July 11th, 2022

To: Mike Foley

Re: Cuyahoga County Utility & Microgrids

Life Cycle Power (LCP) is a provider of mobile power generation solutions and services the public utilities and oil and gas markets across the United States. We have over 750 megawatts of power generation assets currently deployed and are expected to exceed 1 gigawatt by Q4 of 2023. LCP is rooted in the oil and gas industry as the leader of mobile power generation solutions and services areas with limited or no utility power. After Winter Storm Uri of 2021, LCP made a rapid shift into the public utilities sector and has since deployed over 500 megawatts in support of CenterPoint Energy to augment the power generation capabilities of the electrical grid of the greater Houston, Texas area which has a population of over 7 million people.

LCP owns, maintains, and operates a fleet of gas turbine generators ranging in size from 1-35 megawatts from manufacturers such as Solar (a subsidiary of Caterpillar), General Electric and Mitsubishi. We provide the designs and engineering support to integrate with existing electrical substations or provide transformers and electrical distribution equipment for stand-alone microgrids. We have a wealth of experience managing distributed power generation projects and providing the maintenance and support personnel to achieve a true 99.9% mechanical uptime.

We appreciate this opportunity to participate in this RFI and look forward to working with Cuyahoga County to assist in the development of your electrical infrastructure.

Respectfully,

Justin Lippmann
jlippmann@lcpower.energy
432-234-8788

Life Cycle Power would be able to fulfill the following roles:

Utility Management:

- Manage Construction and Ongoing Operations: Oversee the development and construction of microgrids and distributed generation projects, etc.

Life Cycle Power was initially founded to provide power generation assets for large oil and gas microgrid facilities. We have since grown to provide our natural gas turbines to support the public utilities of Houston, Texas with a total deployment of over 500+ megawatts and growing. In addition, we are actively looking at adding battery energy storage systems (BESS) to the fleet to serve the needs of our customers, both public and private.

Developer of Utility Customers, Distributed Generation Projects, and/or Microgrids:

- Develop distributed generation projects (e.g. in-front-of-the-meter solar, battery storage, etc.) for individual customers or the County Utility to be off-takers. Provide the capital and insurance for these projects. Assist in necessary contracts.
- Develop microgrid projects (e.g. single site or multi-customer district). Provide the capital and insurance for these projects. Assist in necessary contracts.

LCP is currently providing these services to CenterPoint Energy in Houston. We have the ability to design, build and operate microgrids.

Design and Construction Team (Engineering, Procurement, Construction) of Distribution Infrastructure, Distributed Generation, and/or Microgrids:

- Design (Engineering and Other)
- Procurement of equipment / materials
- Construct distribution infrastructure, distributed generation, and/or microgrids
- Support distributed generation and microgrid operations in conjunction with, or on behalf of the County Utility and/or its manager or operator.

LCP is also providing all of these services to CenterPoint Energy in Houston. We have very close working relationships with Caterpillar Solar, General Electric and Mitsubishi to be able to source all the necessary power generation and battery assets to support a public utility project such as this.

o Optional - Within this section, consider providing a hypothetical organizational chart, a Responsible, Accountable, Consulted, and Informed (RACI) matrix, or other visual to help define roles and relationships.

1) What challenges or barriers could you see for your role(s) as envisioned by the County and what might be ways for the County to address those challenges?
    - Supply chain shortages for new power generation assets and battery storage devices. Labor and parts shortages have drastically increased the lead time of engines, wire/cable, batteries and transformers by 18-24 months. Diligent planning must be considered when ordering new equipment.

2) What's the typical timeline/cycle for the respondents proposed role(s)? (e.g. it takes X year(s) to find customers for a microgrid and build it)
    - This depends entirely on the equipment that will be required. ie: We will likely have sufficient power generation assets available since we are continuously placing orders with our vendors to build more gas turbines. However, most electrical transformers are a 12-24 month lead time for a pad mounted sub-station style unit which are built to order. At this point in time with the supply chain constraints we are seeing, a minimum of 12 months would be needed from order to desired installation date.

3) Would the respondent meet with the County and / or its representatives to present ideas and to answer follow up questions?
    - Yes

4) All respondents will be placed on a list for other respondents to consider for teaming and/or subcontracting. If your entity requires exclusion from this list, please state so.

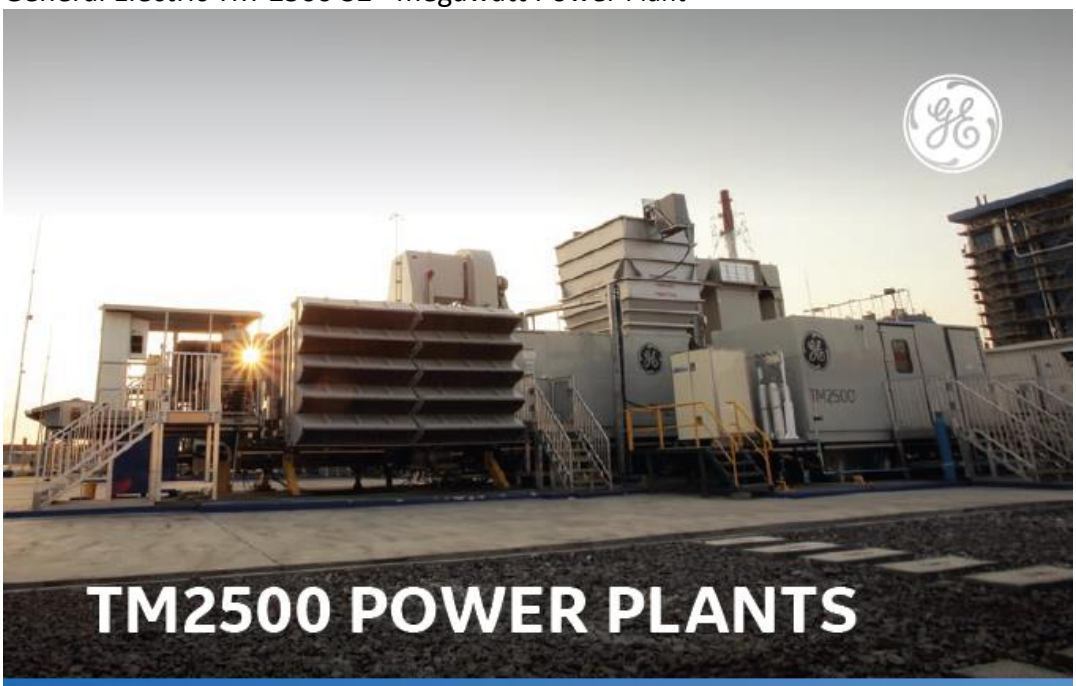
- n/a

Optional / Encouraged Information:

- Press releases
  - https://www.centerpointenergy.com/en-us/corporate/about-us/news/1532
  - https://lcpower.energy/arroyo-invests-in-leading-behind-the-meter-power-solutions-companies/

- Technical / Marketing material

- General Electric TM-2500 32+ megawatt Power Plant



CAPABILITY
8-minute start from cold metal to full power output

VERSATILITY
All units are natural gas/liquid fuel capable across a wide range of fuels, including propane and naphtha

SUSTAINABILITY
10X lower emissions than reciprocating technology; exceeds World Bank requirements

The TM2500 is ideal for providing a baseload bridge to permanent power installations or for generating backup power in the wake of natural disasters, plant shutdowns, or grid instability. Our complete solutions—including trailermounted gas turbine generator set and containerized balance of plant—can put power on the grid within 30 days of the contract signature; this fast power provides the greatest power density among gas turbine trailer-mounted offerings.

		TM2500 (50 Hz)	TM2500 (60 Hz)
SC Plant Performance	SC Net Output (MW)	34.6	37.0
	SC Net Heat Rate (Btu/kWh, LHV)	9,783	9,333
	SC Net Heat Rate (kJ/kWh, LHV)	10,321	9,846
	SC Net Efficiency (%, LHV)	34.9%	36.6%
1x CC Plant Performance	CC Net Output (MW)	49.2	51.1
	CC Net Heat Rate (Btu/kWh, LHV)	6,870	6,753
	CC Net Heat Rate (kJ/kWh, LHV)	7,248	7,125
	CC Net Efficiency (%, LHV)	49.7%	50.5%
	Plant Turndown – Minimum Load (%)	35.0%	36.0%
	Ramp Rate (MW/min)	30	30
	Startup Time (RR Hot, Minutes)	30	30
2x CC Plant Performance	CC Net Output (MW)	99.2	103.1
	CC Net Heat Rate (Btu/kWh, LHV)	6,814	6,698
	CC Net Heat Rate (kJ/kWh, LHV)	7,189	7,067
	CC Net Efficiency (%, LHV)	50.1%	50.9%
	Plant Turndown – Minimum Load (%)	35.0%	35.0%
	Ramp Rate (MW/min)	60	60
	Startup Time (RR Hot, Minutes)	30	30

NOTE: All ratings are net plant, based on ISO conditions and natural gas fuel. Actual performance will vary with project-specific conditions and fuel.

gepower.com

GEA32938A (04/2021)

- General Electric LM-6000 53 megawatt Power Plant

LM6000

AERODERIVATIVE GAS TURBINE

50/60 HZ

53 MW SIMPLE CYCLE OUTPUT

>40% SIMPLE CYCLE EFFICIENCY

GE'S FIRST GAS TURBINE TO BE PAIRED WITH A BATTERY ENERGY STORAGE SYSTEM. FOUR UNITS ARE ALREADY IN OPERATION, AND THE TECHNOLOGY IS EXPANDING TO CREATE A NEW "HYBRID" PRODUCT LINE.

UP TO **35%** HYDROGEN CAPABILITY

		LM6000 PC	LM6000 PF+
SC PLANT PERFORMANCE	SC Net Output (MW)	46.6	53.9
	SC Net Heat Rate (Btu/kWh, LHV)	8,533	8,357
	SC Net Heat Rate (kJ/kWh, LHV)	9,002	8,817
	SC Net Efficiency (%, LHV)	40.0%	40.8%
1X CC PLANT PERFORMANCE	CC Net Output (MW)	60.3	72.4
	CC Net Heat Rate (Btu/kWh, LHV)	6,571	6,170
	CC Net Heat Rate (kJ/kWh, LHV)	6,932	6,510
	CC Net Efficiency (%, LHV)	51.9%	55.3%
	Plant Turndown – Minimum Load (%)	19.0%	37.0%
	Ramp Rate (MW/min)	50	50
	Startup Time (RR Hot†, Minutes)	30	30
2X CC PLANT PERFORMANCE	CC Net Output (MW)	121.1	145.6
	CC Net Heat Rate (Btu/kWh, LHV)	6,541	6,134
	CC Net Heat Rate (kJ/kWh, LHV)	6,902	6,472
	CC Net Efficiency (%, LHV)	52.2%	55.6%
	Plant Turndown – Minimum Load (%)	19.0%	18.0%
	Ramp Rate (MW/min)	100	100
	Startup Time (RR Hot†, Minutes)	30	30

NOTE: All ratings are net plant, based on ISO conditions and natural gas fuel. Actual performance will vary with project-specific conditions and fuel.
† Rapid Response/Hot Start

Over 40 million operating hours and more than 1,320 units shipped makes GE's LM6000 aeroderivative gas turbine a leader in the +40 MW space. The LM6000 offers greater than 99 percent start and operational reliability and greater than 98 percent availability. Its 5-minute fast start allows operators to differentiate their dispatch capability while a simple two-spool configuration results in lower overall maintenance costs. Universal and modular packaging gives the LM6000 a smaller footprint and allows for faster installation and commissioning.

GEA32935B (02/2022)

- Detailed company profile information

- Founded in 2018 – Headquartered in Centerville, Texas
- Employee count - 60
- 750+ mWs of owned and operated power assets

• Questions that the County should consider in the development of potential RFQs / RFPs
- What percentage of power generation assets would you like to see allocated between natural gas/wind/solar/batteries etc..?
- What amount of redundant power generation would you like to be made available?
  - What types of assets would you consider as a backup? Diesel powered engines, batteries, natural gas engines, etc..
- What is the total megawatt load you expect to be needed?
- What are the distribution voltages?

7. Appendix

1. Vision

b. How might the County Utility improve services compared to traditional systems?
- As the state of Texas has learned – you cannot allocate so much of your power infrastructure towards renewables to the point where if the wind stops blowing, you must ask the entire state to reduce electrical consumption.
- https://www.dallasnews.com/news/politics/2022/07/10/ercot-issues-alert-for-possible-rolling-blackouts-monday/ (this was published today, 7/11/22)
- Natural gas will continue to be the backbone of clean, reliable power generation for the foreseeable future

2. Business Economic Models

b. The County envisions a scenario where the developer/concessionaire is compensated through a pass-through model from power purchase agreements with individual customer/off-takers. Do you see any problems with this model or have suggestions on possible alternative compensation models?
- We are ok with this model

3. Organization Models

a. Would you be willing to contract directly with the County to be responsible for the full scope of this initiative?
    - Yes

d. What level of responsibility, if any, would you be willing to have for microgrid project identification and development, customer identification and selection, customer contract negotiations, etc.?
    - LCP would need to be actively involved in the microgrid project identification process to help determine the assets that would be best suited to deploy for that particular scenario

e. What level of pre-design and other information or assurances would you need to respond to an RFP/Q and engage in negotiations with the County?
    - What is the total load (in megawatts) that the RFQ would be responsible for?

f. What level of commitment would you need to have from potential County utility customers to respond to an RFP/Q and engage in negotiations with the County?
    - Minimum 5 years but would prefer longer

5. Initiative Timelines

a. What is a typical turn-around time for you to sign a contract for your role(s)?
    - 1-3 months

c. What impact on this initiative do you foresee, if any, from the current supply chain disruptions?
    - With our current relationships with Caterpillar Solar/General Electric/Mitsubishi – we have been able to mitigate supply chain disruptions by placing orders far enough in advance to accommodate the needs that we are seeing in the market. By leveraging our buying power, keeping enough transformer stock, and most importantly, planning with our customers, we have been able to meet the demands of all our power projects.