ASES SOLAR 2024

Connecting Technology & Policy

Track 2A: Grids & Solar Communities, May 21st, 2024

Introduction

Reimagining the Energy Landscape, Battery Storage for a Resilient Future:

The rise of renewable energy sources and severe weather events pose challenges for global grid systems. Battery energy storage systems (BESS) can provide reliable energy when demand is high and reduce shortages when renewables are scarce. These technologies enable grid operators and communities to redesign the energy landscape.

“The race is on…” (Example: April 12th, 2024: Dominion Energy Virginia launches RFP for solar and BESS projects to meet 2050 energy goals)

“Imagine a world where power outages are a thing of the past…"

(Image: Dominion Energy)

ASES SOLAR 2024

Connecting Technology & Policy

The Challenges for renewable Energy Systems:

- Resources are intermittent
- Gaps between supply & demand
- Limited forecasting
- Often centralized hub and spoke design

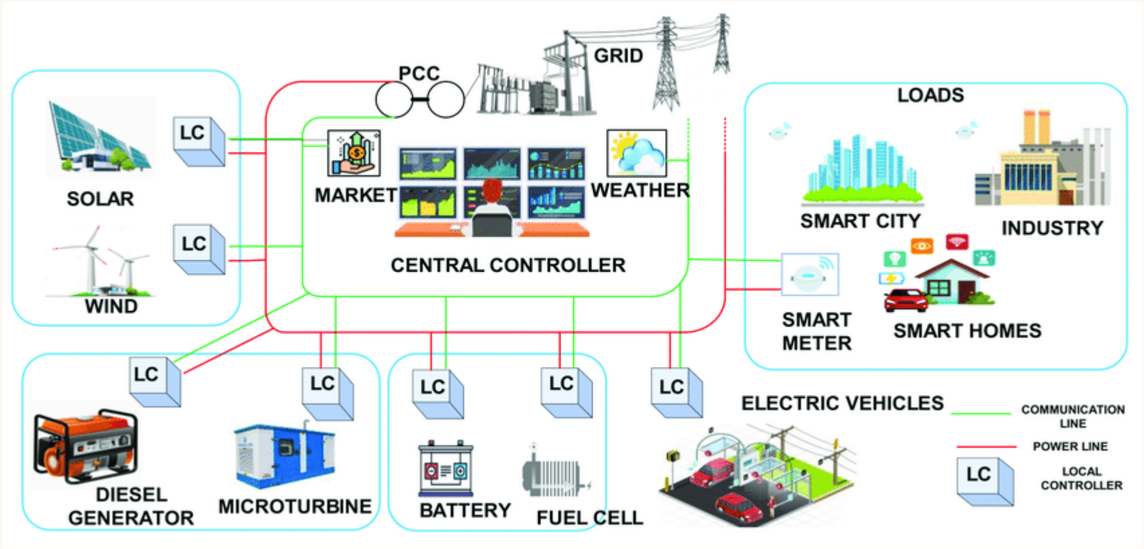
ASES SOLAR 2024
Connecting Technology & Policy

A Solution:

Microgrids / SIDEs with Storage:

What is a microgrid?

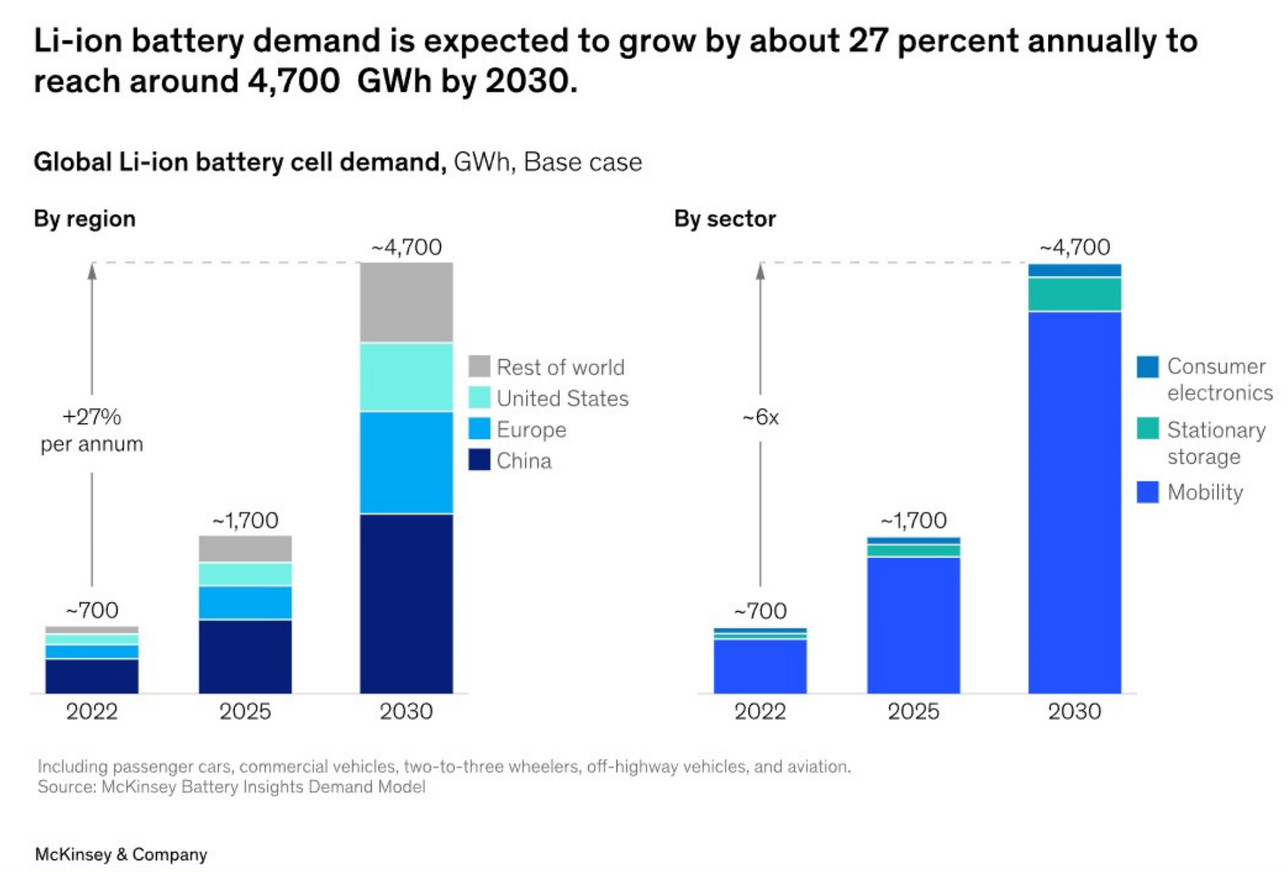
A microgrid is a self-contained electrical network that allows you to generate your own electricity on-site and use it when you need it most. For this purpose, your microgrid will connect, monitor, and control your facility's distributed energy resources (DER) while enhancing performance, sustainable footprint, and resilience. You can operate microgrids while connected to the utility grid or in disconnected "island" mode. When the grid goes down or electricity prices peak, microgrids respond.



Microgrids / SIDEs with Storage (cont.):

Risks & Challenges:

- Costs, energy efficiency and environmental impact are main issues
- Mix of technologies, but high versatility and scalability (from home to utility-scale)



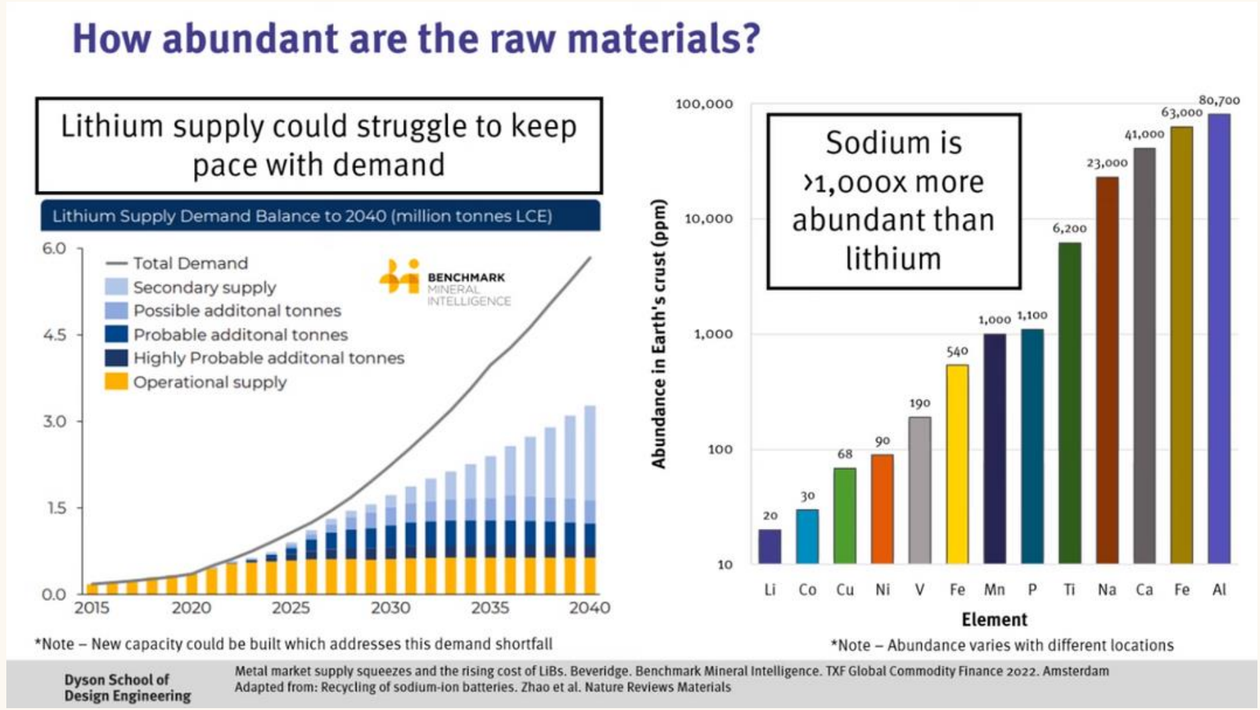
ASES SOLAR 2024
Connecting Technology & Policy

Types of (Battery-) Storage

Renewable Energy Storage Technologies with Growth Potential:

- Lithium-ion batteries
- PHS
- Flow batteries
- Compressed air storage
- Thermal energy storage (i.e with CSP, geothermal, CO2)

- Lithium- Sodium battery a new contender?



Case Studies / Applications (cont.)

1) Schoonschip Floating Community, Amsterdam, Netherlands

The Project: Europe's most sustainable floating neighborhood. Schoonschip features 46 waterborne homes with integrated renewable energy generation (solar, thermal), energy storage, a smart grid, and wastewater treatment with energy recovery.

WHY?

Community Impact:

- Sustainability Model: Schoonschip serves as a blueprint for sustainable urban living, with near-zero emissions and a high degree of resource circularity.
- Community Collaboration: Residents played a pivotal role in the design and development of the project, fostering a strong sense of community and shared responsibility.
- Innovation Hub: The project attracts international attention, positions Amsterdam as a leader in smart energy solutions, and creates opportunities for knowledge exchange.

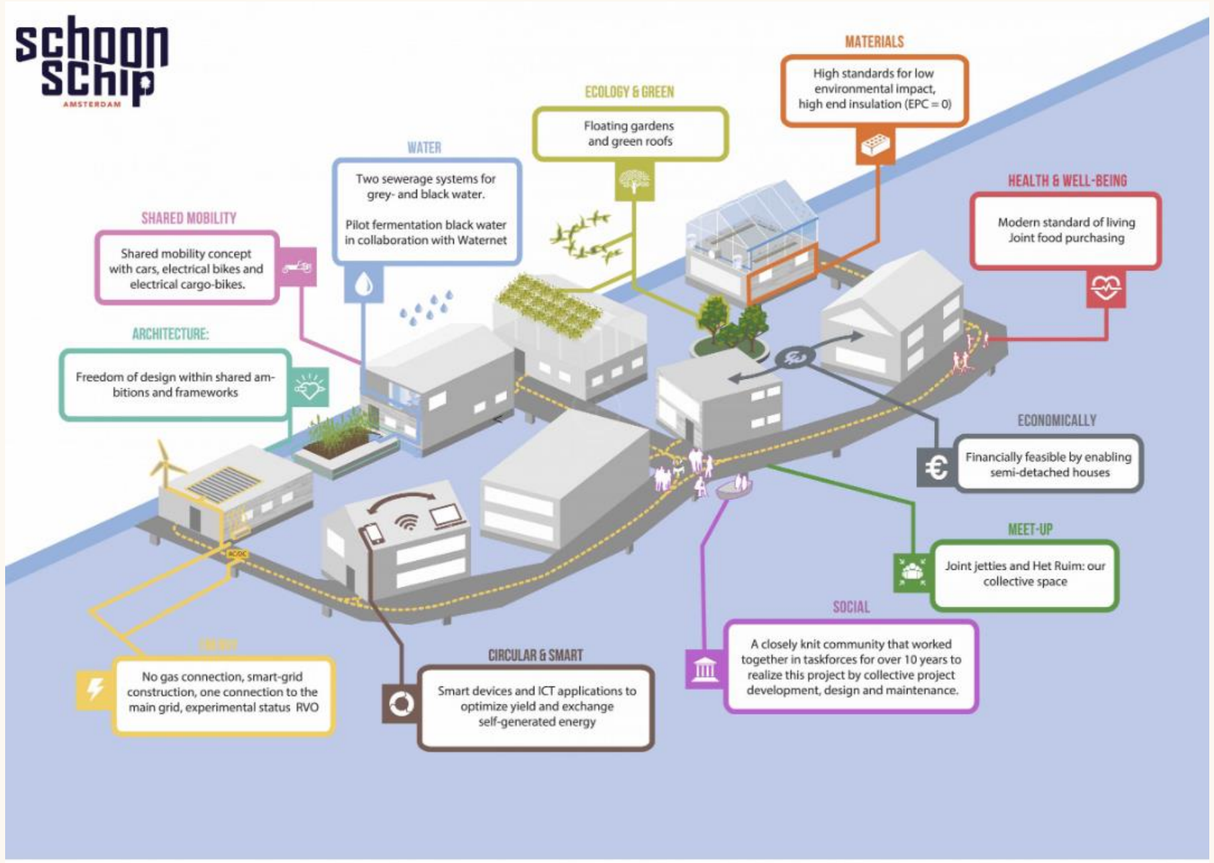
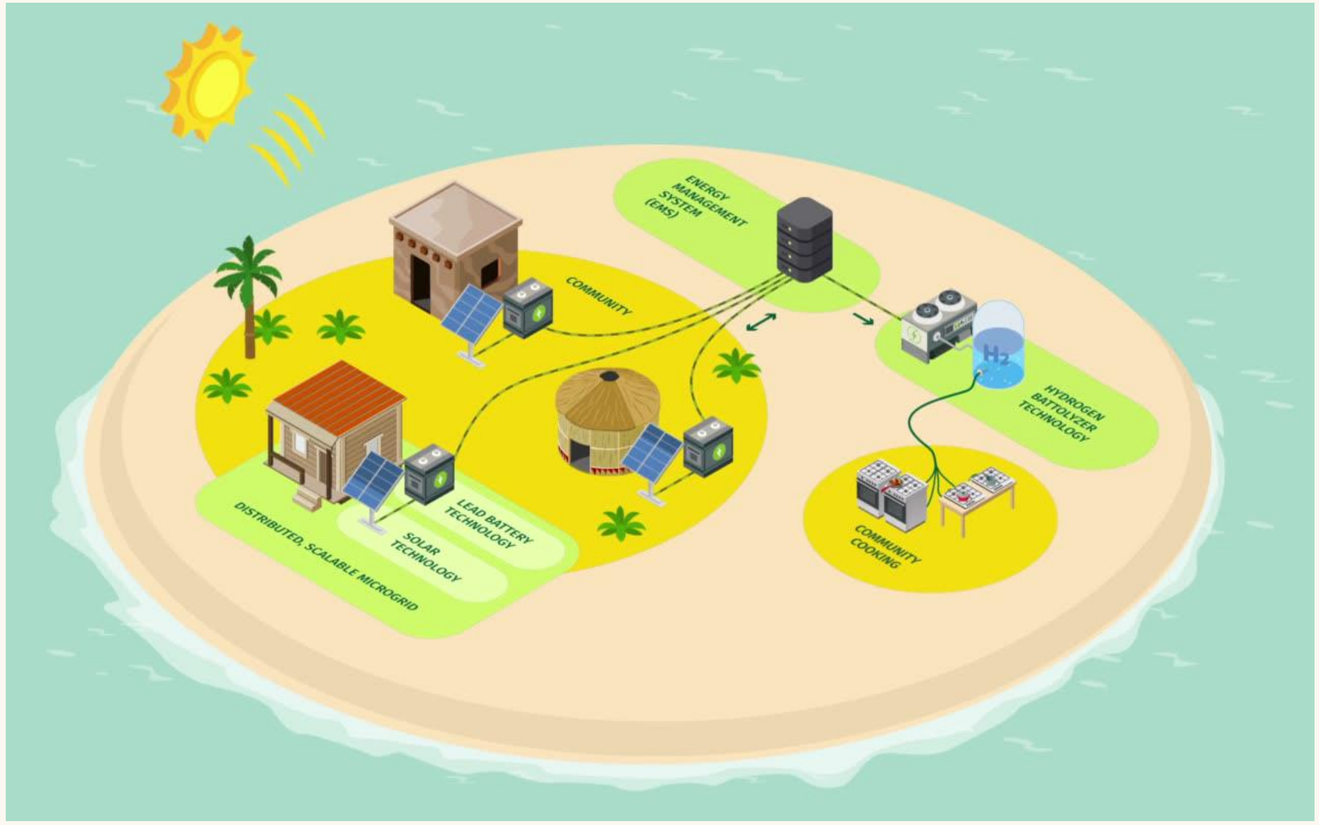


Image: Metabolic

Case Studies / Applications (cont.)

2) LOCEL-H2, Ivory Coast

Scalable, decentralized, plug & play prosumer microgrid with 100% renewable solar energy production that will provide electricity for two communities in Africa.



WHY?

New twist on old battery technology
Creates Hydrogen fuel
High ecololical and environmental impact

ASES SOLAR 2024
Connecting Technology & Policy

The 4 Ms: Markets, Marketing, and Mistakes Made:

- The rapid growth of microgrids & SIDEs underscores the necessity for decision-making support.
- Utilizing smart management tools enables scalability and expedites time-to-market.
- Past errors include:
  - Engaging inappropriate stakeholders,
  - Over-optimistic marketing (NEOM)
  - Misaligned budget allocations and timelines
  - Inadequate integration of mixed technologies
  - Inadequate Energy Management Systems
  - Operational silos

ASES SOLAR 2024
Connecting Technology & Policy

Conclusion:

- New battery technologies, decentralized power generation, smart energy management systems
- Reduce TCO for grid operators and communities alike
- Global demand of limited resources (electricity, drinking water, climate change) ask for resilient, low-carbon & scalable power solutions

ASES SOLAR 2024
Connecting Technology & Policy

REFERENCES:

https://schoonschipamsterdam.org/en/#het-plan

https://www.se.com/us/en/download/document/Buildings_WP517_EN/

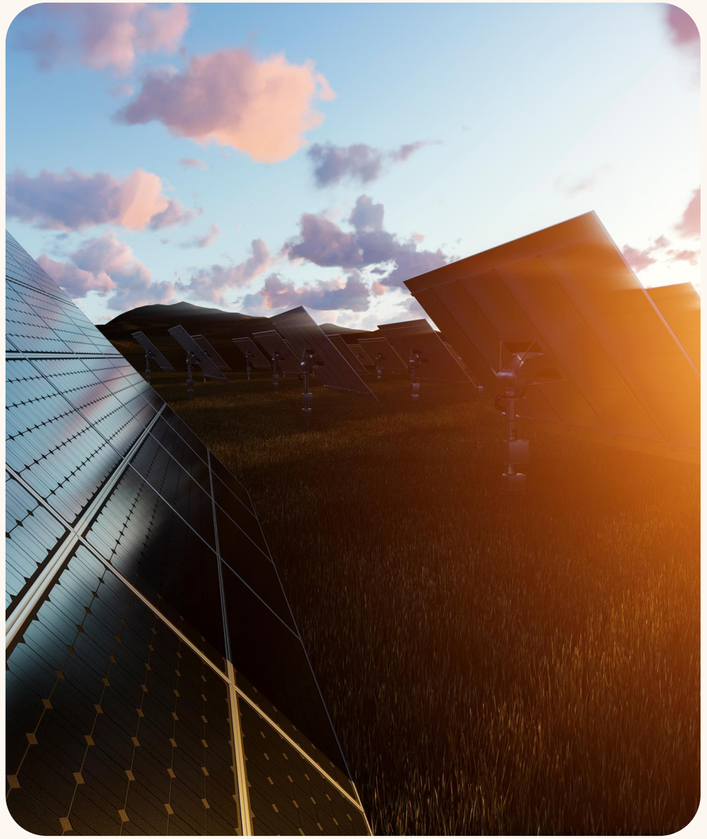
https://blog.se.com/datacenter/2018/08/29/calculate-compare-tco-lithium-ion-vs-vrla-batteries/

https://localh2.org/

https://etap.com/solutions/microgrid

https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/battery-2030-resilient-sustainable-and-circular

https://www.researchgate.net/publication/377026458_Microgrid_Protection_Coordination_Considering_Clustering_and_Metaheuristic_Optimization



ASES SOLAR 2024

Connecting Technology & Policy

Thank You for your Interest & Participation.
For Follow-up:

Ben Glenzer

Linked-in: https://www.linkedin.com/in/ben-glenzer-26609b9/

SSFA