RES West Africa| Dakar
2019, December 2nd

OUR MISSION

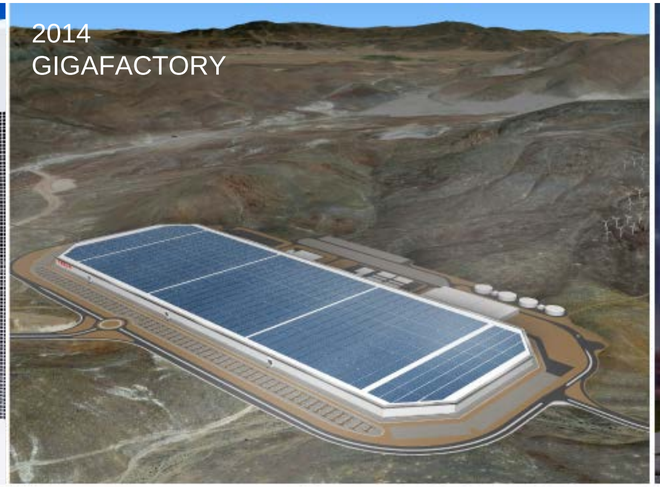
TIMELINE OF INNOVATION

2003
TESLA FOUNDED

2010
SUPERCHARGER
NETWORK

2012
TESLA ENERGY
PRODUCTS

2014
GIGAFACTORY



2016
ACQUIRED SOLARCITY
SOLAR ROOF
POWERWALL 2 & POWERPACK 2

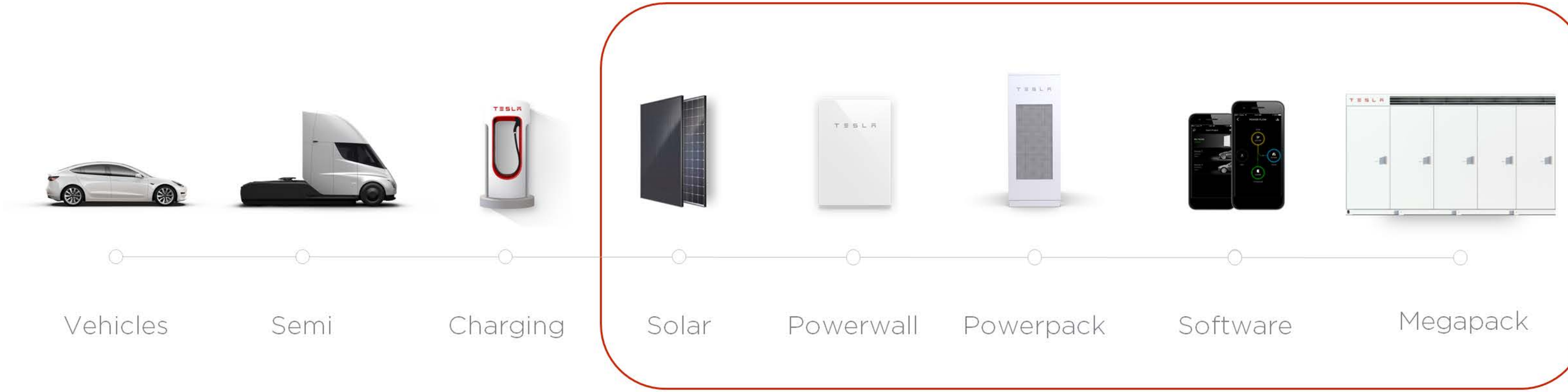
2008
ROADSTER

2012
MODEL S

2015
MODEL X

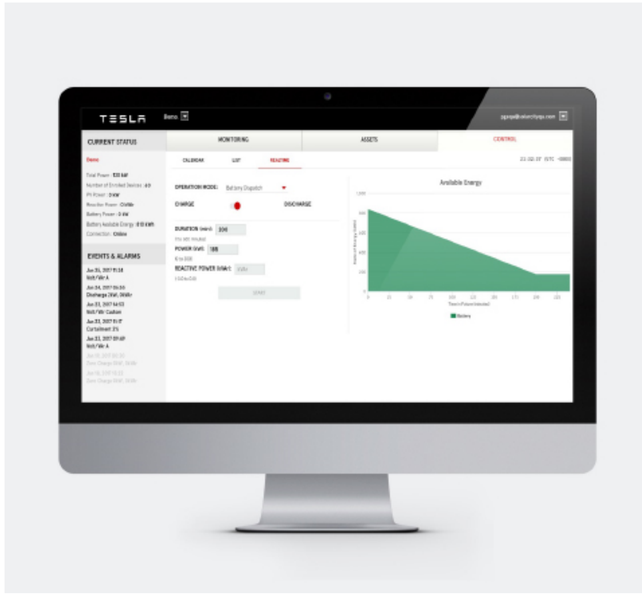
2017
MODEL 3

TESLA PRODUCT SUITE



Tesla Energy Products

TESLA IS YOUR SINGLE-SOURCE PROVIDER OF THE ENTIRE ENERGY STORAGE SYSTEM



Powerpack/Megapack

LITHIUM-ION BATTERIES

LIQUID THERMAL CONTROL

ISOLATED DC-DC CONVERTER

Inverter

BI-DIRECTIONAL

TRANSFORMER-LESS

MODULAR

OFF-GRID AND GRID-TIED CAPABLE

99% PEAK EFFICIENCY

Integrated Software

OPTIMIZATION SOFTWARE

BATTERY MANAGEMENT SYSTEM

SITE MASTER CONTROLLER

Remote Monitoring

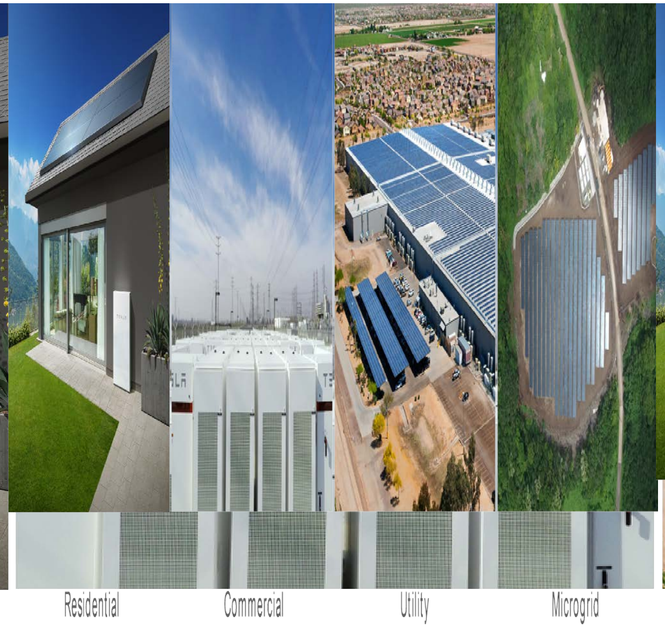
REAL-TIME MONITORING & CONTROL

REAL AND REACTIVE POWER SERVICES

OPTIMIZED DISPATCH AND MARKET PARTICIPATION

TESLA

STORAGE IS PROVEN ACROSS A RANGE OF APPLICATIONS



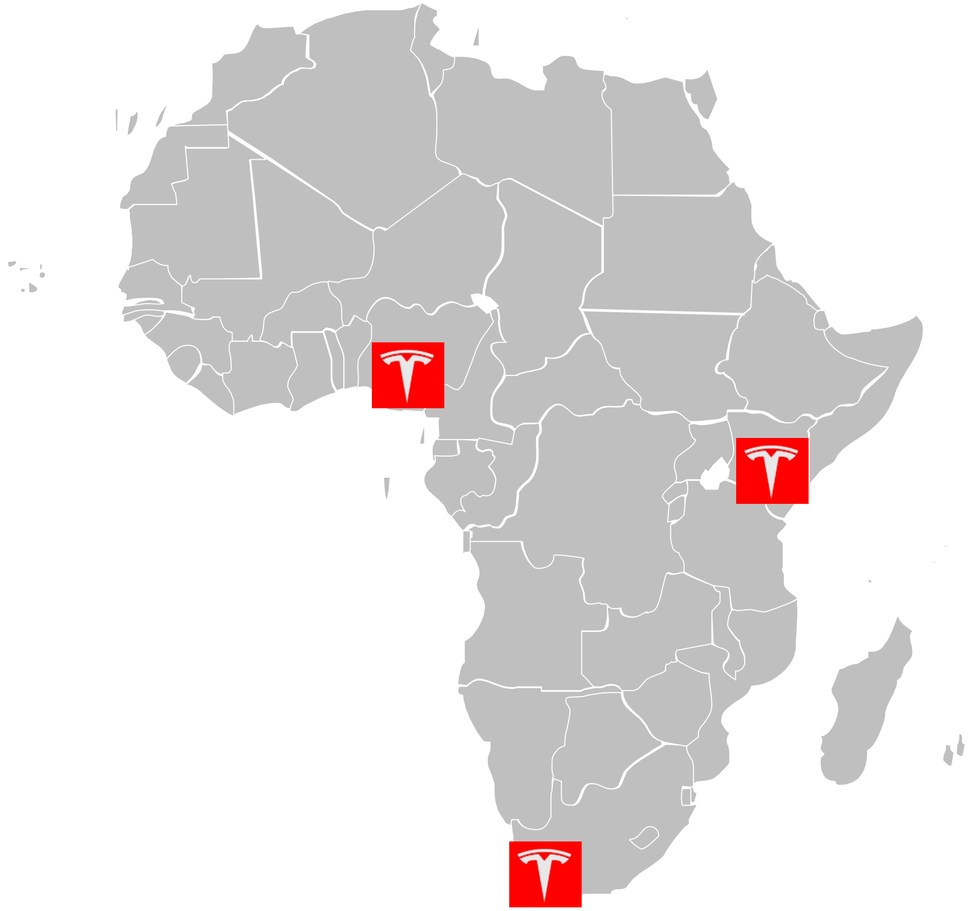
Residential | Commercial | Utility | Microgrid

TESLA IN AFRICA

50+ systems contracted

20+ systems deployed

15+ countries

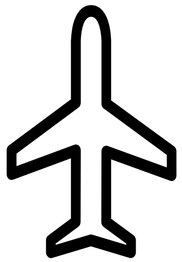


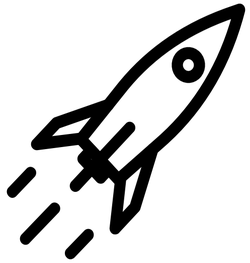
1st system deployed in March 2017

Microgrid diesel abatement & backup

70% average diesel usage reduction

TESLA AFRICAN APPROACH

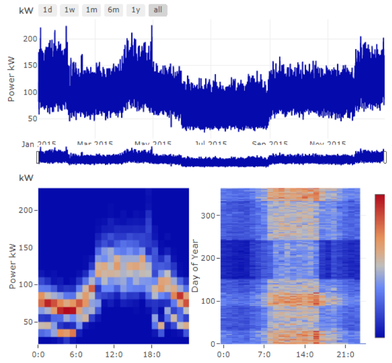




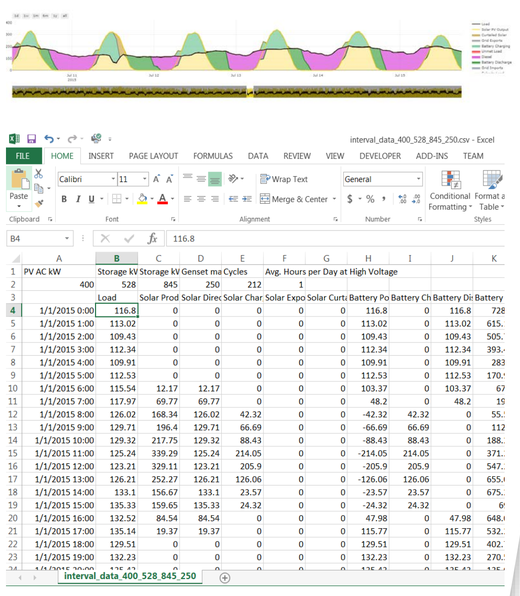
1 – Proof of concept <1MWh	2 – C&I 1-10MWh	3 – Utility scale >10MWh
Microgrid system combined with solar to avoid/reduce thermal engines running. Extremely remote facilities where energy is rare. Ex: Health and Hospitality facilities.	Microgrid and back-up system combined or not with solar to avoid and reduce generators. Remote facilities and/or with unreliable energy access. Ex: Rural Electrification and factories.	Grid services, T&D deferral, ↗ RE penetration and Peaker plants replacement. Ex: Major substation, collocated with large generation asset.

TESLA HAS AN ONLINE SIMULATION UI FOR OFF-GRID MICROGRIDS

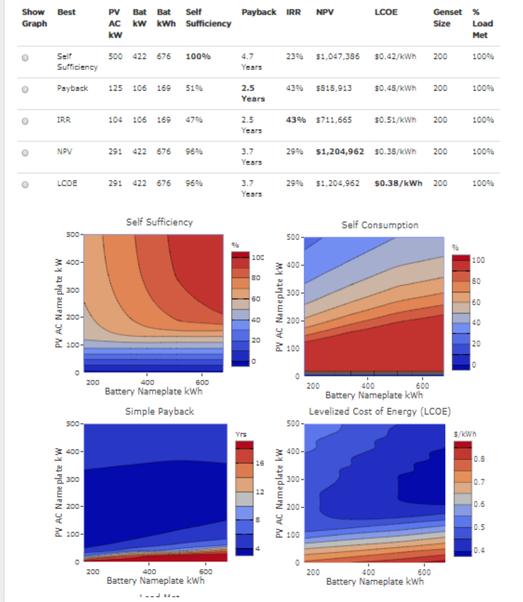
Site and System Inputs



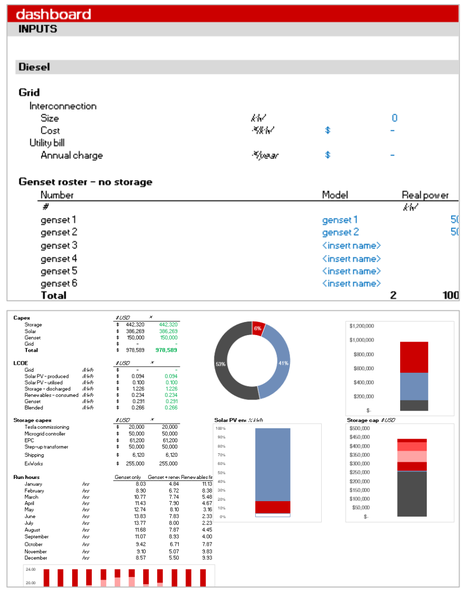
Dispatch Simulation



Optimal Configurations



Cash Flow Analysis



SUSTAINABLE TOURISM: GREAT PLAINS MPALA JENA, ZIMBABWE

Off-grid Microgrid | Solar (130 kWp) + Powerpack (106kW I 420kWh) | Commissioned 2018

Safari lodge is now mostly powered by silent, reliable and renewable energy, reducing diesel consumption by ~90%

POWERING REMOTE HOSPITALS: BORNO STATE, NIGERIA

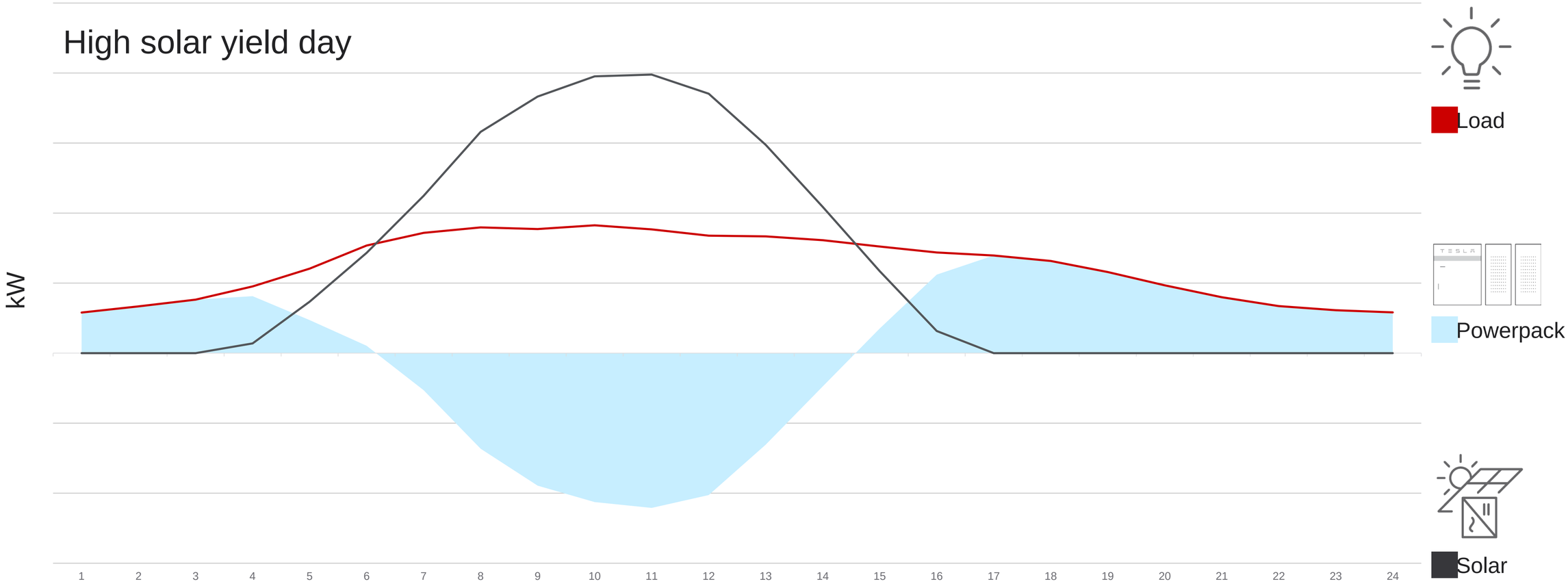
6 x Off-grid Microgrids

Solar (0.8MWp) + Powerpack (0.6 MW I 2 MWh)

Commissioned 2018/2019

Solar, reliable supply of electricity to public health facilities in Northern Nigeria

RENEWABLES ONLY: GRID-FORMING POWERPACK ENABLES HIGH RENEWABLES PENETRATION



Storage charges exclusively from renewables on days with typical solar production

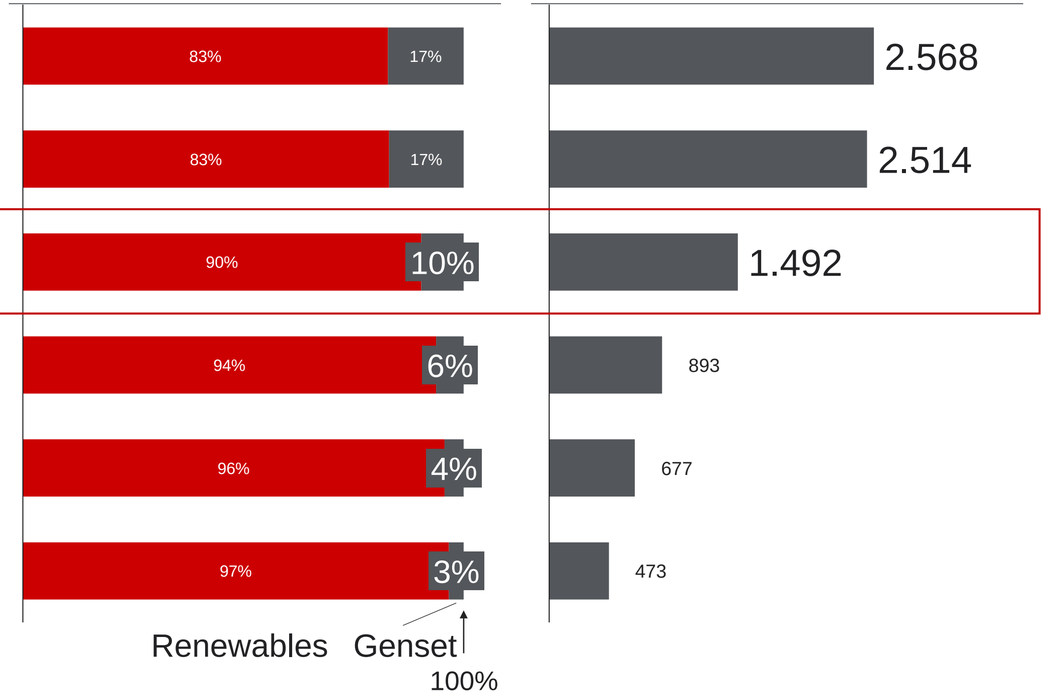
Fossil fuel generators shut down completely while renewables power batteries and load

Renewables are sized well above max load with a Powerpack system sized to absorb all excess generation

MICROGRID ANALYSIS-SIZING

>80% RENEWABLES WITH 15-25% IRR OVER A 20YR PROJECT VIEW FOR A REMOTE ISLAND (0.50 $/KWH DIESEL TODAY)

Solar PV	Storage power	Storage energy	Storage Capex	LCOE	Payback	IRR
kWAC	kW	kWh	‘000 $	$/kWh	years	%
500	400	1600	650	0.236	4.7	24.0
500	500	2000	825	0.254	5.3	21.0
600	400	1600	650	0.227	4.8	23.3
600	560	2200	910	0.238	5.3	20.7
700	450	1800	730	0.231	5.1	21.3
700	500	2000	825	0.234	5.3	20.6



Scenario recommended to client, giving lowest overall LCOE for site at 90% renewables penetration

POWERING VILLAGES: AREZA AND MAIDMA, ERITREA

2 x Off-grid Microgrids

Solar (2MWp) + Powerpack (0.9MW I 4.2MWh)

Commissioned 2018

Rural electrification – clean, reliable electricity for 40,000 people in 2 villages

POWERING TEA FACTORY: KISUMU, KENYA

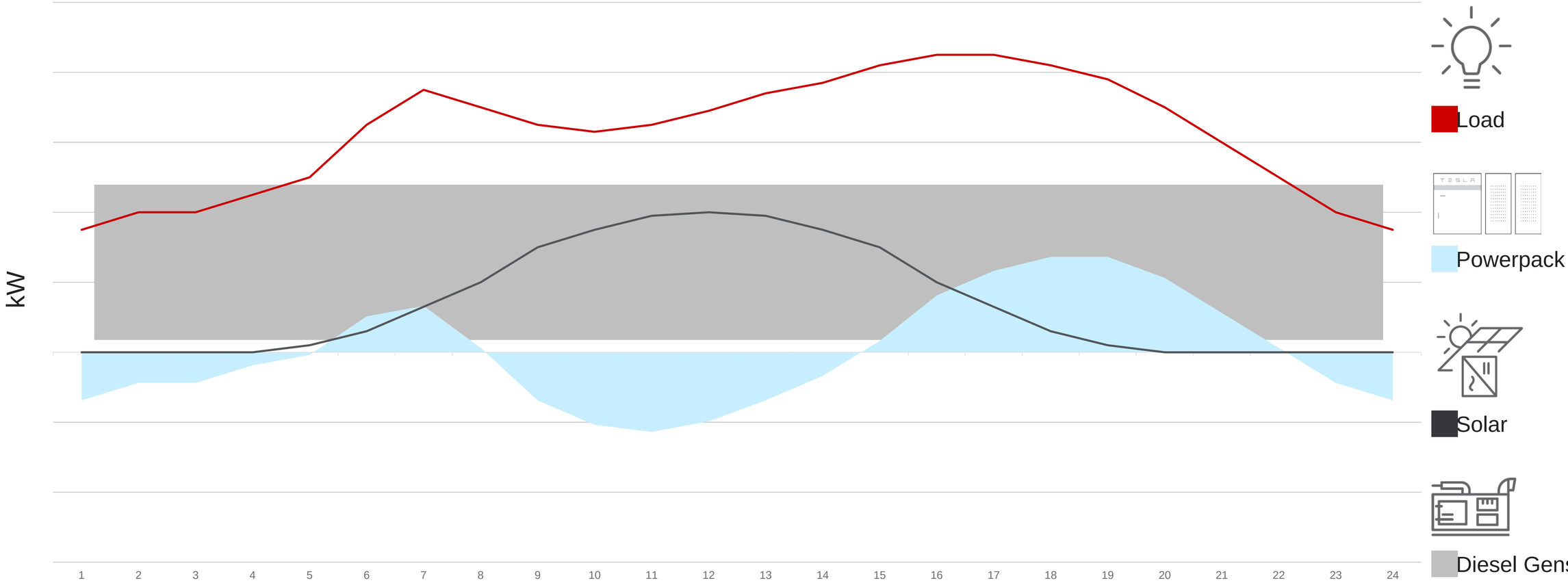
Grid tied grid Microgrid

Solar (1.2MWp) + Powerpack (1MW I 4MWh)

Expected Q1 2020

Solar and reliable electricity for a factory located at the end of the grid.

INTERMITTENCY MANAGEMENT: POWERPACK INTELLIGENTLY BALANCES THERMAL BASELOAD AND RENEWABLES

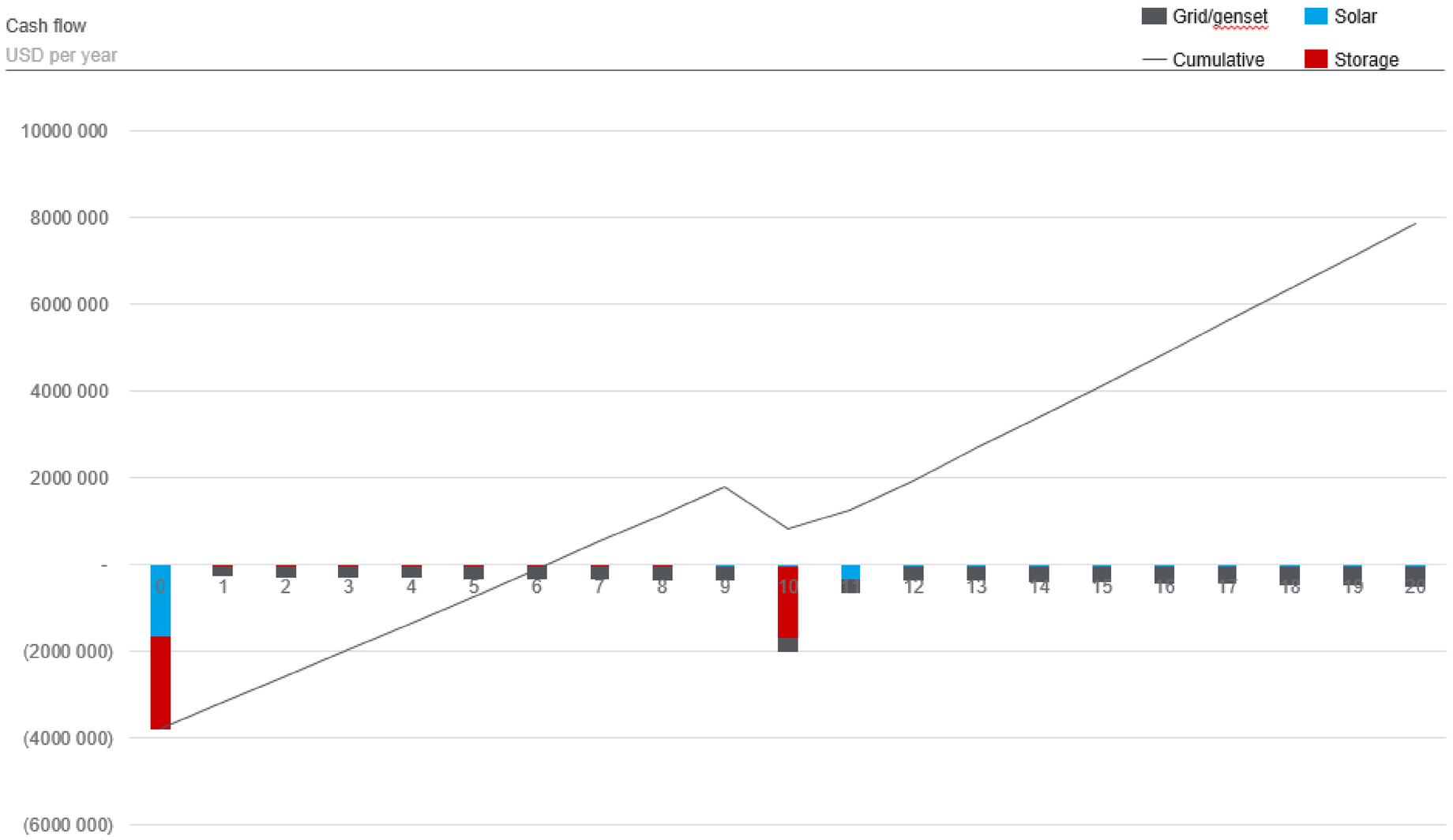


Storage charges primarily from renewables as well as from excess thermal baseload generation

Lower speed / larger fossil engines run as ‘baseload’ generators

Renewables limited relative to generators and storage power

BUSINESS CASE | 1.5 MW PV, 1.12 MW – 4.42 MWH STORAGE



HORNSDALE POWER RESERVE CO-LOCATED WITH 309MW WIND FARM

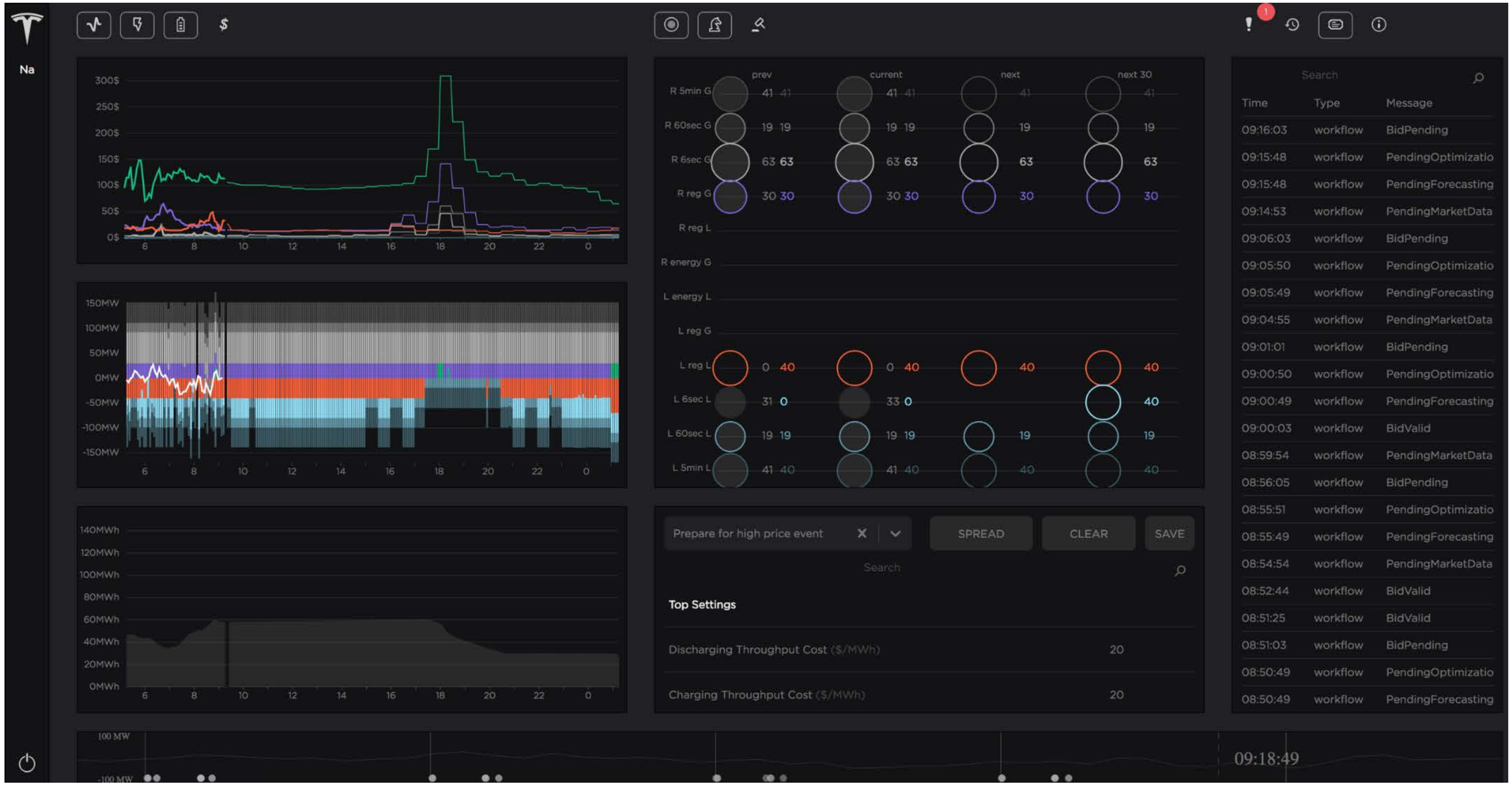
Hornsdale, South Australia

~~100 MW | 129 MWh~~
150MW | 193 MWh

~~Commissioned December 2017~~
Commissioned Q1 2020

TESLA

HORNSDALE POWER RESERVE CO-LOCATED WITH 309MW WIND FARM



1. **Grid Services market participation**

2. **Strategic Reserve**

FREQUENCY REGULATION

Figure 1 Accuracy and speed of regulation FCAS response – large conventional steam turbine

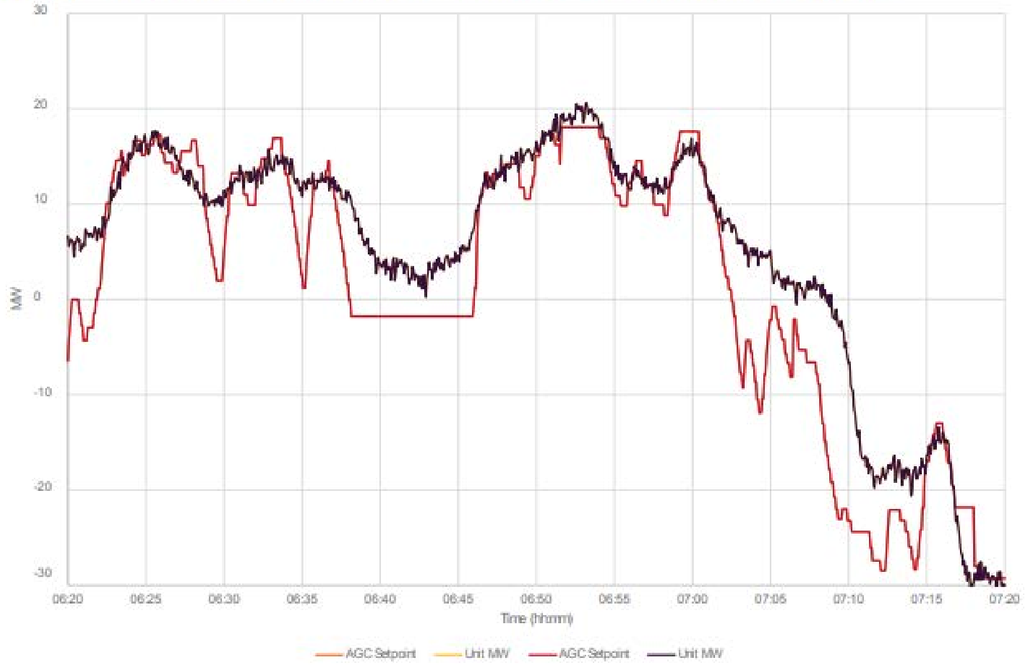
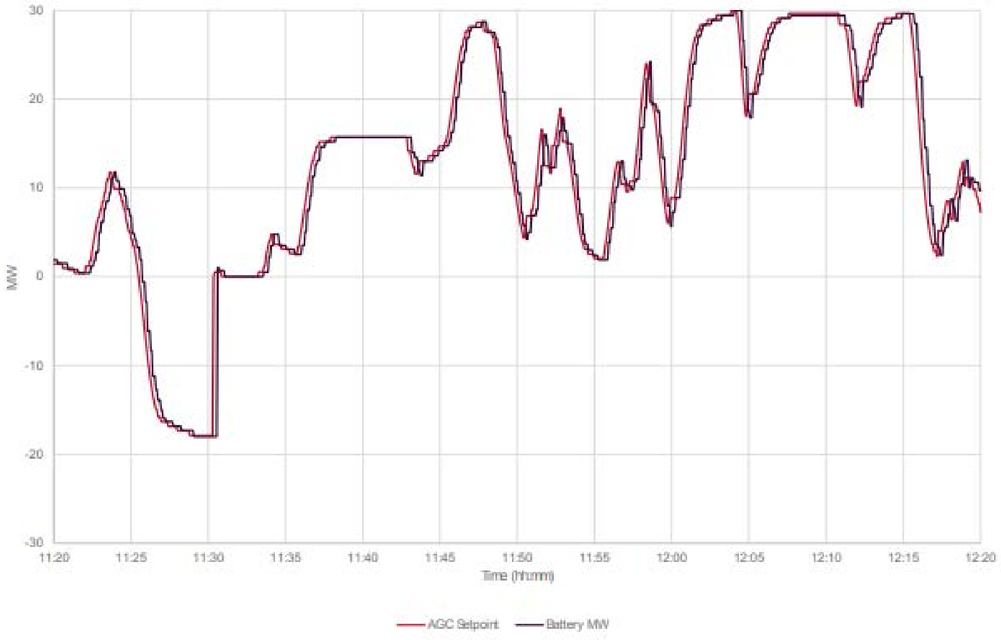


Figure 2 Accuracy and speed of regulation FCAS response – Hornsdale Power Reserve

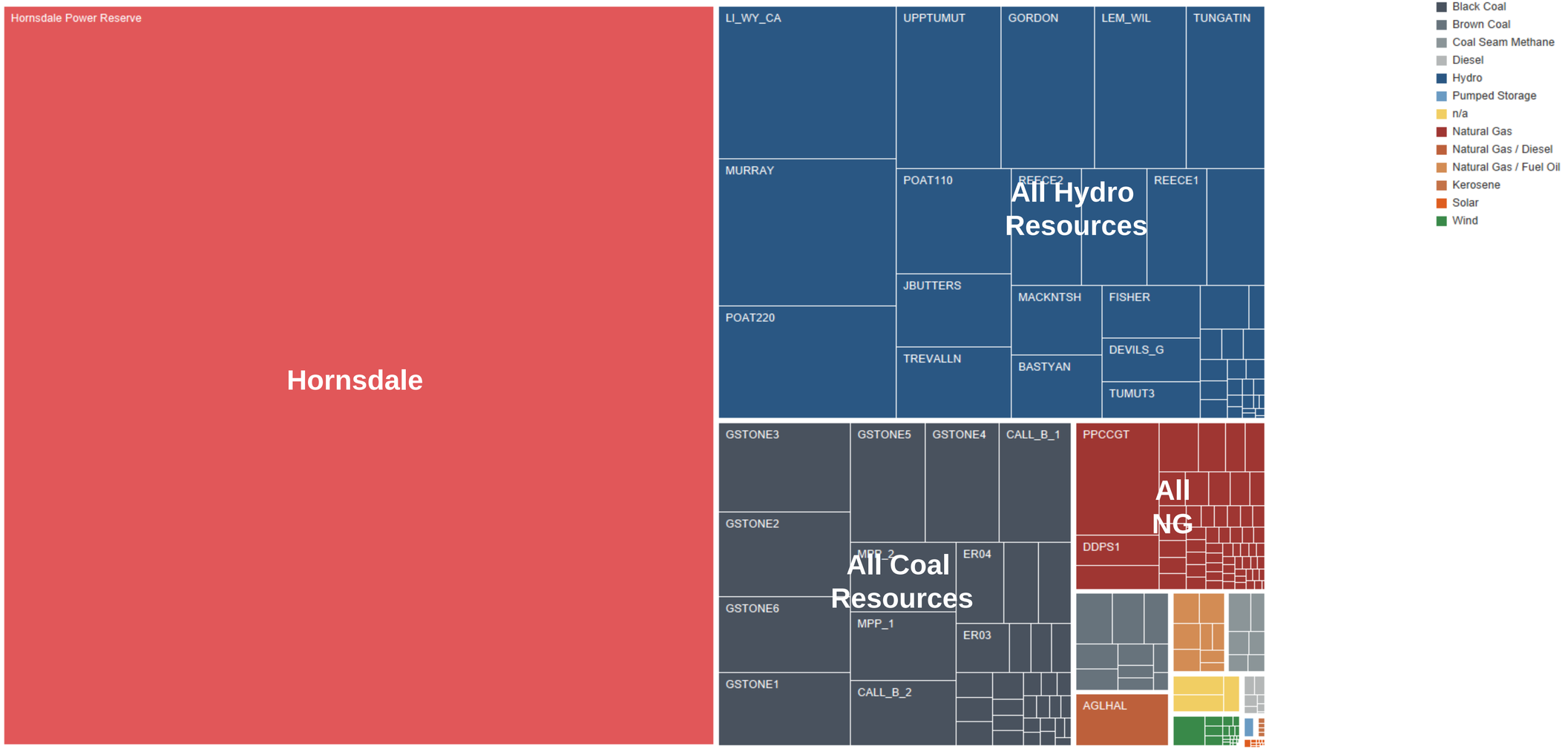


Superior accuracy and speed demonstrated by Hornsdale battery

Source: AEMO, April 2018

MARKET ACTIVITY BY RESOURCE - OPERATIONS IMPACT

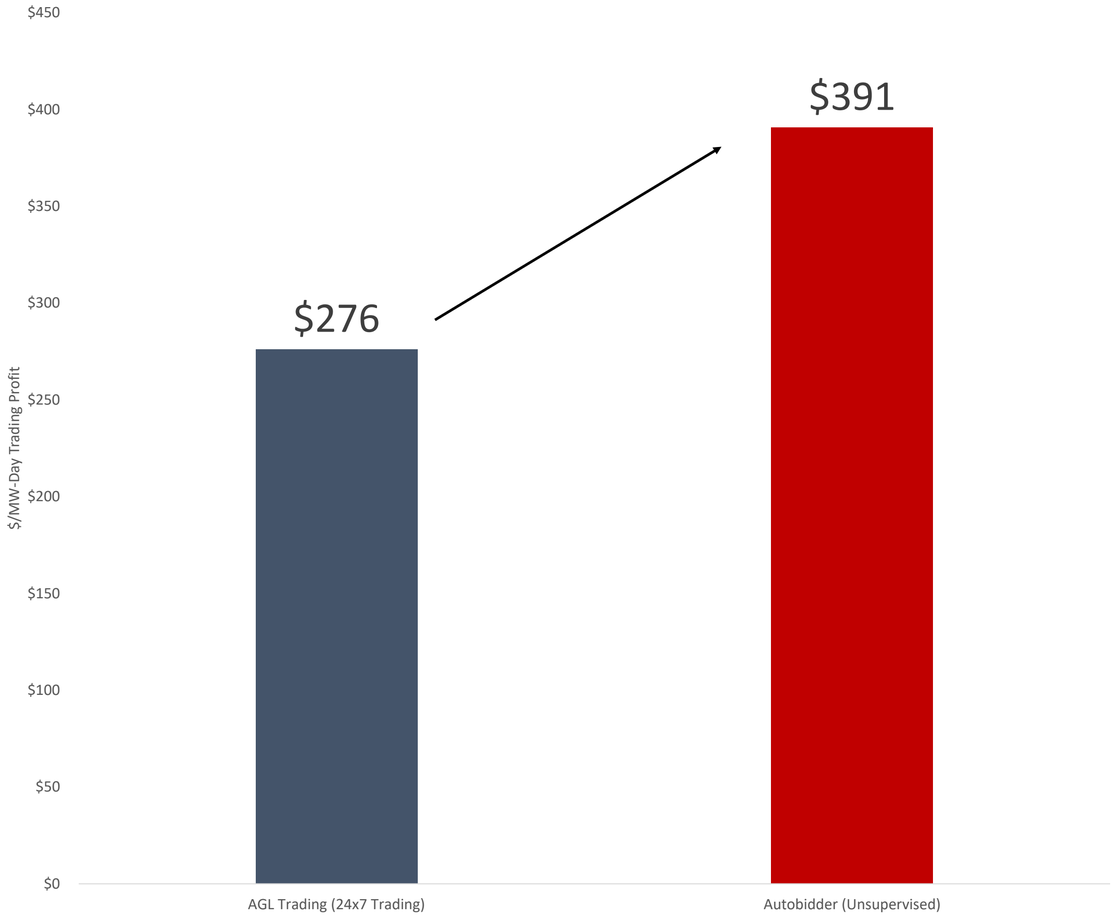
Market Activity by Resource (# of Real-Time Bids)



BENCHMARKING PERFORMANCE

Autobidder vs. AGL Trading

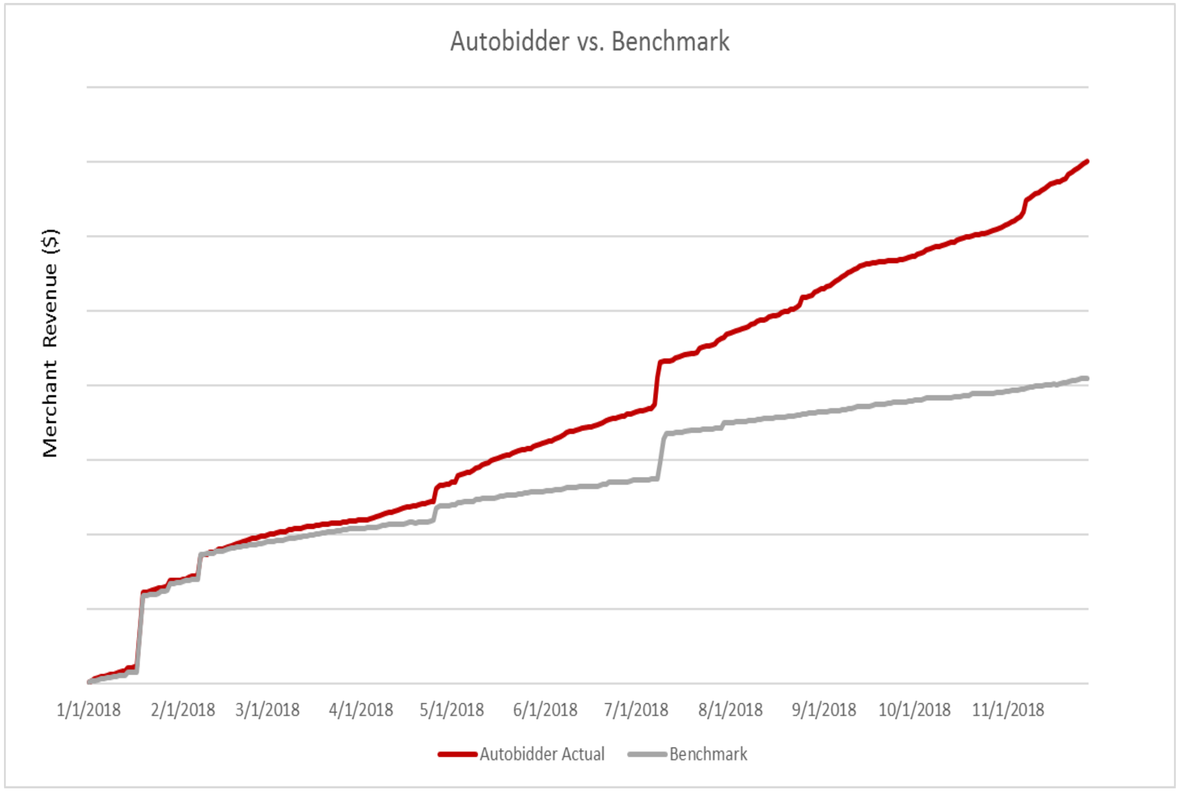
30MW/8MWh, Dec 14 – Jan 25



42% Revenue Premium on 24/7 Trading Team

Autobidder vs. Decision Tree Algorithm

Hornsdale, 2018 Benchmark Year



65% Revenue Premium versus Decision Tree Strategy

KAUAI ISLAND UTILITY COOPERATIVE (KIUC)

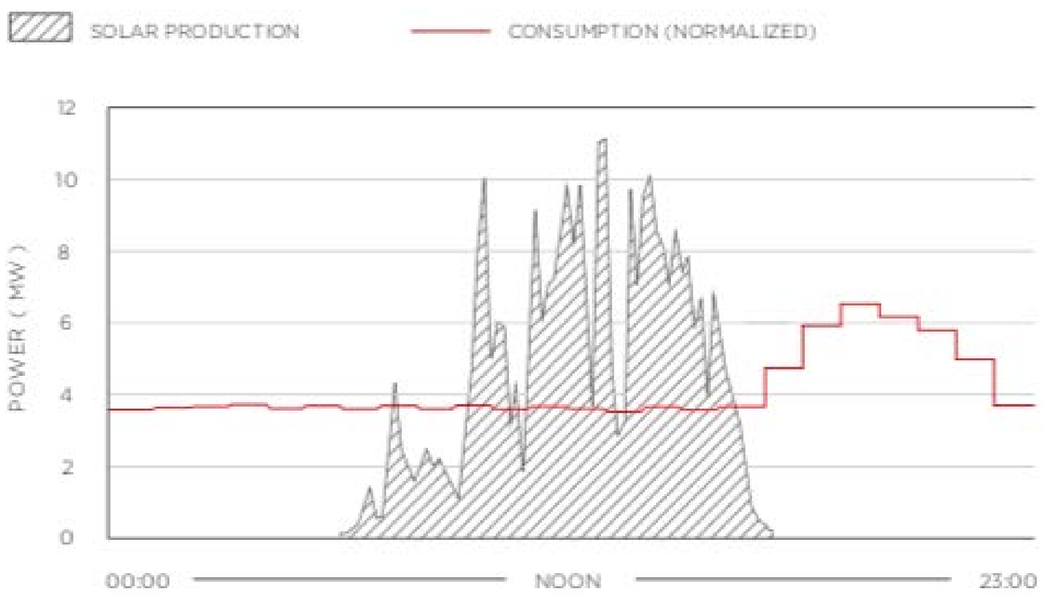
Kauai Island

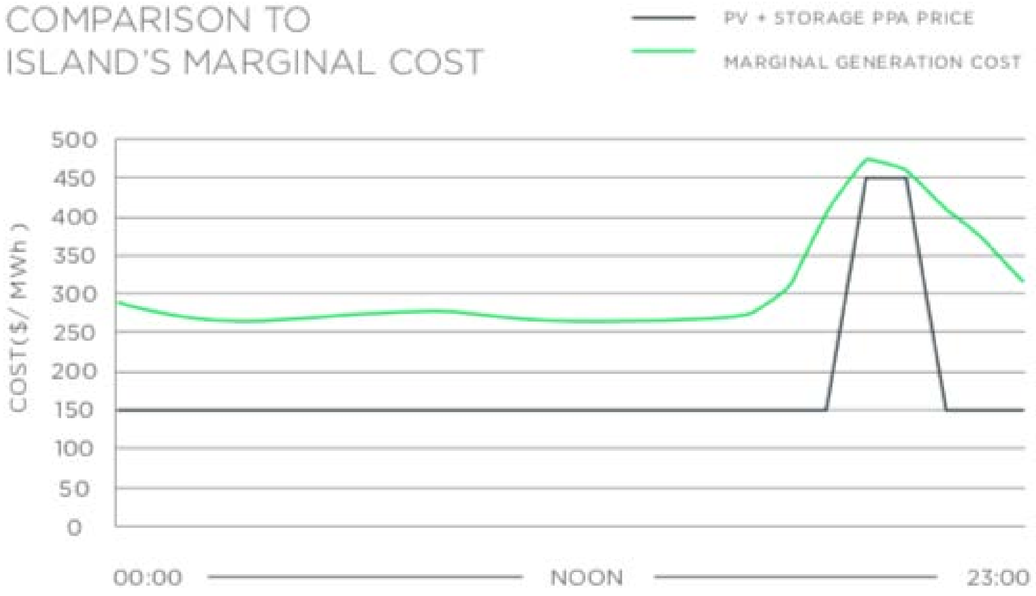
13 MW | 52 MWh (13 MW Solar PV)

Commissioned 2017

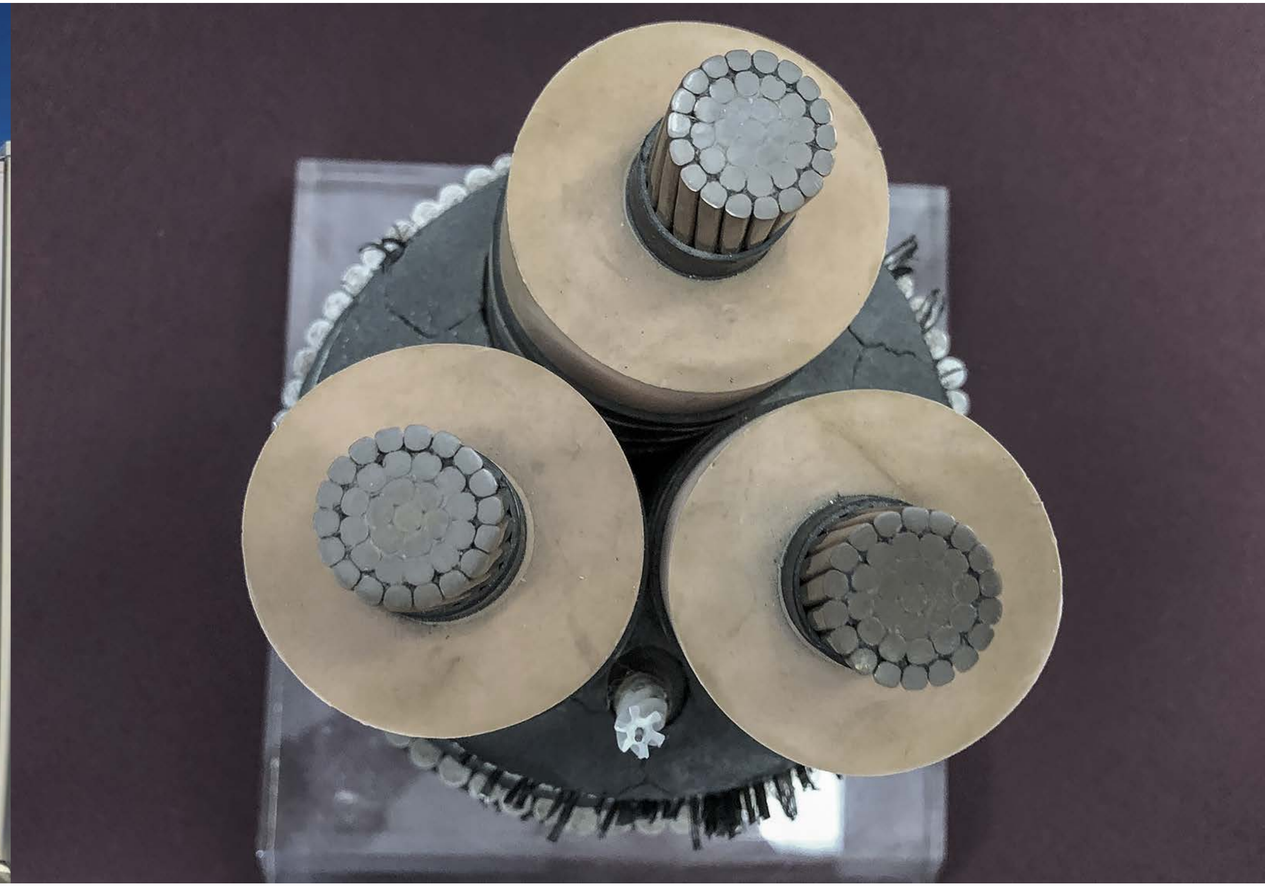
Solar self-consumption & Load shifting

KAUAI ISLAND UTILITY COOPERATIVE (KIUC)





NANTUCKET- NEW ENGLAND



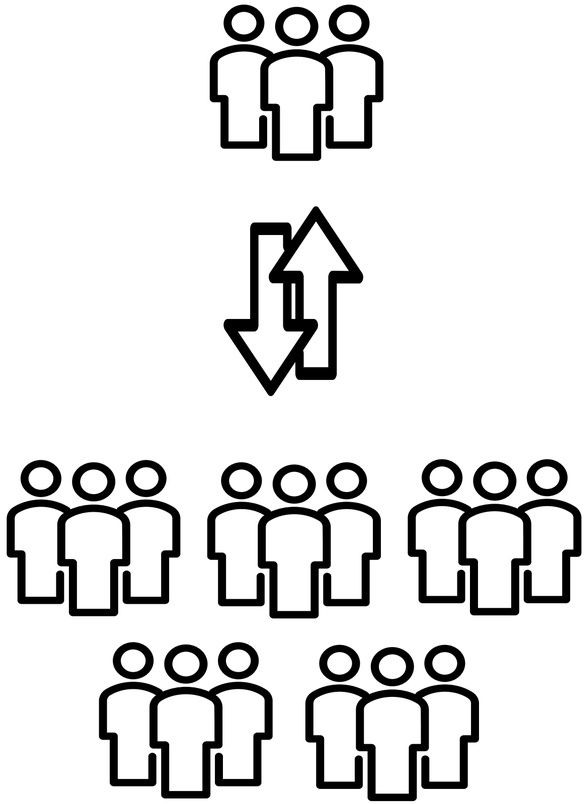
Nantucket

6 MW | 48 MWh

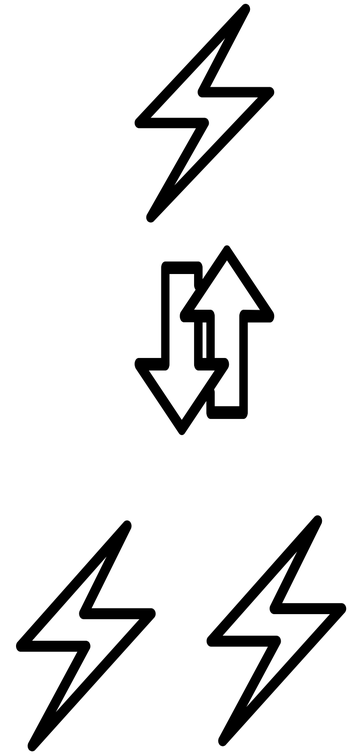
T&D Upgrade Deferral

Commissioned 2019

NANTUCKET- NEW ENGLAND

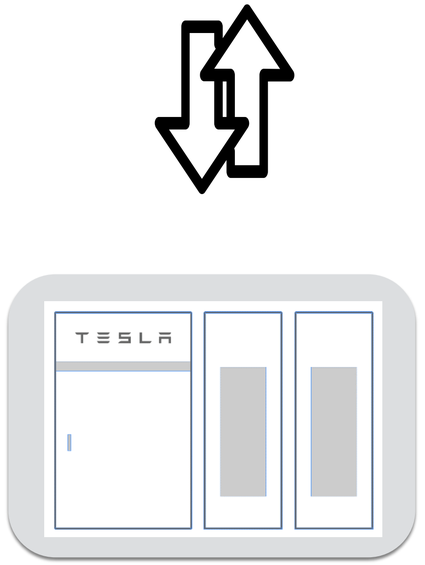


X 5 in Summer



25 MW --> 50 MW

A third subsea cable



200M USD → 81M USD

THANK YOU