أرامكو السعودية
saudi aramco

Opportunities to Integrate Renewable Energy into Isolated Power Systems

Saudi Aramco – Power Systems Renewables Department

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Contents

Objectives

- Optimize fuel mix by displacing high value liquid fuels (ie. Diesel) used for power generation
- Establish the optimal location, scale and type of Renewable Power Plants to displace Diesel in Isolated Power Systems.
- Prioritize the development of Renewable Power Plants that would most effectively reduce the consumption of Diesel in Isolated Power Systems.

The challenges
Competing interests between stakeholders

Saudi Aramco

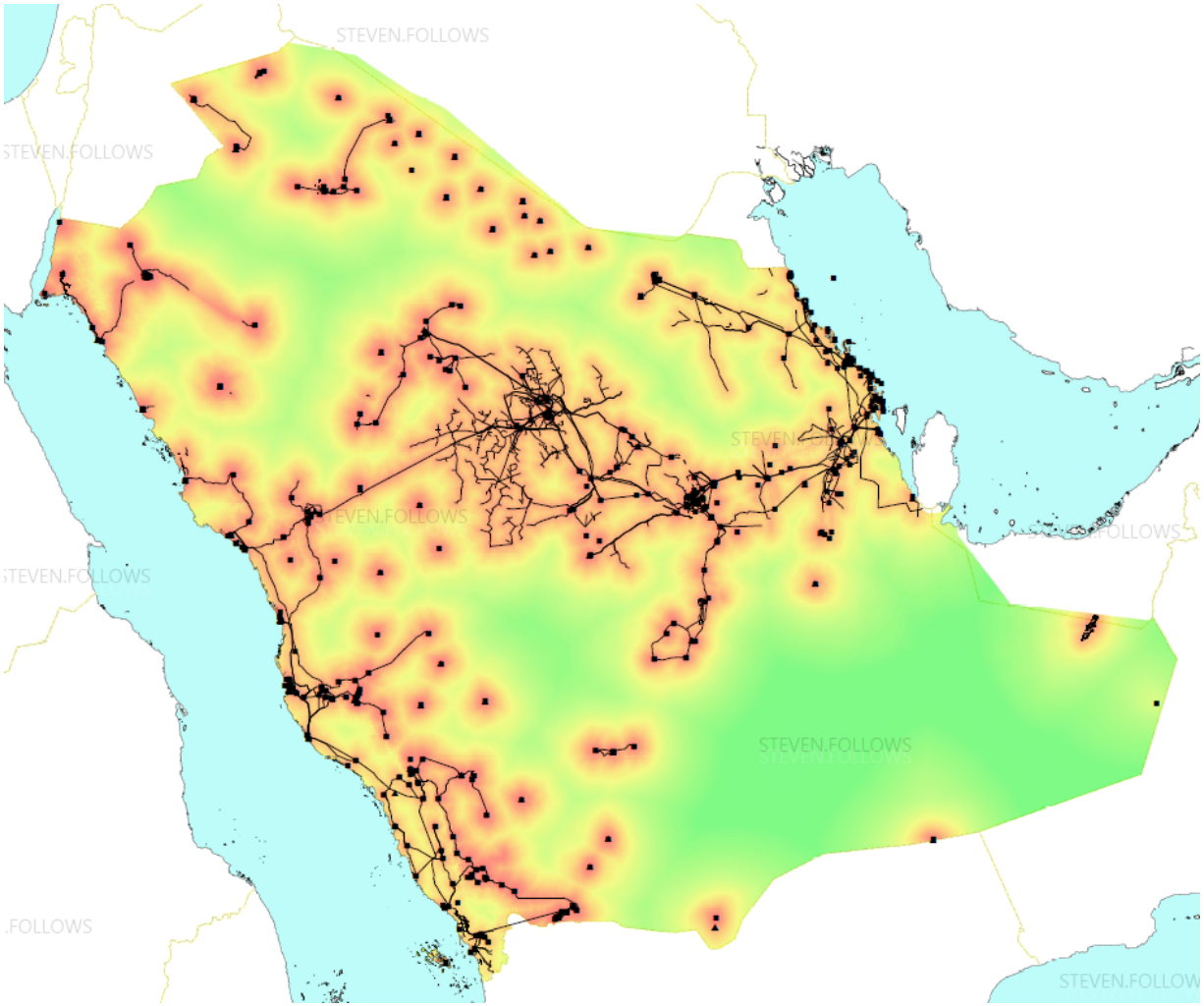
- Reduce the domestic consumption of Diesel for power generation

Power System Operator

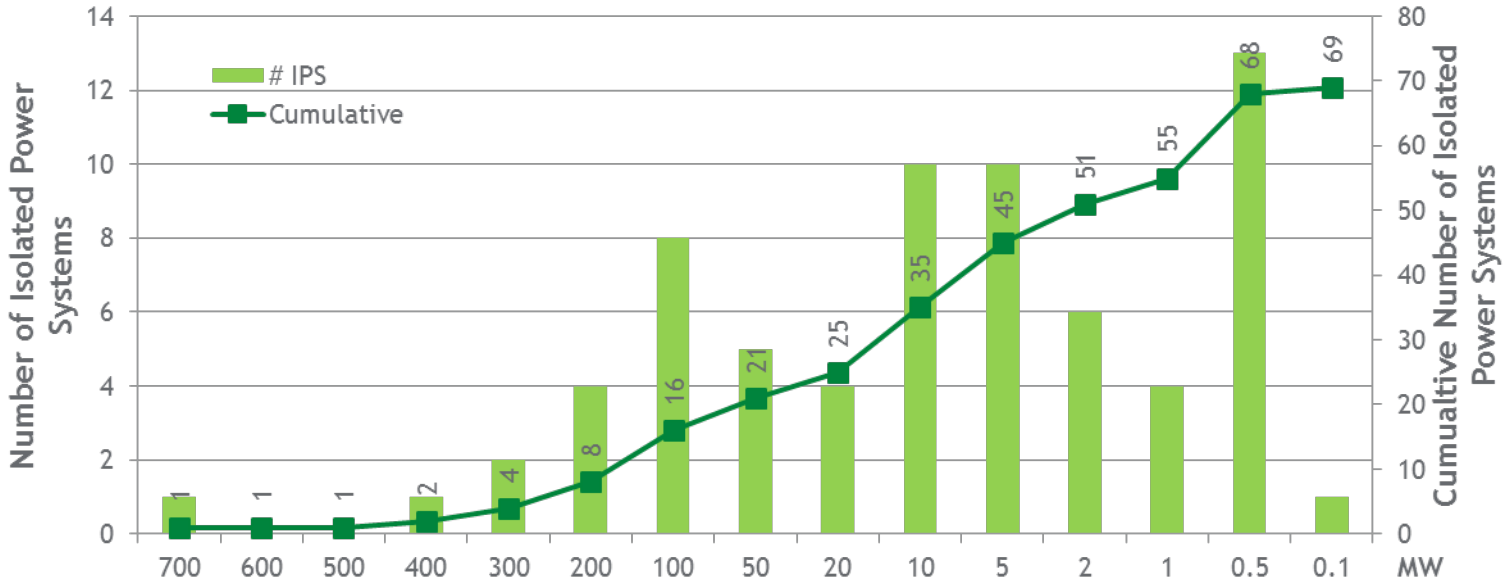
- Operational cost of logistics for fueling Power Plants in remote locations
- Avoided capital expenditure in future transmission and distribution reinforcement and expansion to remote locations

Isolated Power Systems – Locations

69 Isolated Power Systems exist in Saudi Arabia



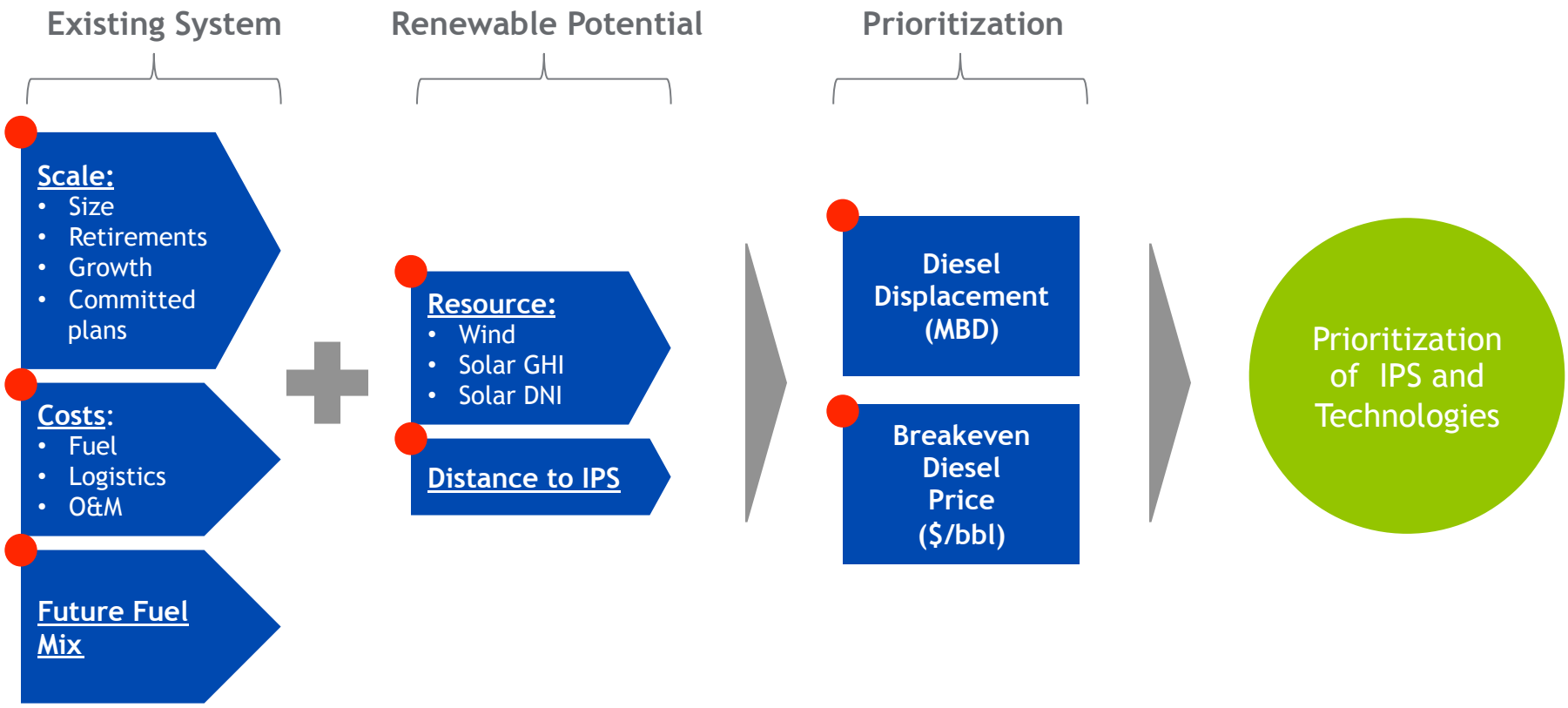
Isolated Power Systems – Key characteristics



- Significant consumption: 69 IPS consuming 70 MBD or 10% of Diesel in Saudi Arabia
- Concentration of consumption: 10 IPS consume 77 % of Diesel
- Large number of small IPS: 34 IPS with capacity of < 5 MW
- 10 largest IPS are least efficient: Average efficiency 28%

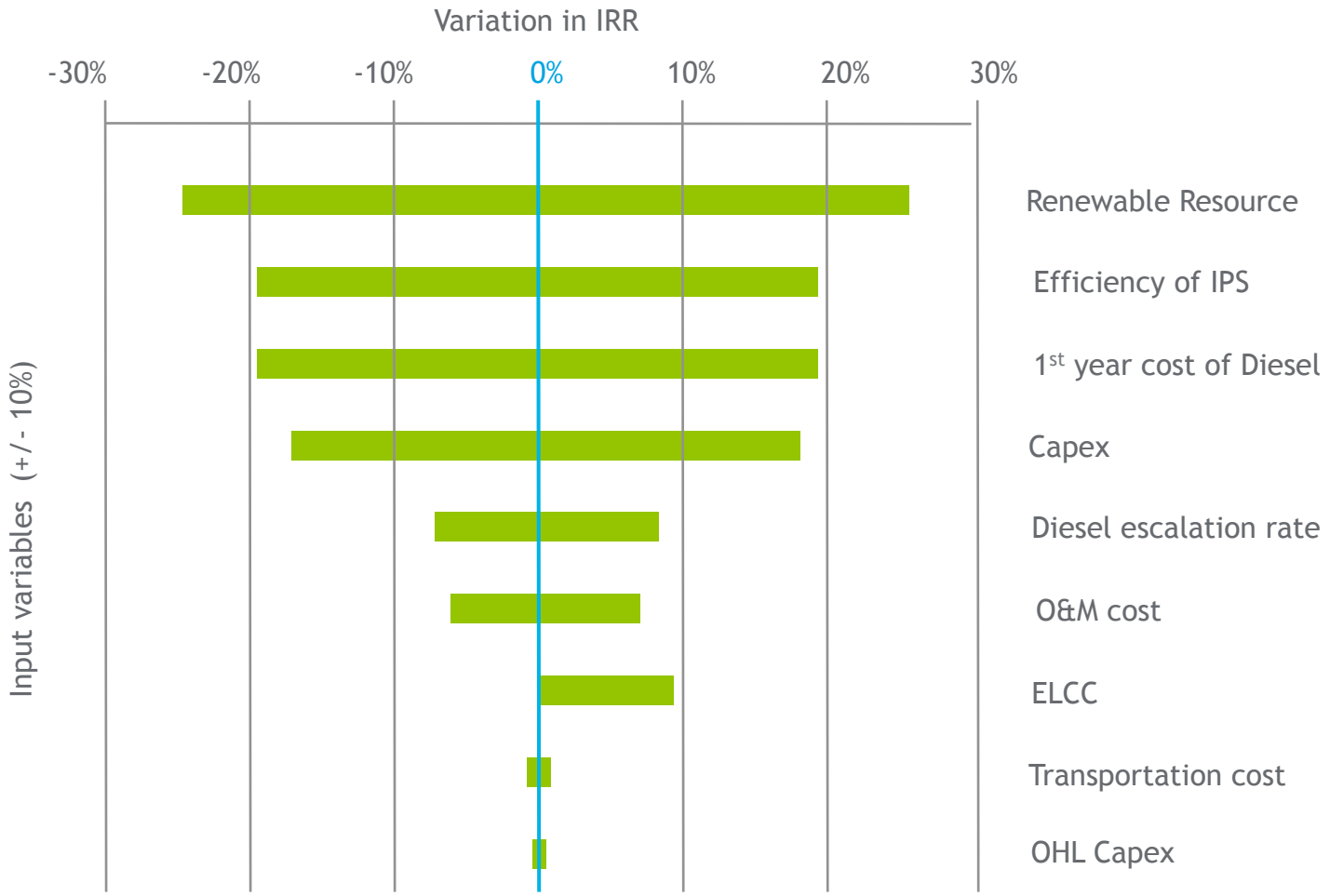
Evaluation process

69 IPS and 3 technologies evaluated and prioritized



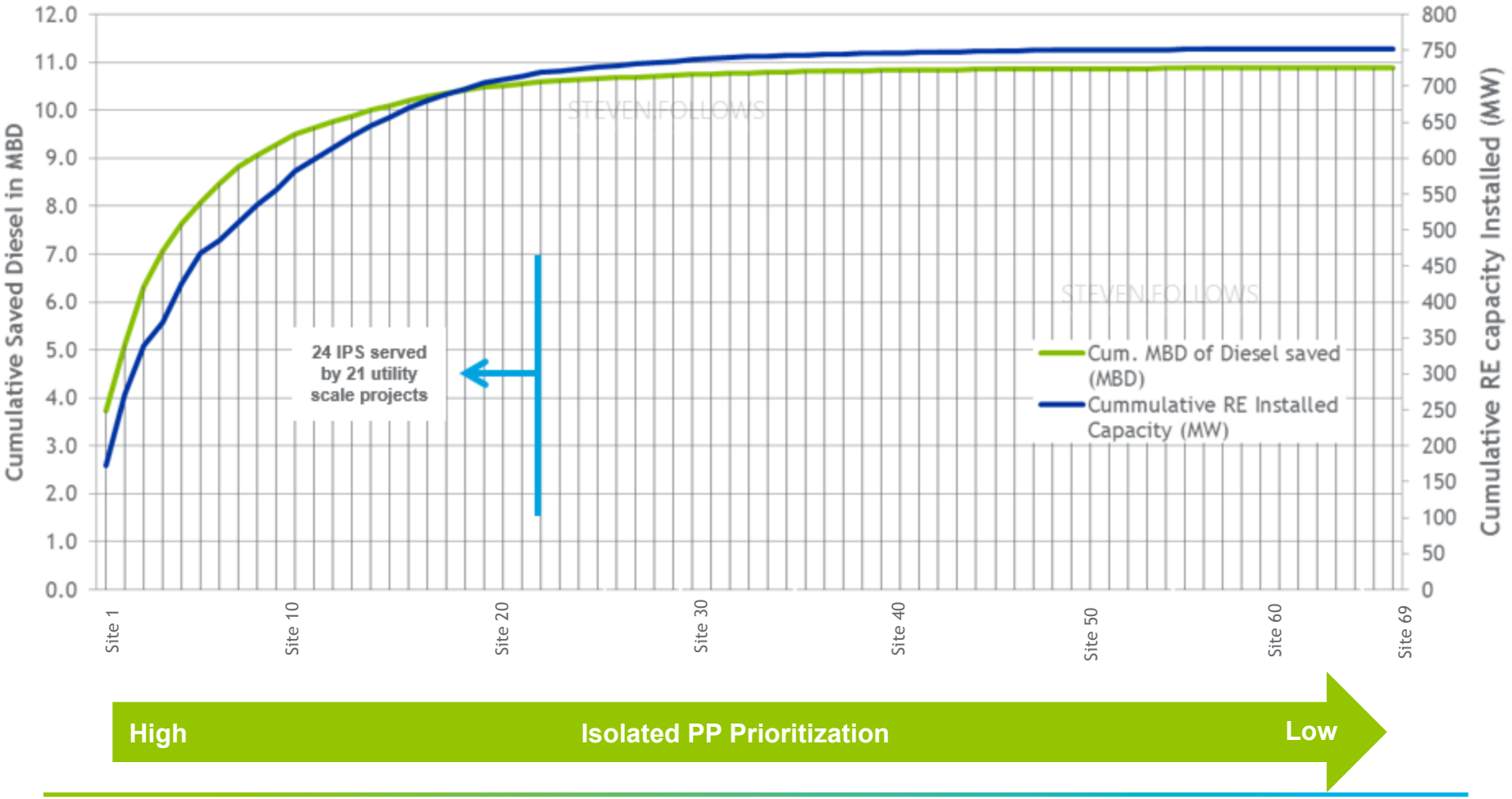
Key findings – Sensitivity Analysis

The efficiency of IPS is a key economic driver



Key findings – Ranking and prioritization

21 RPPs totaling 720 MW displace 15% of total Diesel



Opportunities

750 MW program targeting 10.9 MBD of Diesel savings

Utility Scale Renewables (> 5MW)

- 720 MW program
- 21 projects serving 24 IPSs
- Displace 10.6 MBD of Diesel
- Capacities between 5 MW to 175 MW
- Use optimum renewable technology matching resource, demand and growth
- Site specific projects to be developed

Modular RE-Diesel Hybrid Blocks

- 30 MW program
- 45 projects serving 45 IPSs
- Displace 0.3 MDB of Diesel
- Capacities between 100 kW and 2.5 MW
- Potential to increase penetration to > 25%
- Consider energy storage
- Regional project portfolios

Thank you

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