Hybrid Greentech

Energy Storage Intelligence

Your catalyst for the energy storage uptake

Hybrid Greentech ApS
Who is Rasmus Rode Mosbæk?

2005 - 2008 B.Eng.

2008 - 2010 M.Sc.

2010 - 2014 Ph.D.

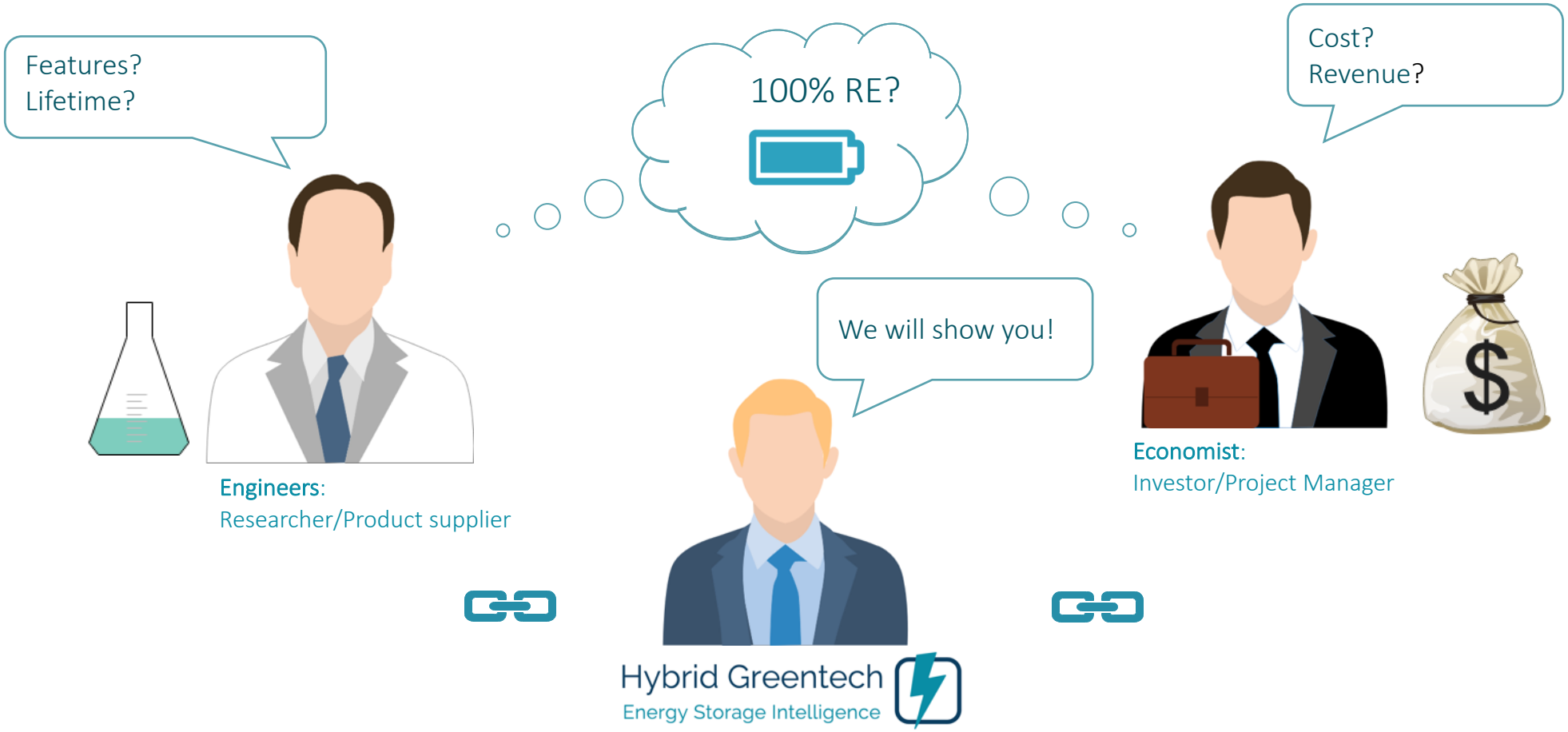
2013 Austria

2014-2018 Project Manager

2018 - CEO & Founder


Dansk
Dekommissionering
DTU Energi
Aarhus Universitet
DTU Fotonik
Parallelvej 4
Risø Huse
Hybrid Greentech ApS
Risø
DTU Vindenergi
Dtu Risø canteen
DTU Risø Campus
Risø Havn
Risø Huse
Frederiksborgvej
Svaleø
DTU Elektro
PowerLab DK
Virta Global
Charging Station
6

Energy Storage Challenge
Closing the gap



Hybrid Greentech
Why, How, What?

Why?

We inspire organizations to be green pioneers and invest in electrical energy storage so that together we can reach 100% renewable energy.

How?

By using the latest research and industry knowledge we are making it simple to take an investment decision on energy storage.

What?

We develop a cutting edge decision tool for energy storage, a sizing and optimization platform that increase revenue and performance.

Hybrid Power Plants

Hybrid Energy Buildings

Electric Mobility

Electric Marine

Microgrids

Hybrid Greentech

Energy Storage Intelligence

Promotes energy storage in the following business areas

Hybrid Greentech ApS
DNV GL Associate Process

At Hybrid Greentech are in the process of becoming DNV GL Associate

- ✓ Approved by DNV GL procurement
- ✓ Letter of Intent
- First cooperation project
- Cooperation agreement
- Associated Partner

DNV·GL

Hybrid Greentech
Energy Storage Consultants

DNV·GL

Hybrid Greentech ApS
Frederiksborgvej 399, Building 108
DK-4000 Roskilde
Denmark

DNV GL - Energy

Tel: +31 646713810
Email: koen.broess@dnvgl.com

Date: 18 September 2019
Our reference: 10142012-RA/STR 19-1140
Your reference:

Subject: Letter of Intent Cooperation partnership between DNV GL and Hybrid Greentech

Dear Sir/Mrs,

This is a Letter of Intent that proposes to outline the cooperation partnership between DNV-GL and Hybrid Greentech discussed on 10th September 2019.

We have agreed that we will enter into a commercial partnership for the purposes of offering Energy Storage Consultancy within the following sectors: Power & Renewables, Automotive and Aerospace and main services: Advisory, Data & Analytics, Certification, Inspections, Verification and assurance.

It is a bilateral cooperation partnership where DNV GL Energy will act as a sub supplier to Hybrid Greentech's customers and Hybrid Greentech will act as a sub supplier to DNV GL's customers.

This letter is a formal expression of intent to start a partnership with between DNV GL and Hybrid Greentech. After one successful project execution in the partnership with Hybrid Greentech and DNV GL a formal cooperation agreement may be made for Hybrid Greentech to become official DNV GL Associate Partner.

Sincerely,

Koen Broess
Business Lead - Energy Storage

DNV·GL
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P.O. Box 9035, 6800 ET Arnhem
The Netherlands
Tel: +31 26 356 9111

DNV GL Netherlands B.V. Utrechtseweg 310-B50, 6812 AR Arnhem P.O. Box 9035, 6800 ET Arnhem The Netherlands
T +31 26 356 9111 F +31 26 351 3683 contact.energy@dnvgl.com www.dnvgl.com Registered Arnhem 09006404

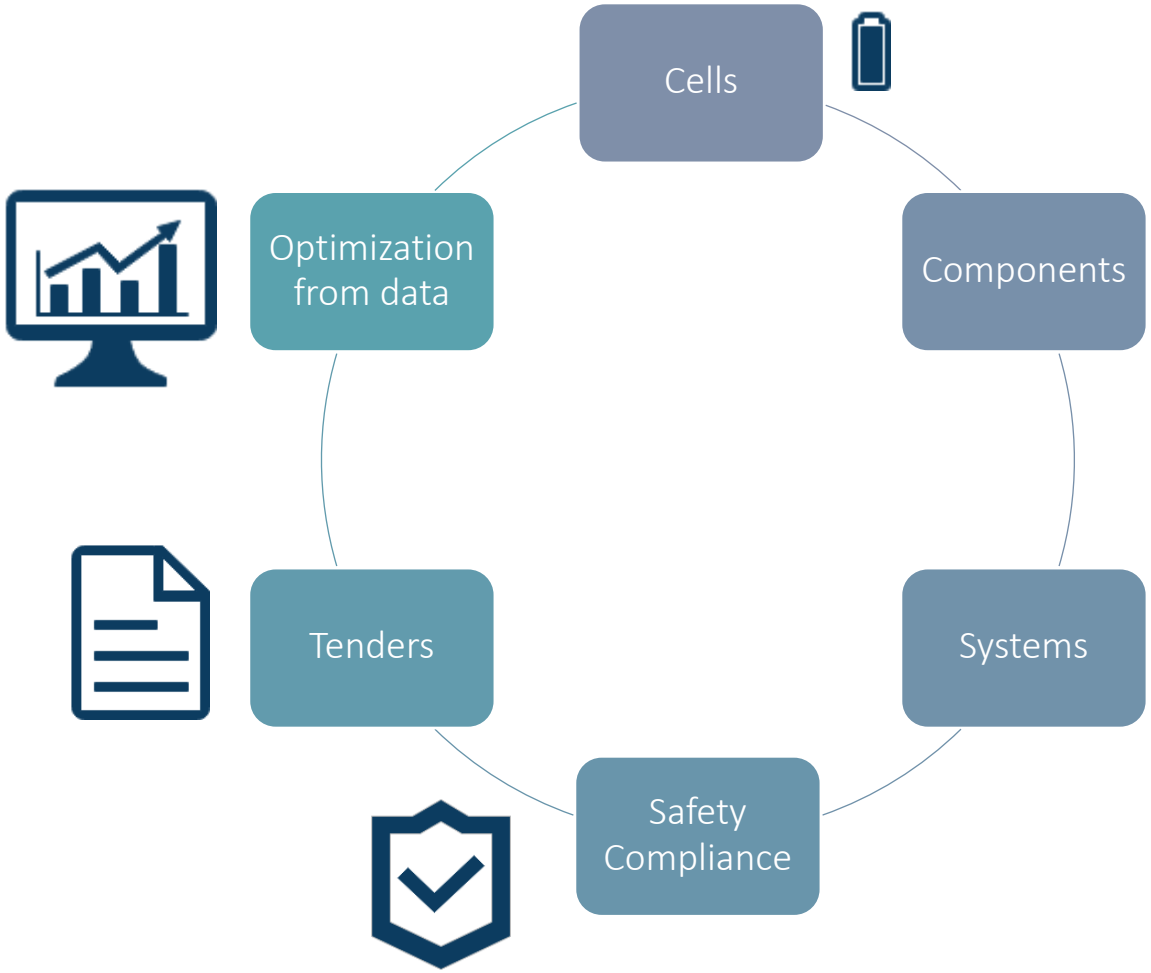
Hybrid Greentech ApS
Are changing the international standards

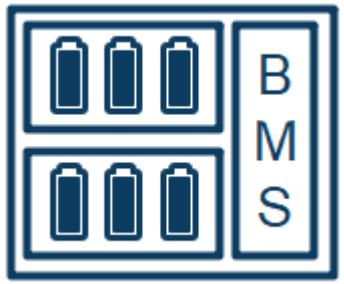
At Hybrid Greentech we do not only read battery safety standards. We create them!

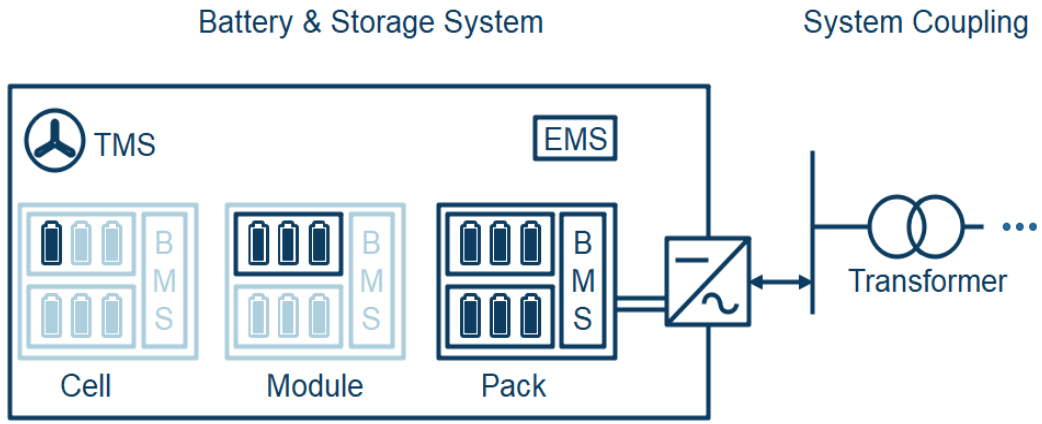
We are a part of the following work groups:

- Energinet TF3.3.1 Technical Requirements for grid connection of battery systems
- Dansk Standard DS-454 Standardization Committee for Electric Vehicles
- IEC SC21A WG5 Secondary cells and batteries containing alkaline or other non-acid electrolytes

Hybrid Greentech ApS
From evaluation to implementation



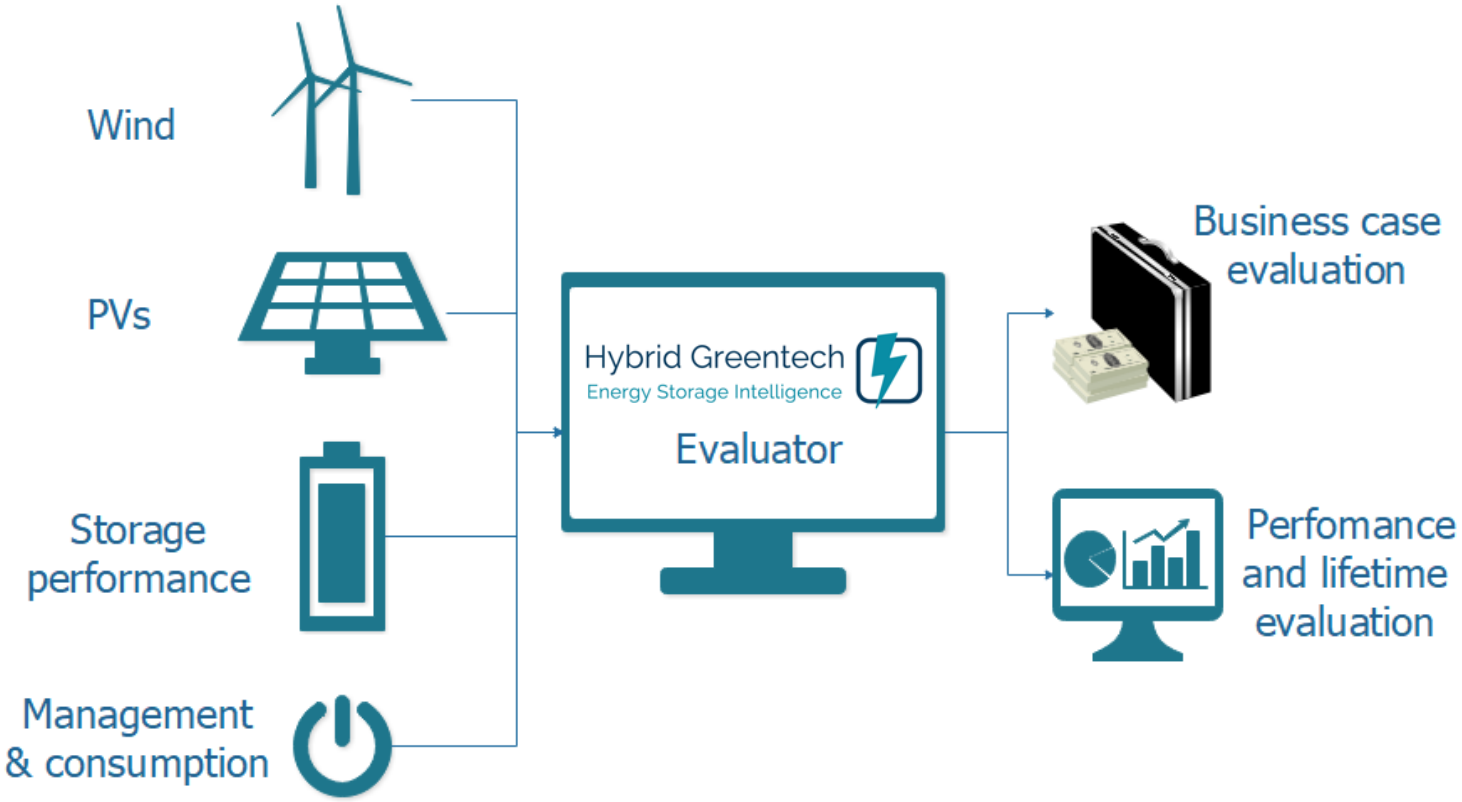




Hybrid Greentech ApS
Energy Storage Evaluator

Hybrid Greentech are developing an Energy Storage Evaluator to increase revenue and performance.

- 10% CAPEX Reduction
- 10% OPEX Reduction
- 90% Reduced evalation time on Hybrid Projects



PROJECT | DATA | SETUP

Hybrid Greentech
Energy Storage Consultants

Overview | Project_1 | Project_2 | +

CALCULATE

Hybrid Power Plant

Production Data ✓
Regulatory Boundaries ✓
Power Limitations ✓

Production Data ✓
Regulatory Boundaries ✓
Power Limitations ✓

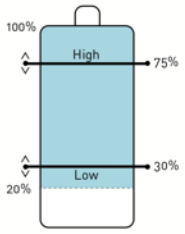
Energy Market Data ✓
Balancing Market

HYBRID POWER PLANT

BATTERY

Battery Input Data

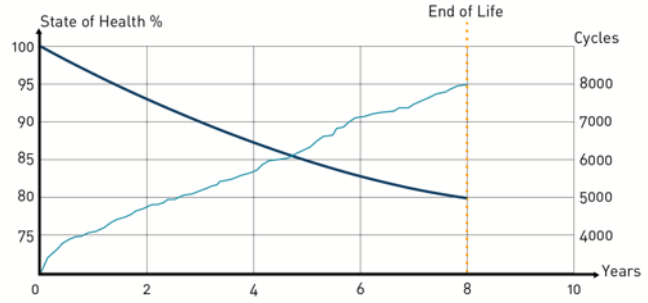
Energy	20	MWh
Power	10	MW
Product Supplier	MegaBattery	
Battery Chemistry	Li-Ion NMC	
Calendar Life	20	years
Cycle Life	8000	cycles



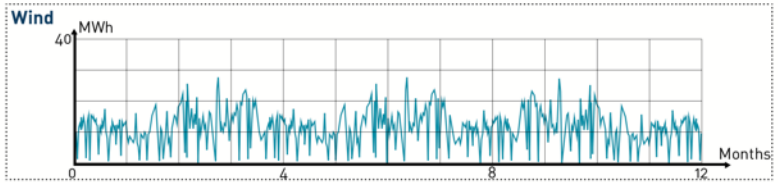
Battery Analysis

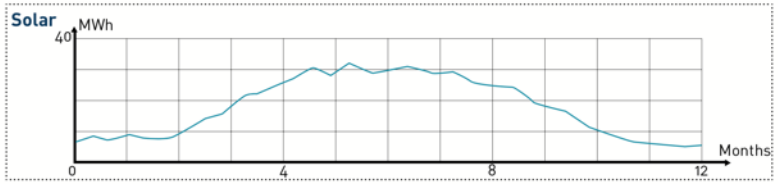
Estimated Cycles	7893	cycles
Estimated Life	8	years
Time Utilization	73%	

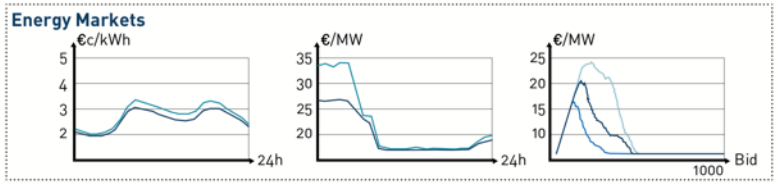
Battery Cycles & State of Health



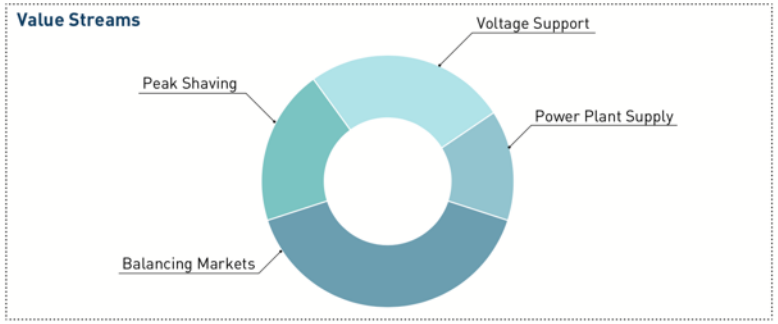
ENERGY OVERVIEW

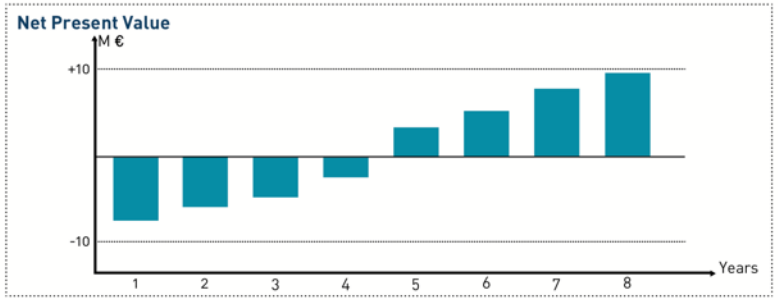






FINANCIAL ANALYSIS





PROJECT | DATA | SETUP

Hybrid Greentech
Energy Storage Consultants

Overview | Project_1 | Project_2 +

CALCULATE

Hybrid Power Plant

Production Data
Regulatory Boundaries
Power Limitations

Production Data
Regulatory Boundaries
Power Limitations

Energy Market Data
Balancing Market

DATA ENTRY

Markets
Balancing Market Data

Import File — FrequencyMarket.CSV

Minimum bid size 0,3 MW

Required Duration 1 hours

ENERGY OVERVIEW

Months

Months

Energy Markets

€c/kWh — 24h

€/MW — 24h

€/MW — Bid

EV Charging Demand

350 kw — Hours

Genset Operation

120 kw — Hours

FINANCIAL ANALYSIS

Value Streams

Voltage Support
Peak Shaving
Power Plant Supply
Balancing Markets

Income

M €

Years

Net Present Value

M €

Years

BATTERY

Battery Input Data

Energy 20 MWh
Power 10 MW
Product Supplier MegaBattery
Battery Chemistry Li-Ion NMC
Calendar Life 20 years
Cycle Life 8000 cycles

100% High 75%
30% Low 20%

Battery Analysis

Estimated Cycles 7893 cycles
Estimated Life 8 years
Time Utilization 73%

Battery Cycles & State of Health

State of Health %
End of Life
Cycles
Years

HYBRID POWER PLANT

PROJECT | DATA | SETUP

Hybrid Greentech
Energy Storage Consultants

Overview | Project_1 | Project_2 | +

CALCULATE

Microgrids

Production Data
Regulatory Boundaries
Power Limitations

Production Data
Regulatory Boundaries
Power Limitations

Genset Operation Model
Genset Limitations

BATTERY

Battery Input Data

Energy	20	MWh
Power	10	MW
Product Supplier	MegaBattery	
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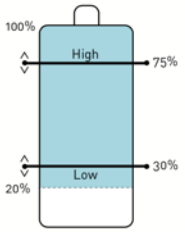

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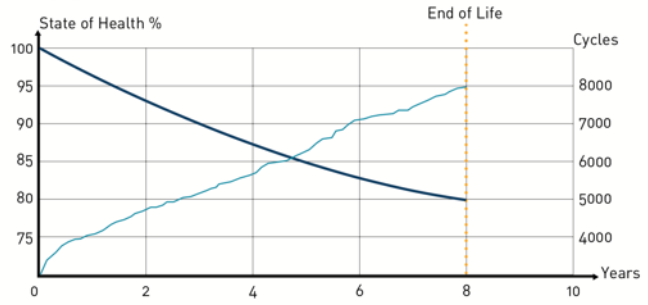
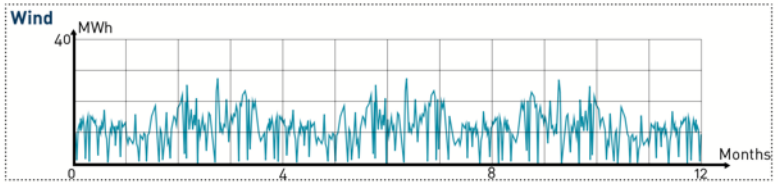
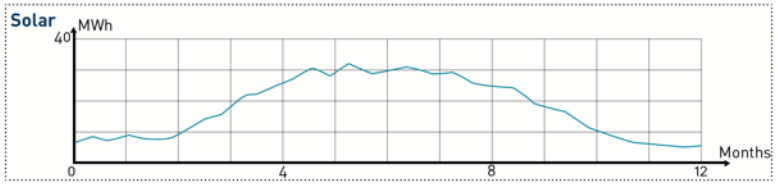
Battery Cycles & State of Health

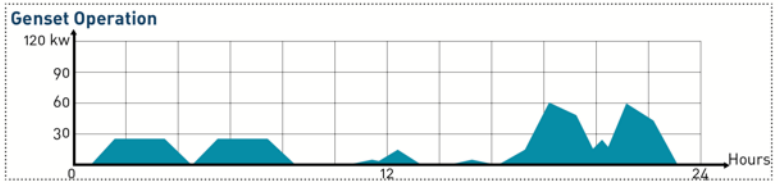


MICROGRIDS

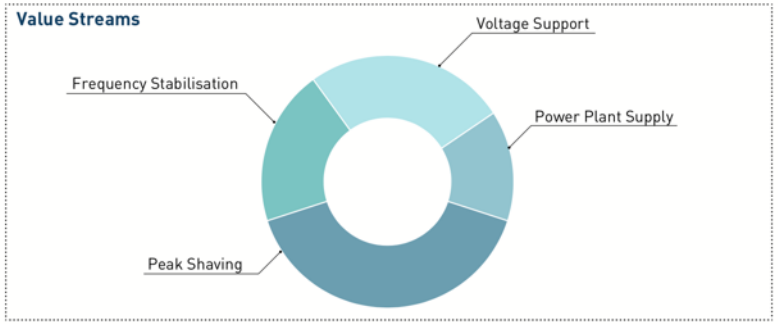
ENERGY OVERVIEW

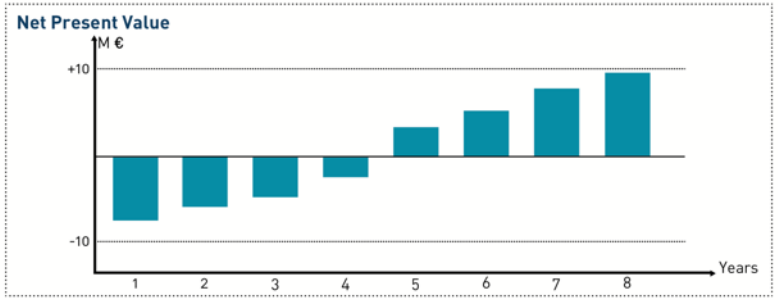






FINANCIAL ANALYSIS





HYBRIDize
Hybrid Power Plants Design and Operation

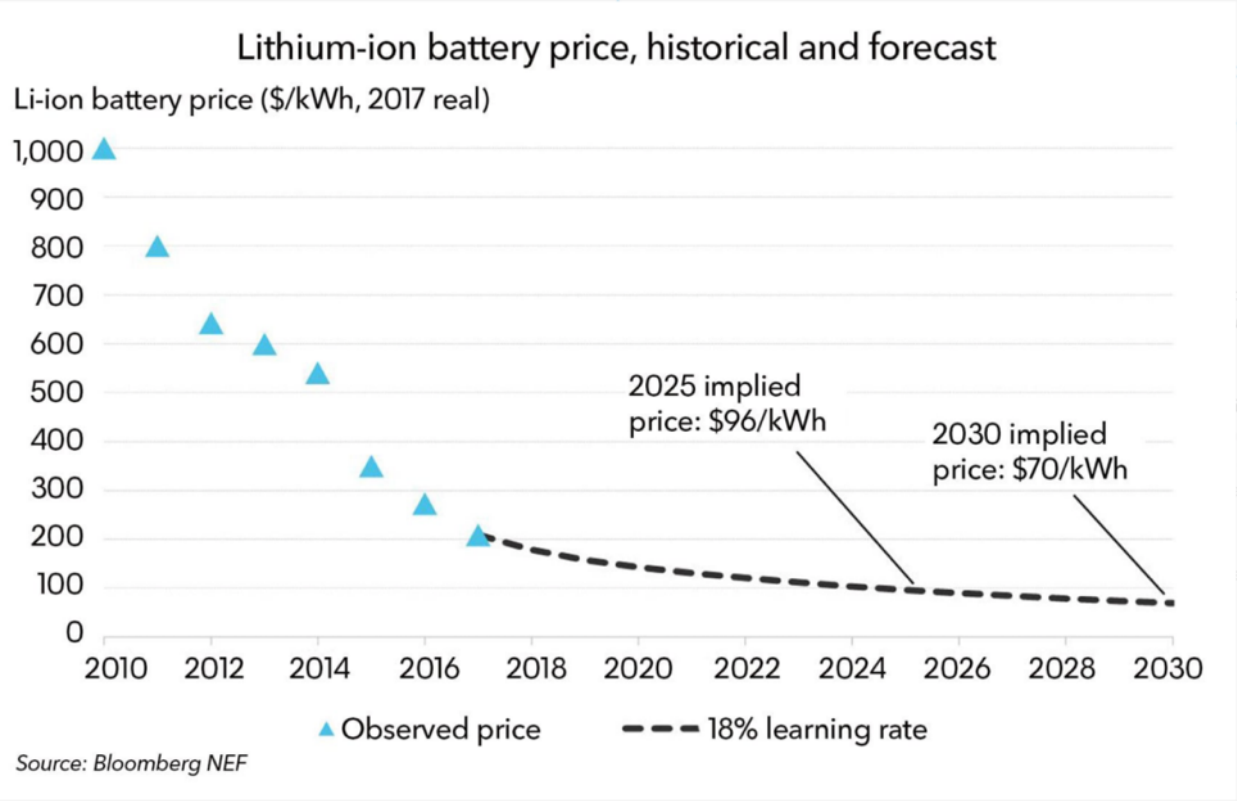
HYBRIDize a Indo-Danish project for design and opearion of large scale grid connected hybrid power plants (HPP) that consists of:

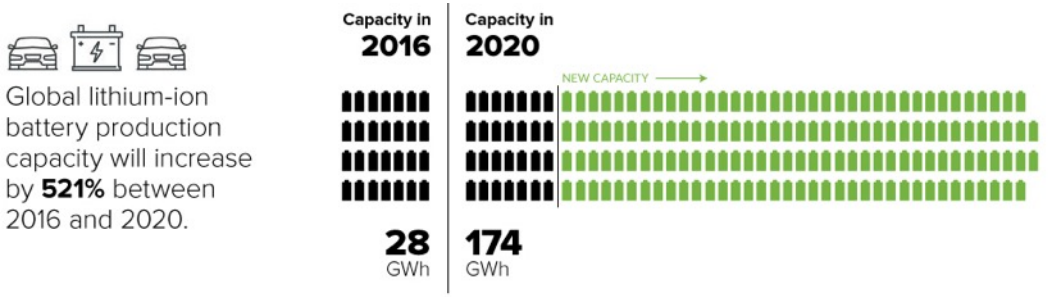
- Wind turbines
- Photovoltaics
- Battery systems

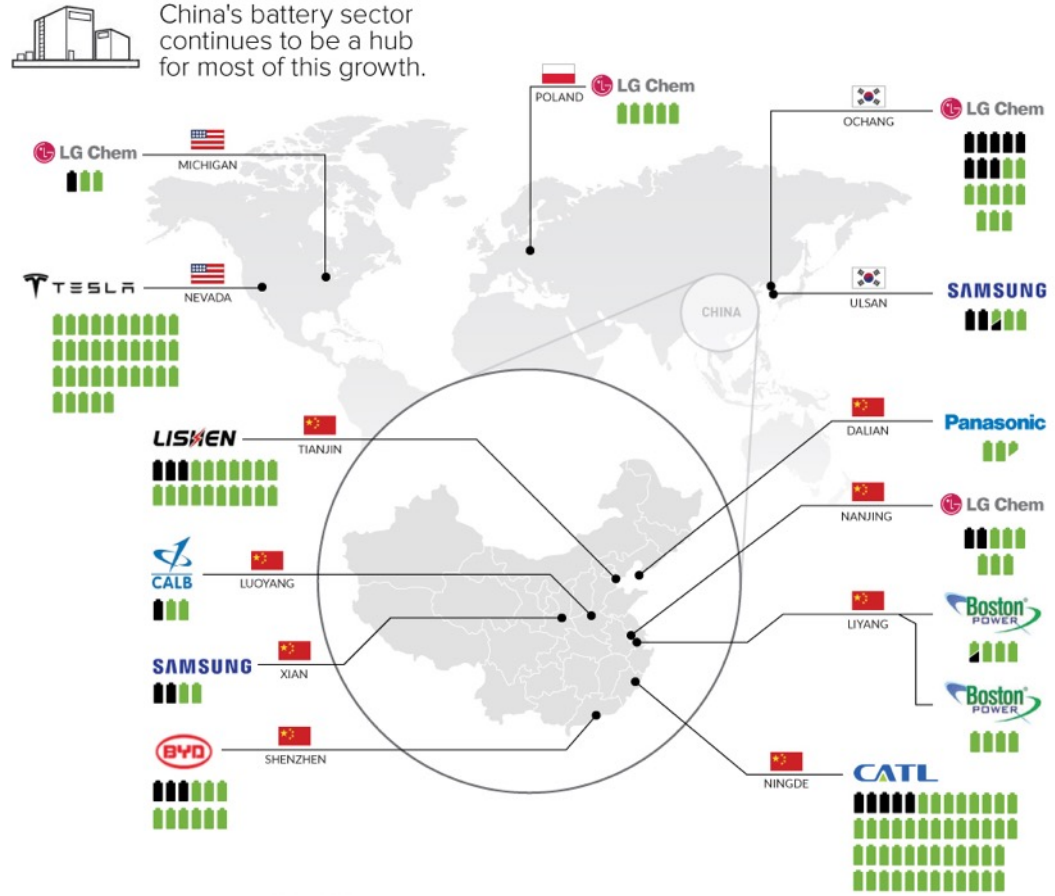
Expected outcomes:

- Minimize levelized cost of energy (LCOE) and levelized cost of storage (LCOS).
- Maximize profit for HPP by optimized energy supply based on market and production forecasts.

Energy Storage
Battery Prices

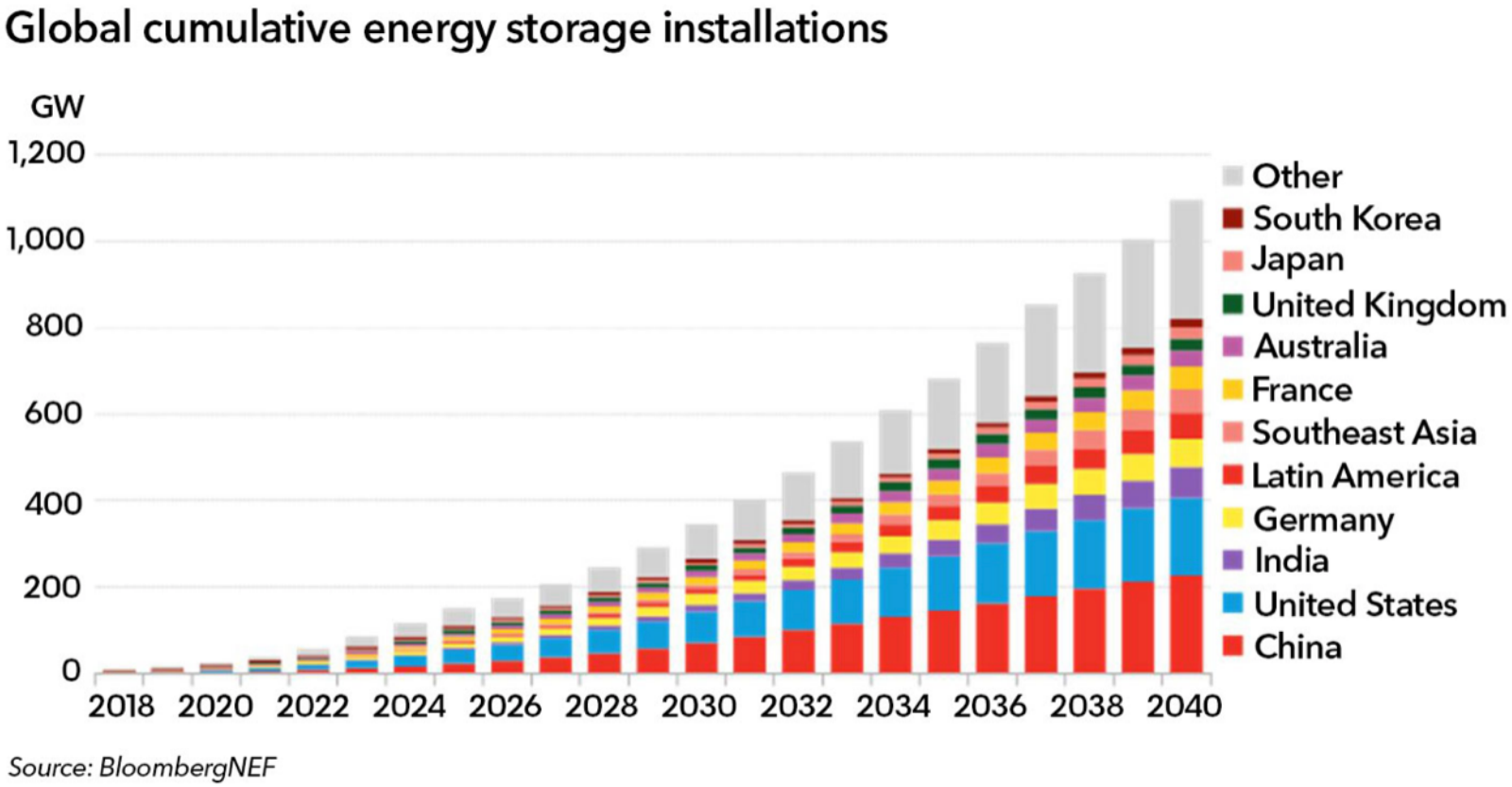






Reference: https://bnef.turtl.co/story/neo2018.pdf?autoprint=true&teaser=true
http://www.visualcapitalist.com/china-leading-charge-lithium-ion-megafactories/

Energy Storage
Market potential



Reference: https://about.bnef.com/blog/energy-storage-investments-boom-battery-costs-halve-next-decade/

Hybrid Greentech
Energy Storage Intelligence

Contact Information

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Phone: +45 31 270 300

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