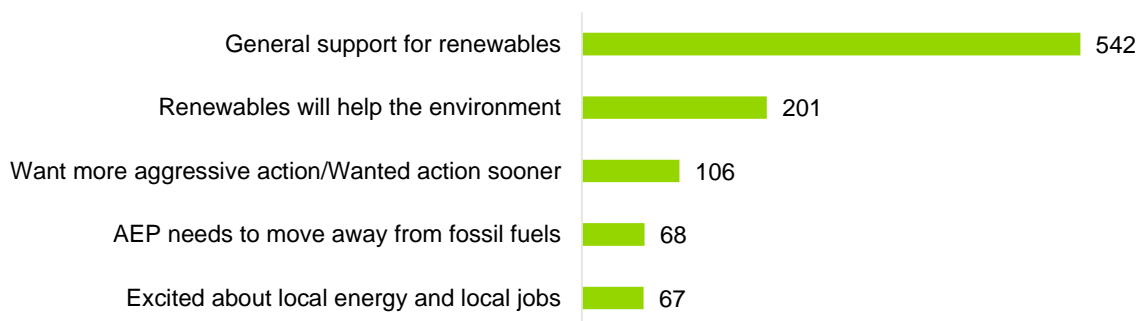
Navigant received 2,109 open-ended comments from residential non-PIPP survey participants.

Survey question: Do you have any comments regarding AEP Ohio's development of renewable energy generation that you would like to share?

Source: Navigant online survey data

Supportive Themes

Figure 16 displays the top five themes represented by the supportive comments. Note that comments may represent more than one theme and not all comments fit into these five themes; therefore, quantities will not sum to 1,069.

Figure 16. Top Five Supportive Themes from Residential Non-PIPP Customers

Navigant received 2,109 open-ended comments from residential non-PIPP survey participants.

Survey question: Do you have any comments regarding AEP Ohio's development of renewable energy generation that you would like to share?

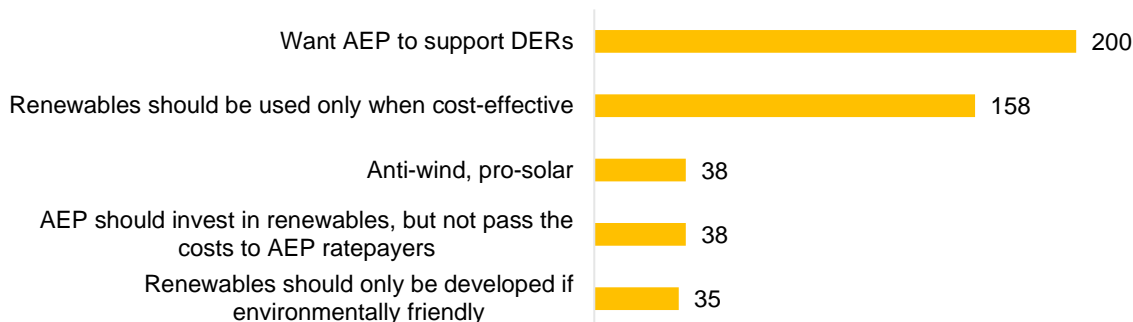
Source: Navigant online survey data

The remaining comments fell into several categories:

- Renewable energy should lower costs in the long run (n=43)
- Willing to pay more for energy generated from renewables (n=29)
- Want more information about AEP Ohio's renewable energy initiatives (n=21)
- Support but also want distributed energy resources (DER), primarily rooftop solar, to be supported (n=20)
- Support because renewable energy will increase energy independence and security (n=18)
- Want to help AEP Ohio transition to a higher percentage of renewables (n=16)
- Support but more concerned about increasing renewables quickly and cost-effectively than generating the energy in Ohio (n=17)
- Want AEP Ohio to lobby Ohio representatives to create more favorable renewable energy policy (n=10)
- Support because renewable energy will diversify AEP Ohio's existing generation portfolio (n=4)
- Other supportive comments (n=40)

Mixed Comment Themes

Figure 17 displays the top five themes represented by the mixed comments. Note that comments may represent more than one theme and not all comments fit into these five themes; therefore, quantities will not sum to 570.

Figure 17. Top Five Mixed Themes from Residential Non-PIPP Customers

Navigant received 2,109 open-ended comments from residential non-PIPP survey participants.

Survey question: Do you have any comments regarding AEP Ohio's development of renewable energy generation that you would like to share?

Source: Navigant online survey data

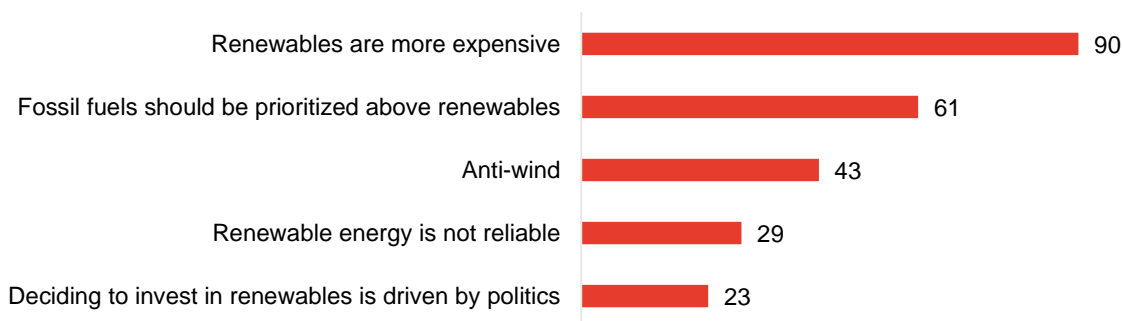
The remaining comments fell into several categories:

- Think AEP Ohio should focus on a diversified generation portfolio, which includes more than only solar and wind (n=23)
- AEP Ohio should pursue nuclear in addition to solar and wind (n= 17)
- Future cost savings from renewables should be passed to AEP Ohio customers (n=17)
- If AEP Ohio pursues renewables, local jobs should be a high priority (n=15)
- Renewables are fine but should not negatively impact reliability (n=14)
- It is okay if renewables result in a small cost increase but not a large one (n=14)
- AEP Ohio should pursue hydro in addition to solar and wind (n=12)
- Renewables are fine but should be phased in gradually (n=8)
- Concerns about land required for renewable energy (n=5)
- Fossil fuels should remain part of the energy mix (n=4)
- Anti-solar, pro-wind (n=2)
- Other mixed comments (n=34)

Opposed Themes

Figure 18 displays the top five themes represented by the opposed comments. Note that comments may represent more than one theme and not all comments fit into these five themes; therefore, quantities will not sum to 240.

Figure 18. Top Five Opposed Themes from Residential Non-PIPP Customers



Navigant received 2,109 open-ended comments from residential non-PIPP survey participants.

Survey question: Do you have any comments regarding AEP Ohio's development of renewable energy generation that you would like to share?

Source: Navigant online survey data

The remaining comments fell into several categories:

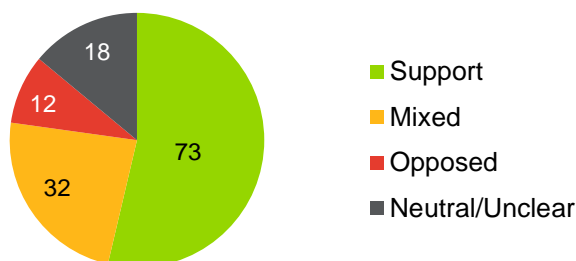
- General opposition to renewables (n=19)
- AEP Ohio should not use renewables because they receive subsidies from the government (n=18)
- Nuclear should be developed instead of renewables (n=16)
- Renewable energy is harmful to the environment (n=14)
- AEP Ohio should not develop renewables because they are inefficient (n=13)
- Money would be better spent elsewhere (n=8)
- Solar is not viable in Ohio (n=7)
- Worried that jobs will be lost because of divestment from fossil fuels (n=4)
- Do not think AEP Ohio as a distribution company should be investing in generation (n=4)
- Other opposed comments (n=7)

Neutral Themes

Customers in this category either did not comment on renewable energy or indicated AEP Ohio's renewable investment was unimportant to them. The majority of comments were from customers who were concerned about cost regardless of energy source (n=163). The second most common theme was customers who were concerned about reliability regardless of energy source (n=16). Thirty-six respondents in this category provided a comment that was unclear or unrelated to the topic at hand. Twenty-six respondents fall into the "Other" category, which includes customers with questions, themes with too few respondents to be categorized into their own group, customers who said they did not know how they felt, or customers with no opinion in either direction.

4.2.6.2 Residential PIPP Comments

Navigant received 135 open-ended comments from residential PIPP survey participants. Of the 135 comments, over half of the comments (73 comments) were supportive of AEP Ohio's development of renewable energy. Almost one-quarter of the responses were mixed (32 comments), while 13% (18 comments) were neutral or unclear. The remaining 9% (12 comments) were opposed. The distribution of comments is shown in Figure 19.

Figure 19. Residential PIPP Comments by Category

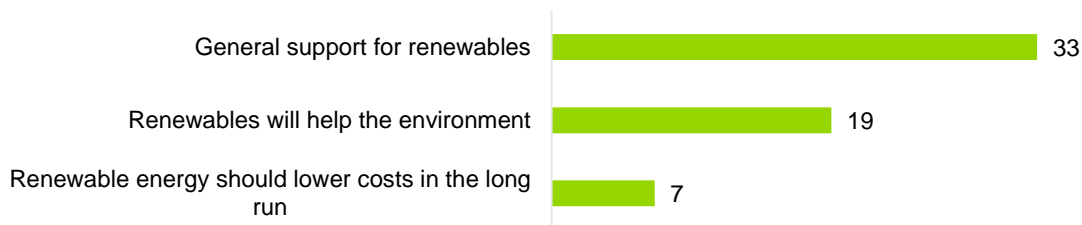
Navigant received 135 open-ended comments from residential PIPP survey participants.

Survey question: Do you have any comments regarding AEP Ohio's development of renewable energy generation that you would like to share?

Source: Navigant online survey data

Supportive Themes

Figure 20 displays the top three themes represented by the supportive comments. Note that comments may represent more than one theme and not all comments fit into these three themes; therefore, quantities will not sum to 73.

Figure 20. Top Three Supportive Themes from Residential PIPP Customers

Navigant received 135 open-ended comments from residential PIPP survey participants.

Survey question: Do you have any comments regarding AEP Ohio's development of renewable energy generation that you would like to share?

Source: Navigant online survey data

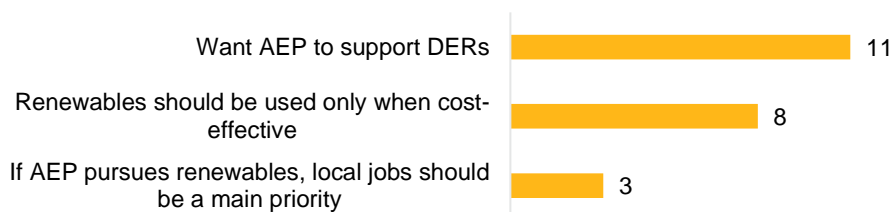
The remaining comments fell into several categories:

- Excited about local energy and local jobs (n=4)
- Support but also want DER to be supported (n=4)
- Want to help AEP Ohio transition to a higher percentage of renewables (n= 3)
- AEP Ohio needs to move away from fossil fuels (n=3)
- Wanted action sooner or want more aggressive action (n=2)
- Support because renewable energy will diversify AEP Ohio's existing generation portfolio (n=2)
- Support because renewable energy will increase energy independence and security (n=1)
- Support but more concerned about increasing renewables quickly and cost-effectively than generating the energy in Ohio (n=1)
- Other supportive comments (n=3)

Mixed Comment Themes

Figure 21 displays the top three themes represented by the mixed comments. Note that comments may represent more than one theme and not all comments fit into these three themes; therefore, quantities will not sum to 32.

Figure 21. Top Three Mixed Themes from Residential PIPP Customers



Navigant received 135 open-ended comments from residential PIPP survey participants.

Survey question: Do you have any comments regarding AEP Ohio's development of renewable energy generation that you would like to share?

Source: Navigant online survey data

The remaining comments fell into several categories:

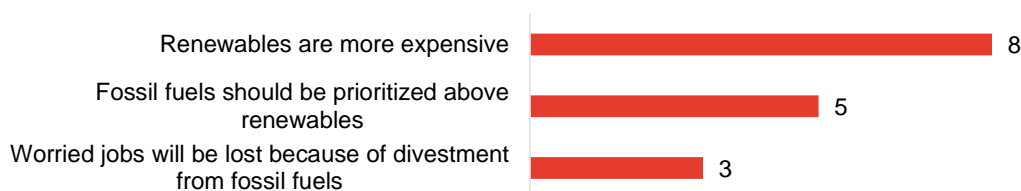
- Anti-wind, pro-solar (n=2)
- Future cost savings from renewable energy should be passed to customers (n=2)
- AEP Ohio should pursue hydro in addition to solar and wind (n=2)
- Think AEP Ohio should focus on a diversified generation portfolio, which includes more than only solar and wind (n=1)
- AEP Ohio should invest in renewables but not pass the costs to AEP Ohio ratepayers (n=1)
- Renewables are fine but should not negatively impact reliability (n=1)

- Renewables are fine but should be phased in gradually (n=1)
- Renewables should only be developed if environmentally friendly (n=1)

Opposed Themes

Figure 22 displays the top three themes represented by the opposed comments. Note that comments may represent more than one theme and not all comments fit into these three themes; therefore, quantities will not sum to 12.

Figure 22. Top Three Opposed Themes from Residential PIPP Customers



Navigant received 135 open-ended comments from residential PIPP survey participants.

Survey question: Do you have any comments regarding AEP Ohio's development of renewable energy generation that you would like to share?

Source: Navigant online survey data

The remaining comments fell into several categories:

- Renewable energy is not reliable (n=2)
- Nuclear should be developed instead of renewables (n=1)
- Renewable energy is harmful to the environment (n=1)
- AEP Ohio should not develop renewables because they are inefficient (n=1)
- The decision to invest in renewables is driven by political correctness (n=1)

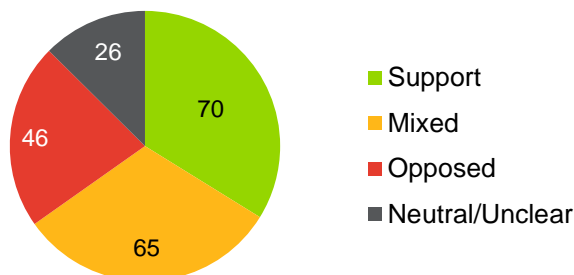
Neutral Themes

Customers in this category either did not comment on renewable energy or indicated AEP Ohio's renewable investment was unimportant to them. The majority of comments were from customers who were concerned about cost regardless of energy source (n=14). The second most common theme was customers who were concerned about reliability regardless of energy source (n=2). Three respondents in this category provided a comment that was unclear or unrelated to the topic at hand.

4.2.6.3 Small C&I

Navigant received 207 open-ended comments from small C&I survey participants. Of the 207 comments, about one-third (70 comments) were supportive of AEP Ohio's development of renewable energy. Another third of the responses were mixed (65 comments), while 13% (26 comments) were neutral or unclear. The remaining 22% (46 comments) were opposed. The distribution of comments is shown in Figure 23.

Figure 23. Small C&I Comments by Category



Navigant received 207 open-ended comments from small C&I survey participants.

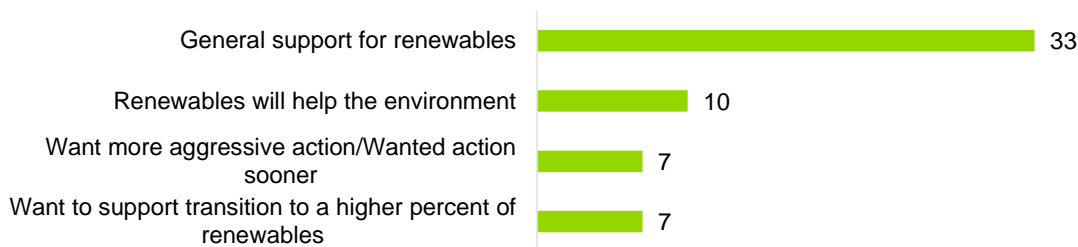
Survey question: Do you have any comments regarding AEP Ohio's development of renewable energy generation that you would like to share?

Source: Navigant online survey data

Supportive Themes

Figure 24 displays the top three themes represented by the supportive comments. Note that comments may represent more than one theme and not all comments fit into these three themes; therefore, quantities will not sum to 70.

Figure 24. Top Three Supportive Themes from Small C&I Customers*



Navigant received 207 open-ended comments from small C&I survey participants.

Survey question: Do you have any comments regarding AEP Ohio's development of renewable energy generation that you would like to share?

*Four themes are represented because the two themes representing the third most common theme received the same number of comments.

Source: Navigant online survey data

The remaining comments fell into several categories:

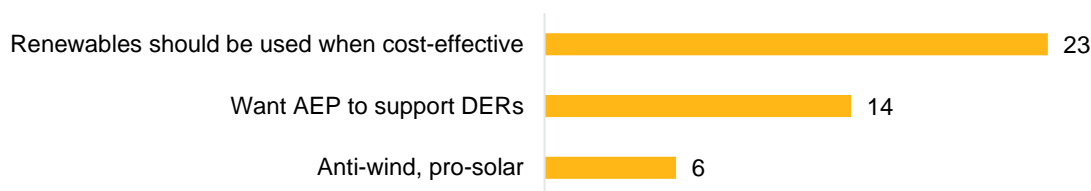
- AEP Ohio needs to move away from fossil fuels (n=5)
- Excited about local energy and local jobs (n=4)
- Renewable energy should lower costs in the long run (n= 3)
- Support because renewable energy will diversify AEP Ohio's existing generation portfolio (n=3)

- Support but also want DER to be supported (n=2)
- Support because renewable energy will increase energy independence and security (n=1)
- Support but more concerned about increasing renewables quickly and cost-effectively than generating the energy in Ohio (n=1)
- Other supportive comments (n=2)

Mixed Comment Themes

Figure 25 displays the top three themes represented by the mixed comments. Note that comments may represent more than one theme and not all comments fit into these three themes; therefore, quantities will not sum to 65.

Figure 25. Top Three Mixed Themes from Small C&I Customers



Navigant received 207 open-ended comments from small C&I survey participants.

Survey question: Do you have any comments regarding AEP Ohio's development of renewable energy generation that you would like to share?

Source: Navigant online survey data

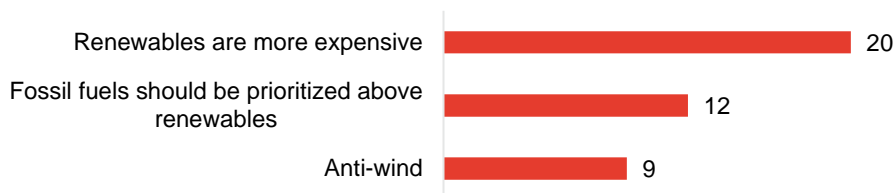
The remaining comments fell into several categories:

- Think AEP Ohio should focus on a diversified generation portfolio, which includes more than only solar and wind (n=5)
- AEP Ohio should invest in renewables but not pass the cost to AEP Ohio ratepayers (n=5)
- AEP Ohio should pursue hydro in addition to solar and wind (n=4)
- Future cost savings from renewables should be passed to AEP Ohio customers (n=3)
- If AEP Ohio pursues renewables, local jobs should be a high priority (n=3)
- Renewables are fine but should be phased in gradually (n=2)
- AEP Ohio should pursue nuclear in addition to solar and wind (n= 1)
- Renewables should only be developed if environmentally friendly (n=1)
- Concerns about land required for renewable energy (n=1)
- Want option to opt-in to renewable energy (n=2)

Opposed Themes

Figure 26 displays the top three themes represented by the opposed comments. Note that comments may represent more than one theme and not all comments fit into these three themes; therefore, quantities will not sum to 46.

Figure 26. Top Three Opposed Themes from Small C&I Customers



Navigant received 207 open-ended comments from small C&I survey participants.

Survey question: Do you have any comments regarding AEP Ohio's development of renewable energy generation that you would like to share?

Source: Navigant online survey data

The remaining comments fell into several categories:

- Renewable energy is not reliable (n=7)
- Does not want to use energy receiving subsidies from the government (n=5)
- Nuclear should be developed instead of renewables (n=1)
- Renewable energy is harmful to the environment (n=1)
- AEP Ohio should not develop renewables because they are inefficient (n=1)
- The decision to invest in renewables is driven by political correctness (n=1)
- AEP Ohio should not invest in generation because they are a distribution company (n=1)

Neutral Themes

Customers in this category either did not comment on renewable energy or indicated AEP Ohio's renewable investment was unimportant to them. The majority of comments were from customers who were concerned about cost regardless of energy source (n=12). Ten respondents in this category provided a comment that was unclear or unrelated to the topic at hand. Four respondents provided other neutral comments.

4.3 Key Findings

Results from the online survey of residential non-PIPP, residential PIPP, and small C&I customers indicate that a strong majority of customers believe it is important AEP Ohio makes greater use of renewable energy above current levels. At least half of the participants in each customer group also believe it is important AEP Ohio provide renewable energy produced in Ohio.



AEP Ohio Voice of the Customer: Attitudes and Expectations for Renewable Energy

The survey revealed that a majority of residential non-PIPP customers and many small C&I customers are willing to pay some additional amount on their electricity bills for AEP Ohio to invest in renewable energy. For residential non-PIPP customers, 57%-60% of customers are willing to pay the maximum dollar range shown in the survey, which varied from \$0.75 to \$1.75. Another 15%-17% of customers are willing to pay something greater than zero but less than the maximum dollar shown. Support for bill increases is relatively consistent across the dollar amounts tested in the survey for residential non-PIPP customers.

Small C&I customer support for bill increases is more sensitive to the amount of the potential bill increase. For increases up to a maximum of 1.5%, approximately one-third of customers are willing to pay this amount and another nearly 20% are willing to pay something greater than zero but less than the maximum. At the higher ranges tested (maximum up to 2.5% increase), the number of customers willing to pay drops to 15%, with another 20% willing to pay something greater than zero but less than the maximum.

The survey asked participants who stated it was slightly important to very important that AEP Ohio makes greater use of renewable energy what they view as the most important benefits. Respondents consistently identified creating a better world for future generations, reducing greenhouse gas emissions, and improving air quality as top benefits of procuring renewable generation.

When asked about the tradeoffs between investing in renewable energy and maintaining current bill amounts, residential non-PIPP customers believe AEP Ohio investing in wind and solar energy is more important than maintaining current bill amounts. Responses from residential PIPP and small C&I customers are more mixed, though a significant majority was either neutral or positive toward AEP Ohio investments in wind and solar.

APPENDIX A. RESIDENTIAL AND SMALL C&I CUSTOMER SURVEY

The purpose of this survey is to better understand your perspective on utility-sourced renewable generation.

Sample Variables (not shown to participant)

- Sector: Residential or Commercial
- PIPPFlag: Yes = customer is on PIPP rate; No = customer is not on PIPP rate

Landing Page

Thank you for taking the time to share your opinions on utility-sourced renewable generation. Your valuable feedback will help inform our strategy in this area. This survey should take approximately 5 minutes to complete.

Screener

1. **Are you a customer of AEP Ohio at your [current residence/place of business]? In other words, do you receive any AEP Ohio bills (either in the mail or electronically)?**
 1. Yes
 2. No [TERMINATE]
 3. Not sure [TERMINATE]

Attitudes

AEP Ohio currently obtains 4.5% of its electricity from renewable sources such as wind and solar. AEP Ohio is looking to make investments to increase the percentage of electricity from wind and solar above this level. They are seeking input from customers regarding these investment choices.

2. **How important is it to you that energy provided to you in the future makes greater use of renewable energy generation (e.g., wind and solar)?**
 1. Not important
 2. Slightly important
 3. Moderately important
 4. Important
 5. Very important



AEP Ohio Voice of the Customer: Attitudes and Expectations for Renewable Energy

[IF Q2 = 2,3,4, or 5]

3. What do you view as the most important benefits to utility investments in renewable energy? Select up to three. [Present random order, allow up to three].
 1. Local job creation
 2. Reduce greenhouse gas emissions
 3. Improve air quality
 4. Diversify the energy supply
 5. Energy independence
 6. Better world for future generations
 7. Other [SPECIFY]
4. How important is it to you that AEP Ohio provide renewable energy that is produced within the state of Ohio?
 1. Not important to be produced in Ohio
 2. Slightly important
 3. Moderately important
 4. Important
 5. Very important to be produced in Ohio
5. Do you have any comments regarding AEP Ohio's development of renewable energy generation that you would like to share?

[OPEN ENDED]

Willingness to Pay (WTP)

AEP Ohio is actively working to develop 900 MW of new renewable generation in Ohio. The total capacity would be comprised of 500 MW of wind generation and 400 MW of solar generation. By developing utility-scale renewable generation in Ohio, AEP Ohio can reduce the environmental impact of electricity generation while creating skilled green energy jobs in Ohio and stimulating the local economy with additional tax revenue. It is possible that AEP's residential and commercial customers may see a slight increase on their monthly bills to receive a higher proportion of renewable energy as part of their electric mix.

[Ask WTP section if <PIPPFlag>=No, else skip to Agreement section]

6. If this renewable initiative resulted in an increase of [X to X+0.25] per month on your electricity bill, would you support paying that amount? [X= randomly selected between \$0.50, \$0.75, \$1.00, and \$1.25 for Residential; between 1%, 1.25%, 1.5%, 1.75%, 2% for Commercial]
 1. I would support paying that amount
 2. I would not support paying that amount
 3. Not sure [Treated as No]

[IFQ6=1, "Yes"]

7. What if the renewable initiative resulted in an increase of [X+0.25 to X+0.50] on your bill?
 1. I would still support paying that amount
 2. I would not support paying that amount
 3. Not sure



AEP Ohio Voice of the Customer: Attitudes and Expectations for Renewable Energy

[IF Q6=2, "No" or 3, "Not Sure"]

8. What if the renewable initiative only resulted in an increase of [X-0.25 to X] on your bill?

1. I would support paying that amount
2. I would support paying something, but not that much
3. I would not support paying anything for the initiative
4. Not sure

[IF Q8=2 "Something, but Not That Much"]

9. What monthly amount would you find acceptable for a renewable initiative like this?

Please answer in dollars.

[NUMERIC OPEN END]

Agreement

On a 5-point scale in which 1 means "Strongly disagree" and 5 means "Strongly agree", how would you rate your agreement with the following statements?

10. AEP Ohio should proactively take steps to reduce the amount of air pollution and greenhouse gas emissions resulting from its operations.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

[Customers will randomly see EITHER Q11 or Q12]

11. Maintaining my current energy bill amount is more important than AEP Ohio investing in wind and solar energy.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

12. AEP Ohio investing in wind and solar energy is more important than maintaining my current energy bill amount.

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

Demographics – Residential

[Ask section if <Sector>=Residential, else skip to Firmographics section]

The following questions are for classification purposes only. Your responses to all questions will only be reported in aggregate and your information will remain confidential.

13. Do you own or rent your home?



AEP Ohio Voice of the Customer: Attitudes and Expectations for Renewable Energy

1. Own
2. Rent
3. Would rather not say

14. How old are you?

1. 18-24
2. 25-34
3. 35-44
4. 45-54
5. 55-64
6. 65 or over
7. Would rather not say

15. Which best describes the approximate average electric bill for your home? Please consider both summer and winter bills.

8. Under \$50 monthly
9. \$50 to under \$100 monthly
10. \$100 to under \$150 monthly
11. \$150 to under \$200 monthly
12. \$200 to under \$250 monthly
13. \$250 or more monthly
14. Would rather not say

16. Please select the category that best describes your total household income last year before taxes. Remember, this information is used for statistical purposes only.

1. Under \$10,000
2. \$10,000 to under \$30,000
3. \$30,000 to under \$50,000
4. \$50,000 to under \$75,000
5. \$75,000 to under \$100,000
6. \$100,000 to under \$150,000
7. \$150,000 or more
8. Would rather not say

[IF <Sector>=Residential, skip to Closing Statement]

Firmographics – Commercial

17. Which of the following best describes the facility your organization operates?

1. Office
2. Retail
3. Convenience Store
4. Grocery
5. Restaurant
6. Industrial
7. Light Manufacturing
8. Warehouse
9. Religious Assembly
10. K-12 School
11. College/University



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- 12. Government Building
- 13. Other (**SPECIFY**)
- 14. Don't know

18. Approximately how many employees does your organization employ within the AEP Ohio service territory?

- 1. 9 or fewer
- 2. 10 to 49
- 3. 50 to 99
- 4. 100 to 249
- 5. 250 or more
- 6. Don't know

19. Which of the following descriptions best fits your organization's situation?

- 1. Your organization's only location is within AEP Ohio's service territory
- 2. Your organization has multiple locations, all located within AEP Ohio's service territory
- 3. Your organization has multiple locations both within and outside of AEP Ohio's service territory, and the headquarters are within AEP Ohio's service territory
- 4. Your organization has multiple locations both within and outside of AEP Ohio's service territory, but the headquarters are not within AEP Ohio's service territory
- 5. Other, please describe (**SPECIFY**)
- 6. Don't Know

Closing Statement

Thank you for completing this survey today. Your responses are valuable and will help AEP Ohio better serve customers like you.

CERTIFICATE OF SERVICE

In accordance with Rule 4901-1-05, Ohio Administrative Code, the PUCO's e-filing system will electronically serve notice of the filing of this document upon the following parties. In addition, I hereby certify that a service copy of the foregoing *Direct Testimony of Trina Horner* was sent by, or on behalf of, the undersigned counsel to the following parties of record this 19th day of September, 2018.

/s/ Steven T. Nourse
Steven T. Nourse

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Summary: Testimony - Direct Testimony of Trina Horner submitted by Ohio Power Company electronically filed by Mr. Steven T Nourse on behalf of Ohio Power Company