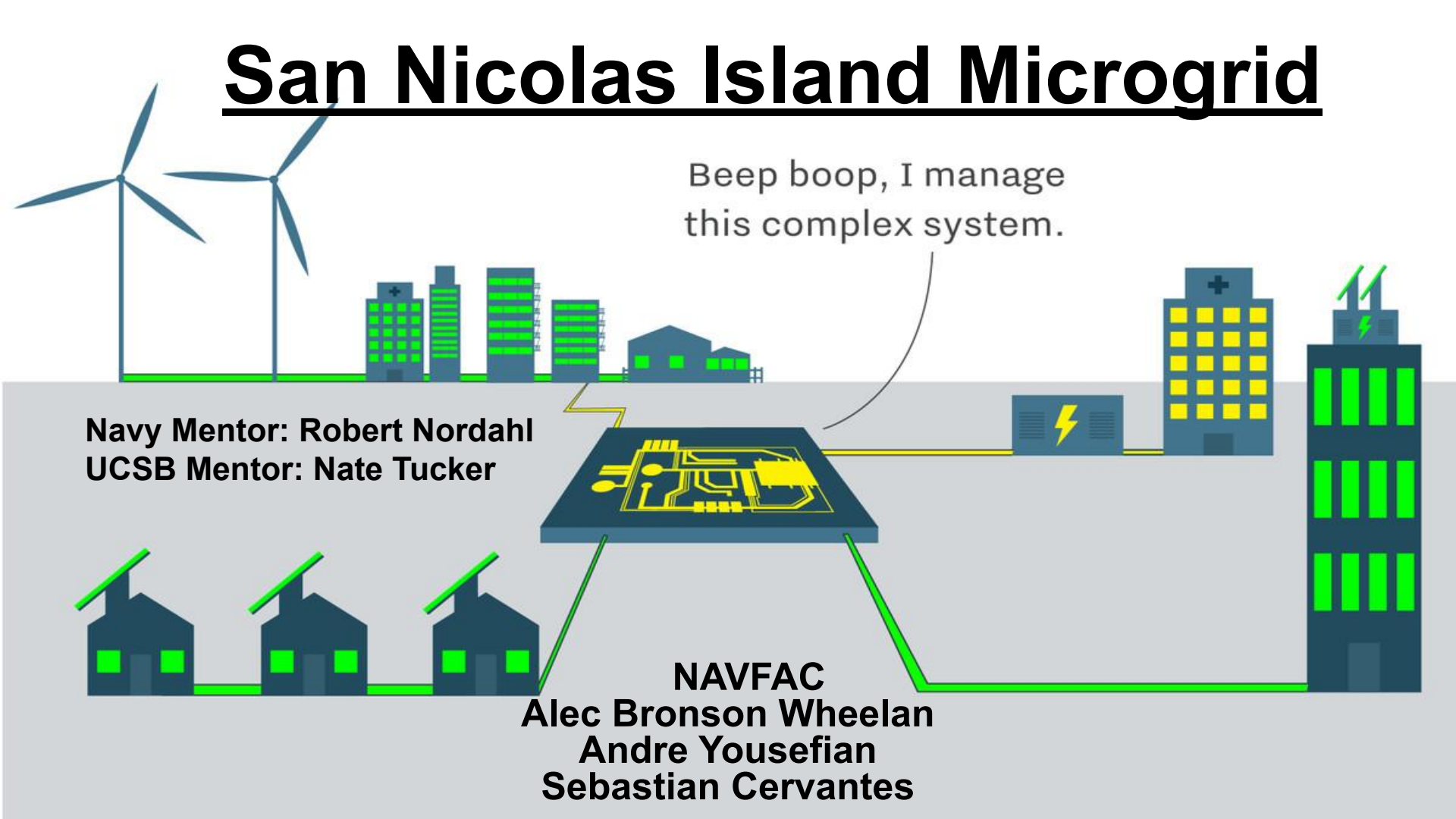
San Nicolas Island Microgrid



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Project Goals

1. Lower costs
2. Reduce carbon emissions
3. Emphasize resilience

San Nicolas Island (SNI) Pier:

*Diesel fuel must be barged to the pier.

Benefits

- Back-up power
- Save costs
- Support remote research

Microgrid Energy Storage:

*A 1 MW Battery by Caterpillar, shipped by cargo plane

Design Requirements

1. Average load: 550 kW
   Peak load: 1.5 MW
2. Improve resilience
3. Lower carbon emissions

Microgrid Team at SNI:

Constraints

1. Money
2. Land area
3. Harsh weather conditions
4. Remote Location
5. Wildlife

Native Fox on SNI:

Diesel Generators on SNI

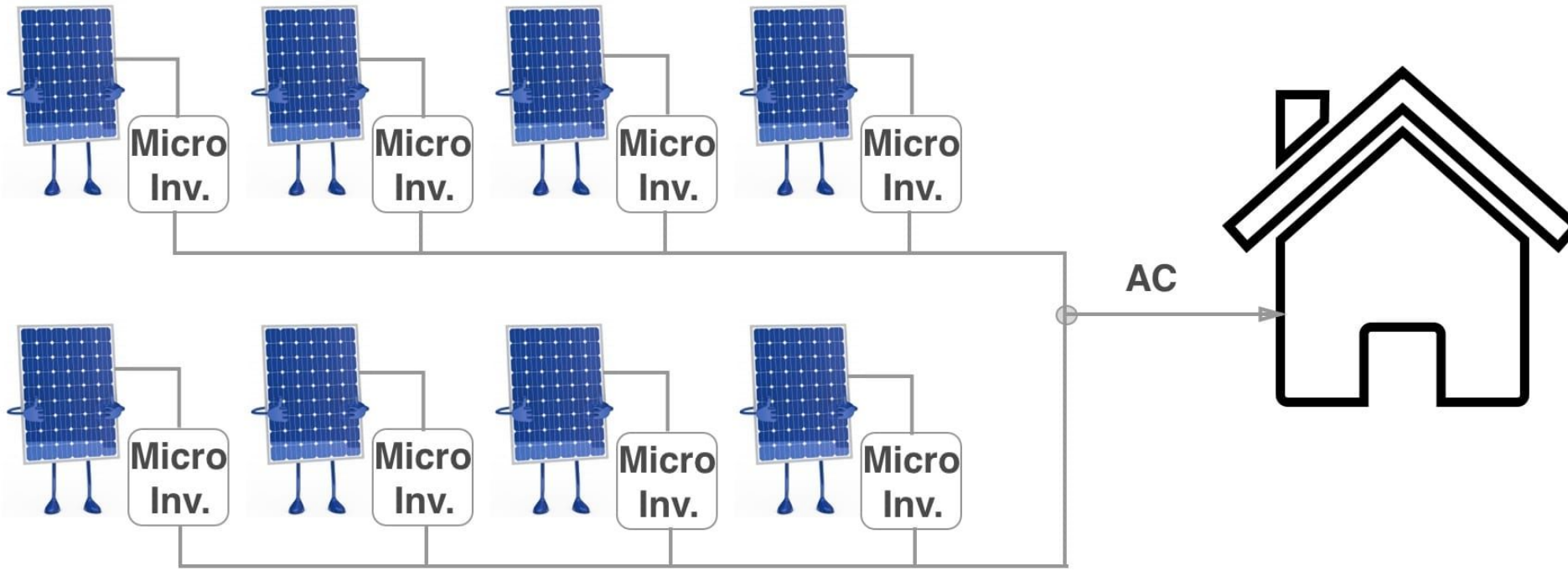
Renewable Components

Proposed Additions:

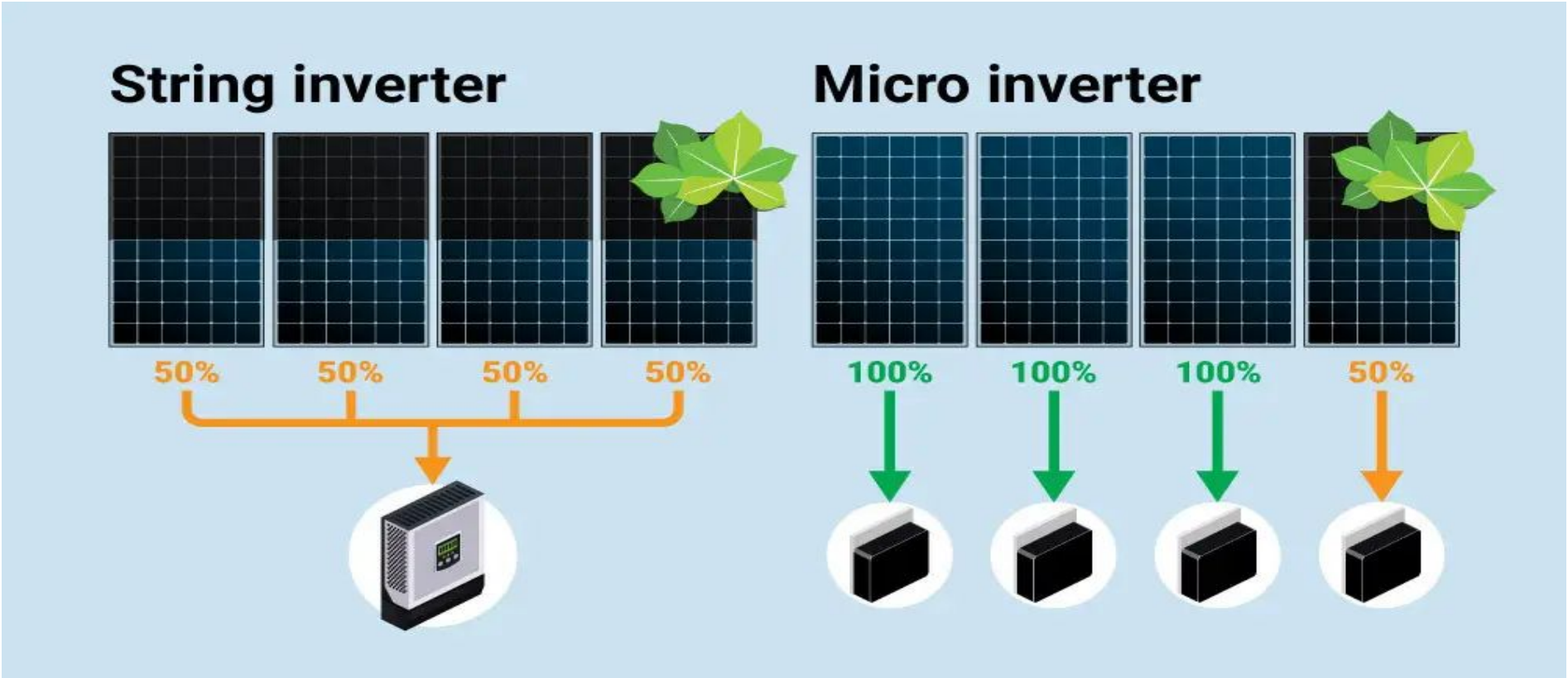
1. **Electric Vehicles:**

2. Protective Coating:

3. Microinverter:



Why Microinverters?

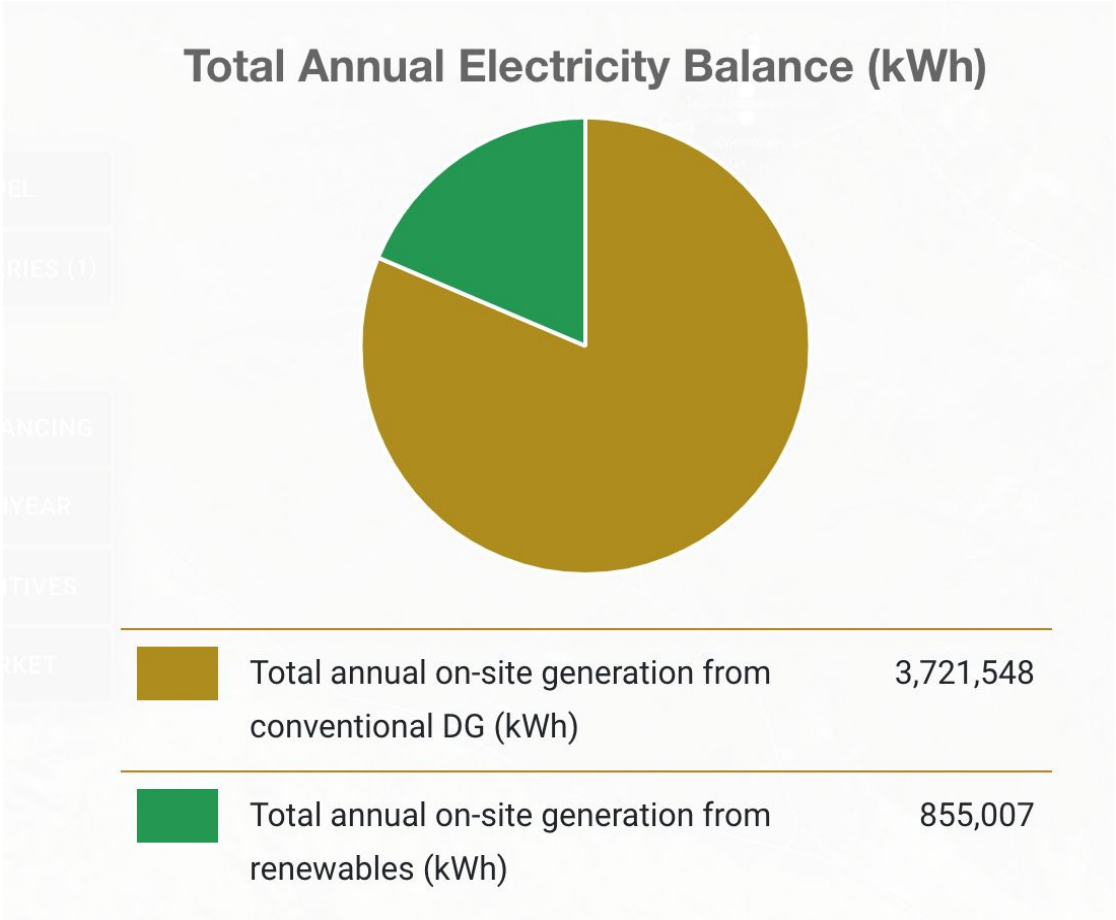


Testing Methods

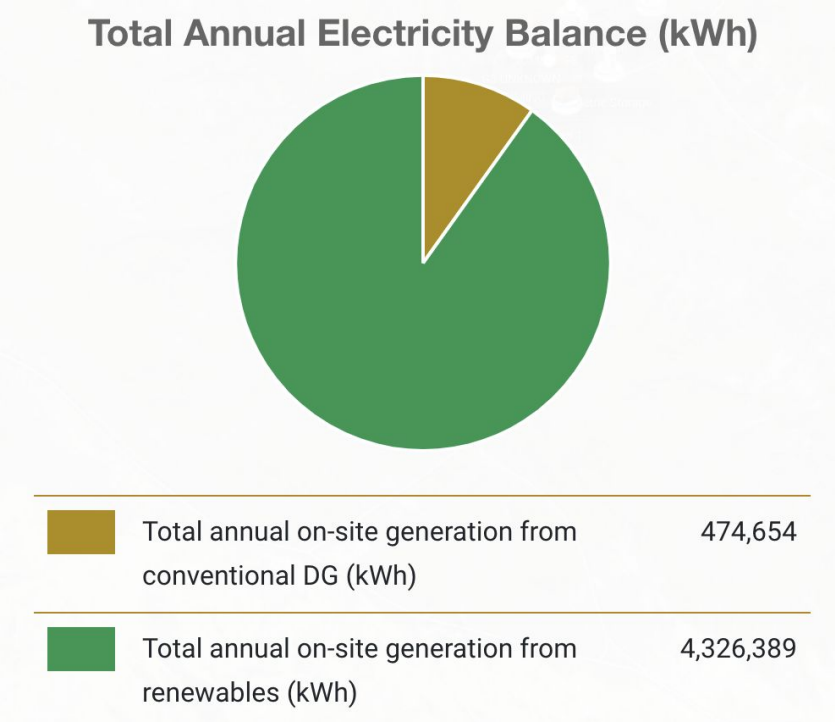
Xendee Modeling:

Microgrid Test Bed:

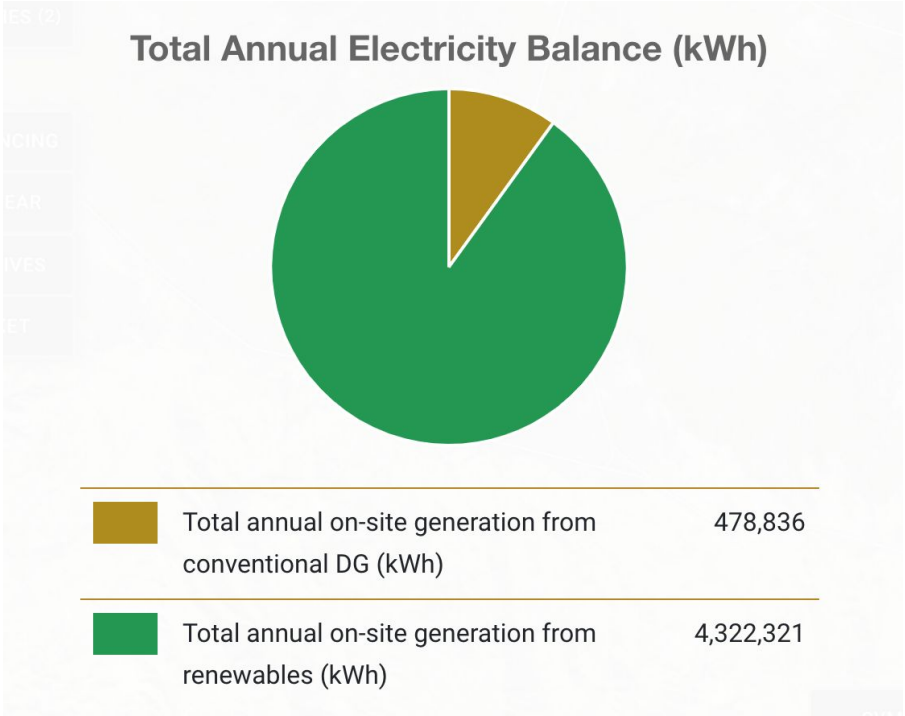
Current


Total Annual Electricity Balance (kWh)
Total annual on-site generation from conventional DG (kWh)
3,721,548
Total annual on-site generation from renewables (kWh)
855,007

PV/Battery Proposal



Inverter/PV/Batt Proposal



Comparing Scenarios

Scenario	Total Savings (%)	LCOE ($/kW)	Break Even Year	CO_2 Emissions (Tons)
Existing	N/A	0.4706	N/A	3,808
PV + Battery Proposal	55.0	0.2560	5 Years	395
Inverter Proposal	54.9	0.2571	5 Years	398

Conclusion

Summary:

- Resiliency added

Future:

- EV storage
- Protective coatings

Acknowledgements

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- Juan Enriquez

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- Nate Tucker
- Wendy Ibsen
- Doug Bradley