Microgrid Financing in 2023
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IEEE Financial Summit
Seattle, WA

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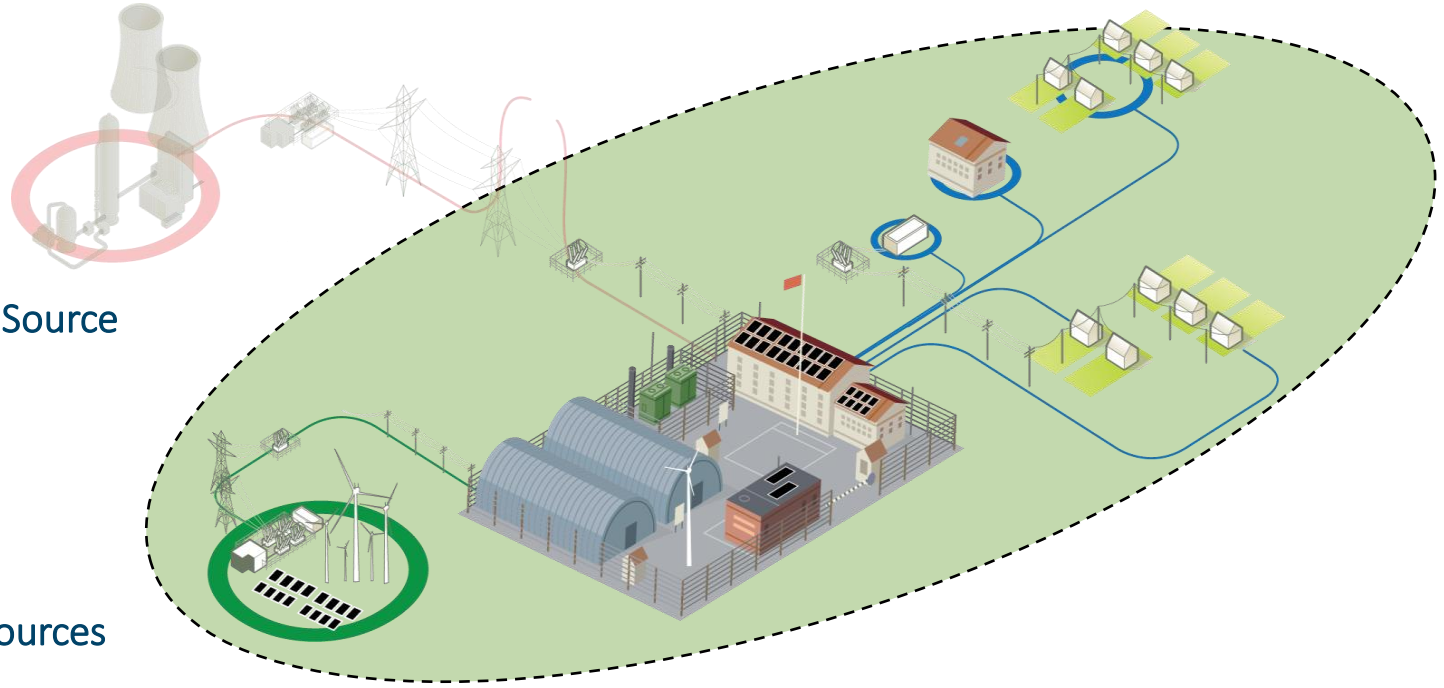

Feasibility Study → Financing → Design & Engineering → Construction → Factory Testing → Install/ Commissioning → Training → Operations & Maintenance

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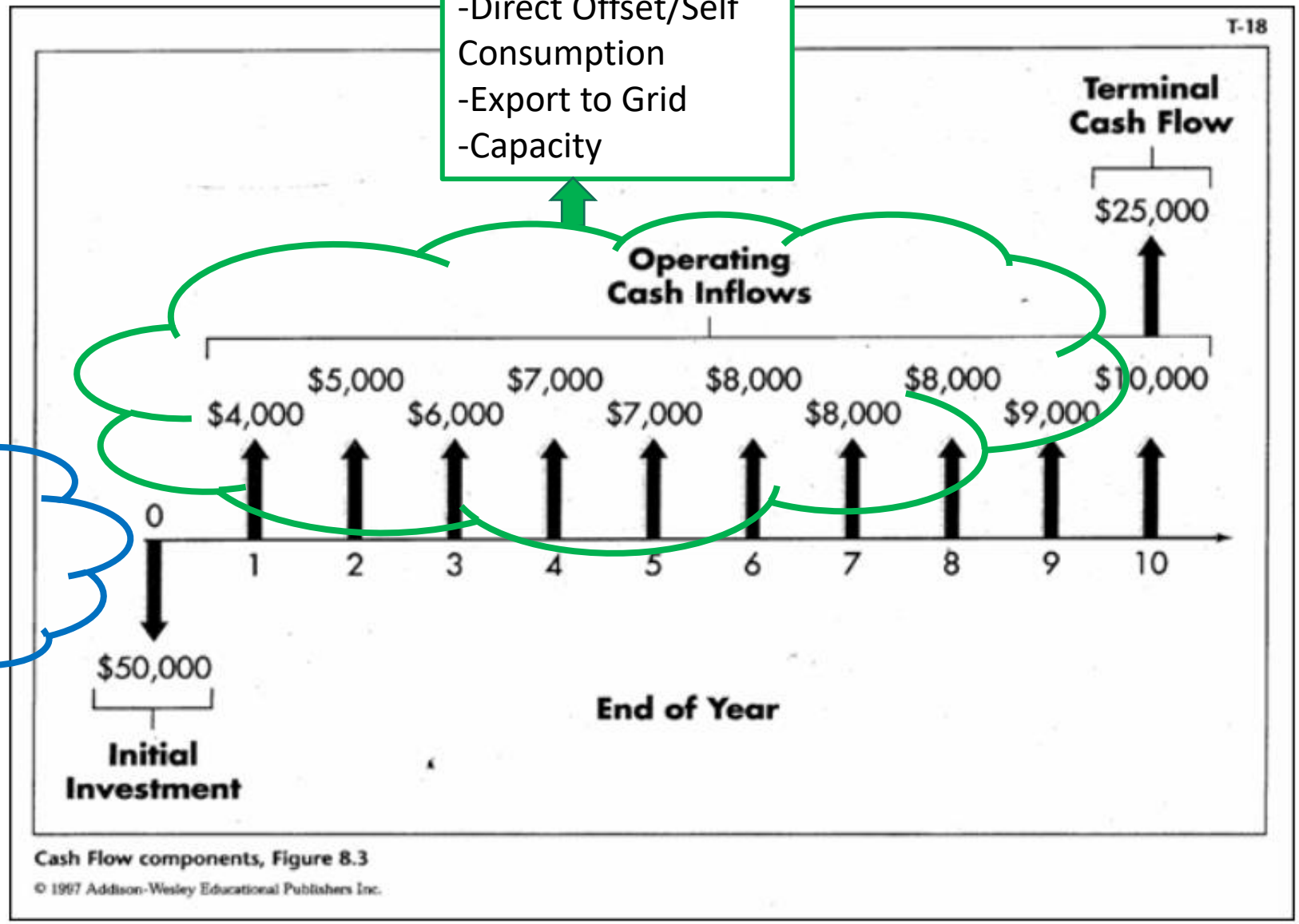
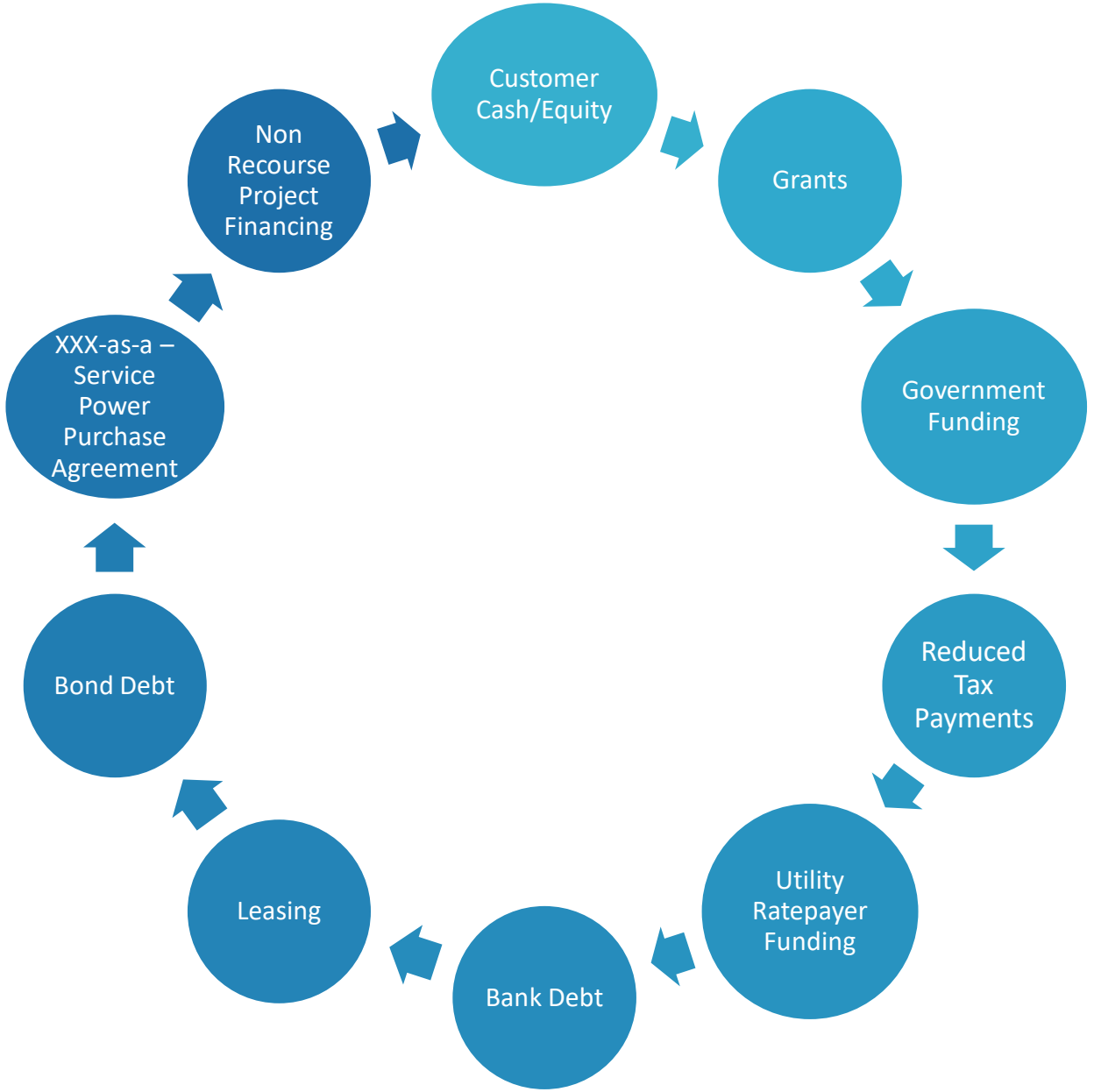
Simplified Overview of Long-Term Incremental Cash Flows

-Direct Offset/Self Consumption
-Export to Grid
-Capacity



-Incentives for Buy-Down
-Tax Credits
-Rebates
-Direct Subsidy

Different Types of Energy Finance



Energy Finance depends on Energy Project Type

North Sea Oil Financing

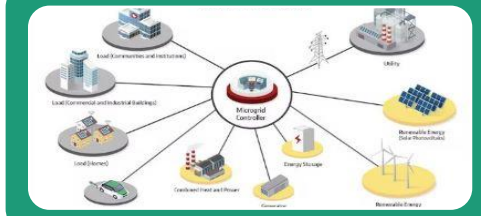
- Predictable Production
- Known Technology
- Variable Pricing

Cogeneration

- Predictable Production
- Electricity/Heat Interplay
- Variable Fuel Costs
- Known Technology
- Stable Off-Take Pricing

Offshore Wind Power

- Variable Production
- No Fuel Cost
- Known Technology
- Stable Off-Take Pricing



Hybrid Microgrid

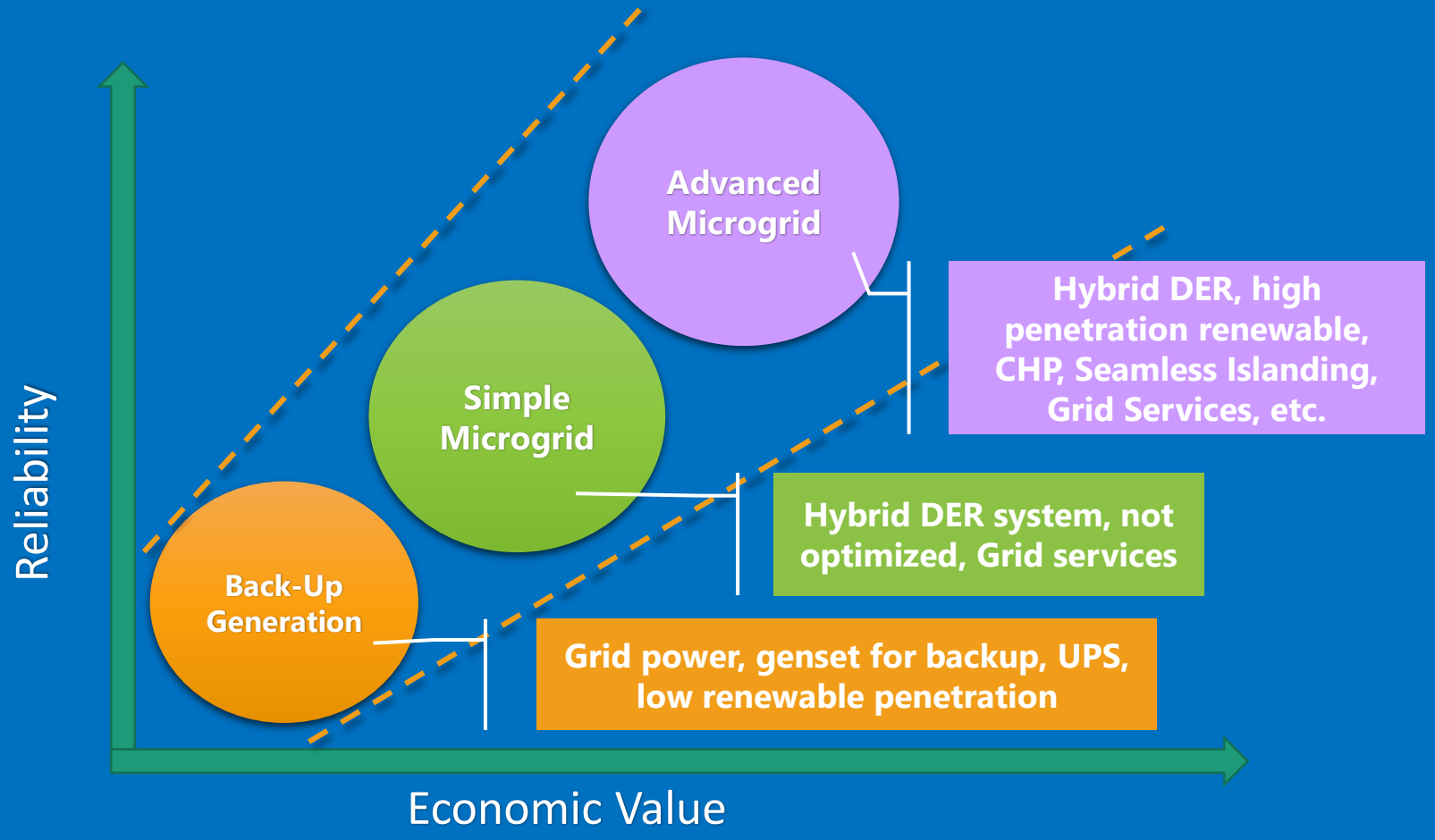
- Variable Production
- Variable Load
- Variable Fuel Costs
- Stable Off-take Pricing
- Relatively Unknown Technology

Low **Medium** **High**

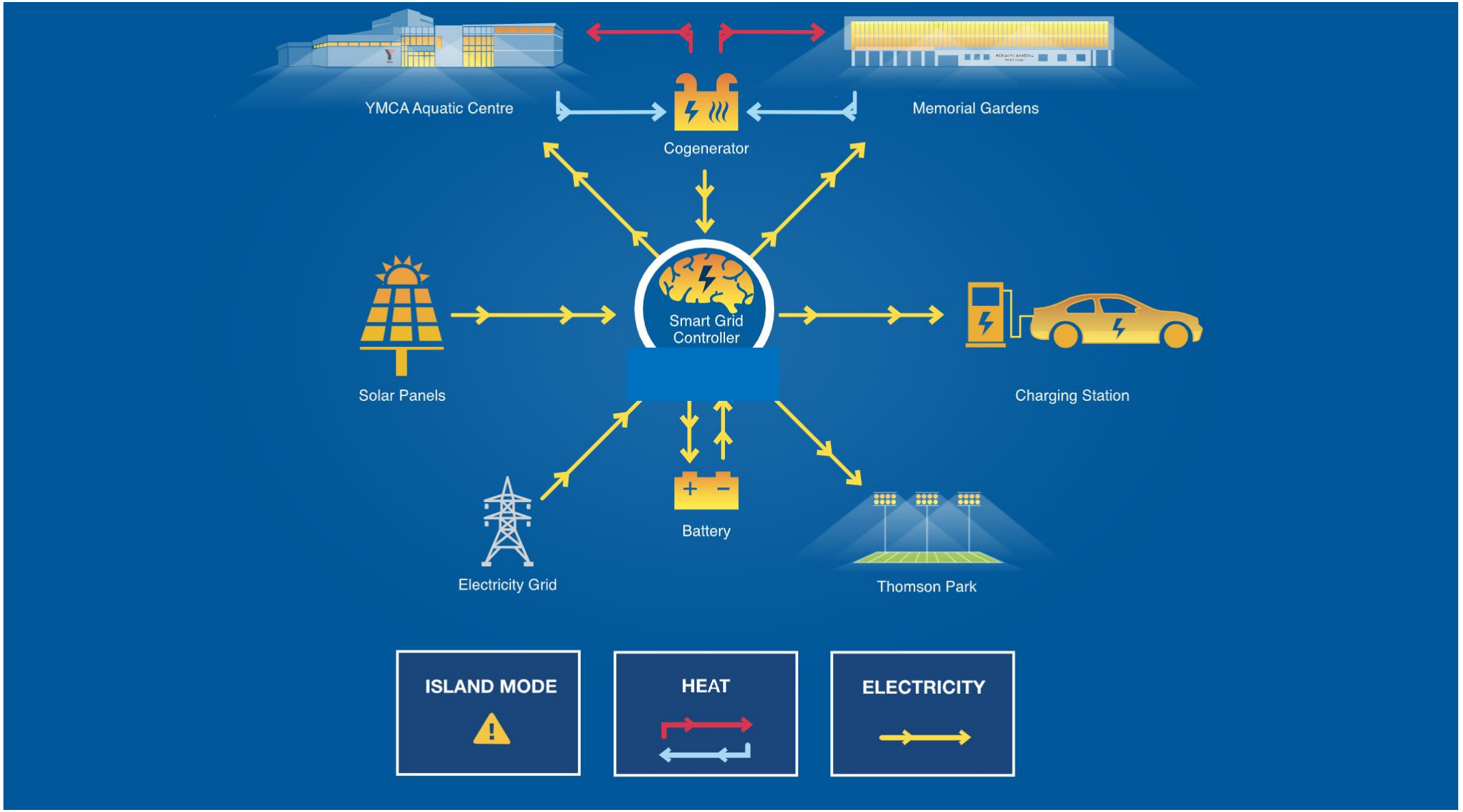
Level of Complexity

Microgrid Value (from user standpoint) Grows with Complexity

Microgrid Value (from Financier standpoint) may be diminished by Complexity



North Bay Hydro Community Energy Park, Ontario, Canada

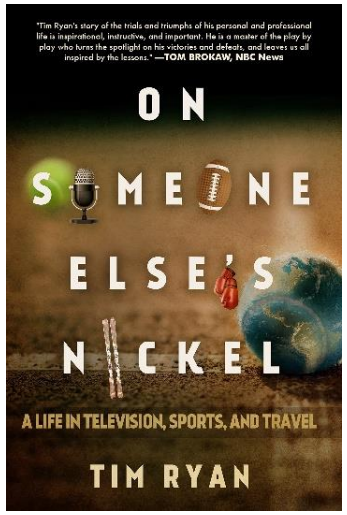


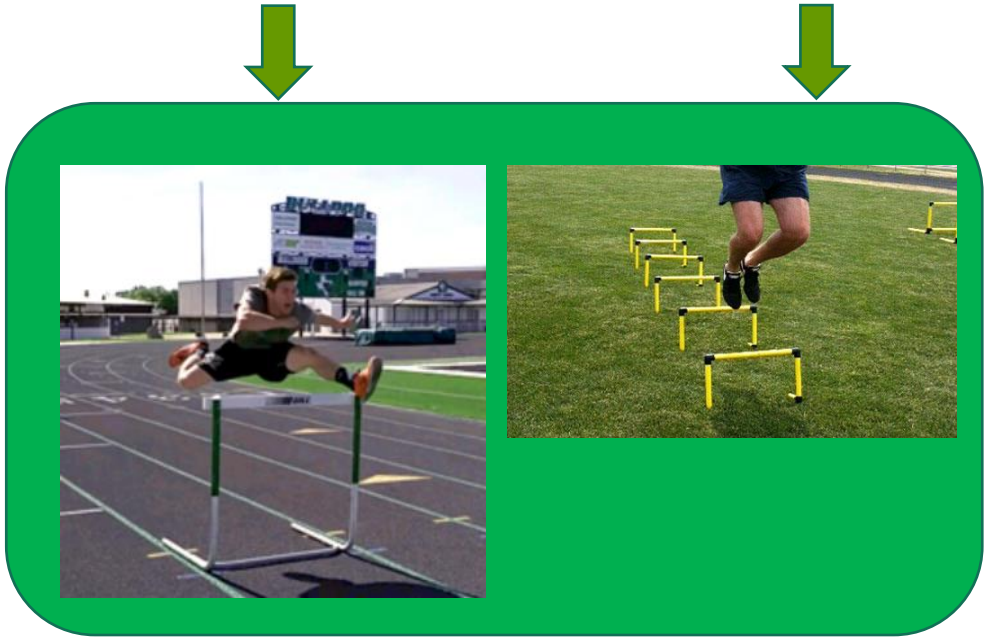
Source: North Bay Hydro Community Energy Park

Microgrid as a Service Creates Benefits to End User

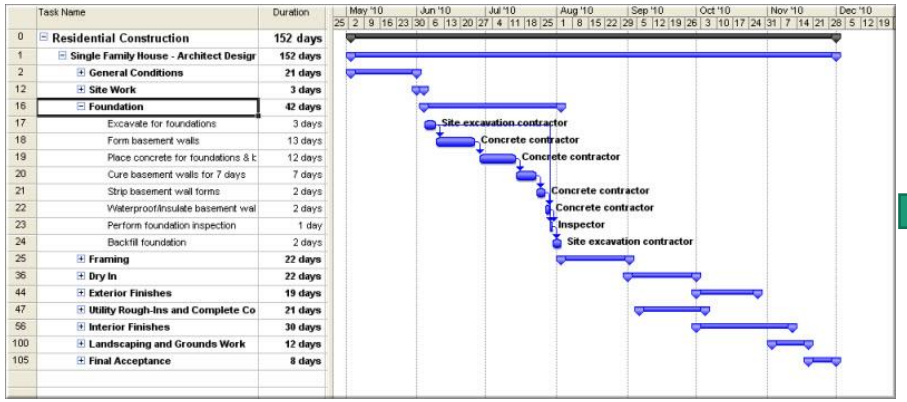
Reliability

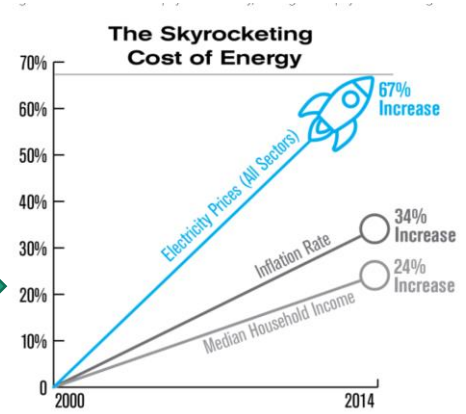
Resiliency





Microgrids as a Service Mitigates Risk



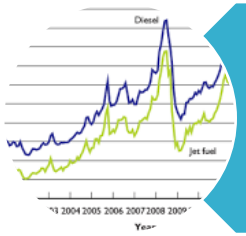


Source: http://energy.i2i.org/2016/02/15/energy-policy-center-report-electricity-rates-skyrocket-across-all-colorado-sectors/

The MaaS Model incentivizes O&M optimization

Ongoing, Intelligent

Process Control

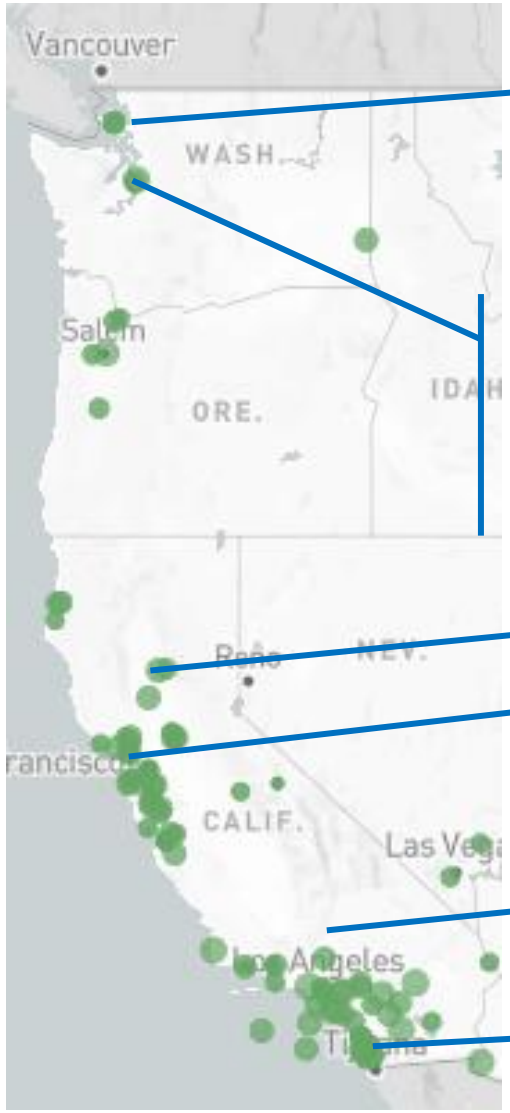


Key Variable Changes can result in enhanced use cases

A successful MaaS provider is driven to retaining IM

MaaS Contracts can include O&M performance metrics with financial kickers and penalties

Selected Microgrid Finance Models from WA and CA



1) OPALCO Decatur Island Community Microgrid, San Juan Islands (2018)
   - Technology: 504 kW, Solar + Storage, 2018;
   - **Funding** via State of WA grant and Utility Investment
   - Grid Connected
2) Decatur Island, Orcas Power & Light Cooperative (2020)
   - Technology: 500 kW Generation, 1000 kW Storage
   - **Funding**: Washington State Grant, Utility
   - Remote

Seattle City Light, Miller Community Center (2021)
- Technology: Battery Storage, solar panels, and microgrid controls;
- **Funding**: State of WA Grant, Seattle City Light Utility Grid Connected

Castello di Amorosa Winery
- Technology: Battery Storage, solar panels, and microgrid controls;
- Funding: Self Funded
- Grid Connected

UC Berkeley Microgrid (30 MW)
- Technology: Battery Storage, solar panels, and microgrid controls;
- Funding: Likely Microgrid as a Service
- Grid Connected
- Operational in 10 Years.

Bluehouse Greenhouse Microgrid (Lancaster, CA)-13 MW
-Technology: Solar, Wind, CHP, Carbon Recovery
-Funding-Microgrid as a Service (Endurant)
-Not Grid Connected

City of San Diego Microgrids (8 Microgrids)
-Technology: 930 kW Solar, 2 MWh of battery storage and EV Charging Stations
-Funding- Shell New Energies under a Microgrid as a Service Model, Gridscape-$950,000, Grant Funding from the California Energy Commission.
-1st Microgrid operational in March 2023

Source: U.S. Department of Energy Combined Heat and Power and Microgrid Installation Databases

The Outlook for Microgrids and Microgrid Finance

- Global microgrid market size is projected to be worth USD 85.7 billion by 2030 growing at a CAGR of 14.03% between 2022 to 2030 Precedence Research
- North America will continue to capture largest market share (40% of global share in 2021), primarily in Commercial & Industrial Sector
- Grid Connected Microgrids comprise 60% of total revenue share and will continue to grow as % of total
- Continued movement towards renewables away from fossil-fuel generation within microgrids
- 1-5 MW Project Size will predominate over 2023-2027 timeframe: (Microgrid Market)
- Microgrid-As-A-Service expected to grow by 15.7%/yr from 2022-2031 (Transparency Market Research)
  - Driven by multi-billion companies that can carry debt burden
  - MAS becomes less expensive ($/kW) as project size grows
  - More projects, more data, less uncertainty, less risk
  - Higher Interest rates, less 3P Capital, lower interest rates more 3P Capital

Thank You!

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References and Resources

- Think Like a Financier to Win Funding for Your Microgrid Project, November 25, 2020, Microgrid Knowledge
- Microgrid Financing: How to Fund Your Project, Microgrid Knowledge, November 30, 2021, Microgrid Knowledge
- The Bankable Microgrid: Strategies for Financing On-Site Power Generation, December 2015, Navigant Consulting
- Private, State, and Federal Funding and Financing Options to Enable Resilient, Affordable, and Clean Microgrids, January 2021, National Association of Regulatory Utility Commissioners
- The Impact of Project Financing in Sustainable Energy Projects, October 6, 2022, CleanTechnica
- Microgrid Global Market Report 2022 Summary, June 2022, Report Linker
- S&C Microgrid Projects Map, August 2019, S&C Electric
- Microgrid and Integrated Systems Program, January 2022, U.S. Department of Energy
- 22 intriguing microgrid projects to watch in 2022, January 2022, Microgrid Knowledge
- Global Microgrid Market Analysis Report 2022-2027 (Summary), August 2022, Cision PR Newswire
- Think Like a Financier to Win Funding for Your Microgrid Project, 2020, Microgrid Knowledge
- Designing Microgrid-as-a-Service Agreements Requires State of the Art Design Methods, September 29, 2021, Microgrid Knowledge
- North Bay completes Canada's first utility-scale microgrid, July 17, 2019, Microgrid Knowledge
- Miller Community Center-Solar Microgrid, Seattle City Light
- Castello Di Amorosa Installs a Solar Microgrid, Wine Industry Network Advisor
- San Diego Approves Deal with Shell New Energies for 8 Microgrids, July 2021, Microgrid Knowledge
- Endurant Enters High-Tech AG Sector with $30 MM Microgrid, August 2021, Microgrid Knowledge
- Microgrid Deployment Tracker 3Q22 Summary, Guidehouse Insights
- Microgrid Market Size to Worth Around USD 85.7 Billion by 2030, November 23, 2022, Globe Newswire
- Microgrid-as-a-Service Market, 2021, Transparency Market Research
- U.S. Department of Energy CombinedHeat & Power and Microgrid Installation Databases, 2023, U.S. Department of Energy

Selected Microgrid Capsule Summaries from WA and CA

- Community Energy ParkNorth Bay Hydro Microgrid, North Bay Ontario, 1 MW, 530 kW natural gas, 9 kW Solar; Storage, EV Charging; Funded by Ontario Independent Electricity System Operator; Municipal and Federal Gov't. 2019, Grid Connected
- JFK Int'l Airport, 11.4 MW 7.7 MW rooftop solar, 3.7 MW fuel cells, and 2 MW/4 MWH battery storage. Financed by Alphastruxture (a Carlyle Group/Schneider JV) using Energy as a Service Model, Grid Connected, Operational Date 2026-2030
- Seattle City Light, Miller Community Center, 680 kW; Battery Storage, solar panels, and microgrid controls; State of WA Grant, Seattle City Light Utility Funding, Grid Connected
- OPALCO Decatur Island Community Microgrid, SanJuan Islands, 504 kW, Solar + Storage, 2018; funded via State of WA grant
- Decatur Island, Orcas Power & Light Cooperative, 500 kW Generation, 1000 kW Storage, 2020
- Arlington Microgrid, Snohomish County Public Utility District; Grid Connected, Storage 1 MW/1.4 MWh, 500 kW AC Solar Array, V2G, 350 kW Emergency Generator, Microgrid Control System; Funding: State of WA Grant, SNOPUD
- Castello di Amorosa Winery, 2022, Grid Connected, 375 kW Storage, 250 kW Storage, Self Funded
- City of San Diego, 8 Microgrids comprising 930 kW Solar, 2 MWh of batter storage and EV Charging Stations, Shell New Energies to Own and Operate under a Microgrid as a Service Model, Gridscape Contributed $950,000, Shell New Energies $4 MM, Grant Funding from the California Energy Commission. 1st Microgrid operational in March 2023
- Kaiser Permanente Ontario CA Microgrid; 2.2 MW of solar, 1 MW fuel cell, and 9MWh battery, $8 MM CEC Grant; Grid Connected
- Bluehouse Greenhouse Microgrid, Southern California, 13.2 MW Microgrid, using EAS Model, Endurant is the developer, 4, 3.3 MW Natural Gas fired Ecomax CHP systems, Not Grid Connected,
- UC Berkeley, Campus Microgrid, Carbon Neutral, All Electricity procured to be carbon free, Add of 30 MW Soar to replace On-Campus Co-Gen, Grid Connected, Operational in 10 Years.