

# Bowman

## Navigating Grid Interconnection in Curaçao

*Presented by*

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# The Curaçao Project Context

## THE CONTEXT OF CURACAO —



DEPENDENCY ON  
VENEZUELA



POPULATION  
APPROXIMATELY  
150,000



COMMERCIAL  
AND RESIDENTIAL  
ELECTRICITY RATE  
AVERAGES AT  
\$0.35 PER KWH



OVERSUPPLY OF  
SOLAR WHEN  
DEMAND WAS  
LOW



ENTHUSIASM FOR  
RENEWABLE  
ENERGY

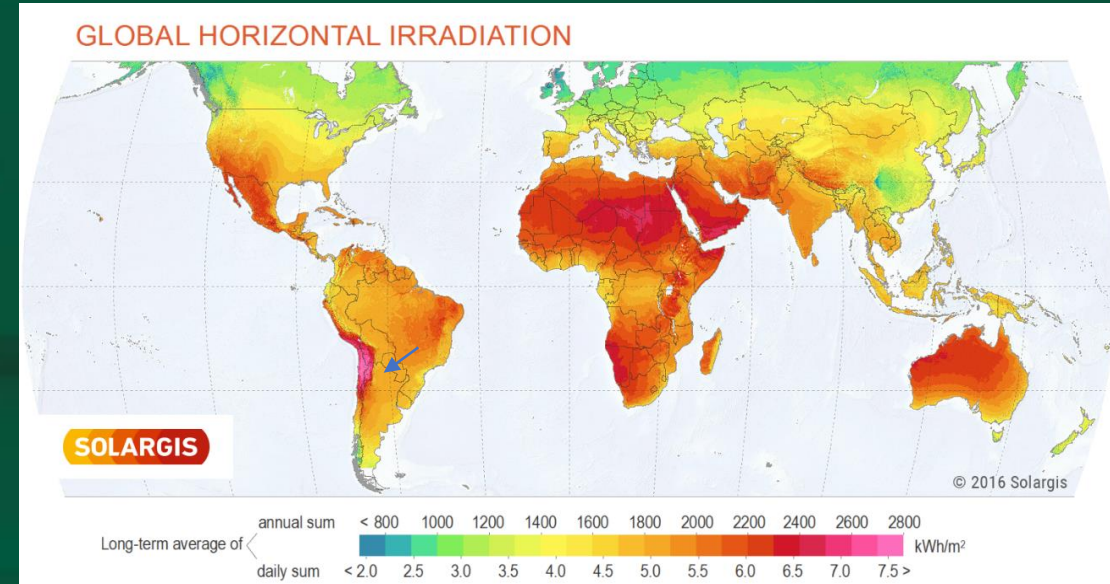


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# Compelling Argument

- ▶ Solar PV could provide at least 30% of Curacao's energy mix
  - ▶ At an upfront cost of \$256,500,000 USD for 171 MW of installed PV capacity
  - ▶ Annual income of \$81,312,000 USD
  - ▶ 3.2 year payback period
  - ▶ 32% rate of return
  - ▶ Lifetime value of \$1,776,300,000 USD



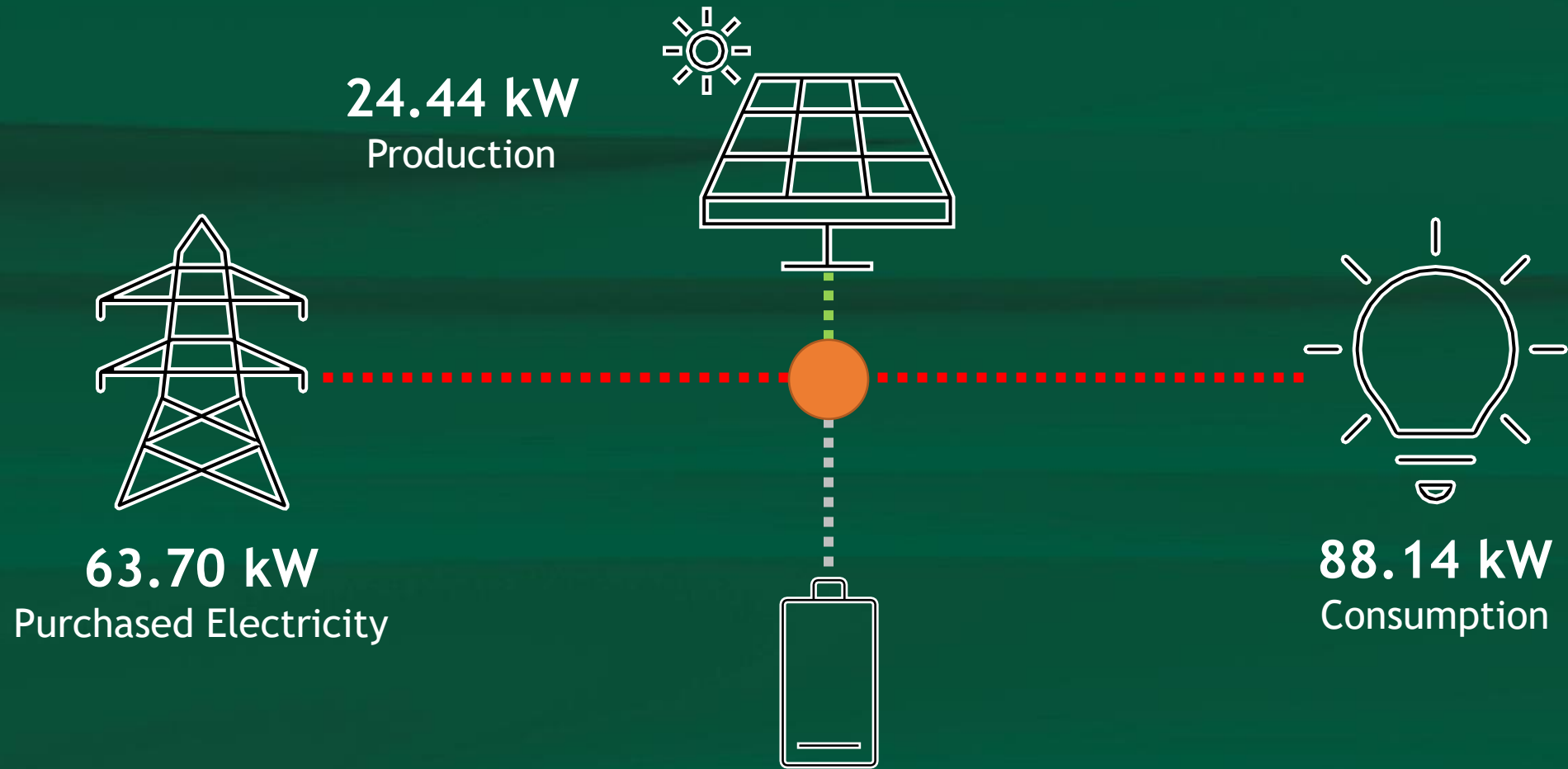
# High-Profile Net Zero Facility



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# Upon Further Investigation...



# System Undersized by at least 50%

- ▶ 36 months of utility bills collected to determine the energy and resource consumption
- ▶ Aqualectra calculated that the maximum size PV system for Post is 125 kW based on Post's average energy use over the previous year, connection capacity, and using (5) sun hours.
  - ▶ BUT, the utility bills were half of actual consumption due to billing / metering error
  - ▶ So PV system was undersized by AT LEAST half



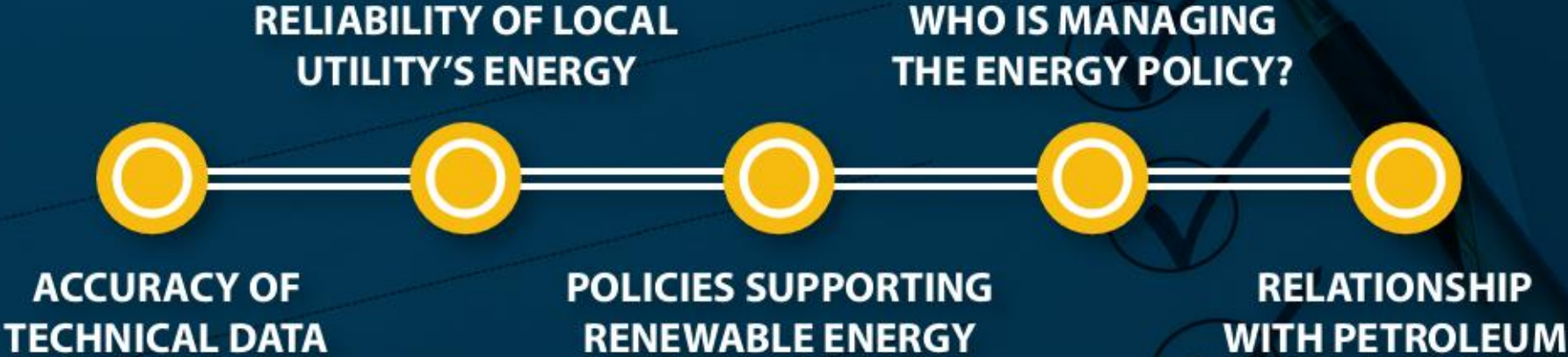
# Economics

- ▶ **Simple Payback Period = Initial Cost/Annual Savings**
  - ▶ = \$442,600 / \$30,073 annual savings
  - ▶ = 15 years
- ▶ **Simple Payback Period = Initial Cost/Annual Savings**
  - ▶ \$442,600 / \$15,036
  - ▶ 29 years!!



# Lessons Learned

## THE CHECKLIST





# Takeaways

- ❖ A microcosm of interconnection challenges globally
  - Integration of > 30% variable renewable energy penetration to the grid puts pressure on the grid
  - For portfolios over 30% RE penetration, future planning should take into account the cost of storage, faster-ramping generators, and forecasting.
  - Developers should show the value of DERs to the grid in addition to the cost

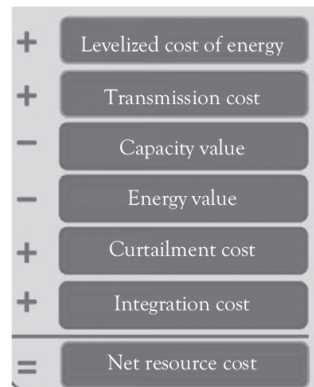
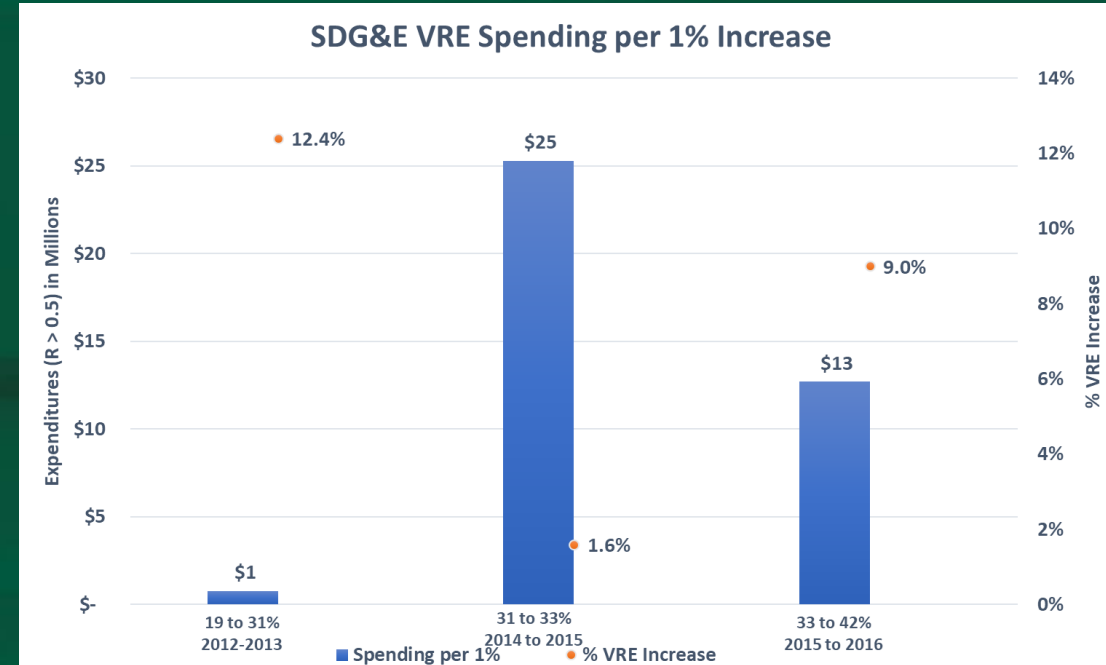


Figure 6.4 Factors comprising net resource cost.

Source: Energy and Environmental Economics, Inc. (E3). RETI 2.0 Plenary Group, Final Plenary Report.<sup>11</sup>



Source: Ginsberg, M, et al. 2019. IEEE.





# Questions?



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