#### **STATE OF LOUISIANA**

#### **BEFORE THE**

#### LOUISIANA PUBLIC SERVICE COMMISSION

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APPLICATION OF ENTERGY LOUISIANA, LLC FOR APPROVAL OF GENERATION AND TRANSMISSION RESOURCES PROPOSED IN CONNECTION WITH SERVICE TO A SIGNIFICANT CUSTOMER PROJECT IN NORTH LOUISIANA, INCLUDING PROPOSED RIDER, AND REQUEST FOR TIMELY TREATMENT

**DOCKET NO. U-37425** 

**Direct Testimony and Exhibits of** 

**Constantine Gonatas** 

On Behalf of the

Alliance for Affordable Energy and

Union of Concerned Scientists

**Public Redacted Version** 



April 11, 2025

LPSC Docket No. U-37425 Direct Testimony of Constantine Gonatas – *Public Redacted Version* 

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#### EXHIBITS

Exhibit CG-1	Resume of Constantine "Dinos" Gonatas
Exhibit CG-2	ELL response to Sierra 1-11
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Exhibit CG-4	ELL response to NPO 14-2, HSPM
Exhibit CG-5	ELL response to NPO 1-8 (public redacted version)
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Exhibit CG-9	ELL response to Staff 1-10
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#### 1 I. IDENTIFICATION & QUALIFICATIONS

#### 2 Q. Dr. Gonatas, please state your name, occupation, and business address.

- 3 A. I am Constantine Gonatas. I am the Principal of CPG Advisors Inc. of Concord MA.
- 4 Q. Summarize your professional education and experience.
- A. I received a BA degree from Princeton University in 1984 in physics, a PhD in physics
  from the University of Chicago in 1990, followed by a postdoctoral fellowship in
  Electrical Engineering at the University of Illinois in 1990, and an MBA degree from
  Babson College in 2009.
- 9 I have been contracted by Grid Strategies since 2022, executing studies on large Data 10 Center impact on the power grid, planning for regional transmission organizations and 11 transmission planning relating to renewable energy. I previously performed similar duties 12 for CPG Advisors' clients since 2006 including advocacy groups, renewable energy 13 developers, and the U.S. Government. I have developed technology optimizing energy 14 storage use, renewable energy forecasting, and hydrogen generation.
- Previously, I was a manager at a superconducting technology company covering
  applications including high voltage power grid.
- Earlier I was a finance manager at Enron from 1996 to 2000, where I analyzed contracts for gas deals, power purchase agreements ("PPAs"), supporting deals for power plants and transmission & distribution companies. Modeling the economics of complex contracts and PPAs including embedded options was part of my responsibilities. I supervised studies of power grids in North America and Latin America. Before that, I was a research engineer at ExxonMobil where my assignments included refinery process improvements and combustion engineering, including hydrogen processing.
- In recent consulting assignments, I have reviewed the economics of transmission associated with renewable energy projects, assessed the reliability of microgrids, and reviewed Integrated Resource Plans ("IRPs"), the cost-effectiveness of storm hardening

projects in hurricane-prone areas, prospective transmission lines, solar plus storage
 integration, and regulatory treatment of renewable energy. My resume is attached as
 Exhibit CG-1.

## 4 Q. Have you previously testified before the Louisiana Public Service Commission 5 ("LPSC" or "Commission")?

A. Yes, I testified in Docket No. U-36625 on the Entergy Future Ready Resilience Plan. I
have also testified before other utility regulators, including those for North Carolina and a
Canadian province. I have also participated in Entergy's IRP proceedings before the City
of New Orleans and the Arkansas Public Service Commission, and I have drafted
comments for the Federal Energy Regulatory Commission.

11 Q. On whose behalf are you testifying?

A. My testimony is sponsored by the Alliance for Affordable Energy and the Union of
Concerned Scientists (collectively, the "Non-Profit Organizations" or "NPOs").

#### 14 II. INTRODUCTION AND SUMMARY

#### 15 Q. What is the purpose of your testimony?

A. As part of its Application, Entergy Louisiana, LLC ("ELL" or "the Company") proposed
two new gas-fired combined-cycle combustion turbine ("CCCT") plants in North
Louisiana, another CCCT plant in South Louisiana (collectively, the three "Planned
Generators") and transmission infrastructure. ELL also proposed a Corporate
Sustainability Rider ("CSR") as an addendum to a proposed Electric Service Agreement
("ESA") with the new Data Center Customer. The stated intent of the CSR is mitigating
the environmental impact of the gas-fired CCCTs.

My testimony focuses on the CSR. I will show that the CSR's environmental benefits are less than ELL claims because of numerous contingencies in the CSR, the inadequate development of transmission resources for renewables, and the distant timelines for developing the CSR resources. The Company further states, incorrectly, the CSR "offsets" emissions from the gas-fired CCCTs. Instead, any CSR generation represents lesser
 matching contributions.

#### 3 Q. What information did you review in preparing your testimony?

A. I reviewed the Company's testimony, exhibits, workpapers, and discovery responses. I also
reviewed the Company's IRPs, and other public information such as Department of Energy
("DOE") studies on carbon capture and storage technology, and Energy Information
Administration data. I also reviewed Midcontinent Independent System Operator
("MISO") data, among other sources.

9 Q.

#### How is your testimony organized?

10 Following a brief overview in Section II, in Section III I discuss key provisions of the A. CSR's provision for the Customer purchase of solar and/or hybrid resources (called 11 "Designated Renewable Resources" in the CSR). In Section IV, I discuss the CSR 12 provision for Carbon Capture and Storage ("CCS") technology. In Section V, I examine 13 14 the Company's claim they are offsetting 60% of the Customer's Proposed Generation using 15 CCCTs. In Section VI, I discuss the relative materiality of the Customer's voluntary "Power to Care" contributions. Finally, in Section VII I provide recommendations to the 16 Commission. 17

#### 18 Q. Please summarize your main conclusions about the CSR.

A. The sustainability commitments in the CSR are less robust than ELL's characterization of
them. The purchase of energy or renewable attributes from the Designated Renewable
Resources may be terminated by the Customer [[\_\_\_\_\_\_\_]], with financial
risks borne by other ratepayers. Although Company witness Elizabeth C. Ingram
downplays such risks as "quite unlikely,"<sup>1</sup> the Company has not quantified these risks. I

<sup>&</sup>lt;sup>1</sup> Direct Testimony of Elizabeth C. Ingram at 20:7 ("Ingram Direct Testimony").

- believe there is a financial risk that the remaining costs associated with the CSR resources
   could ultimately be borne by all other ELL's customers.
- Furthermore, the Company has not yet demonstrated progress towards identifying or 3 enabling the Designated Renewable Resources, notwithstanding the 75 GW of solar, solar 4 5 and storage ("hybrid"), and wind projects in the MISO South interconnection queue. Nor has the Company identified particular transmission projects that would enable these 6 7 resources. The Company lags significantly behind other utilities, such as Duke Energy, 8 which have not only identified renewable energy resources for their long term plans but 9 identified specific transmission projects enabling them (while providing public disclosures 10 about their transmission plans and cost estimates).
- 11 The CSR deployment of CCS technology is uncertain. This Low-Carbon Option ("LCO") 12 portion of the CSR is technically challenging, yet no engineering studies have been 13 completed by the Company. Thus, it is a concept yet to be fleshed out. As stated by ELL witness Ingram, that commitment is contingent on volume and price caps,<sup>2</sup> [[
- Even so, there is a risk that early termination could result in costs being shifted to ratepayers.

]]

18 ELL exaggerates its joint commitments with the Customer to environmental stewardship, 19 claiming it is "offsetting" 60% of the Customer load with renewable power purchases and 20 CCS technology. These offsets are less than they seem. Unlike a pure energy purchaser, who can offset 100% of their procurement with renewable energy, here the Customer, 21 22 through ELL's agency, is building and dispatching gas-fired CCCTs in tandem with 23 renewable resources. Thus the gas-fired CCCTs are not "offset," but they are "matched." 24 In other words, this is a "buy one, get one clean" offer, not a "get one clean" offer. 25 Furthermore, nearly 2/3 of the proposed CSR contributions are from the CCS Low-Carbon 26 Option, which is uncertain as mentioned above.

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Finally, the Customer's "Power to Care" contributions—which are contingent on the Company's shareholders' contributions—would at most represent only about 0.2% of the Project's estimated value over 15 years, and is immaterial for a trillion dollar company like Meta.

5 Q. Does ELL highlight sustainability attributes of its CSR proposal?

A. Yes. In their initial press release,<sup>3</sup> the Company states: "Both Meta and ELL are committed
to sustainability. The new generators will initially support the ability to utilize 30%
hydrogen co-firing. . . . Meta has also committed to helping fund CCS technology at an
Entergy power plant in Lake Charles as well as 1,500 MW of new solar and storage
resources . . . ." ELL's Application and testimony similarly tout the sustainability
commitments of the CSR.<sup>4</sup> In fact, ELL claims that "[t]he CSR *requires* the addition of
incremental renewable resources . . ...<sup>5</sup>

# Q. What do these statements suggest about the sustainability piece of the agreements between ELL and Meta?

- 15 A. They suggest there is a binding commitment, like a firm PPA, for the 1,500 MW of solar
- together with a firm commitment to fund CCS technology. And that there is something
   special about the capability to use 30% hydrogen co-firing in the CCCT generation.

<sup>&</sup>lt;sup>3</sup> Entergy, *Entergy Louisiana to power Meta's data center in Richland Parish* (Dec. 5, 2024), <u>https://www.entergynewsroom.com/news/entergy-louisiana-power-meta-s-data-center-in-richland-parish/</u>.

<sup>&</sup>lt;sup>4</sup> See, e.g., Application at 5 ("Through the CSR, the Customer has committed to paying for 1,500 megawatts ('MW') of designated solar and/or solar and storage ('hybrid') resources . . . ."); Direct Testimony of Phillip R. May, at 32:1–5 ("May Direct Testimony") ("The CSR is an agreement designed specifically for (and open only to) the Customer and that is incorporated into the Customer's ESA to identify customer-specific commitments for clean resources including solar, hybrid, CCS, and, potentially, wind and other clean resources . . . ."); see also id. at 32:16–17 ("Furthermore, the CSR encompasses a commitment by the Customer to reduce emissions within the same region as the Project.").

<sup>&</sup>lt;sup>5</sup> May Direct Testimony at 35:12 (emphasis added); *see also* Ingram Direct Testimony at 6:3.

1	Q.	Is there anything special about co-firing 30% hydrogen, or did the Company have to
2		incur additional costs for this capability?
3	A.	No. The Company has acknowledged that "[t]here are no specific projects costs associated
4		with making the CCCT plants compatible with co-firing hydrogen."6 The equipment is an
5		"off the shelf design, capable of co-firing up to 30% hydrogen." <sup>7</sup> ELL further
6		acknowledged the "inherent ability" of the modern combustion turbine "to co-fire up to
7		30% hydrogen." <sup>8</sup>
8	Q.	What does ELL witness Laura Beauchamp say further about the energy supply for
9		the Customer?
10	А.	She says ELL and the Customer have agreed to commercial terms on an ESA, which
11		includes a CSR covering 1,500 MW of solar and/or storage resources.9
12	Q.	Please summarize ELL's characterization of the CSR.
13	Α.	In a section of her testimony entitled "The Solar and Storage Commitments in the CSR,"
14		Company witness Ingram states "ELL will solicit and procure 1,500 MW of incremental
15		solar and/or hybrid resources [for the Customer]."10 She also testifies that "[t]he CSR
16		requires the addition of incremental renewable resources that complement other, reliable,
17		dispatchable sources of generation. The CSR also includes a CCS commitment that will
18		offset carbon emissions and may help bring a new clean technology to Louisiana." <sup>11</sup> She
19		continues, saying the solar and other clean resources will "allow for continued progress
20		towards both Entergy's sustainability goals and overall environmental stewardship

<sup>&</sup>lt;sup>6</sup> ELL response to Sierra 1-11(a) (attached as Exhibit CG-2).

<sup>&</sup>lt;sup>7</sup> Id.

<sup>&</sup>lt;sup>8</sup> ELL response to Sierra 1-11(b) (attached as Exhibit CG-2).

<sup>&</sup>lt;sup>9</sup> Direct Testimony of Laura K. Beauchamp at 4:18–19 (noting that "ELL and the Customer have worked closely to reach commercial terms on an Electric Service Agreement . . . and related contracts"); *id.* at 14:4 (noting that Rider 1 to the ESA incorporates the CSR into the ESA); *id.* at 62:10–11 (noting that the CSR contemplates procuring 1,500 MW of solar and/or hybrid resources) ("Beauchamp Direct Testimony").

<sup>&</sup>lt;sup>10</sup> Ingram Direct Testimony at 7:15–16.

<sup>&</sup>lt;sup>11</sup> *Id.* at 6:3–6 (emphasis added).

objectives. In addition, the Customer's corporate responsibility commitment to Entergy's
 Power to Care program will have direct benefits across the State. . . .<sup>"12</sup> Separately, ELL
 witness Nicholas W. Owens testified that "the Customer has made significant clean energy
 funding commitments," including "a commitment to fund 1,500 MW of new solar
 capacity."<sup>13</sup>

### 6 III. CSR COMMITMENTS FOR SOLAR/HYBRID RESOURCES ARE LOW 7 PRIORITY

#### 8 Q. Would the development of new solar and hybrid resources benefit ratepayers?

9 A. Yes. In fact, ELL has recognized many of the benefits provided by renewables and storage. 10 In its 2023 Integrated Resource Plan, ELL stated that "[r]enewable energy resources add fuel diversity and will play a core role in building a balanced and diverse resource portfolio, 11 and when paired, renewable energy projects and energy storage technologies have zero net 12 emissions."<sup>14</sup> The Company noted that "[t]he near-term addition of renewables enhances 13 the adaptability of ELL's portfolio to changes, such as rapidly evolving customer demand. 14 15 It also increases fuel supply diversity, lowers environmental cost risk, and responds to customers' preferences for renewable energy . . . . "<sup>15</sup> The majority of ELL's generation 16 already is gas-fired,<sup>16</sup> and ]].<sup>17</sup> Efforts to diversify the generation mix will benefit ELL, considering 18

19 for one thing, the impact of winter storms and other gas supply shocks.<sup>18</sup>

<sup>13</sup> Direct Testimony of Nicholas A. Owens at 3:8–9 ("Owens Direct Testimony").

<sup>17</sup> ELL response to NPO 14-2(b)(i), HSPM

]] (attached as HSPM Exhibit CG-4).

<sup>&</sup>lt;sup>12</sup> *Id.* at 7:6–9.

<sup>&</sup>lt;sup>14</sup> Entergy Louisiana 2023 Integrated Resource Plan at 64 (May 22, 2023) ("ELL 2023 IRP"), <u>https://cdn.entergy-louisiana.com/userfiles/content/irp/2023/Combined-Final-Report-05-22-23.pdf</u>.

<sup>&</sup>lt;sup>15</sup> *Id.* at 64.

<sup>&</sup>lt;sup>16</sup> ELL response to NPO 14-2 (public redacted version), "NPO 14-2 37425\_14-2\_ELL Fuel Mix 2024" (attachment showing that approximately 54% of generation came from gas in 2024) (attached as Exhibit CG-3).

<sup>&</sup>lt;sup>18</sup> US EIA, *Winter storms have disrupted US natural gas production*, (Mar. 13, 2024) https://www.eia.gov/todayinenergy/detail.php?id=61563.

1	ELL has recognized the benefits of battery storage: "When strategically and efficiently
2	integrated into the electric grid, BESS [battery energy storage systems] have the potential
3	to provide transmission and distribution grid benefits by avoiding investments required due
4	to line overloads that occur under peak conditions. In addition to these peak shaving
5	applications, BESS can provide voltage support, which mitigates the effects of electrical
6	anomalies and disturbances." <sup>19</sup>

- Q. Does the Company suggest that there is a binding commitment to procure
  solar/hybrid resources under the CSR rider?
- 9 A. Yes. The testimony by witnesses Beauchamp and Ingram suggest there is a firm
  10 commitment by the Customer to purchase solar/hybrid energy through ELL. The
  11 Company's discovery responses similarly suggest that this is a firm commitment.<sup>20</sup>
- Q. Does a binding power purchase agreement typically have penalties in the case of
  termination or default by the purchaser, particularly if the power supplier has
  incurred costs on behalf of the purchaser?
- 15 A. Yes. Suppliers are generally reluctant to make investments for the benefit of purchasers if the purchasers can just walk away from their obligations to purchase power. [[
- 18
- 19 Q. How does the 1,500 MW solar/hybrid portion of the CSR address a potential early
   20 termination?
- A. According to the Ingram testimony, in the case of early termination of receipt of designated
   renewable resources under the CSR, the Customer shall provide advance notice of such

<sup>&</sup>lt;sup>19</sup> ELL 2023 IRP at 67.

<sup>&</sup>lt;sup>20</sup> See, e.g., ELL response to NPO 1-8 (stating that "the Customer *will* subscribe to 1,500 MW of new solar and/or solar and storage") (emphasis added) (attached as Exhibit CG-5).

<sup>&</sup>lt;sup>21</sup> See [[ Note: most of the HSPM documents discussed in my testimony have also been designated Attorney's Eyes Only.

		termination. <sup>22</sup> [[
2		]].
3		If ELL fails to find a new subscriber for the Customer's renewable resources, costs and
4		benefits for the designated renewable resources would be assumed by all of ELL's
5		customers through rates. <sup>23</sup>
6		This transfers risk and financial responsibility from the Customer to ELL's ratepayers.
7	Q.	Does the Beauchamp testimony discussing the ESA mention terms governing
8		Customer default, and do similar terms apply to a failure to procure renewable
9		energy?
10	А.	Yes. Witness Beauchamp states that Rider 1 of the ESA provides remedies, collateral
11		security and insurance requirements applicable to Customer bulk energy service-none of
12		which are stated by witness Ingram in testimony with respect to Customer termination of
13		the designated renewable resources (the 1,500 MW solar/hybrid generation). <sup>24</sup>
14		While there's an intent for the Customer to purchase 1,500 MW of renewable solar/hybrid
15		resources, and while ELL intends to investigate wind resource procurement, <sup>25</sup> even if such
16		procurement is concluded, the Customer has the right to terminate its offtake of renewable
17		resources with some advance notice, leaving the Company and its ratepayers to bear any
18		potentially remaining costs. This does not suggest the CSR terms contain a commitment to
19		purchase renewable energy consistent with a binding or financeable PPA.
	0	



<sup>&</sup>lt;sup>22</sup> Ingram Direct Testimony at 19:12–14.

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<sup>&</sup>lt;sup>23</sup> Id. at 19:20–20:2.

<sup>&</sup>lt;sup>24</sup> Beauchamp Direct Testimony at 14:4–7.

<sup>&</sup>lt;sup>25</sup> Ingram Direct Testimony at 25:7–10.

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<sup>&</sup>lt;sup>26</sup> HSPM Exhibit ECI-2 at 5 (¶ 10).

<sup>&</sup>lt;sup>27</sup> See National Renewable Energy Laboratory (NREL), Documenting a Decade of Cost Declines for PV Systems, NREL Marks Ongoing Cost Reductions for Installed Photovoltaic Systems, While Also Establishing Benchmark of PV-Plus-Storage Systems (Feb. 10, 2021), <u>https://www.nrel.gov/news/program/2021/documenting-a-decade-of-cost-declines-for-pv-systems.html</u>; Solar Energy Industries Association (SEIA), Solar Market Insight Report; Solar Industry Research Data (Mar. 11, 2025), <u>https://seia.org/research-resources/solar-industry-research-data/</u>; Wesley Cole et al., Cost Projects for Utility Scale Battery Storage: 2023 Update, NREL (June 2023), <u>https://www.nrel.gov/docs/fy23osti/85332.pdf</u>.

<sup>&</sup>lt;sup>28</sup> Ingram Direct Testimony at 20:7.

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# 1Q.Under the CSR, is the procurement of Designated Renewable Resources subject to2other terms?

<sup>29</sup> HSPM Exhibit ECI-2 at 2 (¶ 5).

<sup>30</sup> HSPM Exhibit LKB-2 at 12.

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<sup>33</sup> Ingram Direct Testimony at 8:2–3 ("The CSR further requires the Designated Renewable Resources included within the Initial Renewable Subscription Amount to be fully identified by 2030.").

<sup>&</sup>lt;sup>31</sup> HSPM Exhibit ECI-2 at 1.

<sup>&</sup>lt;sup>32</sup> Direct Testimony of Matthew Bulpitt, at 19:5 ("Bulpitt Direct Testimony").

<sup>&</sup>lt;sup>34</sup> HSPM Exhibit ECI-2 at 1.

# 1Q.Is the Procurement of the Designated Renewable Resource consistent with the Geaux2Zero ("GZ") green tariff?

A. Group 1 subscribers to the GZ tariff agree to binding 20-year terms.<sup>35</sup> Group 2 subscribers
agree to a contract term not less than 10 years. In both cases, termination is subject to a
termination payment equal to the lesser of two years of subscription fees, or fees for the
remainder of the contract term.<sup>36</sup> The Company states the 1,500 MW of solar resources
procured for the Customer are Group 3 Subscriptions under the GZ Rider, thus subject to
a "binding commitment" under the GZ tariff, indicating a term not less than for Group 2
subscribers and with termination fees.<sup>37</sup> [[



# Q. Could the Company have investigated the MISO queue for potential renewable resources to provide more certainty on opportunities for Designated Renewable Resource procurement?

A. Yes. Currently the MISO South queue for solar projects shows 35.4 GW of solar projects
 in the queue of which 20 GWh have progressed to advanced studies.<sup>38</sup> The MISO South
 queue for hybrid projects shows 14.2GW projects of which 4 GW have advanced through

<sup>&</sup>lt;sup>35</sup> ELL, Geaux Zero Rider (Schedule GZ) at 185.2, <u>https://cdn.entergy-</u>

louisiana.com/userfiles/content/price/tariffs/ell elec gz.pdf.

<sup>&</sup>lt;sup>36</sup> Id.

<sup>&</sup>lt;sup>37</sup> ELL response to LEUG 3-1.

<sup>&</sup>lt;sup>38</sup> MISO, *Interactive Queue*, <u>https://www.misoenergy.org/planning/resource-utilization/GI\_Queue/gi-interactive-queue/</u>.

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1 2		studies. It is unclear why the Company chooses to delay identifying the full portfolio of Designated Renewable Resources until 2030, as discussed in the Ingram testimony, <sup>39</sup> when there are many GW of options. This date would be [[
5		
6		Rather than proceed more rapidly to identify generation for the Designated Renewable
7		Resources contemplated by the CSR, as is feasible from the ample MISO generation
8		queues, the Company is stretching out the timelines to 2030. In other words, rather than
9		solidify terms for renewable power purchases by concluding negotiations promptly, the
		Company has created uncertainty by presenting a CSR rider [[
11		]]
12 13 14	Q.	Is the Company thinking ahead about enabling its commitment of 3GW of solar energy in the Geaux Green Option tariff together with the 1.5GW of solar under the CSR?
15	A.	No. When asked in discovery for its transmission plan enabling solar resources (and if there
16		was not yet a plan, when such a plan would become available), ELL provided an indefinite
17		tautological answer: the transmission resources would be "identified and known when such
18		[renewable] resources are identified and evaluated."41
19	Q.	Why is this important?
20	A.	Transmission planning for renewable resources is particularly important and relevant
21		because, unlike the two Planned Generators located near the Customer's prospective load,
22		renewable resources are frequently distant from load. Thus, transmission is a critical
23		component enabling renewable resources, requiring a long lead time. But ELL's discovery
24		response indicates that it has no definite plan. Furthermore, unlike MISO planning

<sup>&</sup>lt;sup>39</sup> Ingram Direct Testimony at 8:2–3.

<sup>&</sup>lt;sup>40</sup> Beauchamp Direct Testimony at 20:4–5, HSPM Chart 1.

<sup>&</sup>lt;sup>41</sup> ELL responses to NPO 12-9 and 12-10 (attached as Exhibit CG-6).

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processes that generally determine quantitative benefit/cost ratios along with other metrics 1 for proposed transmission,<sup>42</sup> ELL's quantitative metrics are unclear. The Company's 2 transmission witness testimony primarily comprises "overall impressions."<sup>43</sup> And although 3 ELL claimed that it performed a "cost/benefit and benefits metrics analysis for each of the 4 potential [transmission] solutions,"<sup>44</sup> when asked to produce those analyses in discovery, 5 the Company did not provide them, instead referring back to its testimony and another 6 discovery response related to load flow studies.<sup>45</sup> Thus the Company presents a façade of 7 having performed adequate due diligence for the Project. 8

9 Q. What is the most that ELL says about transmission for renewable resources in its
10 long-term Strategic Vision for extra high voltage ("EHV") expansion?



# 14 Q. How does ELL's strategic vision for EHV expansion,<sup>46</sup> as it relates to sustainable 15 generation, compare to Duke Energy's plan for enabling solar?

A. Duke Energy, with an immediate plan to increase solar resources by 5GW, similar to ELL's
 4.5GW (including the CSR solar Designated Renewable Resources), identified a
 transmission "red zone" in the Carolinas where solar development is preferred. Duke
 identified specific transmission lines that needed to be built for enabling renewable
 generation, together with budgets for those lines.<sup>47</sup> Those areas are identified on the maps

<sup>&</sup>lt;sup>42</sup> MISO, Transmission Cost Estimation Guide for MTEP24, at2 (May 1, 2024), <u>https://cdn.misoenergy.org/MISO%20Transmission%20Cost%20Estimation%20Guide%20for%20MTEP24337433.</u> <u>pdf</u>.

<sup>&</sup>lt;sup>43</sup> Direct Testimony of Daniel Kline, at 25:22, 27:21, 30:5, 32:6, 34:3 ("Kline Direct Testimony").

<sup>&</sup>lt;sup>44</sup> *Id.* at 40:18.

<sup>&</sup>lt;sup>45</sup> ELL response to NPO 12-8 (attached as Exhibit CG-7).

<sup>&</sup>lt;sup>46</sup> See Kline Direct Testimony at 38:16–21, 51:17–23.

<sup>&</sup>lt;sup>47</sup> North Carolina Utility Commission, Docket E-100 Sub 179 Appendix P at 13, 31 (Figures P-1 & P-3), <u>https://www.duke-energy.com/-/media/pdfs/our-company/carolinas-carbon-plan/supplemental/appendix-p.pdf</u>. In contrast to ELL, Duke did not claim that its transmission maps are confidential. I do not know why ELL has claimed

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#### Figure P-1: DEC/DEP Transmission Red-Zone Map



confidentiality for its transmission vision. In my view, maintaining confidentiality for basic sketches containing no CEII attributes hinders transparency, public participation and oversight.

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#### 2 IV. THE LOW-CARBON OPTION ("LCO") IS AN UNLIKELY POSSIBILITY

#### 3 Q. What aspects of the LCO in the CSR cover carbon capture & storage ("CCS")?

A. As described by witness Ingram, the CSR contains provisions whereby the Customer would
pay to develop CCS technology.<sup>48</sup> While this technology has been demonstrated in certain
facilities including coal-fired generating stations, ELL states that it has not been
demonstrated at scale at a CCCT unit.<sup>49</sup> CCS would be deployed at the Company's recently
commissioned Lake Charles Power Station, a CCCT unit. ELL explained that it was
proposing CCS for this plant, as opposed to one of the Planned Generators, because some
planning activities for CCS at the Lake Charles Power Station are already underway.<sup>50</sup>

<sup>&</sup>lt;sup>48</sup> Ingram Direct Testimony at 22:11–17.

<sup>&</sup>lt;sup>49</sup> Owens Direct Testimony at 12:16–18.

<sup>&</sup>lt;sup>50</sup> *Id.* at 10:20–11:16.

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#### 1 Q. Is the Lake Charles Power Station siting optimal for a CCS project?

- A. The Company does not say. However, siting for CCS is relevant because a project must be sited at a location where geological formations permit long term CO2 storage, or a pipeline must transfer CO2 from a capture site to the storage location. The Company provides no diligence on whether the Lake Charles location has suitable geology, nor does it say a pipeline exists.
- 7 Q.

#### . What factors can drive up the costs of CCS?

8 A. Many factors can influence CCS costs. According to a report by GE Vernova, apart from
9 the capital cost of the CCS plant itself, there are additional costs attributed to land for the
10 CCS equipment, process steam, and reduction in plant output.<sup>51</sup>

#### 11 Q. Has the Company received an engineering study for CCS with a cost estimate?

- A. No. When asked in a discovery to provide the current estimate for this CCS proposal, ELL
  failed to do so. Instead, the Company referred to witness Bulpitt's testimony, and stated
  that a Front-End Engineering & Design ("FEED") study is underway but at a relatively
  early stage.<sup>52</sup>
- 16 Q. Why is a cost estimate for CCS important?
- A. As stated by witness Ingram, the part of the CSR encompassing CCS is subject to price
   caps.<sup>53</sup> If the cost estimate for CCS exceeds the cap, witness Ingram explains the Customer
   is under no obligation to pay for the incremental cost of installing CCS technology on the
   Lake Charles plant.

<sup>&</sup>lt;sup>51</sup> Matt Davidsaver et al., *GE Vernova Advances Carbon Capture*, Gas Turbine World (Dec. 31, 2024), <u>https://gasturbineworld.com/ge-vernova-carbon-capture/</u>.

<sup>&</sup>lt;sup>52</sup> ELL response to LEUG 1-7.

<sup>&</sup>lt;sup>53</sup> Ingram Direct Testimony at 22:15–16, 24:1–5.

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1	Q.	What is the status of recent large-scale CCS projects tied to power generation?
2	A.	According to the Clean Air Task Force, there have been two CCS projects associated with
3		large coal plants. <sup>54</sup> The Petra Nova project at NRG's 240 MW W.A. Parish coal plant in
4		Texas produced CO2 for secondary oil recovery. This project was mothballed in 2020,
5		supposedly because low oil prices impaired the economics of secondary oil recovery.55 The
6		Boundary Dam project in Saskatchewan Canada is a 160 MW coal plant, with output
7		reduced to 115 MW with the CCS in operation. <sup>56</sup>
8	Q.	How does the proposed Lake Charles CCS project differ from these prior projects
9		associated with coal plants?
10	A.	The flue gas from a CCCT has a low CO2 content, approximately 4% as stated by witness
11		Nicholas Owens, $57$ which is lower than coal plant flue gas (12–15%).
12	Q.	Has the U.S. Environmental Protection Agency ("EPA") estimated the cost of CCS
13		for gas-fired combustion turbines?
14	A.	Yes. In its final rule establishing greenhouse gas emission standards for fossil-fueled
15		generating units, EPA estimated a carbon capture cost of \$89 per metric tonne for a CT

16 unit.<sup>58</sup>

<sup>&</sup>lt;sup>54</sup> Clean Air Task Force, *Carbon capture and storage: What can we learn from the project track record?* (July 31 2024), <u>https://www.catf.us/resource/carbon-capture-storage-what-can-learn-from-project-track-record/</u>.

<sup>&</sup>lt;sup>55</sup> E&E News, Low oil prices force Petra Nova into 'mothball status' (July 28, 2020),

https://subscriber.politicopro.com/article/eenews/2020/07/28/low-oil-prices-force-petra-nova-into-mothball-status-012640.

<sup>&</sup>lt;sup>56</sup> The Company refers to these projects in its response to LEUG 11-9.

<sup>&</sup>lt;sup>57</sup> Owens Direct Testimony at 13:1–4.

<sup>&</sup>lt;sup>58</sup> U.S. EPA, New Source Performance Standards for Greenhouse Gas Emissions From New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units; Emission Guidelines for Greenhouse Gas Emissions From Existing Fossil Fuel-Fired Electric Generating Units; and Repeal of the Affordable Clean Energy Rule, 89 Fed. Reg. 39798, 39932 (May 9, 2024). This figure does not include carbon transportation or storage costs.

#### 1 Q. How do you compare the cost estimate of \$89/tonne CO2 with a \$/MWh figure?

A. The Lake Charles Power Station is a modern CCCT. According to its annual gas
consumption and power production, obtained from U.S. Energy Information
Administration Form 923, it has a heat rate of 6969 btu/kWh. Therefore, the plant has 49%
thermal efficiency and emits 0.412 kG CO2/kWh. Thus, a CCS cost of \$89/tonne translates
into a \$36.71/MWh incremental cost for CCS. Note that this is a gross per MWh cost for a
CT (not a CCCT), and does not take into account power consumed by the CCS process nor
transportation/storage costs.



# Q. The CSR establishes an "LCO Energy Rate" for the energy that would come from the CCS-equipped Lake Charles Power Station.<sup>60</sup> Would that rate apply to the plant's gross MWh production, or production net of CCS power consumption?

A. It is unclear whether the LCO Energy Rate applies to gross MWh or MWh net of CCS
energy consumption. Given the Company's discovery response that "[w]hether there is a
reduction in the net [LCPS] output and the extent of such reduction in net output of LCPS
will depend upon the specific design and characteristic of the CCS facilities at LCPS, which
are not known at this time,"<sup>61</sup> this aspect of the CSR appears ambiguous.

<sup>&</sup>lt;sup>59</sup> HSPM Exhibit ECI-2 at 5–6.

<sup>&</sup>lt;sup>60</sup> Ingram Direct Testimony at 23:8–14 & n.21.

<sup>&</sup>lt;sup>61</sup> ELL response to LEUG 11-8.

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<sup>&</sup>lt;sup>62</sup> Ingram Direct Testimony at 24:9–10.

<sup>&</sup>lt;sup>63</sup> ELL response to LEUG 11-6 (describing termination payment) (public redacted version) (attached as Exhibit CG-8).

<sup>&</sup>lt;sup>64</sup> Exhibit ECI-2 at 7.

1	V.	CLEAN ENERGY "OFFSETS" EXAGGERATE CARBON IMPACT
2	Q.	What does ELL claim about Renewable Energy "offsets" resulting from the CSR?
3	A.	In his testimony, witness Philip May claims clean energy will offset 60% of the gas-
4		generated MWh by 2031. <sup>65</sup>
5	Q.	Does that mean the Planned Generators would be dispatched down to allow for
6		increased consumption from renewable resources?
7	A.	This does not appear to be the case. ELL estimates that the Planned Generators will be
8		dispatched frequently, with an assumed 80% net capacity factor. <sup>66</sup>
9	Q.	Is it possible that generation elsewhere could be "offset"?
10	A.	While witness Owens claims that displacing "relatively inefficient generation from existing
11		units with relatively efficient generation from new units has the effect of reducing CO2
12		emissions,"67 a handwaving argument such as this does not obviate the need for analysis
13		in the face of large load growth in MISO. <sup>68</sup> To predict the outcome, complex resource
14		modeling analysis would need to be performed, taking into account supply chain
15		assumptions for generation additions. <sup>69</sup>

#### 16 Q. Has Entergy performed such resource modeling for this docket?

17 A. No.

<sup>&</sup>lt;sup>65</sup> May Direct Testimony at 5:4–7.

<sup>&</sup>lt;sup>66</sup> ELL response to Staff 1-10 (attached as Exhibit CG-9).

<sup>&</sup>lt;sup>67</sup> Owens Direct Testimony at 6:14–16.

<sup>&</sup>lt;sup>68</sup> MISO Load and Forecasts Workshop (2024), <u>https://cdn.misoenergy.org/20241218%20Medium%20and%20Long%20Term%20Forecast%20Workshop%20Prese</u> <u>ntation667265.pdf</u>.

<sup>&</sup>lt;sup>69</sup> ELL now expects a lead time for a CCCT of 6 to 6 and a half years. ELL response to Sierra 6-7 (attached as Exhibit CG-10); *see also* Sonal Patel, "Gas Power's Boom Sparks a Turbine Supply Crunch," *Power Magazine* (April 1, 2025), <u>https://www.powermag.com/gas-powers-boom-sparks-a-turbine-supply-crunch/</u>.

## Q. How is this different from retiring a renewable energy certificate ("REC") by an energy buyer?

3 A. An energy buyer retiring a quantity [A] of RECs to cover energy purchases of the same 4 amount from the energy marketplace can consider their purchases to have a 100% 5 renewable attribute because somewhere in the market, a renewable generator is dedicating volume [A] of their production exclusively to them. This differs from an actor who is 6 7 buying volume [A] energy, buying the same volume of RECs and generating the same 8 quantity of fossil energy. In the latter case, conservatively the actor may only consider 50% 9 of their energy activities to be renewable. This is like the difference between a "free offer" at a supermarket, and a "buy one get one free" offer. 10

# Q. What would be more conservative than stating ELL would "offset" its CCCT generation directly?

A. Because the Company is proposing to procure *both* fossil generation *and* renewable
 generation, with all resources expected to operate at full capacity, an appropriate measure
 of the net percentage of renewables relating to this project equals

$$R\% = \frac{RMWH}{(RHWH + CCMWH)}$$

Where RMWH is the quantity of renewable MWh and CCMWH is the quantity of gas fired MWh. The respective MWh quantities are given by the Company.<sup>70</sup>

19 Counting first just the solar energy contribution to renewables,

$$R\% = \frac{3.29 \, TWH}{(3.29 \, TWH + 15.85 \, TWH)} = 17\%.$$

23

20

16

This does not include contributions from CCS [[

]] If there were contributions from CCS, then

<sup>&</sup>lt;sup>70</sup> ELL response to Staff 1-10 (attached as Exhibit CG-9).

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- $R\% = \frac{9.5 \, TWH}{(9.5 \, TWH + 15.9 \, TWH)} = 37.4\%.$ 1 2 By contrast, the Company claims renewables "offset" its CCCT generation directly:  $R_{offset} = \frac{RMWH}{CCMWH},$ 3 yielding the 60% touted by the Company.<sup>71</sup> The implicit assumption in the "offset" is that 4 5 fossil generation is reduced an equal amount for each MWh of renewable generation. But the Company contradicts this claim when it asserts the CCCTs will be run as baseload 6 units, with 80% capacity factors, and further ]]<sup>72</sup> 8 9 Is the Company significantly exaggerating the clean energy offset of its proposal? Q. Yes. As opposed to ELL's claim of 60%, it is likely that only 17% would be offset by the 10 A. Designated Renewable Resources. If the CCS Low-Carbon Option were developed, 37.4% 11 in total (including the Designated Renewable Resources) would be conservatively offset, 12 13 however this scenario is unlikely as explained in Section IV. Moreover, as explained above in Section III of my testimony, there is reason to doubt whether the 1,500 MW of 14 15 Designated Renewable Resources will actually be developed. 16 VI. MATERIALITY OF "POWER TO CARE" CONTRIBUTIONS What promises does the Customer appear to make with respect to ELL's "Power to 17 0. Care" program? 18 The Customer is matching ELL's contribution to this program, up to \$1 million per year.<sup>73</sup> 19 A.
  - <sup>71</sup> Id.

<sup>&</sup>lt;sup>72</sup> ELL response to LEUG 10-2(d), HSPM.

<sup>&</sup>lt;sup>73</sup> Ingram Direct Testimony at 27:14–16.

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1	Q.	Is the Customer necessarily contributing \$1 million per year?
2	А.	No. This Customer contribution is on a matching basis, up to \$1 million, so if ELL's
3		contributions fall short of \$1 million, the Customer's contributions would fall short of \$1
4		million also.
5	Q.	How many times is the "Power to Care" program mentioned?
6	А.	It is mentioned more than 20 times in ELL's Application and testimony. It is also featured
7		prominently in the press release announcing the Project.74
8	Q.	How does the Customer's "Power to Care" contribution compare to its total
9		investment in the project?
10	А.	Considering a maximum contribution of \$1 million per year over the 15-year contract term
11		as a ratio to the \$10 billion total Project value indicated from the Company press release,
12		this contribution would be no more than 0.15% of the total Project value.
13	Q.	Would you say the Customer "Power to Care" contribution is material?
14	А.	No, I would not.
15	VII.	RECOMMENDATIONS TO COMMISSION
16	Q.	What are your recommendations to the Commission?
17	А.	I recommend the following:
18		First, the Commission should direct ELL to accelerate its identification and procurement
19		of Renewable Resources, allowing a fuller picture of their ultimate transmission needs to
20		be clarified as well. Identification by 2030 is unacceptable when there are many GW of
21		solar and hybrid resources advancing through the MISO South queue today.

<sup>&</sup>lt;sup>74</sup> Entergy, *Entergy Louisiana to power Meta's data center in Richland Parish* (Dec. 5, 2024), <u>https://www.entergynewsroom.com/news/entergy-louisiana-power-meta-s-data-center-in-richland-parish/</u>.

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Second, if the Commission is inclined to issue Certifications of Public Convenience and
 Necessity ("CPCNs") for the Planned Generators, it should condition its approval on
 amending the CSR as follows:



- Under the amended CSR, should the Customer choose not to exercise its option to
   purchase LCO Energy, the Customer shall purchase RECs within MISO, or a
   supplemental Geaux Zero subscription, whose quantity shall equal or exceed the
   value the LCO Energy would have had.
- 19 Q. Does this conclude your testimony?
- 20 A. Yes.

#### **BEFORE THE LOUISIANA PUBLIC SERVICE COMMISSION**

#### ENTERGY LOUISIANA LLC, ex parte

*IN RE*: APPLICATION FOR APPROVAL OF GENERATION AND TRANSMISSION RESOURCES IN CONNECTION WITH SERVICE TO A SINGLE CUSTOMER FOR A PROJECT IN NORTH LOUISIANA

**DOCKET NO. U-37425** 

#### AFFIDAVIT

I, Constantine Gonatas, being first duly sworn, deposes and says that he is the same Constantine Gonatas whose Direct Testimony accompanies this affidavit; that such testimony was prepared by him; that he is familiar with the contents thereof; that the facts set forth therein are true and correct to the best of his knowledge, information and belief; and that he adopts the same as his sworn testimony in this proceeding.

**Constantine Gonatas** 

Sworn to and subscribed before me on this  $\frac{7}{2}$  day of April,  $\frac{2024}{2024}$ , in <u>Middlesex</u>, <u>(oncod MA</u>.

PUBLIC NOTAR



My commission expires: Nov 30, 2029