Microgrid Financing in 2023
February 3, 2023
IEEE Financial Summit
Seattle, WA

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Simplified Overview of Long-Term Incremental Cash Flows

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

- Direct Offset/Self Consumption
- Export to Grid
- Capacity
Different Types of Energy Finance

- Non Recourse Project Financing
- Customer Cash/Equity
- Grants
- Government Funding
- Reduced Tax Payments
- Utility Ratepayer Funding
- XXX-as-a-Service Power Purchase Agreement
- Bond Debt
- Leasing
- Bank Debt

Non-Recourse Project Financing
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

Level of Complexity
- Low
- Medium
- High
Microgrid Value (from user standpoint) Grows with Complexity

Microgrid Value (from Financier standpoint) may be diminished by Complexity
Microgrid as a Service Creates Benefits to End User

Reliability

Resiliency
Microgrids as a Service Mitigates Risk
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

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.

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

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

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
• *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
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 Alphastruxtire (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.