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St. Charles Electricity Supply Considerations

January 2025

Rocky Mountain Institute (RMI) is an independent, non-partisan, nonprofit organization dedicated to accelerating a prosperous, clean energy future for all

What We Do:

- *Founded in 1982, RMI advances its mission through market-research, analysis, and collaborations with communities, businesses, policymakers, and NGOs.*

St. Charles is Facing a Rare Energy Supply Decision

- IMEA is proposing a 20-year supply contract to St. Charles 10 years in advance of the proposed start date (2035).
- My goal is to offer a perspective on the implications of signing this contract on:
  1. Reliability
  2. Sustainability
  3. Cost
- I'll conclude by discussing what other cities have done and suggested next steps for St. Charles.

Reliability:

PJM, not IMEA, Uses a Portfolio of Assets to Ensure Reliability

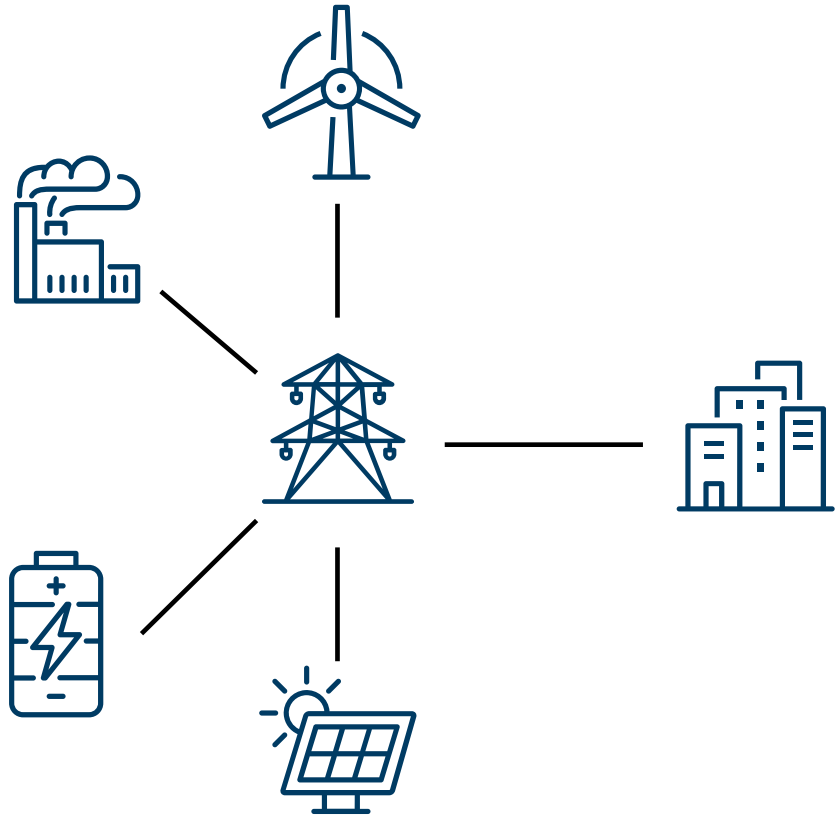
Source: https://www.ferc.gov/power-sales-and-markets/rtos-and-isos

- St. Charles is located in PJM, a regional transmission operator (RTO) that allows for competition among electricity generators in a market.
- Electricity provided by IMEA and other generation owners is integrated into PJM's systems, which then ensure that supply equals demand at all times.
- The reliable operations of the grid across the region is maintained by PJM, *not* individual utilities or power providers.
- Most outages are due to failures in electrical transmission and distribution wires. Local resilience can be enhanced through microgrids that can "island" from the grid.

Reliability:

PJM uses a Portfolio of Generation Assets to Ensure Grid Reliability

- No individual generator runs all the time
  - Prairie State Coal was not available to generate electricity for 10% of the hours in 2023.[1]
  - During winter storm Uri, coal plants in Texas were unable to operate when their coal piles froze solid.
- PJM uses a *diverse generation fleet*, a robust transmission system, and advanced analytical tools to provide reliable electricity service to 65 million Americans.[2]
- Cleaner, modern grids can combine renewables with batteries, transmission, efficiency, demand response, and peaker plants to provide reliable generation.

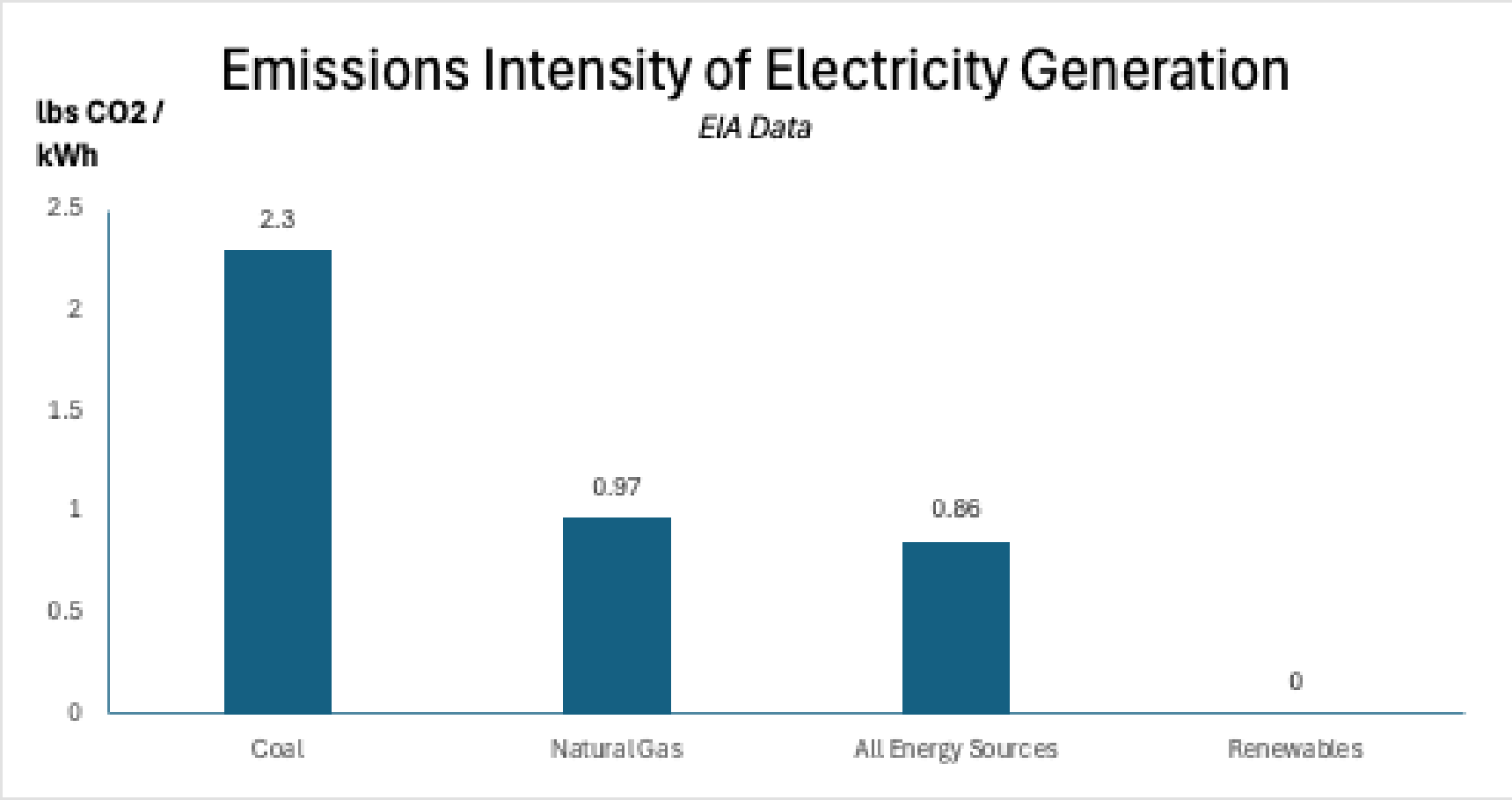


1. https://prairiestateenergycampus.com/about/annual-performance/

2. https://www.pjm.com/-/media/library/reports-notices/special-reports/2021/20210311-reliability-in-pjm-today-and-tomorrow.ashx

Sustainability:

Coal plants are among the most polluting forms of electrical generation



Source: https://www.eia.gov/tools/faqs/faq.php?id=74&t=11

Sustainability:

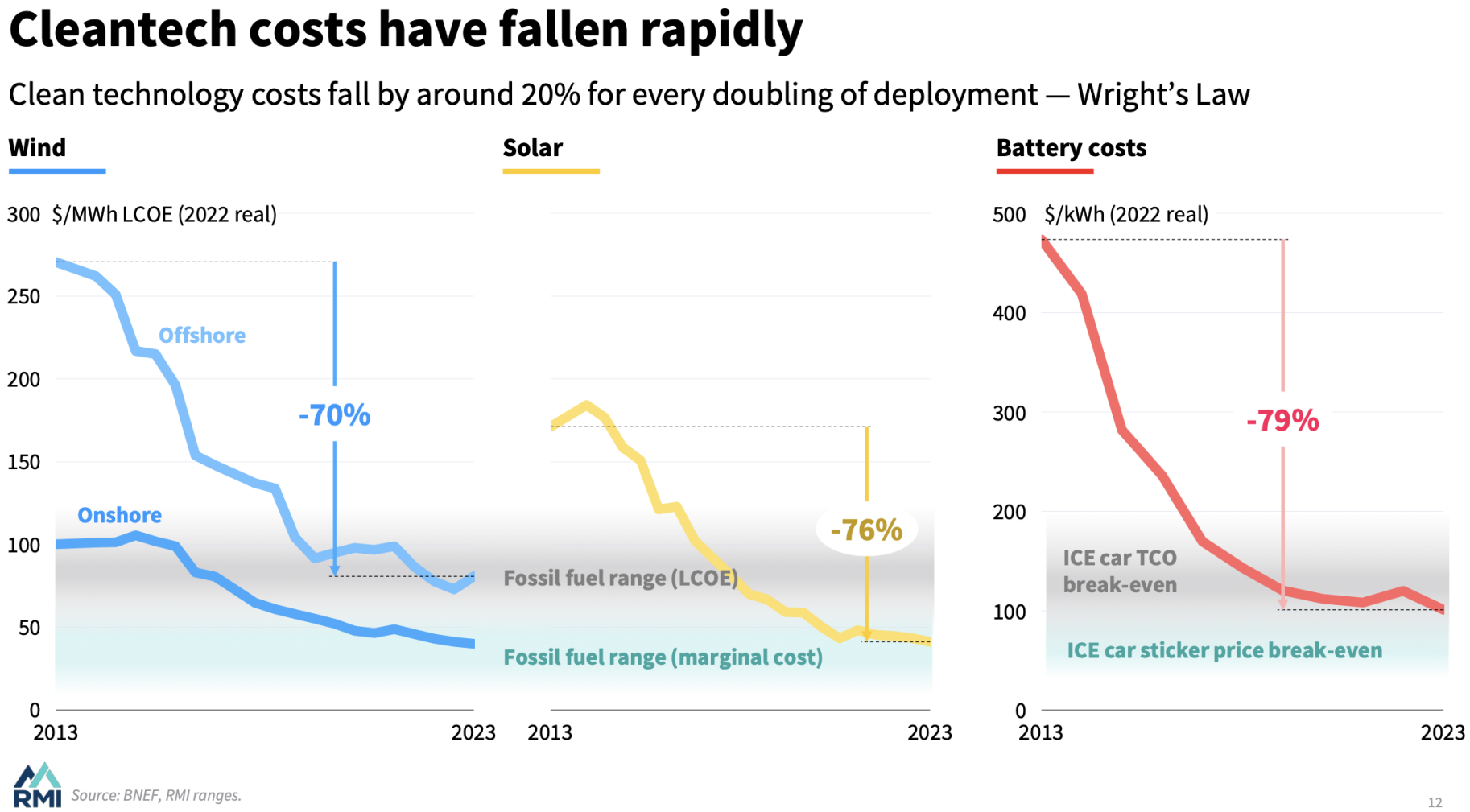
IMEA's Coal-Based Electricity is High in Emissions

- 80% of IMEA's electricity is from coal.
- Prairie State is the largest source of emissions in the state of Illinois.[1]
- RMI estimates suggest that in 2022, IMEA's electricity was 3x more carbon intensive than Illinois's average.
- Prairie State is the source of ~30% of SO2 emissions from electricity generation in Illinois.[2] SO2 exposure can lead to breathing difficulty, decreased lung function, and higher rates of hospitalization.[3]

1. https://www.epa.gov/ghgreporting/ghgrp-2022-emissions-location
2. EIA data, https://www.eia.gov/electricity/data/emissions/xls/emissions2023.xlsx
3. https://www.lung.org/clean-air/outdoors/what-makes-air-unhealthy/sulfur-dioxide

Cost:

Coal is Increasingly Uneconomic Compared to Alternatives

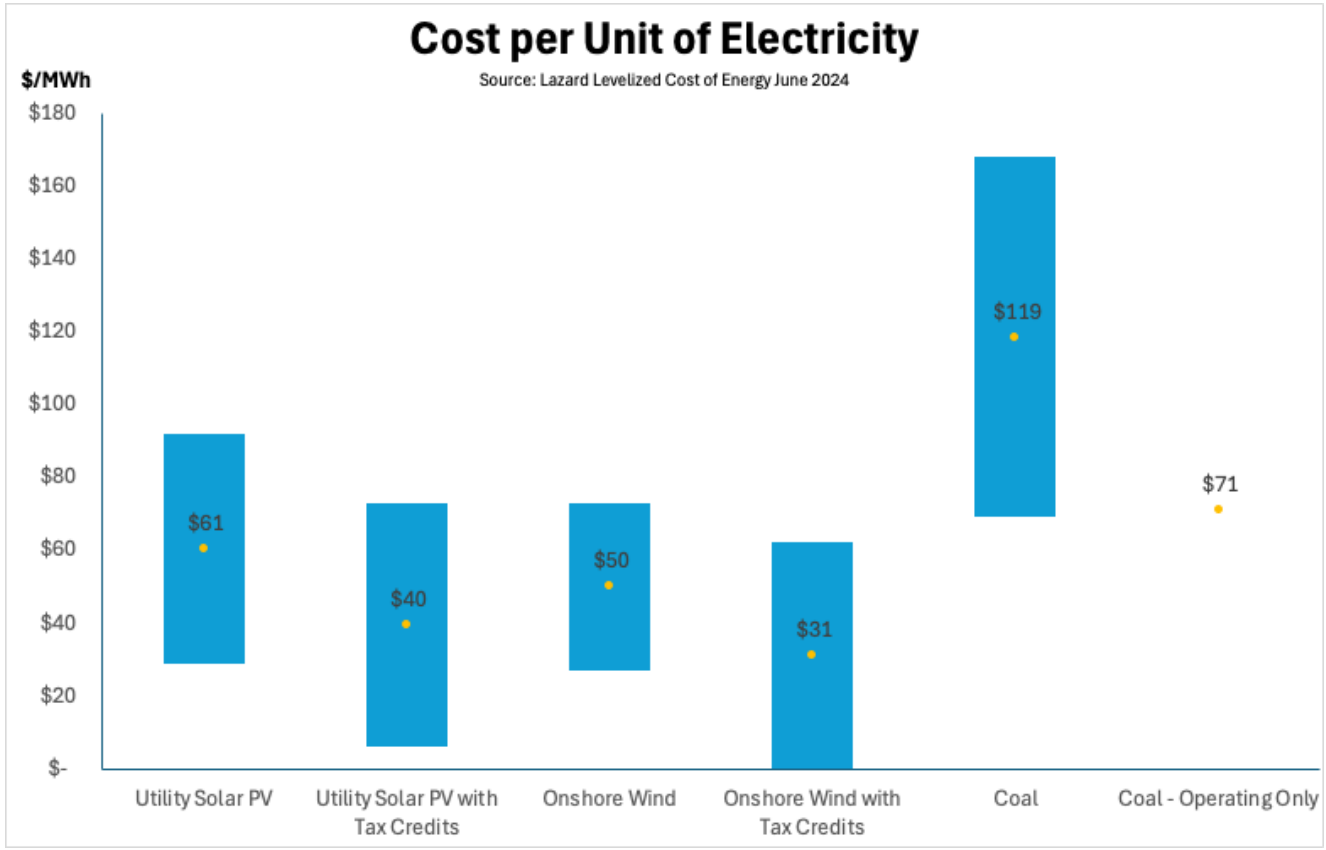


Source: The Cleantech Revolution, RMI, https://rmi.org/insight/the-cleantech-revolution/

Cost:

Coal is Increasingly Uneconomic Compared to Alternatives

- Without tax incentives, the average cost of building a new wind or solar farm is less than continuing to operate existing coal plants.[1]
- With tax incentives, it isn't even close.[1]
- Wind and solar costs are expected to decline further over time due to ongoing learning curves.[2]

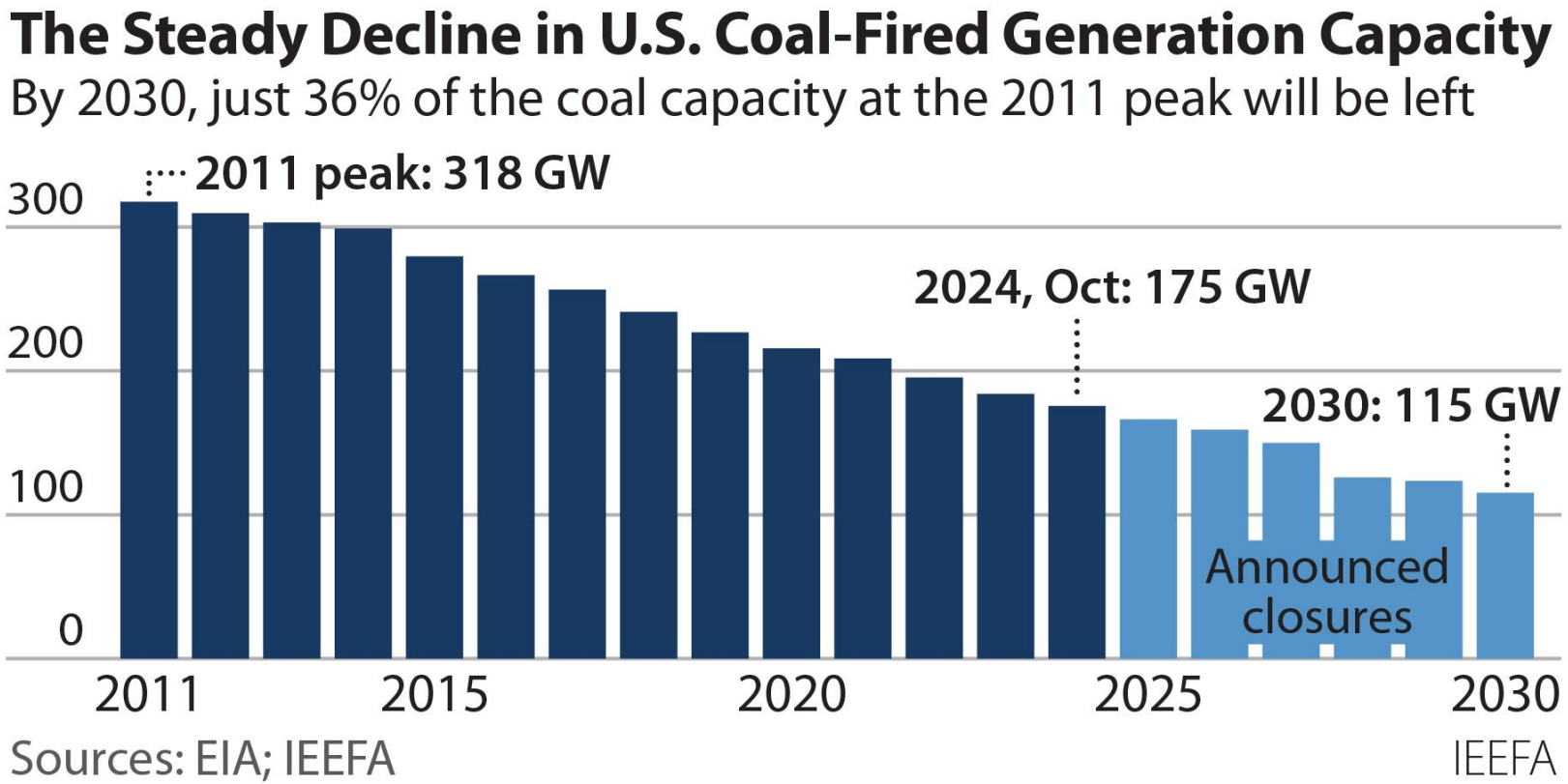


1. https://www.lazard.com/media/xemfey0k/lazards-lcoeplus-june-2024-_vf.pdf

Cost:

Coal is Increasingly Uneconomic Compared to Alternatives

Coal plants continue to close across the US due to their inability to compete with renewable energy and natural gas generators



1. https://ieefa.org/resources/nowhere-go-down-us-coal-capacity-generation

IMEA's Undiversified Approach Exposes St. Charles to Risks

- Two important means of managing risk are diversification and scenario planning.
- IMEA relies heavily on 2 coal plants and has seemingly not conducted scenario analysis.
- This approach creates various risks for IMEA and St. Charles:
  - *Reputational Risks:* What if St. Charles's high emissions create reputational damage with potential partners (*e.g.*, large companies with sustainability goals)?
  - *Market Risks:* What if electricity market prices fall and St. Charles is locked into a relatively high rate?
  - *Asset Risks:* What if one of IMEA's 2 coal plants fails?
  - *Regulatory Risks:* What if the coal plants are forced to shut down?
    - Prairie State is currently being sued due to an alleged failure to comply with EPA regulations.
    - The Clean Energy Jobs Act (CEJA) requires Prairie State have 0 emissions by 2045 – how will they do it?
  - *Provider Risks:* What happens to St. Charles if IMEA goes bankrupt?

1. https://www.bnd.com/news/local/article291678600.html

Case Study:

Springfield, MO Leveraged a Portfolio of Generation

- Springfield is a city of 170,000 people that is served by a municipal utility.
- Springfield's municipal utility meets demand with a portfolio of assets.
- 45% of their electricity comes from renewable sources, particularly low-cost wind energy.
- The City plans its generation using an integrated resource plan.

"It does take a balanced portfolio, and I think that's what really got us through [a winter storm] – to have the different types of generating units."

–Cara Shaefer, CU's director of communications and energy services[1]

1. https://sbj.net/stories/cu-satisfied-with-renewable-energy-goal,73303

Case Study:

Chicago Bought Clean Energy and Supported Workforce Training

- The City of Chicago was unhappy with their retail provider's default offer.
- The City issued an RFP seeking low-cost, clean electricity.
- Chicago signed a 5-year retail contract:
  - Solar power covers 70% of the city's load.
  - Their supplier agreed to make an annual $400k investment to support local community workforce training.
- Cook County later signed a similar, 12-year agreement with the same providers.

"The signing of this agreement demonstrates that the City of Chicago is leading by example and driving high-impact climate action, building the clean energy workforce of the future and equitably distributing meaningful benefits to foster the local clean energy economy for all."

–Mayor Lori E. Lightfoot[1]

1. https://www.chicago.gov/city/en/depts/mayor/press_room/press_releases/2022/august/Purchase100PercentCleanRenewableEnergy2025.html

Case Study:

Taos, NM, Saved Its Customers Money by Switching to Clean Energy

- Kit Carson Electric Cooperative provides electricity to 29,000 people in New Mexico.
- In 2023, Kit Carson split away from its supplier, Tri-State Generation and Transmission, in favor of a private electricity provider, Guzman Energy.
- The shift is expected to increase renewables usage and “cut customers’ bills by as much as 25 percent.”[1]

1. https://www.santafenewmexican.com/news/local_news/kit-carson-electric-completes-split-from-tri-state/article_d5aa2bbe-2a31-11ed-94ca-fbe7eb9134fb.html

St. Charles Has Options and Should Explore Them

- Cities and municipal utilities in Illinois have contracted with alternative providers, such as Constellation and NextEra (e.g., Rochelle, Champaign, and Geneva).
  - Consultants can do more than just procure electricity – e.g., Batavia has hired a consultant to help them with a variety of other operational and strategic needs.

- How might an alternative arrangement impact St. Charles's goals?
  - **Reliability** would likely be unaffected (although local resilience could be enhanced by installing local microgrids).
  - **Sustainability** would likely be enhanced by adopting non-coal generation assets.
  - **Costs** could decline if lower-cost generation sources, such as wind and solar, are purchased, and could be better balanced to withstand future market/policy shifts
  - **Other Risks** associated with coal generation could be mitigated (e.g., financial exposure to regulatory and asset risk, public relations concerns, etc.)

Suggested Next Steps

1. **Engage others to learn more** (e.g., talk to peer communities, municipalities with other supply strategies, alternative providers)
2. **Apply for the upcoming Illinois Public Utility Planning Program**
3. **Consider hiring a consultant**
4. **Negotiate and/or run a competitive solicitation**

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RMI – Energy. Transformed.

Energy Markets are Increasingly Dynamic and Unpredictable

2007–2012	Innovations in fracking cause natural gas prices to fall >50% from 2007-2012.[1]
2013–2023	Costs for off-shore wind, solar, and batteries all fall by more than 70%.
2012–2024	Large corporations sign contracts for 84GW of renewable energy capacity.[2]
2021	Illinois passes the Climate and Equity Jobs Act, targeting 100% clean energy by 2045.
2024	Electricity demand projections rise–driven by AI, manufacturing, and electrification.
2025–2055	???

1. https://www.bls.gov/opub/btn/volume-2/the-effects-of-shale-gas-production-on-natural-gas-prices.htm
2. The Cleantech Revolution, RMI, https://rmi.org/insight/the-cleantech-revolution/
3. https://cebuyers.org/deal-tracker/

Carbon Sequestration for Coal Plants is an Exciting but Untested and Expensive Approach

- There is currently 1 coal facility in the United States with carbon capture and sequestration, Petra Nova in Texas
- The upgrade cost $1 billion, or $4200 / kW
- The captured CO2 is used to enhance oil production in nearby wells
- Per the Congressional Budget Office, ”[t]he extent to which carbon capture and storage will be used in the future is highly uncertain.”[1]

Image Source: EIA, https://www.eia.gov/todayinenergy/detail.php?id=33552

1. https://www.cbo.gov/publication/59832#_idTextAnchor021

Staff Experience

Stephen Abbott

Principal, US Cities and Communities

Stephen leads RMI's efforts to help US cities and communities pursue clean technology opportunities that support local priorities such as cost effectiveness, reliability, sustainability, job creation, and equity. In 2024, Stephen's team has provided support to over 70 communities across the United States.

Stephen has over 10 years of experience supporting a variety of organizations–from cities to universities to large companies–in developing and deploying energy strategies. Stephen has advised cities such as Chicago and Cincinnati on their innovative clean energy contracts, and he led the development of a website dedicated to clean energy opportunities for cities: cityrenewables.org. Through this work, he has developed expertise in energy market analysis, economic modeling, risk mitigation, and project management.

Stephen is the author of over a dozen reports and blogs on clean energy topics. These publications can be viewed at: rmi.org/people/stephen-abbott.