



NREL Support to Louisville Metro Government

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NREL at a Glance

2,685

Employees,
postdoc researchers,
interns, visiting
professionals, and
subcontractors



World-class
facilities, renowned
technology experts

871

Partnerships
with industry,
academia, and
government



Campus
operates as a
living laboratory



LA100

The Los Angeles 100% Renewable Energy Study

LA100 offers detailed, ultrahigh-resolution analysis to equip LA decision-makers to understand:



What are the **pathways and costs to achieve a 100% renewable electricity supply** while electrifying key end uses and maintaining the current high degree of reliability?



What are the potential benefits to **the environment and health**?



How might **local jobs and the economy** change?



How can **environmental justice communities** benefit from and be part of the solution?

Project Focus

- **Phase I Project Focus:**
 - Identifying avenues for achievement of 100% clean renewable electricity goal for Louisville Metro Government (LMG) operations by 2030 based on current institutional and legal context in Louisville
 - Detailed planning of Phase II activities and Statement of Work
- **Phase II Project Focus:**
 - Evaluating technical, economic, legal, and practical feasibility of various avenues for achievement of 100% clean renewable electricity for LMG operations by 2030
 - Can be used by LMG leadership to inform and prioritize actions

How We Will Work Together

Provide Planning and
Implementation Support

Inform Prioritization of Actions

Evaluate Feasibility of Options

Identify Avenues for Goal
Achievement

What is NREL's Role?

- NREL is an independent technical institution that does not provide policy recommendations, nor is it involved in any policy or political advocacy work of any kind
- **NREL will provide LMG with decision-supportive analysis and data on the costs and benefits of various avenues for achievement of your goals**

Ongoing Activities

- **Many (many) hours of interviews with LMG staff**
- **Desk-based research focused on:**
 - LMG's legal and institutional constraints in the electricity space
 - LG&E portfolio of assets, regulatory paradigm, etc.
 - Legal relationship between LMG and LG&E

Environmental Justice and Equity Considerations

- **Procedural Justice:** Are members of the public – and specifically members of frontline communities that will be impacted by LMG’s pursuit of its 2030 goal – able to be meaningfully involved in decision processes? What efforts will decision makers make to seek out and facilitate involvement of those potentially affected?
- **Recognition Justice:** What historical injustices of the energy system must be acknowledged and accounted for within the process to plan LMG’s achievement of its 2030 goal? How are communities in the Louisville area currently being impacted by the energy system?
- **Distributional Justice:** What would a fair and equitable spread of benefits and costs look like across the community as LMG achieves its 2030 goal? What are the pros and cons of various avenues for achievement of the LMG 2030 goal from this perspective?

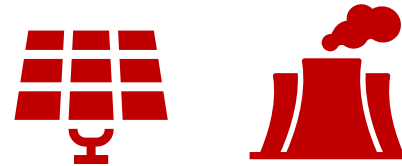
Avenues for 2030 Goal Achievement: Electricity Supply and Demand

*Can we reduce demand for
electricity?*



Electricity Demand

*Can we clean up the
electricity supply?*

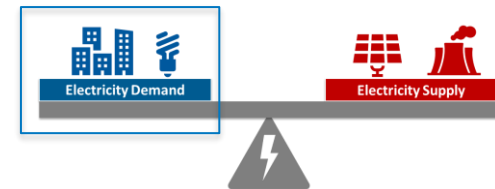


Electricity Supply



Background: Demand-side Measures

- How do we define demand-side measures?
- How can demand-side help to meet the 2030 100% clean electricity goal for LMG?
- Most demand-side measures can be pursued without utility involvement
- There are *many* options to improve municipal energy efficiency – some of them are more cost-effective than others

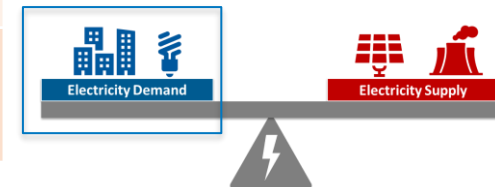


Background: Financing Demand-Side Measures

- In cases where new infrastructure is needed, energy efficiency is characterized by upfront capital expenditures followed by operational savings.

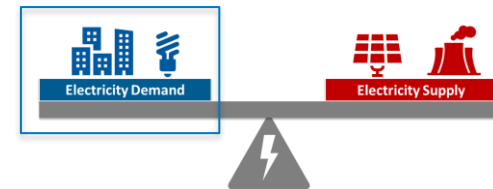
Example Financing Mechanisms

	CAPEX Required?	OPEX Savings?	Energy Savings?
Budget Financing	Yes	Yes	Yes
Public Bond	Yes	Yes, less the bond interest	Yes
Bank Loan	No	Depends on loan terms	Yes
Energy Service Performance Contract	No	Depends on contract, but likely marginal if any	Yes
Municipal Savings Reinvestment Funds	Yes/No	Yes	Yes



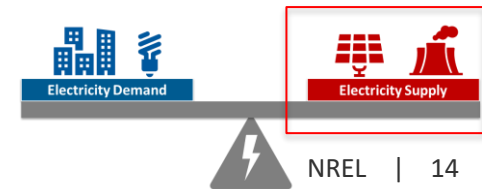
Demand Side Avenues

- **Use Less Energy via Energy Efficiency Measures**
 - Changes in operational patterns for buildings with controls
 - Investment in control systems for buildings without controls
 - Energy efficient retrofits for municipal public lighting
 - Energy efficient retrofits for municipal buildings
 - Weatherization, lighting, space/water heating appliance replacement, etc.
- **Use On-Site Clean Energy via Distributed Energy Resources**
 - Rooftop (or otherwise on-site) solar located “behind the meter”
 - Geothermal water source heat pumps for heating and cooling



Background: Supply-side Measures

- Metro Government currently purchases electricity and receives public lighting service from Louisville Gas & Electric (LG&E)
- LG&E is a regulated monopoly utility with a 97% fossil energy mix

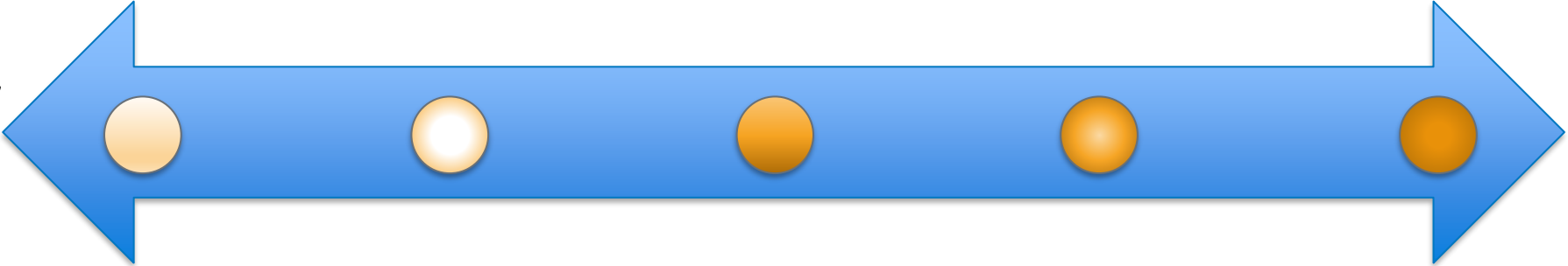


Supply Side Avenues

What options can LMG consider to decarbonize the electricity supply?

Utility highly involved

Utility not involved



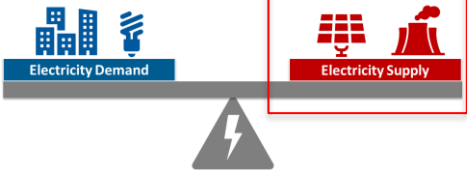
LG&E Green
Tariff & Solar
Shares Programs

Virtual Power
Purchase
Agreement

Utility and Policy
Advocacy Activities
[Outside of Scope]

Municipalization
(LMG Only)

Municipalization
(Entire Community)



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Thank you!

