ASIA CLEAN ENERGY FORUM 2025

Empowering the Future: Clean Energy Innovations, Regional Cooperation and Integration, and Financing Solutions

2–6 June | ADB Headquarters

Private Sector and Partnership Financing

Session 4.2: De-Risking Clean Energy Investments

Insights and challenges in implementing decarbonization through high-penetration hybrid renewable systems

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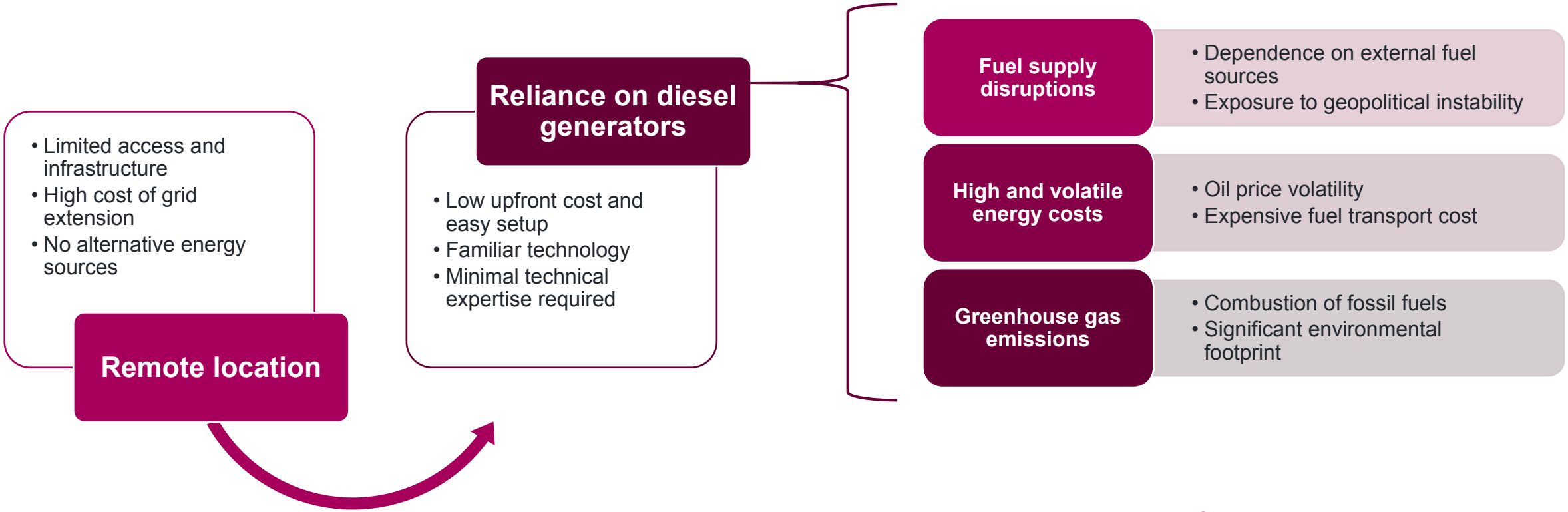
The Challenge: Dependance on Diesel

Mines and island grids often rely heavily on diesel generators.



Large industrial consumers may face comparable challenges.

The Opportunity: Embracing Renewable Energy

Solar, wind and battery storage offer a compelling alternative.

- Lower O&M costs
- Long-term price stability

- Increased resilience to adverse conditions
- Diversified energy sources

- Reduced carbon footprint
- Compliance with ESG commitments

- Improved shareholder value
- Higher long-term asset value

Fuel-Saver Approaches

Fuel-Saver models can be implemented through different financial structures:

Off-Balance Sheet

- Independent Power Producers (IPPs) finance, own, and operate the renewable energy system.
- Long-term Power Purchase Agreements (PPAs) for energy supply.
- Reduces upfront capital expenditure energy consumer.
- Flexibility in terms of risk allocation and long-term asset management:
  - **BOO: IPP builds, owns, and operates the system indefinitely.**
  - **BOOT: IPP builds, owns, and operates for a set period, then transfers ownership.**

On-Balance Sheet

- Upfront capital investment required by the energy consumer/operator.
- The project owner owns and operates the renewable energy system directly.
- Upfront capital investment is required but enables full control over the asset.
- Attractive payback periods (e.g., 3–5 years) driven by substantial energy cost savings.
- Operator bears all operational risks but retains all benefits and savings.

Solutions Are Different for On-Grid & Off-Grid and Each Project

Grid connected

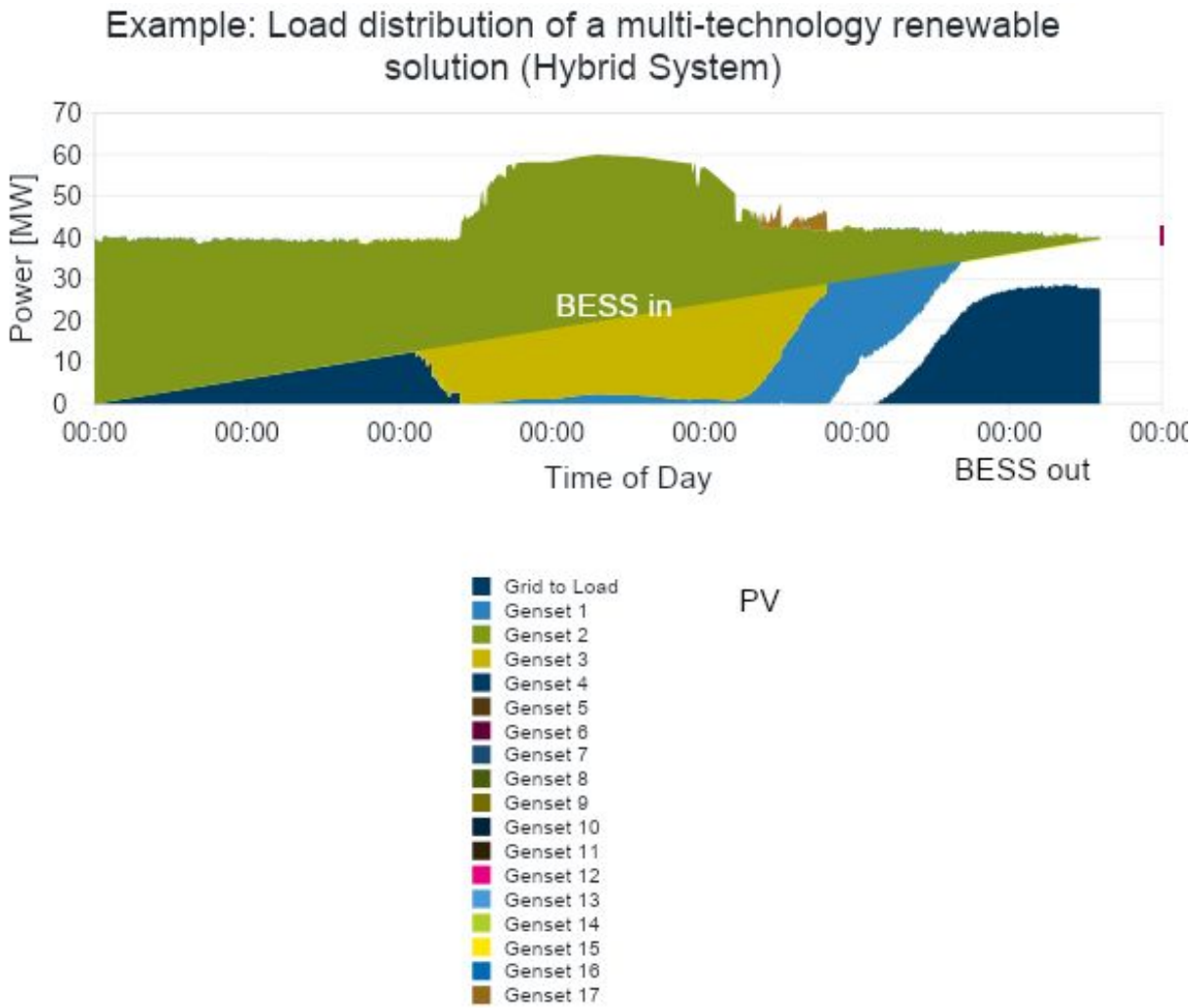
1. Baseline is primary energy factor of the grid
2. Reliability of grid supply (load shedding, ...)
3. Option for private green PPA (Hydro, PV, Wind)
4. Option for on-site generation and/or storage

Off-grid situation

1. Baseline is fossil fired power generation
2. Add on-site generation and storage (site specific)
   - Solar (15-50% RE share)
   - Wind (50-65% RE share)
   - Energy storage (intra-day fluctuations)
   - Keep fossil generation as back-up

Technical and economic feasibility

1. Every project requires a tailored solution
2. Determine decarbonization options (scope 1 and 2 level)
3. Based on feasibility and budget implement in stages



Tailored solution: Define needs and develop concept

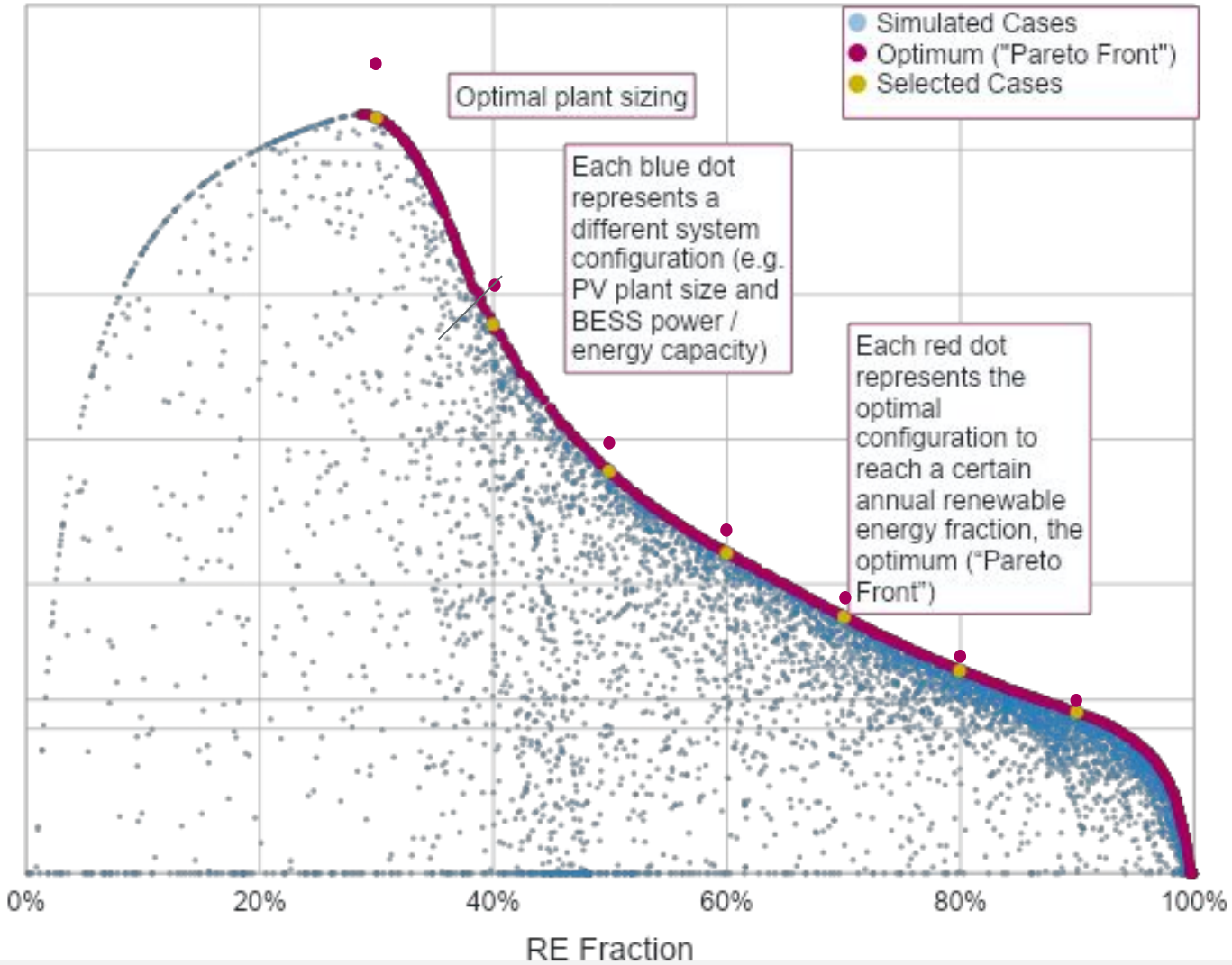
Challenge sizing assumptions, find optimum solution

Example: IRR vs. Fuel Savings

- Moving down: Less IRR
- Moving right: Higher RE share
- Optimum IRR: Upper right edge
- Blue: Values calculated during optimization process; not included in the output
- Magenta: Output of optimization process (“Pareto front”)

Notes:

- Simulations are done with Dornier’s inhouse tool AHEAD (dornier-ahead.com)
- Curve different for each project, depending on specific inputs such as solar resources or financial assumptions
- Highest IRR may not be optimum from a total savings or from CO2 Emission reduction perspective



Remaining Challenges

While the technical and commercial concept is proven, challenges remain in achieving the highest possible or even 100% renewable penetration due to:

High Upfront Investment	High initial capital expenditure (equipment)
	Infrastructure development costs (land, grid connections)
	Financing challenges in remote locations due to higher perceived risk, evaluate on- and off-balance alternatives
Intermittency and Storage Costs	High cost of battery storage systems (battery cost dropped significantly, further drop expected)
	Backup power requirements / oversizing to ensure reliable supply
	Technological limitations (energy density, lifespan, and discharge rates)
Operational and Maintenance Complexity	Need for technical expertise to install, operate and maintain – willingness to accept risks to be analysed.
	Remote location maintenance challenges
	System integration complexity
Economic and Policy Uncertainties	Sometimes lack of clear and consistent policy and regulatory frameworks
	Uncertain long-term return on investment due to evolving markets and technological advancements
	Community acceptance and engagement challenges

Conclusions and Summary:
100% renewables is a target - phased implementation is key

RE value drivers large-scale consumers

- Lowest energy cost
- Hedging operating cost
- Increase profitability
- Extend economic reach
- Reduce carbon footprint
- Compliance with ESG commitments

Phased approach: from “economic now” to “economic next”

- Lowest hanging fruit: renewable energy generation
- Next: energy efficiency, electrification of transport
- Quick pay-off investments first
- Observe market for next stage decision
- Off-grid mini-grids: Best economics for renewables
- On-grid: In fair cost environments, renewables do pay off

Contact Information

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VENTURE THE IMPOSSIBLE
TO ATTAIN THE BEST...

PROF. CLAUDE DORNIER

Dornier Renewables covers all main Renewable Energy Technologies

- Solar Photovoltaic, Floating Photovoltaic
- Concentrating Solar Power, Concentrating Solar Heat & Cooling
- Wind
- Biomass
- Battery Electric Storage System (BESS)
- Other Storage Options: Molten Salt, Pumped Hydro
- Grid & Transmission

Dornier Renewables

TURNOVER	EUR 20 Million (2024)
PROJECTS	70 completed on average per year
EMPLOYEES	95 Professionals
SERVICES	○ Advisory on Renewable Energy (RE) projects ○ Solar, Wind, Hybrids, Biomass ○ From Concept to Implementation ○ Installation PV & Wind ○ Operation & Maintenance Wind, Biomass ○ Grid & Energy Storage

MILESTONES	○ Over 20 GW of Renewable Energy Projects, from Engineering to Erection
	○ Commercial & Industrial Decarbonization:
	  ○ Mining Industry
	  ○ Industrial & Municipal Sites
	  ○ Airports
	○ Floating Photovoltaic

COUNTRIES	> 50 Countries

Engineering: Based on holistic analysis, we optimise your project design and implement it

OUR APPROACH

CLIENT NEEDS ANALYSIS
- Energy Requirements,
- Generation Cost
- Grid Conditions

RENEWABLE RESOURCES
Solar, Wind, Hydro etc.
(on-site, off site)

FINANCIAL REQUIREMENTS
On-balance (EPC)
Off-balance (IPP)
Rental/Lease

RENEWABLE TECHNOLOGY OPTIONS
PV, Wind, Other
Energy Storage
Grid Connection

OPTIMIZED CONCEPT
Technical Concept & Sizing /
Economics / Timeline

COMPETITIVE SELECTION
Procurement of
RE Plant or PPA

IMPLEMENTING
Building of the RE Project

Dornier Renewables Value Proposition

We tailor leading, holistic renewable energy solutions for our customers.

We optimize returns rather than energy yield or MW's.

We efficiently manage implementation.