



June 3, 2019

By Hand Delivery

Ms. Lora Johnson, CMC
Clerk of Council
Room 1E09, City Hall
1300 Perdido Street
New Orleans, LA 70112

In Re: RESOLUTION AND ORDER ESTABLISHING ADOCKET AND
OPENING A RULEMAKING PROCEEDING TO ESTABLISH RENEWABLE
PORTFOLIO STANDARDS
DOCKET NO. UD-19-01

Dear Ms. Johnson:

Please find enclosed an original and three (3) copies of the Alliance for Affordable Energy's Comments on the above-mentioned docket. Please file the attached communication and this letter in the record of the proceeding and return one time stamped copy to our courier, in accordance with normal procedures. If you have any questions, please do not hesitate to contact me.

Thank you for your time and attention,

Sincerely,

Logan A Burke
Executive Director
Alliance for Affordable Energy

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1 **Introduction:**

2 On March 28, 2019 the New Orleans City Council voted to approve resolution R-19-109,
3 opening a rulemaking docket to consider the shape and scope of a Renewable Portfolio Standard
4 for New Orleans. The Alliance for Affordable Energy (“The Alliance”) appreciates this
5 opportunity to move New Orleans forward to develop a clean energy system that is both
6 equitable and resilient. Every jurisdiction¹ that that has enacted a Renewable Portfolio Standard
7 has done so somewhat differently, as each jurisdiction has different needs, profiles, and policy
8 priorities. New Orleans is situated in a vulnerable location, especially as the climate crisis, fueled
9 by greenhouse gas emitting energy resources, continues to impact major weather events, Thus
10 the city has a need to create an energy system that is resilient and responsive to these events.

11 In New Orleans, the impacts of climate change are already at our doorsteps. The events
12 of Katrina and worsening and unpredictable heat and rain have made it perfectly clear that the
13 city must take serious action to both mitigate and adapt to a changing climate.

14 In 2017, a report from the Union of Concerned Scientists found that New Orleans, and
15 Louisiana at large, would be at particular risk for the early symptoms of climate change like
16 chronic inundation.² In 2018, UCS conducted a peer reviewed study looking at the impact of
17 chronic flooding under three different sea level rise scenarios. UCS’s study found that, by 2100,
18 495 of today's homes in New Orleans are at risk of becoming chronically inundated with water.
19 Today those homes are worth a collective \$105,376,100, house an estimated 861 people, and

¹ Research by the Union of Concerned Scientists using the DSIRE database. 29 States, the District of Columbia, and three US territories have a Renewable Portfolio Standard. Eight states and one territory have Renewable Portfolio Goals. Standards are typically enforceable mandates whereas goals are typically aspirational targets. The DSIRE database can be accessed here: <http://www.dsireusa.org/>

² Union of Concerned Scientists. 2017. “When Rising Seas Hit Home: Louisiana Faces Chronic Inundation.” Fact sheet available online: <https://www.ucsusa.org/sites/default/files/attach/2017/07/when-rising-seas-hit-home-louisiana-fact-sheet.pdf>

1 contribute \$1,176,563 to the local property tax base.³ At the state level the study found:

2 *Louisiana is third in the nation for most homes at risk in*
3 *2045... By 2045, more than 40,000 of today's residential properties,*
4 *currently home to roughly 99,000 people, are at risk of chronic*
5 *inundation... By 2045, more than \$4.3 billion-worth of residential*
6 *property (based on today's values) is at risk of chronic flooding...*
7 *The Louisiana homes at risk in 2045 currently contribute about \$36*
8 *million in annual property tax revenue.*⁴

9 This grim future, however, is avoidable. The report goes on to say:

10 *If nations adhere to the primary goal of the Paris*
11 *Agreement—capping warming to below 2 degrees Celsius—and*
12 *there is limited loss of land-based ice, about 75 percent of*
13 *Louisiana's at-risk homes would avoid chronic flooding by the end*
14 *of the century, thus safeguarding the vast majority of property*
15 *values and annual property tax revenue.*⁵

16 In addition, because of historic and systemic inequities, this city is home to a significant
17 population of vulnerable low-income residents. These residents cannot afford outsized bill
18 impacts and must be protected from energy burdens that may only be exacerbated by extreme
19 heat events and the energy needed to maintain health and comfort. Finally, residents and
20 businesses in New Orleans have made clear their interest in renewables. With nearly 40 MW of
21 customer owned and sited renewables already in place, and this Council's enabling rules for
22 community solar, there is already local buy-in and appetite to move away from "traditional"
23 energy resources and toward clean and distributed energy.

³ Dahl, K., R. Cleetus. E. Spanger-Siegfried, S. Udvardy, A. Caldas. P. Worth. 2018. "Underwater: Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate." Union of Concerned Scientists. Cambridge, MA. <https://www.ucsusa.org/global-warming/global-warming-impacts/sea-level-rise-chronic-floods-and-us-coastal-real-estate-implications>

⁴ Union of Concerned Scientists. 2018. *New Study Finds 117,000 Louisiana Homes Worth \$13 Billion will be at Risk from Tidal Flooding*. Cambridge, MA. <https://www.ucsusa.org/press/2018/new-study-finds-117000-louisiana-homes-worth-13-billion-will-be-risk-tidal-flooding>

⁵ Union of Concerned Scientists. 2018. *New Study Finds 117,000 Louisiana Homes Worth \$13 Billion will be at Risk from Tidal Flooding*. Cambridge, MA. <https://www.ucsusa.org/press/2018/new-study-finds-117000-louisiana-homes-worth-13-billion-will-be-risk-tidal-flooding>

1 These comments are designed to answer the four primary questions set forth by the
2 Council in the initial resolution. The document is organized as follows:

- 3 1. What would an appropriate RPS target for New Orleans be, and should it be a
4 requirement or a goal?
- 5 2. How should a New Orleans RPS target be satisfied?
- 6 3. How should the RPS standard be enforced, should the council consider a penalty or
7 alternative compliance payment structure?
- 8 4. What protections should be put in place to protect ratepayers from unreasonable increases
9 in rates due to the RPS?

10 **1. WHAT WOULD AN APPROPRIATE RPS TARGET FOR NEW ORLEANS BE, AND**
11 **SHOULD IT BE A REQUIREMENT OR A GOAL?**

12 Based on a review of publicly available data there is potential for Entergy New Orleans
13 (ENOL) to meet a 100% RPS; even after both technical and economic considerations are taken
14 into account. Whatever target the City Council decides to set, the Council should make any RPS
15 target a requirement because that is the best way to ensure that the RPS policy objectives will be
16 realized. The Alliance recommends that the City Council set a goal to meet this mandate by
17 2040, given the urgency of climate change and the direct impacts climate changes has on New
18 Orleans.

19 **a. What percentage of ENOL's load should be met through renewable resources, and what**
20 **data or other information exists indicating that the target is achievable in New Orleans?**

21 “Project Sunroof”, a google backed research project, indicates that New Orleans could
22 generate 58% of their annual retail sales from solar roofs located in the city limits.⁶ According to

⁶ UCS calculation using data retrieved from Project Sunroof: <https://www.google.com/get/sunroof/data-explorer/>

1 the New Orleans specific data, 126,000 roofs (or 94% of roofs in the city) are suitable for rooftop
2 solar.⁷ That rooftop space could house 2.7 GW of solar capacity which is enough capacity to
3 generate 3.5 Million MWhs of electricity per year (after accounting for various factors that will
4 impact solar insolation patterns).⁸

5 This data should be taken for what it is, a single indicator, and not be extrapolated to
6 suggest that 58% of NOLA retail sales should be met with only rooftop solar. There are plenty of
7 other considerations that should be factored into setting a target, including transmission and
8 distribution constraints and costs. Achieving a 100% RPS will require more than just relying on
9 rooftop solar and the city should take advantage of opportunities to deploy ground mounted solar
10 in the form of solar gardens or community solar and emerging advancements in distributed wind.
11 ENOL and the city of New Orleans should also allow for economic imports of renewable energy
12 from outside the city limits. Improving the transmission system would allow for a higher level of
13 renewable energy penetration from resources coming from outside Orleans parish and would
14 likely help the city gain access to more low-cost renewable resources.

15 Setting targets and carve outs (discussed in greater detail later) should balance the above
16 constraints along with concerns about economics, energy burden, resiliency, climate, local
17 pollution, economic empowerment, and local job development.

18 A target should consider the expected retirement timelines for owned Entergy assets,
19 including Union Power Station, (2032), as well as potential early dissolution of PPAs—including

and data sourced from the FERC Form 1/1-F, FERC Form 3/3-A or EIA 861 filings. Retrieved using S&P Global Market Intelligence. (See attachment 1)

⁷ Project Sunroof calculation (see attachment) <https://www.google.com/get/sunroof/data-explorer/place/ChIJZYIRsISkIIYRtNMiXuhbBts/> See Attachment 1

⁸ Project Sunroof calculation (see attachment) <https://www.google.com/get/sunroof/data-explorer/place/ChIJZYIRsISkIIYRtNMiXuhbBts/>

1 bi-lateral contracts with Entergy Corp. affiliates—for above market fossil and nuclear resources
2 (also discussed later in greater detail). As such, we recommend a target of 100% by 2040, with
3 incremental goals along the way, including a 2033 target of 55%.

4 **b. In what year should ENOL be required to meet this target, and should ENOL have**
5 **specific, incremental targets to meet?**

6 The latest reports from the IPCC and the fourth national climate assessment lay out a
7 clear need to rapidly decarbonize the electric sector, and the economy at large.⁹ The latest
8 climate science strongly suggests a need to get to net-zero carbon by mid-century.¹⁰ It is this
9 very fact that has led to many states setting targets to procure 100% of electricity from renewable
10 or clean energy standards (RPS or CES).¹¹ The latest work from EQ Research indicates that 17
11 states, the city of DC, and Puerto Rico have either already proposed, enacted or are expected to
12 enact a 100% RPS or CES.¹² Compliance deadlines for these proposals range from 2032 (DC) to
13 2052 (NY).

⁹ Licker, R. 2018. “What is the Fourth National Climate Assessment?” Union of Concerned Scientists. Online:
<https://blog.ucsusa.org/rachel-licker/what-is-the-fourth-national-climate-assessment>

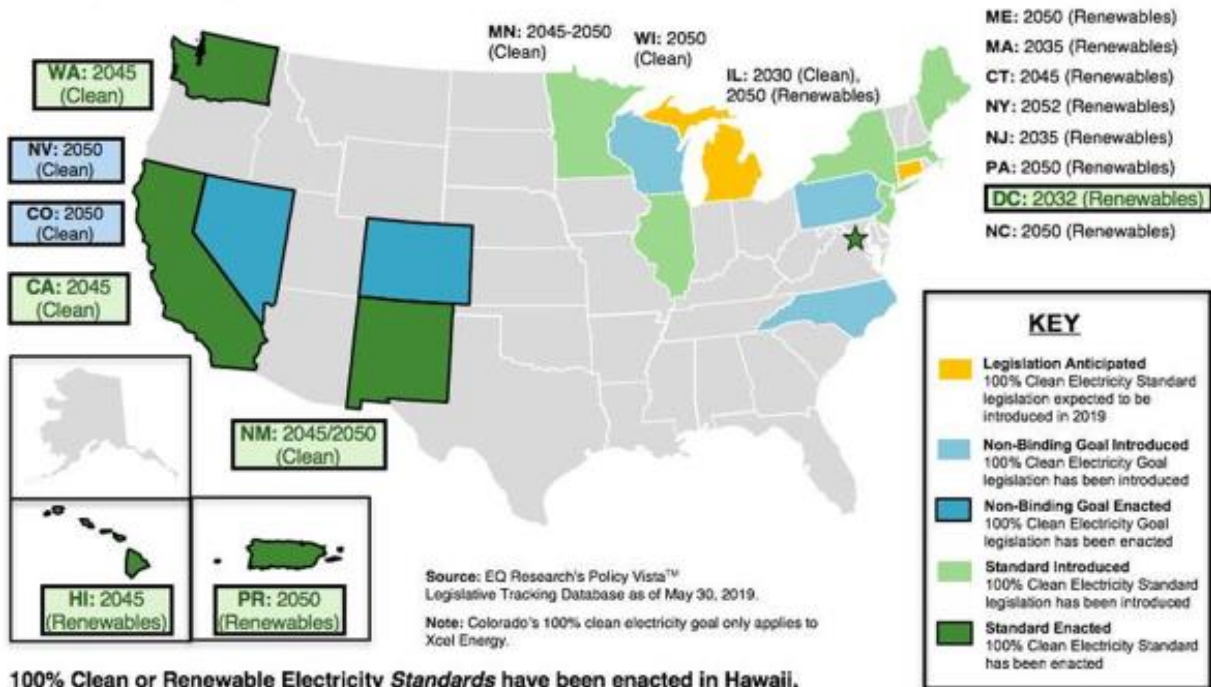
¹⁰ Watts, J. 2018. “We have 12 years to limit climate change catastrophe, warns UN.” The Guardian. Online:
<https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report>

¹¹ A CES or Clean Energy Standard tends to be broader in what resources qualify to meet the standard. Typically, a CES will allow for technologies like nuclear and fossil-fired power plants that are 100% CO2 emissions free via carbon capture technology.

¹² EQ Research Staff. 2019. *States Charting Paths to 100% Targets*. EQ Research. Originally posted online:
<https://eq-research.com/blog/100/> . Updated graphics via:
https://twitter.com/Ben_Inskeep/status/1134215624274698240?s=20

100% Clean or Renewable Electricity Targets

Anticipated, Proposed or Enacted 100% Standards and Goals

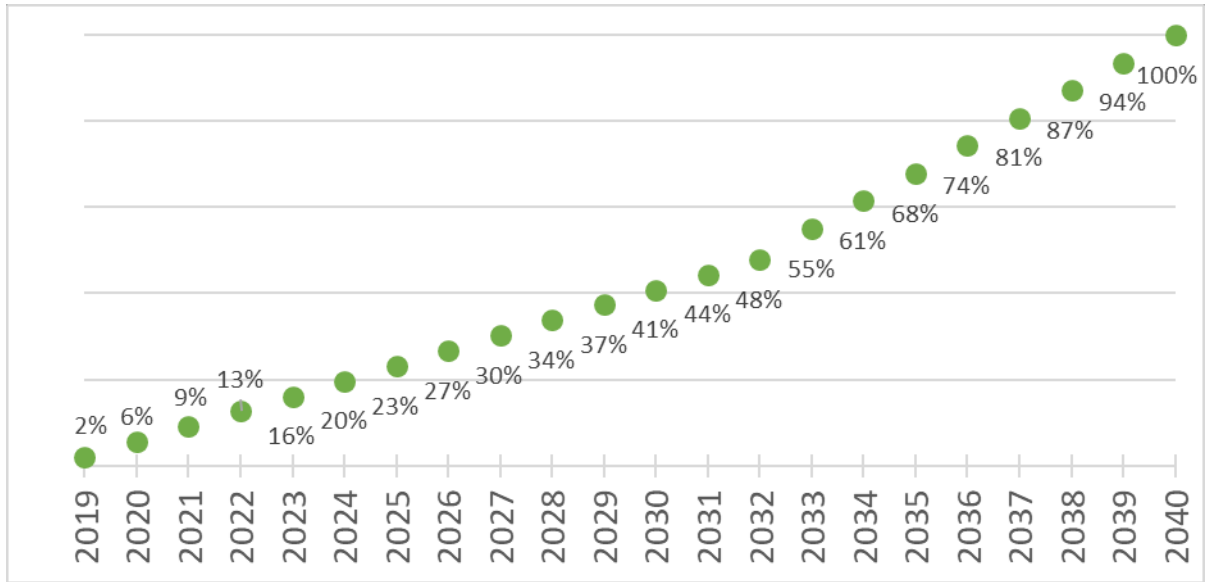


100% Clean or Renewable Electricity *Standards* have been enacted in Hawaii, California, New Mexico, Washington, Puerto Rico, and the District of Columbia.
 100% Clean or Renewable Electricity *Goals* have been enacted in Nevada and Colorado.



1
 2 *Figure 1. Anticipated, Proposed, or Enacted 100% Clean or Renewable Standards or Goals (Source: EQ research).*
 3 We recommend a target of 100% by 2040, with incremental goals along the way,
 4 including a 2033 target of 55%. These milestones shouldn't be seen as the only targets that
 5 should be set in an RPS. Setting annual compliance targets and incremental goals is best practice
 6 when it comes to RPS policy and it is most commonly done on a straight-line schedule.¹³

¹³ Leon, Warren. 2012. "Designing the Right RPS." Clean Energy States Alliance. Online: <https://www.cesa.org/assets/2012-Files/RPS/CESA-RPS-Goals-and-Program-Design-Report-March-2012.pdf>



1
 2 *Figure 2. Illustrative RPS Schedule starting in 2019 at 2% that increases to meet a 55% by 2032 interim target and*
 3 *a 100% by 2040 final target.*

4 The Council should also note that a trajectory like the one recommended here would keep
 5 the city on target to meet the goals of the City’s Climate Action Strategy to reduce emissions
 6 from the energy sector.

7 **2. HOW SHOULD A NEW ORLEANS RPS TARGET BE SATISFIED?**

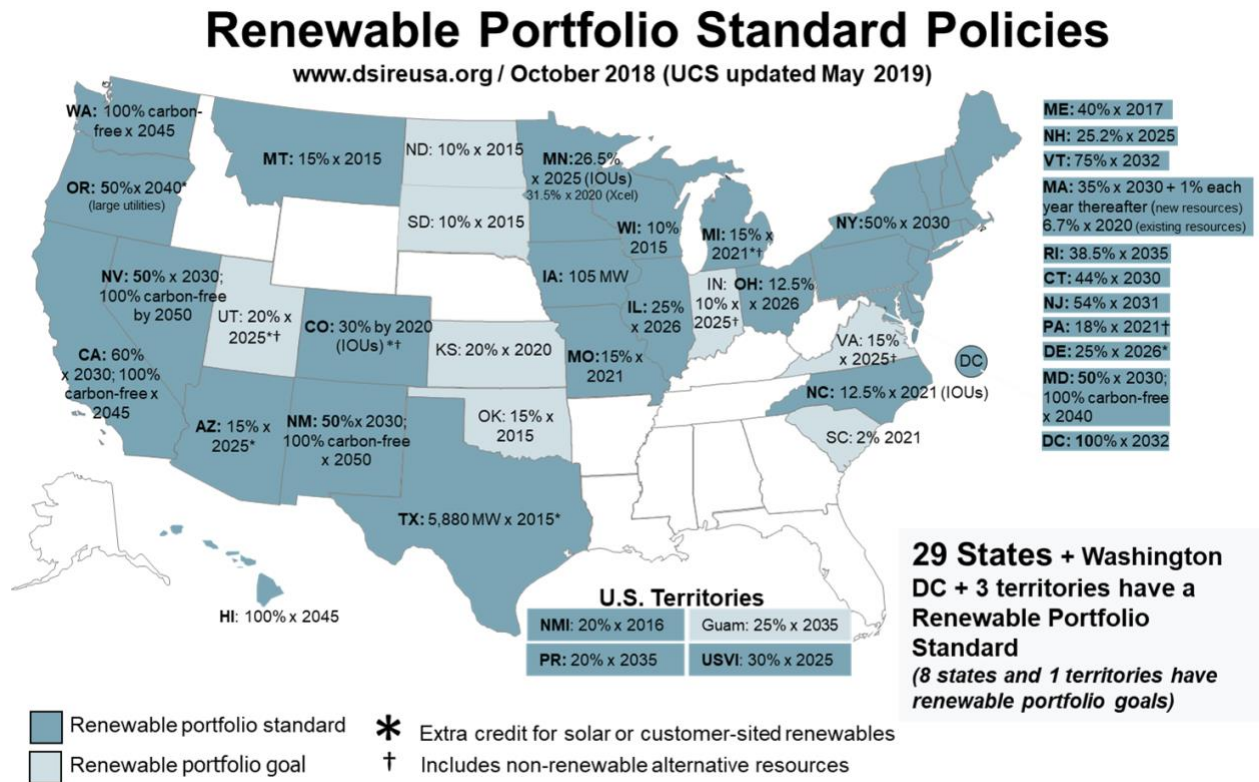
8 New Orleans’ RPS should be satisfied using existing frameworks to the extent possible,
 9 including leveraging the Midwest Renewable Energy Tracking System (M-RETS) program that
 10 currently tracks RECs (both for compliance and voluntary purposes) within the MISO footprint
 11 and beyond. The MRETS program is described in greater detail below.

12 New Orleans should also carve out technologies and geographies within the RPS to help
 13 ensure that all policy objectives are met.

14 **a. Should ENOL be allowed to purchase RECs to satisfy the requirement, and if so what, if**
 15 **any, limitations should be applied to the use of RECs? If RECs are allowed, how should**
 16 **they be certified or verified?**

17 ENOL is a participant of the MISO energy market and presently RECs generated, traded,

1 purposes of RPS compliance or serve the voluntary market.¹⁴ Presently, nine states within the
 2 MISO footprint have an RPS and are tracked by the MRETS program: North Dakota, South
 3 Dakota, Minnesota, Wisconsin, Ohio, Indiana, Iowa, Illinois, and Missouri.¹⁵ Renewable energy
 4 facilities in states without an RPS are still eligible to generate and sell RECs either in a voluntary
 5 market or to utilities that are allowed to procure RECs from out of state.



6
 7 *Figure 4. Renewable Portfolio Standards in the US. (DSIRE/UCS)*

8 M-RETS verifies that generating units are not registered in any other registry. M-RETS
 9 also substantiates renewable energy credits and has safeguards to prevent double-counting. M-
 10 RETS can aid in tracking renewable energy generation from both large- and small-scale
 11 renewables. Typically, M-RETS uses either meter reading data from MISO or self-reported

¹⁴ MRETS Website: <https://www.mrets.org/>

¹⁵ Research by the Union of Concerned Scientists using the DSIRE database. www.dsireusa.org.

1 generation data that is annually confirmed by an independent source. Currently, M-RETS will
2 track RECs for RPS compliance anywhere within the MISO territory and will track RECS for
3 voluntary compliance anywhere in North America.¹⁶

4 MRETS does not currently track energy efficiency but they easily could. MRETS has
5 recently launched new features like peak/off peak tracking and hourly generation data. MRETS
6 receives all MISO data with peak/off peak data and hourly generation data. RECs are minted and
7 traded in MWh chunks but the additional granularity gives greater resolution to users and
8 regulators. The Alliance strongly recommends reaching out to MRETS for additional
9 information about system capabilities.

10 **b. What resources should be included in the definition of resources that may be used to**
11 **meet the target (whether through the addition of resources to ENOL's system or through**
12 **the purchase of RECs) -- Solar Water Heat, Solar Space Heat, Geothermal Electric, Solar**
13 **Thermal Electric, Solar Thermal Process Heat, Solar Photovoltaics, Wind (Large and**
14 **Small), Biomass, Hydroelectric, Geothermal Heat Pumps, Combined Heat & Power,**
15 **Landfill Gas, Hydroelectric (Large and Small), Geothermal Direct- Use, Anaerobic**
16 **Digestion, Fuel Cells using Renewable Fuels, other?**

17 The Alliance recommends keeping efficiency and/or thermal technologies out of the RPS,
18 or at least have them in their own tier. Those technologies deserve their own policy drivers that
19 are more tailored to their economic needs. Of course, it is the Council's prerogative to attach
20 additional funding for efficiency to an RPS legislation and the reasons why that might be
21 advisable are detailed later in these comments.

22 Of the renewable electricity technologies listed above, we support wind (large and small),

¹⁶ MRETS Website: <https://www.mrets.org/about/why-use-m-rets/>

1 solar PV, biomass (with strict sustainability criteria), geothermal electric, and power produced
2 from landfill gas and anaerobic digesters. We are not opposed the inclusion of fuel cells, so long
3 as they are using renewable energy as an input, though double counting must be avoided. The
4 same requirements would apply to other storage technologies. Hydro-electric power is often left
5 out of RPS as it is generally considered a mature technology. However, considering the potential
6 for new technologies that could eventually take advantage of New Orleans' location next to the
7 Mississippi River, the Alliance recommends hydro-electric should be included here.

8 **c. Should there be a requirement that some portion of the RPS must be met through**
9 **specific types of renewables (or RECs), such as solar or distributed generation?**

10 Yes. Creating set-asides or carveouts is a great way to ensure that an RPS meets all the
11 legislative objectives set forth in the RPS in an intentional and explicit way. Carveouts can be set
12 up in several different ways and can include geographic, vintage, and technology limitations.

13 They have generally been used to set create minimum procurement requirements but
14 there is no reason why these rules should not create guidelines and limits to procuring renewable
15 resources. For example, if the City Council wanted to limit the potential for ENOL to comply
16 with the RPS through out of state REC purchases, *out-of-state-resources* could be placed into its
17 own tier and set with an upper limit (as opposed to a lower limit) to that tier.

18 Creating these limits helps ensure the development of new renewables and the associated
19 benefits of those renewables which include economic development and pollution reductions.

20 Geographically there are at least 3 delineations that the City Council should consider. The
21 first is within city limits (on the distribution level), the second is within state boundaries, and the
22 third is “all remaining deliverable resource” which could be defined as “located in MISO or a
23 renewable resource that was located outside of MISO but tied to the MISO grid via an High

1 Voltage Direct Current (HVDC) tie-in.”

2 Geographic tiers, as described above, is one of many different ways the City Council
3 could structure the RPS. Another way would be to include tiers for specific types of resources.
4 The City Council could even carve out specific resources within a geographic tier. For example
5 within these geographic groups the city could carve out additional requirements for special
6 resource classes—like resilient resources located on the distribution system, renewables that are
7 part of a microgrid, or resources that specifically benefit low to moderate income customers.

8 The Alliance recommends these rules propose a 10% carve out for low- and moderate-
9 income (LMI) households. This is based on the National Renewable Energy Laboratory’s
10 (NREL) technical potential for solar located on the rooftops of LMI households within New
11 Orleans, which would amount to over 750,000 MWh or approximately 13% of ENOL retail sales
12 in 2018.¹⁷ That technical potential will likely prove to be a conservative estimate as technology
13 advances and as solar gardens / community solar become available.

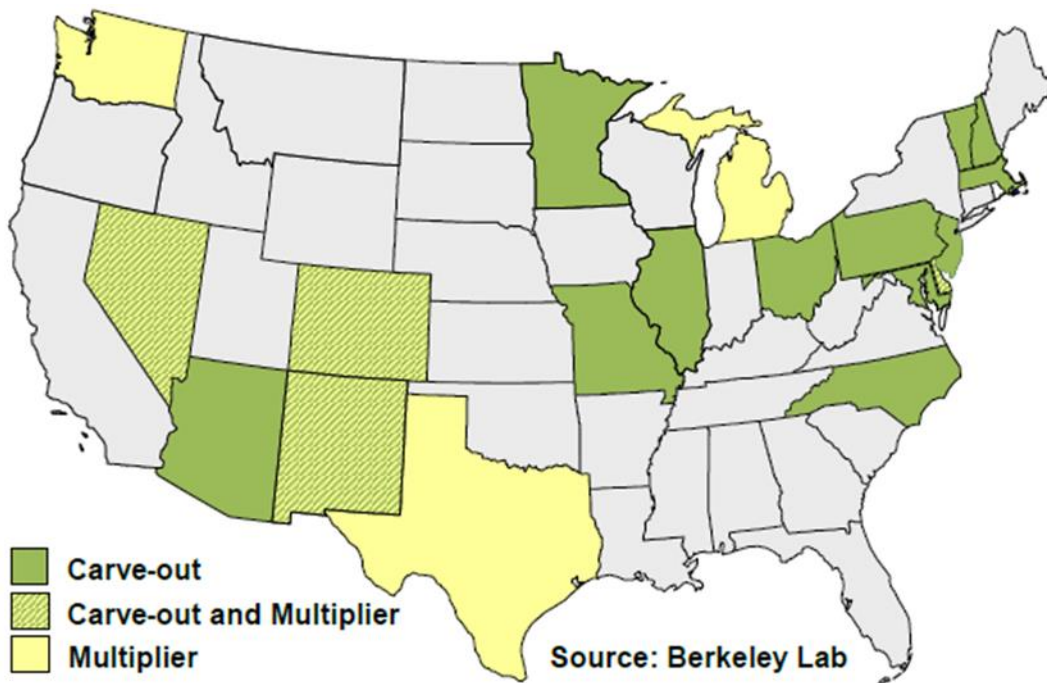
14 The limits on geography and vintage could also help ensure additionality, that is ensuring
15 new renewable resources are being encouraged and built as a result of this RPS. For example, the
16 Council may choose to make all REC eligible resources, even existing resources, located within
17 the city or state as being eligible while resources outside of the state may only be eligible if the
18 project didn’t start generating electricity prior to the confirmation of an RPS.

19 **d. Should the Council consider adopting a method of encouraging local renewable**
20 **resources, such as by providing ENOL with greater credit toward meeting the RPS**
21 **requirement for local resources than for remote resources?**

¹⁷ NREL Solar For All web-based tool: <https://maps.nrel.gov/solar-for-all/?aL=RzzQQu%255Bv%255D%3Dt&bL=clight&cE=0&lR=0&mC=30.91636380602182%2C-90.208740234375&zL=8>

1 Creating geographic tiers, as described above, will ensure that New Orleans helps reach
2 policy objectives beyond carbon reductions including local emission reductions of criteria
3 pollutants, grid resilience, job creation, and local economic development. A tier system has
4 proven successful in many states to help drive local benefits within the RPS without the pitfalls
5 associated with multipliers.

6 At present, 16 states and the District all have a specific carve out for either Solar or for
7 Distributed Generating resources with five states choosing to use a multiplier (three states use
8 both). Different states have elected to handle the solar and DG carve outs differently and some of
9 the options selected by other states are detailed below.



10
11 *Figure 5. Solar and DG carve outs by state (LBNL)*

12 **Carve Outs:** Carve outs are designed to help RPS intentionally meet specific goals. For
13 example, if the City Council wants to encourage development of renewables at LMI households,
14 they could set aside a certain portion of the RPS that must be met with resources that meet an
15 LMI requirement. Similarly, if resilience is a priority, the City Council could create a definition

1 of resilient renewables (say, renewable resources connected to an islandable microgrid) that
2 would make a facility eligible for a “resilient” RPS class.

3 One concern with carve outs is that they can, but don’t necessarily have to, increase the
4 cost of an RPS. In theory, having one bucket that all renewable resources can count towards
5 lowers the cost of compliance with an RPS because all resources compete and this drives down
6 the REC costs. However, lowest possible cost is not the only objective of an RPS. Energy
7 burden, resilience, climate, local pollution, economic empowerment, and local job development
8 are all important considerations and creating tiers can help create an intentional way of meeting
9 those policy goals.

10 In some jurisdictions, like DC, NJ, and MA, RECs associated with the solar carve out (so
11 called Solar RECs, or SRECs), are procured at a premium.¹⁸ However, carve outs don’t
12 universally translate into higher procurement costs. Delaware, for example, requires automated
13 competitive solicitation for SRECs, the competition helps drive down price.¹⁹ Additionally,
14 SREC’s can be procured under long term contracts, which assists solar developers lower cost
15 financing, those savings be passed along.²⁰ Other states have similar mechanisms and the result
16 is that the SREC program in Delaware and elsewhere has consistently remained below its
17 prescribed cost cap.²¹

18 **Multipliers:** Some states apply multipliers to special tiers of resources like solar or

¹⁸ Barbose, G. 2018. “Renewable Portfolio Standards 2018 Annual Status Report.” Lawrence Berkeley National Lab. http://eta-publications.lbl.gov/sites/default/files/2018_annual_rps_summary_report.pdf

¹⁹ Heeter, J., E. Holt, S. Koebrich, V. Stori. 2108. “Case Studies of RPS Best Practices: Solar Carve-Outs, SREC Tracking, and Thermal Inclusion.” Clean Energy States Alliance. Online: <https://www.cesa.org/assets/2018-Files/Case-Studies-RPS-Best-Practices.pdf>

²⁰ Heeter, J., E. Holt, S. Koebrich, V. Stori. 2108. “Case Studies of RPS Best Practices: Solar Carve-Outs, SREC Tracking, and Thermal Inclusion.” Clean Energy States Alliance. Online: <https://www.cesa.org/assets/2018-Files/Case-Studies-RPS-Best-Practices.pdf>

²¹ Barbose, G. 2018. “Renewable Portfolio Standards 2018 Annual Status Report.” Lawrence Berkeley National Lab. http://eta-publications.lbl.gov/sites/default/files/2018_annual_rps_summary_report.pdf

1 distributed resources. Multiples are pre-determined factors that increase the value of the special
2 tiered resource. If a resource tier has a 2x multiplier then retiring a REC from that class of
3 resources counts the same as retiring two RECs from the general pool of REC eligible resources.
4 The Alliance cautions against using multipliers as a way of providing support for specific
5 resources or other criteria. Multipliers are usually derived arbitrarily and so are problematic for
6 several reasons. Multipliers can have the unintended consequence of diluting the RPS goal. If in
7 year 2030 the target is 50% but there is a 2x multiplier on DG Solar, then the city could wind up
8 with only 25% of load being met with renewables (all DG-solar). This would, for example, also
9 dilute the effectiveness of the RPS in driving down emissions.

10 Multipliers can be calculated with the intent of hitting a specific target for a specific
11 resource, which then runs the risk of that calculation being based on estimations that don't reflect
12 reality. Consequently, administratively calculated multipliers can over- or under-estimate what
13 the right multiplier will need to be to hit policy targets. Which means New Orleans would either
14 over or under procure renewables of a certain type, possibly at an inflated cost. Rather, the city
15 should set specific targets for specific resources and allow the market to determine the proper
16 REC price.

17 **3. HOW SHOULD THE RPS STANDARD BE ENFORCED, SHOULD THE COUNCIL**
18 **CONSIDER A PENALTY OR ALTERNATIVE COMPLIANCE PAYMENT**
19 **STRUCTURE?**

20 If the City Council wants to ensure that the RPS targets are met and that the goals of the
21 RPS policy come to fruition, then a penalty or Alternative Compliance Payment (“ACP”) is a
22 helpful way to achieve those goals. An ACP can also help keep the costs of compliance to a
23 manageable level. In effect, the ACP becomes the ceiling for the REC price and by extension

1 that is a ceiling for compliance costs. If REC prices are too high, utilities can simply pay the
 2 ACP which will limit compliance costs.

3 If an alternative compliance payment is set up, those funds should then go to a “green
 4 fund.” The green fund can then be used to finance energy efficiency and renewable energy
 5 projects. This redirecting of money back to clean energy will help keep long term costs
 6 manageable and help ensure compliance with the RPS targets and sets up a positive feedback
 7 loop that can further drive down the costs for low-income customers.

8 I The Alliance would also recommend creating safeguards to help discourage the use of
 9 leveraging the ACP as a way of not meeting the RPS. The most efficient way to accomplish this
 10 is to make the ACP, or a portion of the ACP, non-recoverable in utility rates.

Tier	Carve Out	Percent	ACP	Notes
Tier 1 Dist. Grid	LMI	10% of annual	\$100/MWh (declining)	Excess LMI RECs can contribute to Tier 1 Remaining, Tier 2 and Tier 3 compliance requirements
	Resilient	15% of annual	\$75/MWh (declining)	Excess Resilient RECs can contribute to Tier 1 Remaining, Tier 2 and Tier 3 compliance requirements
	Remaining	10% of annual	\$50/MWh (declining)	Excess Tier 1 RECs can contribute to Tier 2 and Tier 3 compliance requirements
Tier 2	In-state	30 % of annual	\$20/MWh (declining)	Excess Tier 2 RECs can contribute to Tier 3 compliance requirements
Tier 3	In-MISO	35% of annual	\$15/MWh (declining)	

11 *Figure 6. Illustrative Table of How Tier ACP System Could Work*

12 The City Council should also consider setting ceilings or ACPs for the individual carve
 13 outs or tiers. That is to say, the ACP for class of RECs that are eligible under the tier 1 (produced
 14 within the city limits) might be higher than the ACP for Tier 2 RECs (located within the state).
 15 Even with the tier you can further break out the ACP. The following table is an illustrative
 16 example of how the city could tier and carve out specific resources to meet the RPS goals.

1 As noted in the table, Tier 1 resources (in this example) are resources that are connected
2 to the distribution grid and are eligible to produce RECs under the definition of a renewable
3 energy resource outlined above. Within Tier 1, there are three carve outs for special classes of
4 resources, like projects attached to low/moderate income households, or renewable resources that
5 are connected to microgrids (labeled a “resilient” tier). Each of these carve outs has its own
6 target (displayed here as a % of the overall target), its own ACP (which can decline over the
7 years as indicated above).

8 **4. WHAT PROTECTIONS SHOULD BE PUT IN PLACE TO PROTECT RATEPAYERS**
9 **FROM UNREASONABLE INCREASES IN RATES DUE TO THE RPS?**

10 The Alliance recommends that the members of the Council focus more on consumer *bills*
11 than on consumer *rates*. Though not a perfect measure of affordability, bills are a better metric
12 than rates. This matters as energy efficiency drives down the total bill by reducing kwh sold.
13 With that in mind, there are a number of ways to limit bill impacts, the most direct way would be
14 to implement a cost cap, discussed later.

15 Less directly, but possibly more effectively, is to increase and mandate funding to energy
16 efficiency programs. Energy efficiency lowers consumers’ bills and so counterbalances any
17 upward pressure on bills (regardless of the source of said upward pressure). Energy efficiency
18 doesn’t have to be part of RPS compliance, but it can be part of a package of programs that will
19 help improve air quality, develop local work force, and reduce the energy burden. In addition,
20 every kwh saved through energy efficiency programs is a kwh that is not served by any
21 generation at all, reducing the overall generation needs for Entergy New Orleans customers
22 further reducing the compliance needs of the RPS.

23 Those states with higher energy efficiency targets and highly rated utility efficiency

1 programs often have lower energy burden.²² Energy efficiency programs have the added benefit
2 that the programs can be targeted to serve those whose energy burden is the worst—Low to
3 Moderate Income (“LMI”) customers. Research shows that, nationally, the energy burden for
4 LMI customers is 3x the burden for non-LMI customers.²³ Fortunately, many states have
5 successfully targeted EE programs to LMI households. This Council has already made their
6 dedication to ramping up Energy Efficiency, in New Orleans, and for these reasons, we
7 encourage the Council to maintain their current plan to increase savings by .2% annually until
8 savings reach 2%. This target, while not an explicit piece of this RPS, it is part of an important
9 overall energy policy portfolio for New Orleans.

10 Having a carve out for LMI resources also has great potential to help reduce the current
11 burden LMI households in New Orleans current endure. When the right policies are in place,
12 rooftop solar can provide environmental, economic, and social benefits to low-income
13 communities.²⁴ As noted by a 2018 NREL study, “LMI residents lack equal access to the PV
14 market largely because they face unique barriers including renting, lower credit scores, and
15 limited savings to support upfront PV investments. Some states have designed innovative
16 financing programs to address these issues.”²⁵ New Orleans should learn from the experiences of
17 other jurisdictions and work to ensure that the city’s low-income households have equal access to

²² Daniel, J. 2018. “How Affordable is Your Electricity? Comparing Electric Rates, Bills, and Burden.” Union of Concerned Scientists. Online: <https://blog.ucsusa.org/joseph-daniel/state-electricity-affordability-rates-vs-bills-vs-burden>

²³ Department of Energy. 2018. “Low-Income Household Energy Burden Varies Among States — Efficiency Can Help in All of Them.” Department of Energy Office of Energy Efficiency and Renewable Energy. Online: https://www.energy.gov/sites/prod/files/2019/01/f58/WIP-Energy-Burden_final.pdf

²⁴ Sen, B. 2017. “How States Can Boost Renewables, With Benefits for All: Renewable Portfolio Standards and Distributed Solar Access for Low-Income Households.” Institute for Policy Studies. Online: <https://ipsdc.org/wp-content/uploads/2017/04/RPS-Report.pdf>

²⁵ Cook, J., L. Bird. 2018. “Unlocking Solar for Low- and Moderate-Income Residents: A Matrix of Financing Options by Resident, Provider, and Housing Type.” National Renewable Energy Laboratory. Online: <https://www.nrel.gov/docs/fy18osti/70477.pdf>

1 benefit from renewables and the RPS.

2 Because LMI households are already overburdened, the Alliance strongly recommend a
3 policy to exempt all low-income households from any RPS rider that might be added to
4 residential customer bills. This would ensure more equitable management of an RPS in New
5 Orleans. While some states already have a low-income rate available to reduce energy burdens²⁶
6 an exemption from an RPS rider for income qualified customers could provide the bill protection
7 desired.

8 Most importantly, it is entirely possible that procuring renewable energy will have
9 downward pressure on rates for all customers, not upward pressure. The City can accomplish this
10 feat by using the RPS as an opportunity to facilitate ENOL weening itself off of expensive
11 market purchases and above market-price contracts. Currently, ENOL procures some electricity
12 by purchasing energy off the MISO market and via bi-lateral contracts.

13 In 2018, MISO's average wholesale price of electricity at the Louisiana Hub was only
14 \$36/MWh for all hours and \$44/MWh during peak hours.²⁷ In 2018, ENOL bought energy from
15 the MISO system for an average price of \$61/MWh.²⁸ These prices are far higher than average
16 prices, and 39% higher than average on-peak prices, suggesting that ENOL is buying energy at
17 peak hours and/or from constrained areas. Generating more local electricity during peak times
18 could help lower the cost of delivering energy to customers.

19 ENOL also buys energy and capacity via bilateral contracts. Most of those bi-lateral
20 contracts are with Entergy Affiliate companies—companies that, like ENOL, are owned by

²⁶ 2014, Low Income Assistance Review, Synapse Economics. <https://www.synapse-energy.com/sites/default/files/Low-Income-Assistance-Strategy-Review-14-111.pdf>

²⁷ Research conducted by UCS via MISO dataset, retrieved with S&P Global Market Intelligence. See Attachment 2.

²⁸ Research conducted by UCS via 2018 FERC Form 1, retrieved with S&P Global Market Intelligence. See Attachment 3.

1 Entergy Corporation.²⁹ A review of these bi-lateral contracts found that all of them are at above
2 market prices. These affiliate transactions are most likely associated “baseload” coal and nuclear
3 power plants owned by Entergy. It is very unlikely that ENOL is relying on these resources only
4 as peaking resources, where above average market prices might be explainable. It is far more
5 likely that ENOL is using captive customers in New Orleans to subsidize otherwise uneconomic
6 resources elsewhere in Louisiana; or, in Arkansas or Mississippi. UCS has conducted recent
7 analysis on coal and nuclear power plants and found many of Entergy’s assets to be uneconomic
8 compared to market prices.^{30,31} It appears that Entergy may be using these bi-lateral contracts
9 with affiliated companies to prop up otherwise uneconomic coal and nuclear power plants.

10 These bilateral contracts have included purchasing energy from:

- 11 • Entergy Arkansas at an average price of \$49/MWh in 2018, or roughly 64%
12 higher than average Arkansas Hub market prices in 2018.³² Entergy Arkansas
13 owns and operates the White Bluff and Independence coal plants and the costs of
14 these power plants were included in a recent ENOL IRP filing,³³ presumably
15 because they are associated with the bi-lateral contracts. These two coal-fired
16 power plants, along with many other coal-fired power plants, regularly operate
17 when it is uneconomic to do so.³⁴ It would appear that one reason these two coal

²⁹ Research conducted by UCS via 2018 FERC Form 1, retrieved with S&P Global Market Intelligence. See Attachment 3.

³⁰ Daniel, J. 2018. Out-of-merit generation of coal-fired power plants in Organized Competitive Markets. US Association of Energy Economics.

³¹ Clemmer, S., J Richardson, S. Sattler, D. Lochbaum. 2018. “The Nuclear Power Dilemma Declining Profits, Plant Closures, and the Threat of Rising Carbon Emissions.” Union of Concerned Scientists. Cambridge, MA. <https://www.ucsusa.org/sites/default/files/attach/2018/11/Nuclear-Power-Dilemma-full-report.pdf>

³² Research conducted by UCS via 2018 FERC Form 1, and MISO datasets retrieved with S&P Global Market Intelligence. See Attachment 3.

³³ Entergy New Orleans, LLC. 2019. ENOL 2018 IRP Technical Meeting #4. Docket No. UD-17-03. https://www.entergy-neworleans.com/userfiles/content/IRP/2019_ENO_4th_Technical_Meeting_Materials.pdf

³⁴ Daniel, J. 2018. Out-of-merit generation of coal-fired power plants in Organized Competitive Markets. US Association of Energy Economics.

1 plants might be doing this is because the bi-lateral contracts make them
2 indifferent to market prices. As a result, ENOL customers in New Orleans would
3 be subsidizing uneconomic coal plants in Arkansas.

- 4 • Entergy Louisiana LLC at an average price of \$46/MWh in 2018, or roughly
5 26% higher above Louisiana Hub market prices;³⁵ and,
- 6 • System Energy Resources Inc (whose ultimate parent is Entergy Corporation) at
7 an average price of \$77 /MWh or over two times Louisiana hub market average.³⁶
8 System Energy Resources owns and operates the Grand Gulf nuclear power
9 plant. Recent analysis from UCS found that the Grand Gulf plant operates at cost
10 below \$40/MWh and that if the power plant were reliant on market prices alone,
11 it wouldn't be economic to own and operate the reactor.³⁷ S&P Global Market
12 Intelligence also conducts projections of power plant profits and similarly found
13 that the plant is operating at a market loss.³⁸ This suggests that ENOL customers
14 are funding a nearly 50% profit margin to Entergy and subsidizing an otherwise
15 uneconomic nuclear plant.

16 On the other hand, from 2010 to 2018, solar costs have declined dramatically. Residential
17 rooftop solar PV costs have declined 71%, commercial PV costs declined 72%, and utility-scale
18 PV declined 81%; as a result, the long run cost of buying those resources was, in 2018,
19 calculated to be between \$0.08–\$0.10/kWh for residential solar, \$0.06–\$0.08/kWh for

³⁵ Research conducted by UCS via 2018 FERC Form 1, and MISO datasets retrieved with S&P Global Market Intelligence. See Attachment 3.

³⁶ Research conducted by UCS via 2018 FERC Form 1, retrieved with S&P Global Market Intelligence. See Attachment 4.

³⁷ Clemmer, S., J Richardson, S. Sattler, D. Lochbaum. 2018. "The Nuclear Power Dilemma Declining Profits, Plant Closures, and the Threat of Rising Carbon Emissions." Union of Concerned Scientists. Cambridge, MA. <https://www.ucsusa.org/sites/default/files/attach/2018/11/Nuclear-Power-Dilemma-full-report.pdf>

³⁸ Research conducted by UCS via S&P Global Market Intelligence. See Attachment 4.

1 commercial solar, and \$0.04–\$0.06/kWh for utility scale solar.³⁹ Currently, utilities are procuring
2 utility scale solar plus storage for 4.5 cents/kWh.⁴⁰ If New Orleans acts now, it can help ensure
3 that community members can take advantage of the ITC before the tax credits expire⁴¹ and
4 procure rooftop solar at a price that is comparable to, or likely below, the cost of buying energy
5 from Grand Gulf or utility scale solar at costs at or below bi-lateral contract prices and market
6 prices. Weening ENOL customers off these above market contracts and onto lower cost contracts
7 for renewable energy will place downward pressure on rates, offsetting some, if not all, the costs
8 associated with procuring RECs.

9 To the extent New Orleans can become more self-reliant, buying energy from local
10 sources or from buying competitively procured renewables, New Orleans will be able to save its
11 community money and keep more money circulating within the community.

12 **a. What would be an unacceptable level of rate impact resulting from compliance with an**
13 **RPS?**

14 As noted earlier, the city should be far more concerned with bill impacts as opposed to
15 rate impacts when it comes to implementing an RPS. When it comes to bill impacts, the city can
16 draw from the lessons of other states and the District on what to expect. By far the most
17 comprehensive study conducted on bill impacts of renewable portfolio standards is the 2018 RPS
18 study conducted by LBNL.⁴² Washington D.C. is the only other city that directly regulates an

³⁹ LCOE Including ITC. Fu, R., D. Feldman, R. Margolis. 2018. U.S. Solar Photovoltaic System Cost Benchmark: Q1 2018. National Renewable Energy Laboratory. Golden, CO. <https://www.nrel.gov/docs/fy19osti/72399.pdf>

⁴⁰ Maloney, P. “How can Tucson Electric get solar + storage for 4.5¢/kWh?” Utility Dive. Online: <https://www.utilitydive.com/news/how-can-tucson-electric-get-solar-storage-for-45kwh/443715/>

⁴¹ In 2015, congress passed a multi-year extension of the ITC, extending the 30% ITC to 2019 at which point it would begin to phase down, the so called “sunset.” The solar sunset schedule reduces the ITC from 30% down to 26% in 2020, down to 22% in 2021, and down to 10% for commercial and utility scale projects in 2022. For residential projects the ITC expires after 2021.

⁴² Barbose, G. 2018. “Renewable Portfolio Standards 2018 Annual Status Report.” Lawrence Berkeley National Lab. http://eta-publications.lbl.gov/sites/default/files/2018_annual_rps_summary_report.pdf

1 investor owned utility and so makes for an good comparison when looking at RPS
2 implementation and compliance. According to the LBNL study, DC compliance costs between
3 2015 and 2017 hovered around 3%.⁴³

4 The study also looked at states where the local utilities owns generating assets and are
5 responsible for retail distribution of electricity, which is the case with Entergy New Orleans. In
6 those states RPS compliance has typically been between 1-3%.⁴⁴ While there have been outliers,
7 like AZ and MN that saw bill impacts as high as 4%, there were more examples of states like MI,
8 MO, NC and CA that saw bill impacts below 1 percent in some (if not all) years.⁴⁵

9 The LBNL study found that across all states analyzed, only two states (NJ and MA) saw
10 bill impacts above 5%.⁴⁶

11 It is also important to reiterate the earlier findings that ENOL is currently procuring
12 energy at above market costs and at costs far above typical contract prices of wind and solar. So,
13 it is possible that an RPS will actually help drive down energy costs, counterbalancing any
14 upward pressure RPS compliance might have. Lastly, if the City Council adopts the low-income
15 safeguards outlined above, the city will be able to protect the most vulnerable communities in the
16 city.

17 **b. If a limit on rate impact is established, how should it be structured -- as a flat cap, as an**
18 **Alternative Compliance Payment structure, or through some other structure?**

19 Most states that have an RPS policy do have some sort of mechanism for cost

⁴³ Barbose, G. 2018. "Renewable Portfolio Standards 2018 Annual Status Report." Lawrence Berkeley National Lab. http://eta-publications.lbl.gov/sites/default/files/2018_annual_rps_summary_report.pdf

⁴⁴ Barbose, G. 2018. "Renewable Portfolio Standards 2018 Annual Status Report." Lawrence Berkeley National Lab. http://eta-publications.lbl.gov/sites/default/files/2018_annual_rps_summary_report.pdf

⁴⁵ Barbose, G. 2018. "Renewable Portfolio Standards 2018 Annual Status Report." Lawrence Berkeley National Lab. http://eta-publications.lbl.gov/sites/default/files/2018_annual_rps_summary_report.pdf

⁴⁶ Barbose, G. 2018. "Renewable Portfolio Standards 2018 Annual Status Report." Lawrence Berkeley National Lab. http://eta-publications.lbl.gov/sites/default/files/2018_annual_rps_summary_report.pdf

1 containment. Creating cost caps or establishing other limits to the costs of compliance are a
2 smart policy objective but they do come with pitfalls. It is also worth noting that some price
3 ceilings have had the unintended consequence of becoming the price floor. It is also worth noting
4 that limiting the cost of compliance can also have the effect of limiting the ability for the policy
5 to reach the intended ambition laid out at the onset.

6 Arizona, California, Hawaii, Iowa, Minnesota, Nevada, and Wisconsin are the only states
7 with no forms of price containment associated with their RPS.⁴⁷ For the remainder of
8 jurisdictions with an RPS, there are four common types of cost containment:

- 9 1. Renewable Energy Fund Cap: In New York, there is a cap to the renewable energy
10 fund which sets a pre-determined limit to the amount of money available to fund
11 renewable energy projects. New York is the only state with this type of cost
12 containment.⁴⁸
- 13 2. Renewable Energy Contract Price Cap: In Montana there is a cap on the renewable
14 energy contract price wherein the price of contracts is limited by statute or regulation.
15 In practice, this has had the consequence of the contract price cap acting as a floor, as
16 opposed to a ceiling.⁴⁹ Montana is currently the only state with this type of cost
17 containment, though California had this form at one point.
- 18 3. Alternative Compliance Payment: Alternative compliance payments are the most
19 common form of cost containment, having been adopted by 14 jurisdictions.
20 Alternative compliance payments (ACP) are payments to meet compliance

⁴⁷ UCS research based on a review of RPS policies in the DSIRE database. www.dsireusa.org

⁴⁸ Pierpont, B. 2012. "Limiting the Cost of Renewables Lessons for RPS Policies." Clean Energy States Alliance Webinar. Online: <https://www.cesa.org/assets/Uploads/April-24-RPS-Cost-Containment-Combined-Slides.pdf>

⁴⁹ Pierpont, B. 2012. "Limiting the Cost of Renewables Lessons for RPS Policies." Clean Energy States Alliance Webinar. Online: <https://www.cesa.org/assets/Uploads/April-24-RPS-Cost-Containment-Combined-Slides.pdf>

1 obligations rather than retiring RECs and this, in effect, creates a REC price ceiling.
2 ACPs are a simple, well-defined mechanism that prevents high costs and maintains
3 cost-effectiveness but can allow policy compliance without renewable energy
4 generation actually being procured.⁵⁰

5 4. Rate/bill impact or revenue requirement cap: Setting a rate impact or revenue
6 requirement impact cap is the second most common form of RPS cost containment,
7 having been adopted by 12 states. These caps are often “complex and ambiguously
8 defined.”⁵¹

9 Additionally, surplus REC’s should not be bankable. Rather, surplus RECs should be
10 retired within a year (12 months) that they are minted. If ENOL procures surplus RECs they
11 should be sold; either into the voluntary REC market; or, as a compliance REC if the REC
12 qualifies for compliance for another State’s RPS. The utility can then use revenue generated by
13 surplus REC sales to offset other costs of compliance and help keep total compliance costs down.
14 For example, any revenue stream from sold RECs could net against the any RPS compliance
15 rider or could be used to directly invest in EE or RE programs for LMI customers. Selling excess
16 credits on an annual basis will also help maintain the stringency of the rule, preventing early year
17 banking.

18 For those lowest income households in New Orleans any increase in energy bills can be
19 devastating. Therefore, we strongly recommend a policy to exempt all low-income households
20 from any RPS rider. This would ensure more equitable management of an RPS in New Orleans.

⁵⁰ Pierpont, B. 2012. “Limiting the Cost of Renewables Lessons for RPS Policies.” Clean Energy States Alliance Webinar. Online: <https://www.cesa.org/assets/Uploads/April-24-RPS-Cost-Containment-Combined-Slides.pdf>

⁵¹ Pierpont, B. 2012. “Limiting the Cost of Renewables Lessons for RPS Policies.” Clean Energy States Alliance Webinar. Online: <https://www.cesa.org/assets/Uploads/April-24-RPS-Cost-Containment-Combined-Slides.pdf>

1 While some states already have a low-income rate available to reduce energy burdens⁵² an
2 exemption from an RPS rider for income qualified customers could provide the bill protection
3 desired.

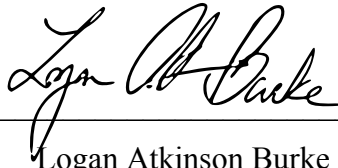
4 **Conclusion**

5 These responses and recommendations should form the basis of a Renewable Portfolio
6 Standard for New Orleans that directs the city toward a more equitable energy system and is
7 responsive to the need for resilience in the face of the mounting climate crisis. Rather than
8 simply focusing on mitigating the worst effects of climate change by reducing our dependence
9 on fossil fueled generation, New Orleans energy policy must also mandate our systems adapt to
10 protect the residents who call this city home. These comments are not fully exhaustive of the
11 potential policy tools this Council could use to act on climate, and the Alliance reserves the right
12 to provide additional recommendations on clean and renewable energy policy in this and other
13 dockets. We look forward to input from other stakeholders and continued engagement in this
14 proceeding to conclude with an energy standard that works for everyone.

⁵² Brockway, N., J. Kellay, E. Malone. 2014. “Low Income Assistance Review.” Synapse Economics. Cambridge MA. <https://www.synapse-energy.com/sites/default/files/Low-Income-Assistance-Strategy-Review-14-111.pdf>

**In Re: RESOLUTION AND ORDER ESTABLISHING A DOCKET AND OPENING A
RULEMAKING PROCEEDING TO ESTABLISH RENEWABLE PORTFOLIO
STANDARDS. DOCKET UD-19-01**

I hereby certify that I have on this 3rd day of June, 2019, served the required number of copies of the foregoing correspondence upon all other known parties of this proceeding, by USPS or electronic mail.



Logan Atkinson Burke
Alliance for Affordable Energy

**RULEMAKING PROCEEDING TO ESTABLISH RENEWABLE PORTFOLIO
STANDARDS**

DOCKET UD-19-01

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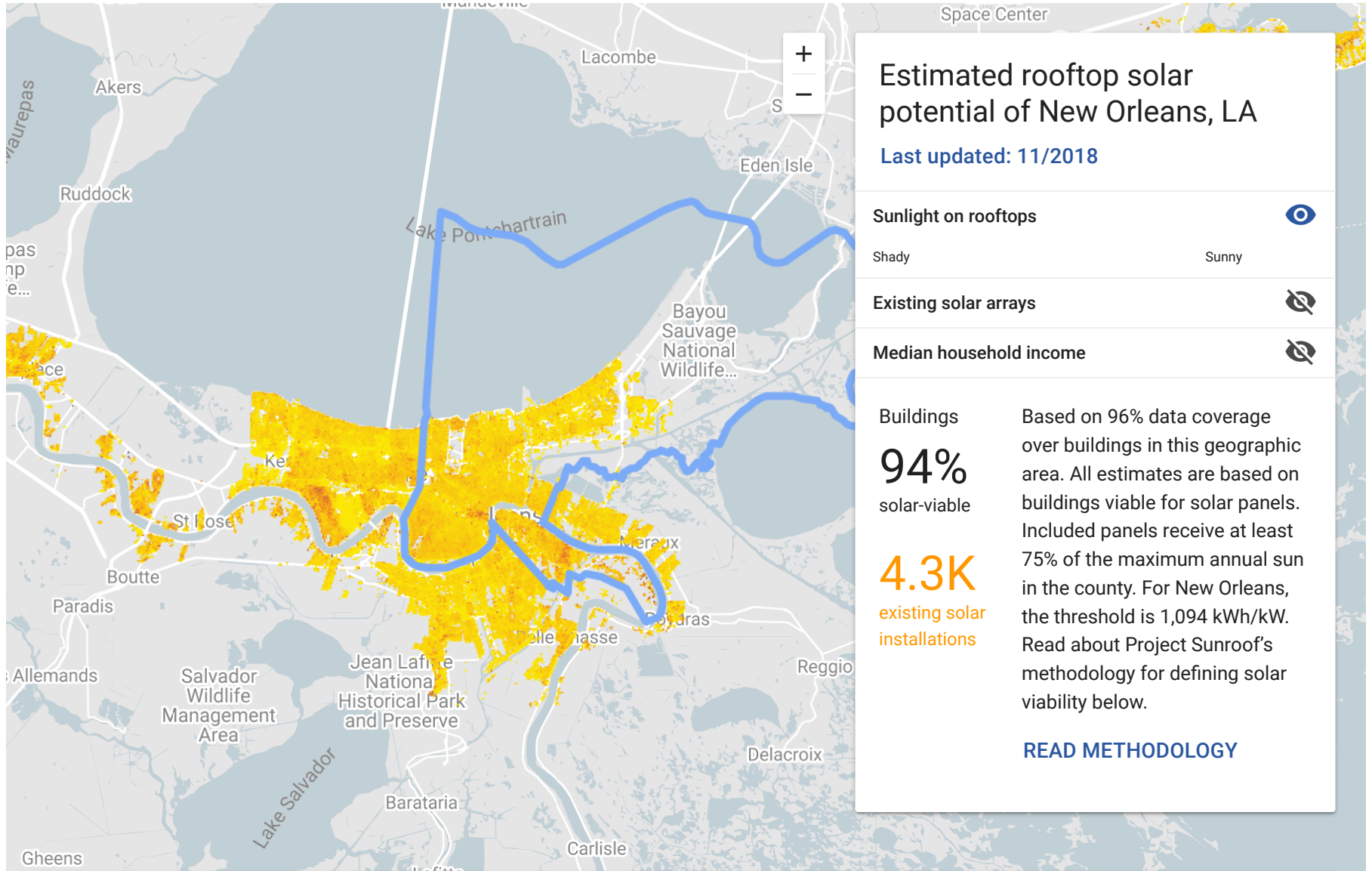
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Attachment 1



Estimated rooftop solar potential of New Orleans, LA

Last updated: 11/2018

Sunlight on rooftops Sunny Shady

Existing solar arrays

Median household income

Buildings
94%
 solar-viable

4.3K
 existing solar installations

Based on 96% data coverage over buildings in this geographic area. All estimates are based on buildings viable for solar panels. Included panels receive at least 75% of the maximum annual sun in the county. For New Orleans, the threshold is 1,094 kWh/kW. Read about Project Sunroof's methodology for defining solar viability below.

[READ METHODOLOGY](#)

ESTIMATED SOLAR INSTALLATION POTENTIAL [SHARE LINK](#)



Overall

Total estimated size and solar electricity production of viable roofs for New Orleans, LA

Roofs

94%

Roofs

126K

Roof space

190M

sq ft

Capacity

2.7K

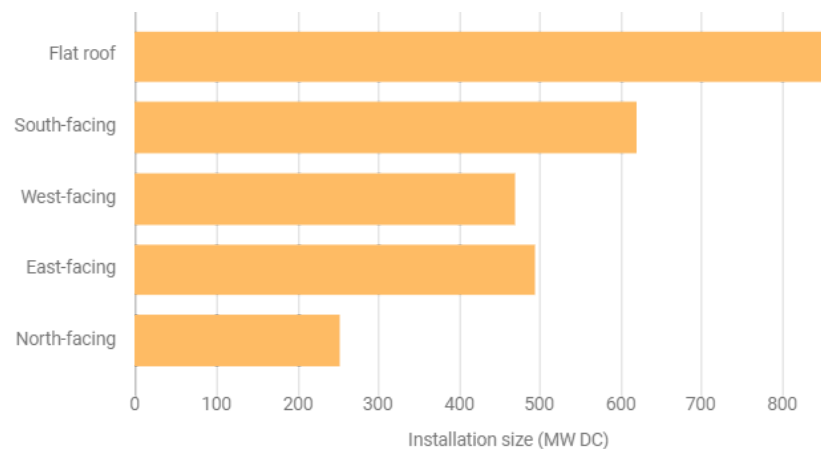
MW DC

Electricity

3.5M

MWh AC per yr

Total installation size (MW DC)



Total yearly energy generation potential (MWh AC)



Per roof

Median estimated system size and solar electricity production per viable roof for New Orleans, LA

Roof space

969

sq ft

Capacity

13.8

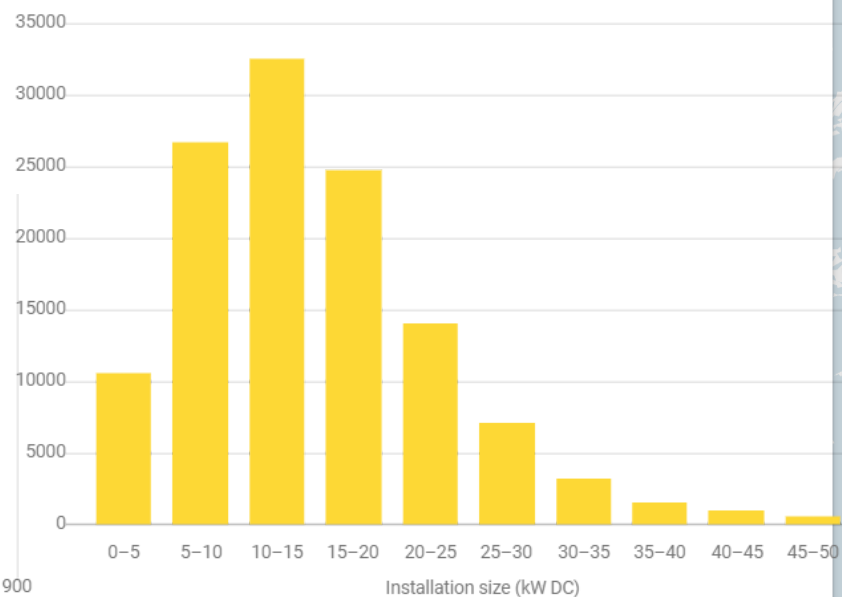
kW DC

Electricity

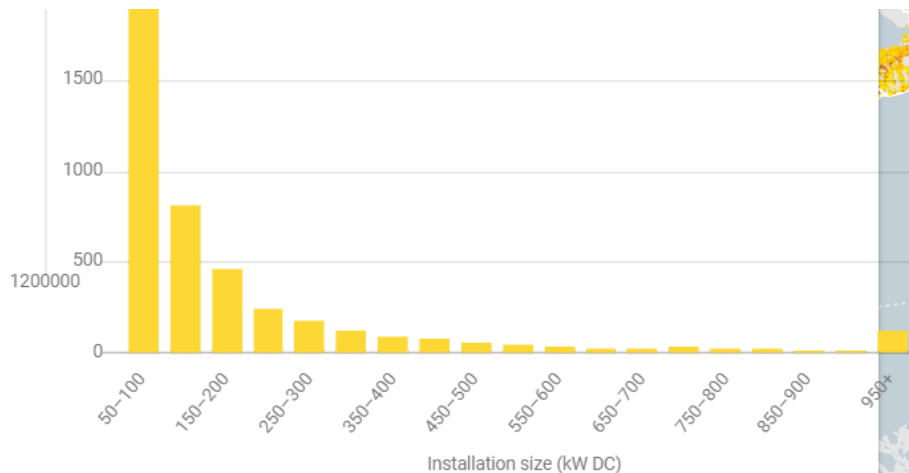
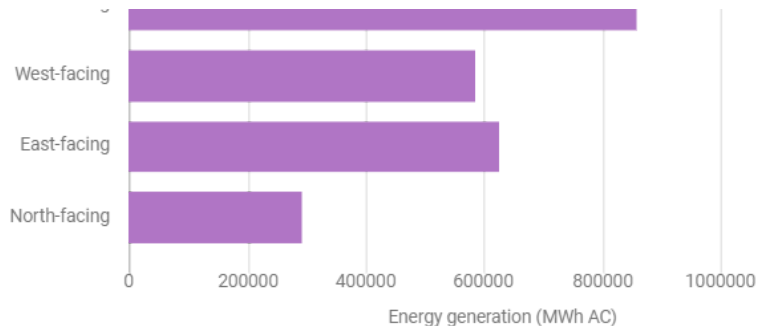
17.9K

kWh AC per yr

Rooftop solar capacity distribution (number of roofs, < 50kW)






Rooftop solar capacity distribution (number of roofs, > 50kW)



POTENTIAL IMPACT

If all the viable solar installations were implemented, the amount of avoided CO₂ emissions from the electricity sector in New Orleans would be:

	Carbon dioxide								
	2.1M	=		Passenger cars	=		Tree seedlings		
	metric tons			452K			54.8M		
				taken off the road for 1 yr			grown for 10 yrs		

ESTIMATE METHODOLOGY

This tool estimates the technical solar potential of all buildings in a region. Technical potential includes electricity generated by the rooftop area suitable for solar panels assuming economics and grid integration are not a constraint. There are many definitions of technical potential, and other

definition of technical potential, installations meet the following criteria:



Sunlight

Every included panel receives at least 75% of the maximum annual sun in the county. For New Orleans, the threshold is 1,094 kWh/kW.



Installation size

Every included roof has a total potential installation size of at least 2kW.



Space & obstacles

Only areas of the roof with enough space to install 4 adjacent solar panels are included. Obstacles like chimneys are taken into account.

[READ MORE METHODOLOGY](#) ▾

ATTRIBUTION

Feel free to include data from Project Sunroof in other materials, reports, and communications with the following attribution:

Source: Project Sunroof data explorer (November 2018).

Share your ideas with us!

We love to learn more about ways to improve data access and the value it has to our daily users. Email us example reports, stories, or ideas at projectsunroof-dataexplorer@google.com.

Sources: [2010 U.S. Census](#), [National Renewable Energy Laboratory weather data](#), [EPA GHG Equivalencies](#), [Department of Energy SLED \(State & Local Energy Data\)](#), Google Maps

Google



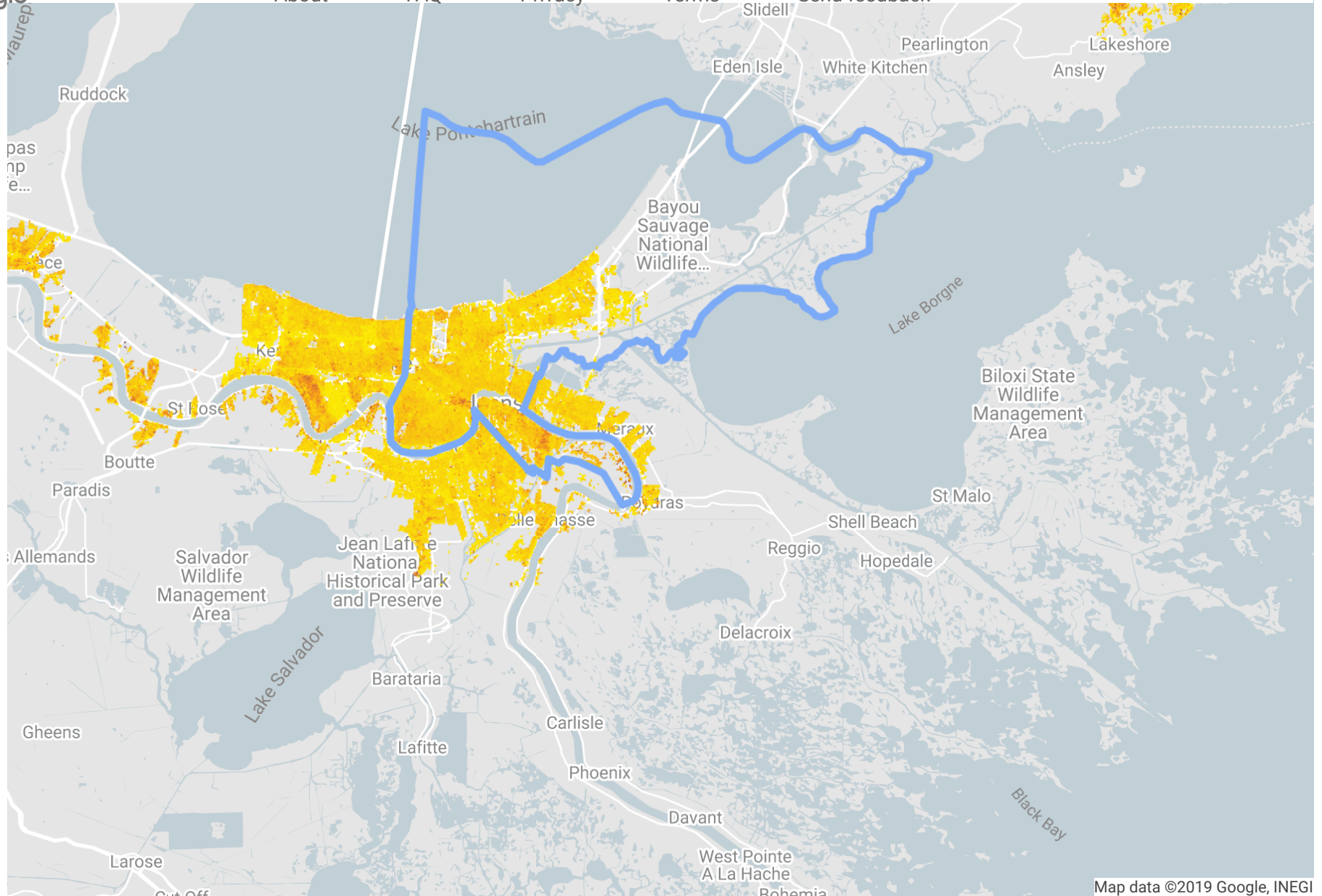
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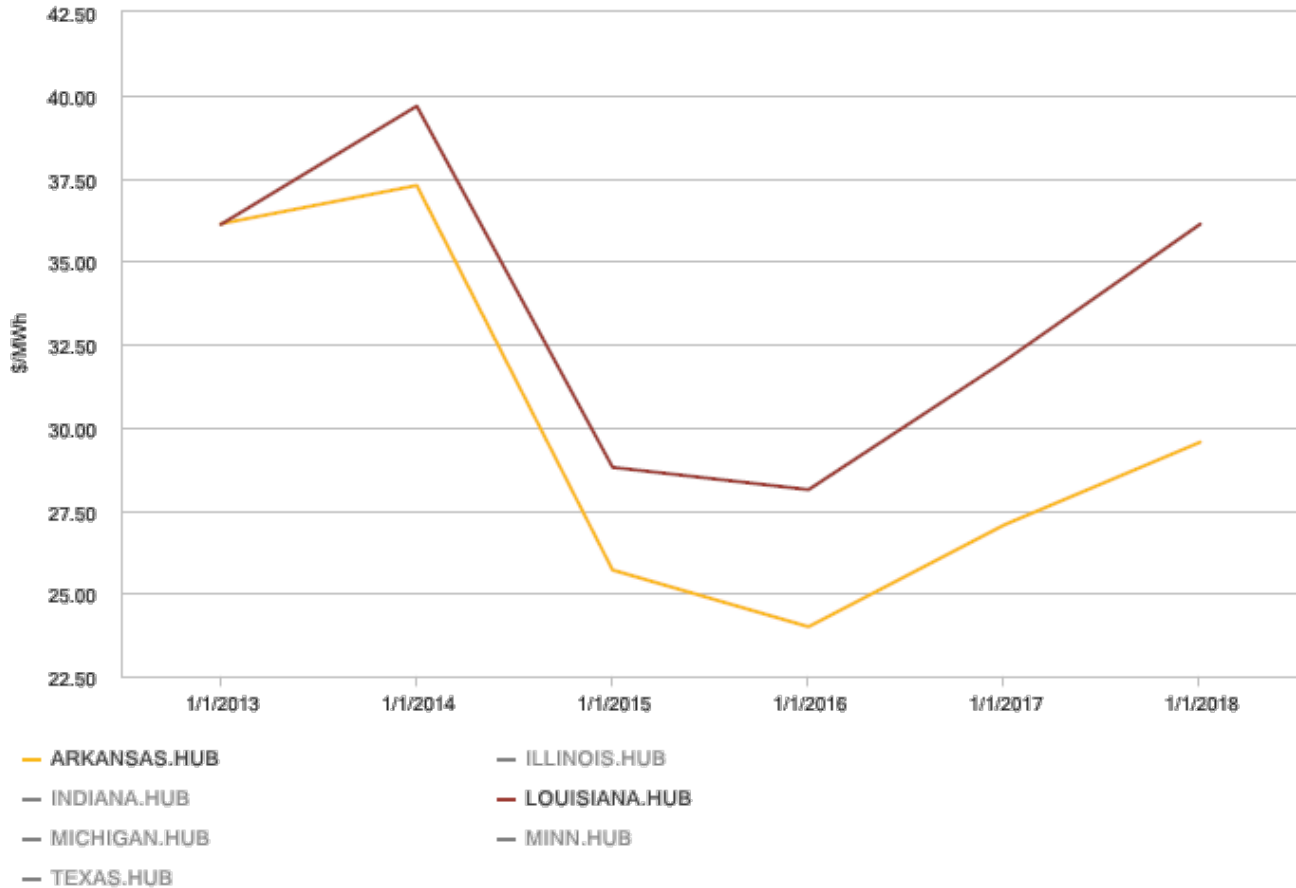
Send feedback



ISO Day-Ahead Prices

Region: MISO
As Of: 01/01/2019
Frequency: Annual
Peak: Around the clock

Chart



Data

DATE	ARKANSAS.HUB	ILLINOIS.HUB	INDIANA.HUB	LOUISIANA.HUB	MICHIGAN.HUB	MINN.HUB	TEXAS.HUB
1/1/2018	29.56	30.42	33.19	36.12	33.21	26.98	31.58
1/1/2017	27.07	26.93	29.38	32.00	29.58	23.27	32.14
1/1/2016	24.00	26.66	28.11	28.13	28.02	20.76	26.94
1/1/2015	25.71	26.67	28.67	28.80	28.59	22.18	28.23
1/1/2014	37.29	37.03	39.77	39.67	44.93	32.75	45.18
1/1/2013	36.13	30.58	32.41	36.11	33.03	31.08	38.62

Hourly data is displayed in prevailing time, which includes an annual daylight savings adjustment, as follows: ISO-NE, NYISO, PJM, MISO, Ontario use Eastern Time; ERCOT and SPP use Central Time; Alberta uses Mountain Time. To view more than one day or to adjust displayed time zone, click into Advanced Charting or export data to the Excel Add-In and adjust the time zone setting.

Daily, monthly, and annual peak prices assume the following definitions: Peak hours include IESO, NYISO, ISO-NE, PJM hour beginning (HB) 7 – 22, M - F, ET (prevailing); MISO HB 6 – 21, M - F, year round EST; ERCOT, SPP HB 6 – 21, M - F, CT (prevailing); CAISO HB 6 – 21, M - Sat, PT (prevailing); AESO HB 7 – 22, M - Sun, MT (prevailing). All other hours are considered off-peak. The NERC holiday calendar is followed. See Help documentation for further details.

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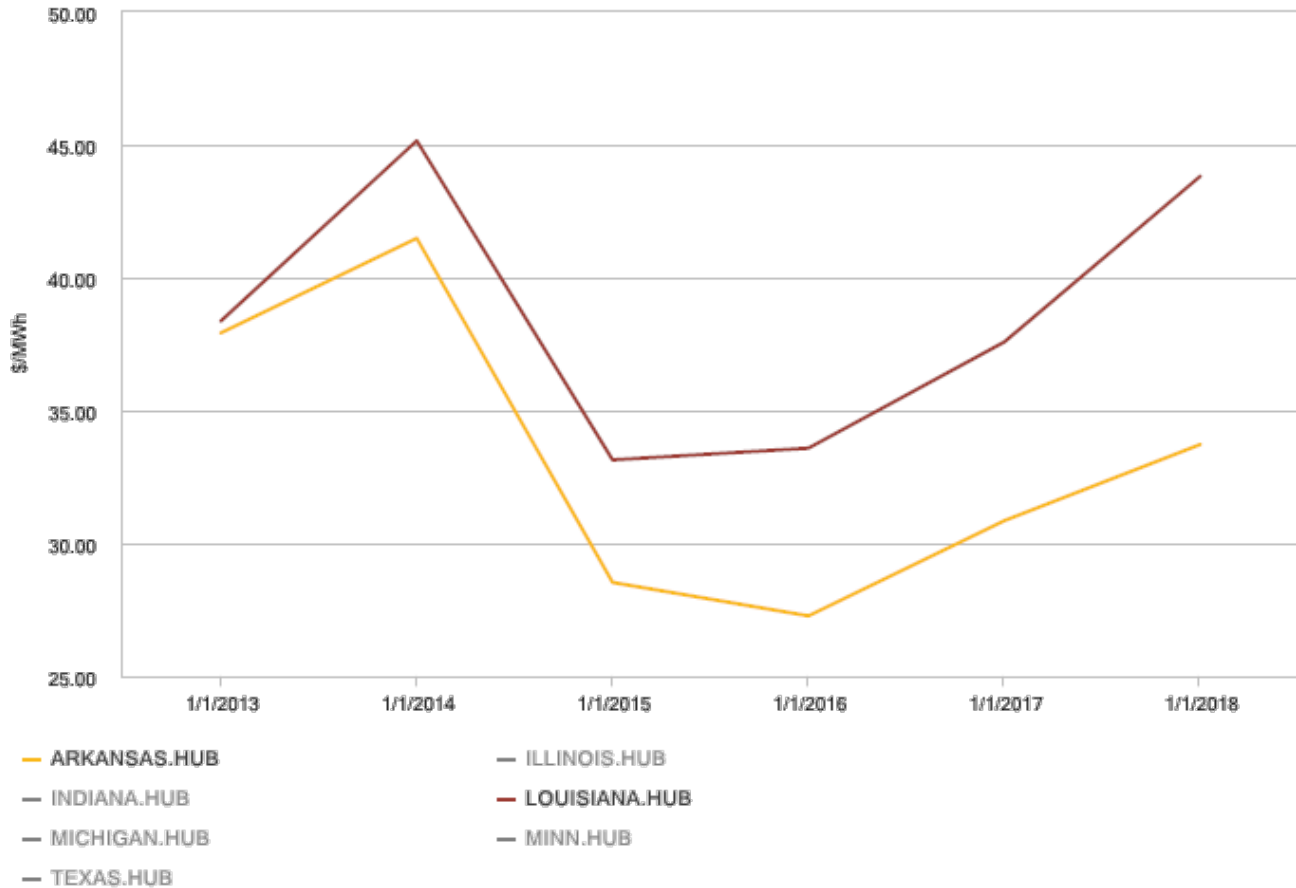
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ISO Day-Ahead Prices

Region: MISO
 As Of: 01/01/2019
 Frequency: Annual
 Peak: On Peak

Chart



Data

DATE	ARKANSAS.HUB	ILLINOIS.HUB	INDIANA.HUB	LOUISIANA.HUB	MICHIGAN.HUB	MINN.HUB	TEXAS.HUB
1/1/2018	33.73	35.70	39.01	43.83	38.23	31.54	36.36
1/1/2017	30.87	31.47	34.31	37.59	34.21	27.57	38.00
1/1/2016	27.28	31.36	33.67	33.60	33.07	25.17	31.28
1/1/2015	28.54	31.15	33.41	33.15	33.19	26.88	32.14
1/1/2014	41.49	45.26	48.17	45.16	53.03	41.31	51.23
1/1/2013	37.93	35.82	38.04	38.38	38.40	38.37	41.63

Hourly data is displayed in prevailing time, which includes an annual daylight savings adjustment, as follows: ISO-NE, NYISO, PJM, MISO, Ontario use Eastern Time; ERCOT and SPP use Central Time; Alberta uses Mountain Time. To view more than one day or to adjust displayed time zone, click into Advanced Charting or export data to the Excel Add-In and adjust the time zone setting.

Daily, monthly, and annual peak prices assume the following definitions: Peak hours include IESO, NYISO, ISO-NE, PJM hour beginning (HB) 7 – 22, M - F, ET (prevailing); MISO HB 6 – 21, M - F, year round EST; ERCOT, SPP HB 6 – 21, M - F, CT (prevailing); CAISO HB 6 – 21, M - Sat, PT (prevailing); AESO HB 7 – 22, M - Sun, MT (prevailing). All other hours are considered off-peak. The NERC holiday calendar is followed. See Help documentation for further details.

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Buyer/Seller: Buyer Reported
 Year: 2018
 Region Level: NERC Region
 Region: All
 Company Level: Operating Company
 Company: Entergy New Orleans, LLC
 View By: View Details

BUYER REPORTING	BUYER REPORTING ULTIMATE PARENT	YEAR	COUNTER PARTY, SELLER	COUNTER PARTY ULTIMATE PARENT, SELLER	CONTRACT TYPE	FERC RATE SCHEDULE	AVG BILLING DEMAND (MW)	AVG NCP DEMAND (MW)	ENERGY PURCHASED (MWH)	ENERGY RECEIVED (MWH)	ENERGY DELIVERED (MWH)	DEMAND COST (\$/MWH)	ENERGY COST (\$/MWH)	OTHER COST (\$/MWH)	PURCHASE PRICE (\$/MWH)	TOTAL C SETTLEMENT (\$000) A
Entergy New Orleans, LLC	Entergy Corp.	2018	Capacity Deferrals	Capacity Deferrals	Other	NA	NA	NA	0	0	0	NA	NA	0.00	0.00	2,772
Entergy New Orleans, LLC	Entergy Corp.	2018	Arkansas LLC (1)	Arkansas LLC (1)	Long-term service from a designated generating unit	NA	NA	NA	670,116	0	0	36.45	12.71	0.00	49.16	32,944
Entergy New Orleans, LLC	Entergy Corp.	2018	Entergy Corp.	Entergy Corporation	Other	NA	NA	NA	0	0	0	NA	0.00	NA	0.00	322
Entergy New Orleans, LLC	Entergy Corp.	2018	Entergy Louisiana LLC (1)	Entergy Louisiana LLC (1)	Long-term service from a designated generating unit	NA	NA	NA	2,176,866	0	0	25.37	20.16	0.00	45.53	99,113
Entergy New Orleans, LLC	Entergy Corp.	2018	MISO	Midcontinent Independent System Operator, Inc.	Other	NA	NA	NA	871,161	0	0	0.19	68.13	(7.47)	60.85	53,009
Entergy New Orleans, LLC	Entergy Corp.	2018	Occidental	Occidental	Other	NA	NA	NA	0	0	0	NA	NA	0.00	0.00	1
Entergy New Orleans, LLC	Entergy Corp.	2018	Small Residential Generation	Small Residential Generation	Other	NA	NA	NA	127	0	0	0.00	39.37	0.00	39.37	5
Entergy New Orleans, LLC	Entergy Corp.	2018	System Energy Resources Inc.	Entergy Corporation	Other	NA	NA	NA	1,064,956	0	0	67.03	10.34	0.00	77.37	82,395

This data is from the annual FERC Form 1 filing by major electric utilities. Seller Reported are transactions from the Sales for Resale pages 310-311 only. Buyer Reported are transactions from Purchased Power pages 320-321. Buyer is a combination of the Buyer Reported and the view from Sales for Resale where the counter-party is the buyer. Any Seller is a combination of the Seller Reported and the Purchased Power transactions where the counter-party is the seller.

NERC Region and NERC Subregion only apply to utility companies. Independent Power Producers, Non-Utility Generators, Marketers and other non-utility type companies will NOT have a NERC or NERC subregion assigned. Please use Unspecified to see this list of companies.

Investor Owned Utilities (IOU) are the primary filers of the FERC Form 1. To see transactions from the view of an Independent Power Producer (IPP), Municipality, Cooperatives, Public Authorities or Federal Agencies please use the Buyer/Seller filter option of Any Buyer or Any Seller. This view may not include all of the transactions by these entities. It only includes those where the IOU is reporting the data.

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Entergy New Orleans, LLC | Electric Sales Detail

(MI KEY: 4057085; SPCIQ KEY: 3474364)

Periods: Last Five Years

	2014 Y	2015 Y	2016 Y	2017 Y	2018 Y
Date Ended	12/31/2014	12/31/2015	12/31/2016	12/31/2017	12/31/2018

Revenues (\$000)

Residential Electric Revenue, Total	202,478	200,075	225,372	244,059	254,766
Commercial Electric Revenue, Total	184,381	176,999	201,179	222,946	212,094
Industrial Electric Revenue, Total	32,739	30,069	32,181	35,043	32,746
Public St & Hghwy, Oth Auth, Rails Rev	66,174	62,980	67,630	75,534	70,431
Total Retail Electric Revenue	485,955	470,275	526,520	577,761	570,204
Electric Sales for Resale	80,393	63,496	32,843	29,027	29,506
Total Sales of Electricity Revenue	566,347	533,771	559,363	606,788	599,710
Less Prov for Rate Refund Revenue	(76)	0	0	0	0
Net Sales of Electricity Revenue	566,423	533,771	559,363	606,788	599,710
Total Other Operating Revenue	13,741	15,101	15,283	12,228	11,281
Total Electric Operating Revenue	580,164	548,872	574,646	619,015	610,991

Electricity (MWh)

Residential Electric Volume, Total	1,963,375	2,103,861	2,230,878	2,154,642	2,400,963
Commercial Electric Volume, Total	2,046,493	2,167,175	2,267,545	2,247,858	2,270,143
Industrial Electric Volume, Total	452,482	461,236	440,608	428,867	447,686
Public St & Hghwy, Oth Auth, Rails Vol, Total	767,840	814,300	794,331	790,059	794,978
InterDept Sales Vol, Total	2,552	2,552	2,552	2,552	2,552
Total Retail Electric Volume, Total	5,232,742	5,549,124	5,735,914	5,623,978	5,916,322
Sales for Resale Volume	1,338,047	1,589,502	1,211,857	1,703,399	1,483,715
Total Sales of Electricity Volume (MWh)	6,570,789	7,138,626	6,947,771	7,327,377	7,400,037

Customers

Residential Electric Customers, Total	151,377	161,498	177,949	179,633	181,829
Commercial Electric Customers, Total	14,576	15,262	16,431	16,517	16,882
Industrial Electric Customers, Total	2,124	2,161	2,173	2,106	2,044
Public St & Hghwy, Oth Auth, Rails Customers, Total	1,778	1,805	1,863	1,881	1,879
Interdepartmental Sales Customers	0	0	0	0	0
Total Retail Electric Customers, Total	169,855	180,726	198,416	200,137	202,634
Sales for Resale Customers	1	1	1	0	0
Total Sales of Electricity Customers	169,856	180,727	198,417	200,137	202,634

2014 Y

2015 Y

2016 Y

2017 Y

2018 Y

Prices (cents/kWh)

Residential Electric Price	10.31	9.51	10.10	11.33	10.61
Commercial Electric Price	9.01	8.17	8.87	9.92	9.34
Industrial Electric Price	7.24	6.52	7.30	8.17	7.31
Avg Price Charged to Ultimate Customers	9.29	8.47	9.18	10.27	9.64
Avg Price for Resale Customers	6.01	3.99	2.71	1.70	1.99
Avg Price Total Sales of Elec	8.62	7.48	8.05	8.28	8.10

Data is sourced from the FERC Form 1/1-F, FERC Form 3/3-A or EIA 861 filings.
Energy Filings Quick Reference Guide

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Grand Gulf | Plant Financials

Periods : Last Five Years

	2014 Y	2015 Y	2016 Y	2017 Y	2018 Y
Operational Statistics					
Operating Capacity (MW)	1,428.00	1,428.00	1,428.00	1,428.00	1,428.00
Summer Peak Capacity (MW)	1,408.50	1,401.00	1,401.00	1,401.00	1,401.00
Winter Peak Capacity (MW)	1,428.00	1,428.00	1,428.00	1,428.00	1,428.00
Net Generation (MWh)	10,252,183	11,714,588	5,897,272	7,364,648	6,919,470
Capacity Factor (%)	81.96	93.65	47.01	58.87	55.31
Heat Rate	10,400	10,400	10,400	10,400	10,400

Reported Plant Production Costs**Fuel Expenses**

Fuel Expense (\$000)	94,064	99,554	30,463	79,667	71,975
Fuel Expense (\$/MWh)	9.18	8.50	5.17	10.82	10.40
Estimated Fuel Cost?	No	No	No	No	No

Non-Fuel Operating & Maintenance Expenses

Operating Supervision and Engineering (\$)	29,379,280	28,504,166	28,989,528	53,655,307	38,391,914
Steam Expense (\$)	26,440,542	27,399,652	20,505,296	30,155,298	25,631,252
Steam Transferred (Credit) (\$)	0	0	0	0	0
Coolants & Water Expense (\$)	10,716,606	8,572,843	6,874,477	7,967,102	6,753,046
Electric Expense (\$)	1,294,958	1,203,011	1,083,998	998,246	1,150,826
Miscellaneous Power Expenses (\$)	40,356,752	39,815,359	33,389,696	38,926,533	43,860,800
Rental Expense (\$)	1,261,971	1,961,013	1,391,492	2,084,506	1,796,613
Allowance Expense (\$)	0	0	0	0	0
Non-fuel Operating Expense (\$)	109,450,109	107,456,044	92,234,487	133,786,992	117,584,451
Maintenance Supervision Expense (\$)	10,066,450	8,347,659	8,356,571	9,877,448	9,634,242
Maintenance of Structures (\$)	517,384	1,227,284	1,735,838	800,421	2,898,663
Maintenance of Boiler Plant (\$)	8,881,320	9,182,089	9,789,629	9,281,874	9,713,442
Maintenance of Electric Plant (\$)	34,233,289	2,776,912	4,116,871	5,643,301	4,623,346
Maintenance of Other Plant (\$)	25,925,407	21,356,351	31,926,706	52,356,373	57,498,888
Total Maintenance Expense (\$)	79,623,850	42,890,295	55,925,615	77,959,417	84,368,581
Maintenance Expense (\$/MWh)	7.77	3.66	9.48	10.59	12.19
Unit Non-Fuel O&M (\$/MWh)	18.44	12.83	25.12	28.75	29.19

	2014 Y	2015 Y	2016 Y	2017 Y	2018 Y
Estimated Non-Fuel O&M Cost?	No	No	No	No	No

Production Costs and Ratios

Total Operating & Maintenance Expense (\$000)	283,138	249,900	178,623	291,413	273,929
Total O&M Expenses per MWh (\$/MWh)	27.62	21.33	30.29	39.57	39.59
Variable Production Expense (\$000)	131,627	129,231	59,816	121,599	112,007
Fixed Production Expense (\$000)	151,512	120,669	118,806	169,814	161,922
Variable Production Expense per MWh (\$/MWh)	12.84	11.03	10.14	16.51	16.19
Fixed Production Expense per kW-yr (\$/kW-year)	106.10	84.50	83.20	118.92	113.39

SNL Modeled Production Costs

Non-Fuel Non-Allowance Variable O&M Cost (\$)	37,814,792	30,069,268	29,632,020	42,349,282	40,390,606
Allowance Costs (\$)	0	0	0	0	0
Non-Fuel Variable O&M Cost (\$)	37,814,792	30,069,268	29,632,020	42,349,282	40,390,606
Fuel Costs (\$)	94,064,343	99,553,629	30,462,608	79,666,666	71,975,497
Variable O&M Cost (\$)	131,879,135	129,622,897	60,094,628	122,015,948	112,366,103
Non-Fuel Variable O&M Costs per MWh (\$/MWh)	3.69	2.57	5.02	5.75	5.84
Fuel Cost per MWh (\$/MWh)	9.18	8.50	5.17	10.82	10.40
Fixed O&M Cost (\$)	151,259,167	120,277,071	118,528,082	169,397,127	161,562,426
Fixed O&M Cost per kW-Year (\$/kW-year)	105.92	84.23	83.00	118.63	113.14
Total Operating & Maintenance Expense (\$)	283,138,302	249,899,968	178,622,710	291,413,075	273,928,529
Total Operating & Maintenance Expense per MWh (\$/MWh)	27.62	21.33	30.29	39.57	39.59

Note: S&P Global Market Intelligence reports generation and fuel consumption at the power plant and prime mover level, gathered from the Energy Information Administration forms 923 and 906 (EIA 923/906). Data from these forms is provided in both a preliminary/monthly report and a final annual report. The EIA does not provide a formal deadline for publication. Monthly reports are published 3 to 6 months after month-end, and annual data may not be published for 24 months from year-end.

In the case of pumped storage facilities, Net Generation (MWh) represents the total generation before energy used for pumping.

Additional data is sourced from the Federal Energy Regulatory Commission Form 1 (FERC Form 1) and the Environmental Protection Agency's Continuous Emissions Monitoring Systems (CEMS). In the absence of current-year filings, S&P Global Market Intelligence utilizes regression analysis to generate cost estimates. Inputs to the model are taken from the EIA 923, FERC Form 1 and CEMS.

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Grand Gulf | Power Plant Profile

OWNER	ULTIMATE PARENT	OPERATING CAPACITY OWNERSHIP (%)	PLANNED CAPACITY OWNERSHIP (%)
System Energy Resources Inc.	Entergy Corp.	90.00	-
Cooperative Energy	Cooperative Energy	10.00	-

Operator

System Energy Resources Inc.

Plant Description

Operating Status	Operating
Current Operating Capacity (MW)	1,428.0
Planned Capacity of Terminated Developments (MW)	1,443.0
Prime Mover	Nuclear
Primary Fuel	Nuclear
Fuel Group(s)	Nuclear
Co-Fired Units?	No
Fuel Switching Units?	No
Year First Unit in Service	1985
Cogenerator?	No
Offshore?	No
Regulatory Status	Merchant Unregulated

Site Information

City or County	Claiborne County
State, Province, or Admin Region	Mississippi
Country	USA
NERC Region and Subregion	SERC/DELTA (100.00%)
ISO or TSO	MISO (100.00%)
Planning Area	Midcontinent Independent System Operator, Inc. (100.00%)
Balancing Authority	Midcontinent Independent System Operator, Inc. (100.00%)
Interconnected Utility	Entergy Mississippi LLC
Water Source	Mississippi River Aquifer

Recent News & Notes

EXCLUSIVE NRC launches inspection after another unplanned outage at Miss. nuclear plant [12/20/2018](#)

EXTRA Advocacy group recommends lifeline for US nuclear generators [11/12/2018](#)

EXTRA Exec: Wide load forecast error to blame for weekend's Max Gen Alerts in MISO [9/19/2018](#)

Nuclear update: US output tumbles as 3 units shut for refueling [2/20/2018](#)

Nuclear update: Total US output edges higher as Harris reactor reaches 100% [1/22/2018](#)

Summary Operating Data - 2017

Operating Capacity (MW)	1,428.0
Net Generation (MWh)	7,364,648
Capacity Factor (%)	58.87

Total Operating & Maintenance
Expense per MWh (\$/MWh)

39.57

Unit Details

UNIT NAME	GENERATION TECHNOLOGY	TECHNOLOGY DETAIL	UNIT NAMEPLATE CAPACITY (MW)	CAPACITY (MW)		PRIMARY FUEL	OPERATING STATUS	ONLINE DATE
				SUMMER NET CAPACITY (MW)	WINTER NET CAPACITY (MW)			
1	Nuclear (NU)	Boiling Water Reactor	1,440.0	1,401.0	1,428.0	Nuclear	Operating	Jul - 1985
3	Nuclear (NU)	Boiling Water Reactor	1,443.0	1,443.0	1,443.0	Nuclear	Terminated	NA

Project Summary

PROJECT PHASE	PROJECT TYPE	GENERATION TECHNOLOGY	TECHNOLOGY BREAKOUT	CURRENT DEVELOPMENT STATUS	NEW CAPACITY (MW)	PRIMARY FUEL	ESTIMATED COMPLETION DATE	ESTIMATED PROJECT COSTS (\$000)	ESTIMATED PROJECT COST (\$/KW)
2	Generation	Nuclear (NU)	1 NU	Terminated	1,443.0	Nuclear	NA	* 9,090,900	6,300
3	Generation	Nuclear (NU)	Rerate of 178 MW	Completed	178.0	Nuclear	Jul - 2012	NA	NA
4	Generation	Nuclear (NU)	Retirement of 1 NU	Announced	(1,428.0)	Nuclear	Nov - 2044	NA	NA

Power Purchase Agreements

COUNTERPARTY	CONTRACTED (MW)	CONTRACT START DATE	CONTRACT END DATE	CONTRACT TERM (YEARS)
Entergy Mississippi, LLC	471.2			NA
Entergy Arkansas, LLC	514.1			NA
Entergy New Orleans, LLC	242.8			NA
Entergy Louisiana, LLC	199.9			NA

*Cost estimated by S&P Global Market Intelligence.

S&P Global Market Intelligence guarantees coverage of operational power plant units that file data with the EIA or are larger than 1 MW. S&P Global Market Intelligence does not comprehensively cover operational plants below this threshold. S&P Global Market Intelligence comprehensively covers power projects (generation or environmental) with units over 1 MW and supplying more than 50% of power generated to the grid.

Due to the variability of sources reporting values on in-development projects, S&P Global Market Intelligence accuracy on the following fields is guaranteed to be within 10%: unit capacity (nameplate, summer and winter) and project costs (minimum and maximum). Online date is guaranteed within 6 months for operational plants.

S&P Global Market Intelligence guarantees coverage on Power Purchase Agreements for plants first tracked after Jan - 2011 and with a unit greater than 100 MW.

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Grand Gulf | Financial & Operational Forecast

Forecast Date: Q1 2019
Plant/Unit: Whole Plant
Periods: Next 5 Years

Grand Gulf

Summary

Pool Assignment	MISO				
Forecast Service Year	Jul - 1985				
Forecast Retirement Year					
	2020Y	2021Y	2022Y	2023Y	2024Y
SNL Forecast Operations					
Fuel Type	Nuclear	Nuclear	Nuclear	Nuclear	Nuclear
Operating Capacity (MW)	1,428.00	1,428.00	1,428.00	1,428.00	1,428.00
Net Generation (MWh)	10,994,390	10,961,090	12,060,170	10,961,090	10,994,390
Capacity Factor (%)	87.65	87.62	96.41	87.62	87.65
Heat Rate (Btu/kWh)	10,490	10,490	10,490	10,490	10,490
Heat Input (MMBtu)	115,331,200	114,981,800	126,511,200	114,981,800	115,331,200
Availability Factor (%)	87.65	87.62	96.41	87.62	87.65
SNL Forecast Revenue					
Capacity Revenue (\$)	19,869,884	18,481,026	23,883,425	22,026,078	24,509,303
Energy Revenue (\$)	316,229,600	309,712,800	340,581,700	322,821,300	338,939,300
Total Revenue (\$)	336,099,484	328,193,826	364,465,125	344,847,378	363,448,603
Capacity Revenue per kW-Year (\$/kW-year)	13.91	12.94	16.73	15.42	17.16
Energy Revenue per MWh (\$/MWh)	28.76	28.26	28.24	29.45	30.83
SNL Forecast Production Costs					
Variable Operations & Maintenance Cost (\$)	44,151,720	45,030,380	50,685,190	47,125,600	48,355,980
Total Emission Cost (\$)	0	0	0	0	0
Total Fuel Cost (\$)	64,025,260	65,299,430	73,499,570	68,337,740	70,121,940
Fixed Operations & Maintenance Cost (\$)	268,611,100	274,038,400	280,341,200	286,789,100	294,189,000
Total Operating & Maintenance Expense (\$)	376,788,080	384,368,210	404,525,960	402,252,440	412,666,920
Fuel Cost per MWh (\$/MWh)	5.82	5.96	6.09	6.23	6.38
Fuel Cost per MMBtu (\$/MMBtu)	0.56	0.57	0.58	0.59	0.61
Variable Operations & Maintenance Cost per MWh (\$/MWh)	4.02	4.11	4.20	4.30	4.40
Emissions Cost per MWh (\$/MWh)	0.00	0.00	0.00	0.00	0.00
Fixed Operations & Maintenance Cost per kW-Year (\$/kW-year)	188.10	191.90	196.32	200.83	206.01
Total Operating & Maintenance Expense per MWh (\$/MWh)	34.27	35.07	33.54	36.70	37.53
Operating Margin (\$)	(40,688,596)	(56,174,384)	(40,060,835)	(57,405,062)	(49,218,317)
Power Forecast Gross Margin per MWh (\$/MWh)	20.73	19.88	19.92	20.93	22.28

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