Reform, IRRP, and Performance Improvements At MEC

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MEC Reform and Integrated Resource and Resiliency Plan (IRRP)

Marshalls Energy Company's Reform and IRRP is funded by ADB through a Supplemental Management and Operations (SMO) project.

Reform Activities

1. Business and operations planning and implementation
2. Reorganization and new:
    a. Organizational structure
    b. Job descriptions
    c. Staffing level and staffing
    d. Management processes
    e. Management compensation plan
3. New MEC Act and Corporate Governance
4. New Tariff Policy and Methodology
5. Revenue Protection

IRRP and Performance Improvement Activities

1. Demand Forecast
2. Least cost generation planning
3. Distribution network resiliency
4. Distribution Network Protection System
5. Advanced Metering Infrastructure (AMI)
6. Revenue Protection Unit
7. System studies to determine solar penetration limit
8. Solar Policy and Regulation

New MEC Tariff Policy and Methodology

- We've updated our tariff system for the first time in 15 years.
- Our new tariff has two parts:
  1. Base Rate: Covers operating costs (excluding fuel), depreciation, return, and taxes; updated annually after issuance of audited financial report.
  2. Fuel Rate: Reflects current fuel costs; updated monthly.
- We now use a straightforward, documented methodology to calculate the tariff. This ensures our tariff recommendations are fair and justifiable for our board, the government, and legislators.
- Our management team calculates the tariffs, and our board reviews and approves them. We've also created a tariff model to assist with calculations.
- Result: Average Base = 20.2 ¢/kWh, Fuel = 24.0 ¢/kWh, Total = 44.2 ¢/kWh

MEC has established a new Revenue Protection Unit (RPU)

- **Established RPU along with operating processes and procedures.**
- **Resident expert adviser since April 2024.**
- **Routine customer inspections for proper metering, meter reading, accounting for energy delivered and consumed , billing, and collection.**
- **Since May 2024, the RP team has inspected many large commercial customers and all customers on one feeder.**
- **They identified theft, malfunctioning meters, improper CT multiplier recording in customer system, inaccurate billing, etc.**

<u>Results as of July 2024:</u>

- **Total Reclaimed losses in kWh: 7.2 million**
- **Total Reclaimed losses in US$: 3.1 million**

MEC is implementing a new distribution protection system

Issues with current system

Lack of protection coordination and selectivity. Fault cannot be isolated and affects the entire power system.

- **Lack of sensitivity: Some faults are not detected by the protection system**
- **Underfrequency-based load shedding is not implemented**
- **No busbar protection scheme**

Benefits with new system

Fast fault reaction: Fault is located and cleared in milliseconds

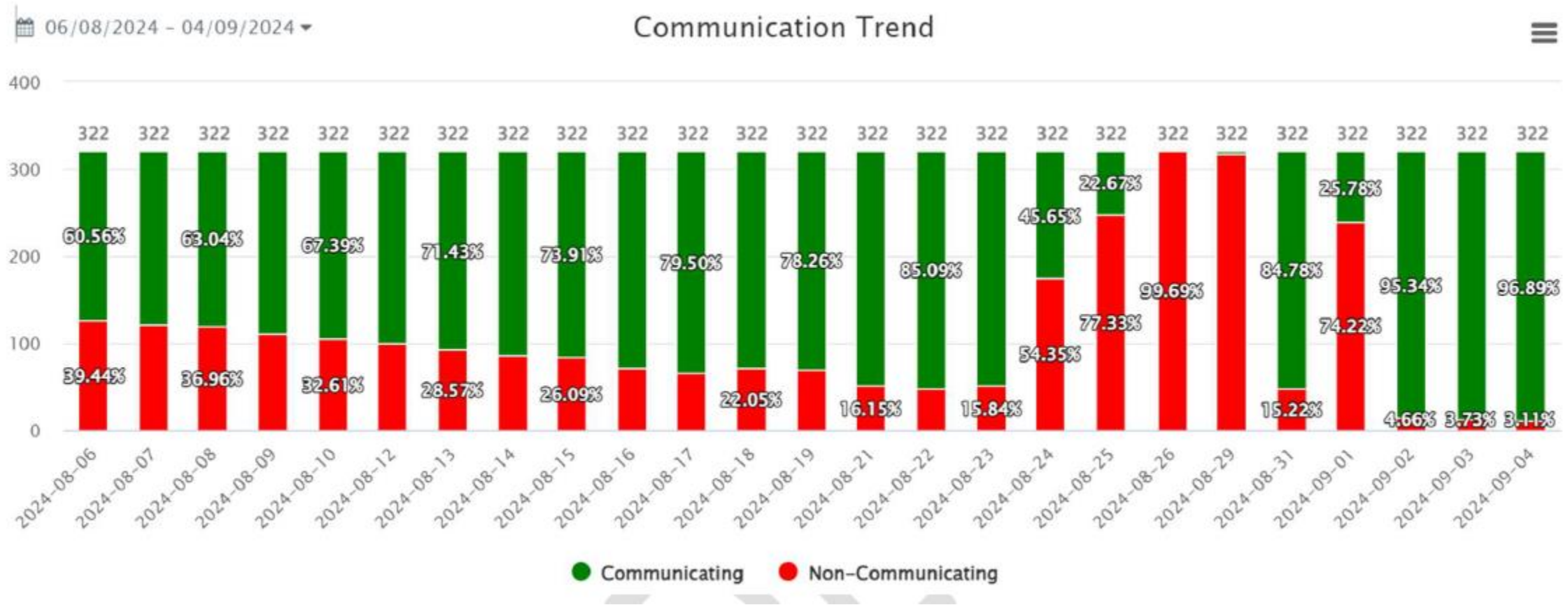
- **Increase the likelihood of detecting downed conductor: Detecting the fault when conductor breaks**
- **Consideration of future Solar PV plants**
- **MEC personnel:**
  a. **Can observe protection operation and system faults on the monitor**
  b. **Will receive full information about the faults on the monitor**
  c. **Will receive prompt indication of fault location and VCBs**
- **Protection equipment designed with special *Conformal Coating,* protecting electronic in salty environment.**
- **Provides opportunity to add :**
  a. **Power system frequency control – automatic load shedding**
  b. **Sensors to detect damaged area in underground cable**

Advanced Metering Infrastructure (AMI)

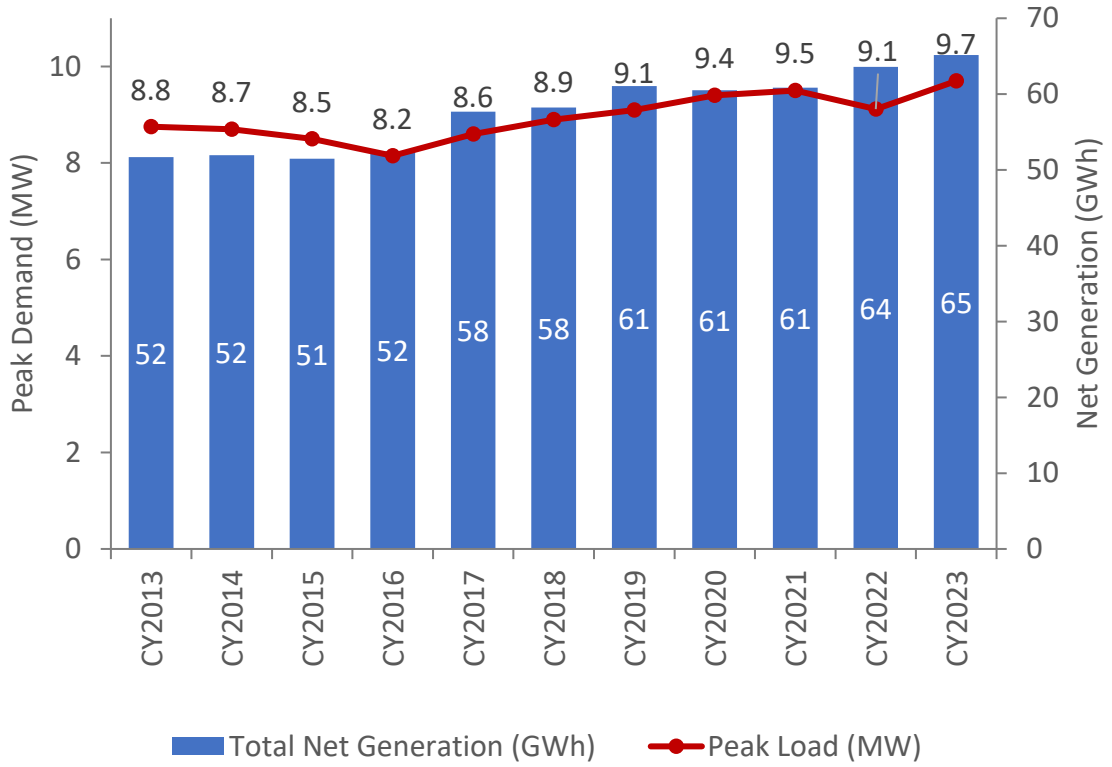
More than 320 AMI meters installed in last three months

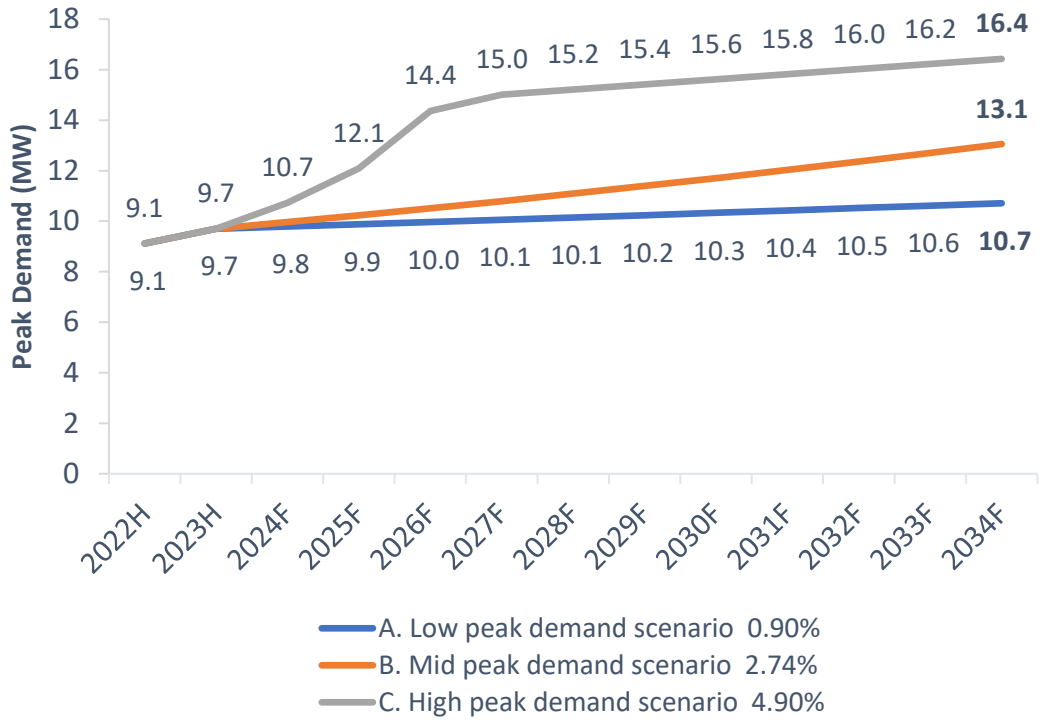



MEC AMI has Achieved 97% Communication Rate

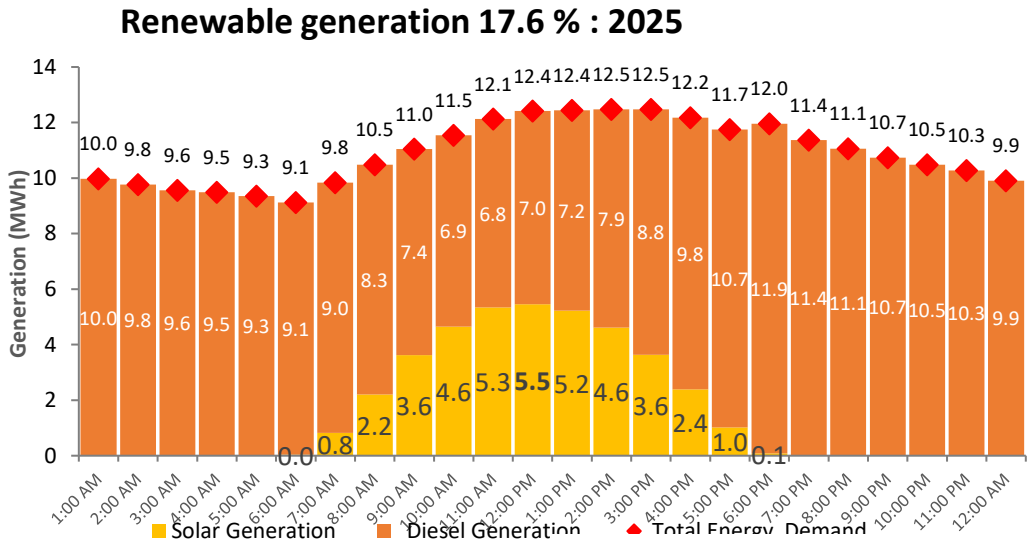


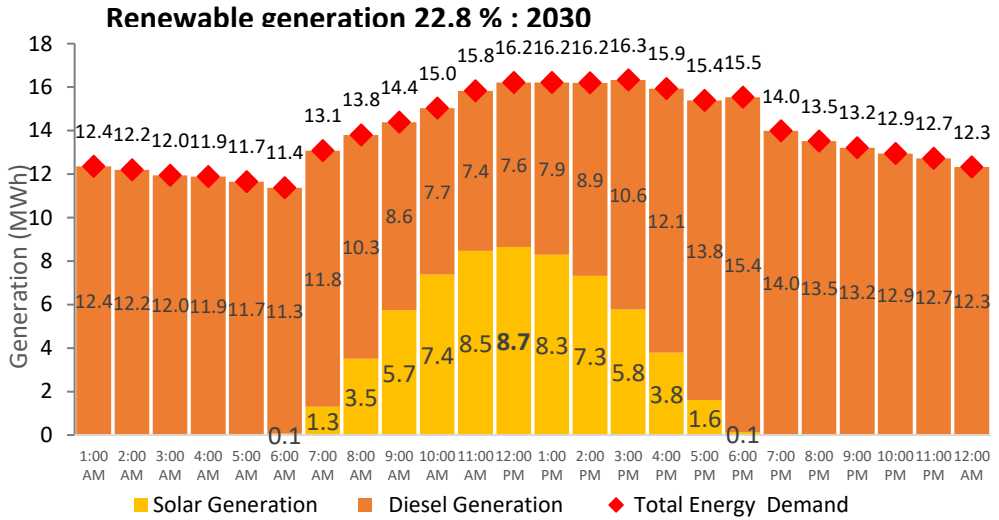
MEC's peak system demand is expected to reach around 16.4MW in the next decade

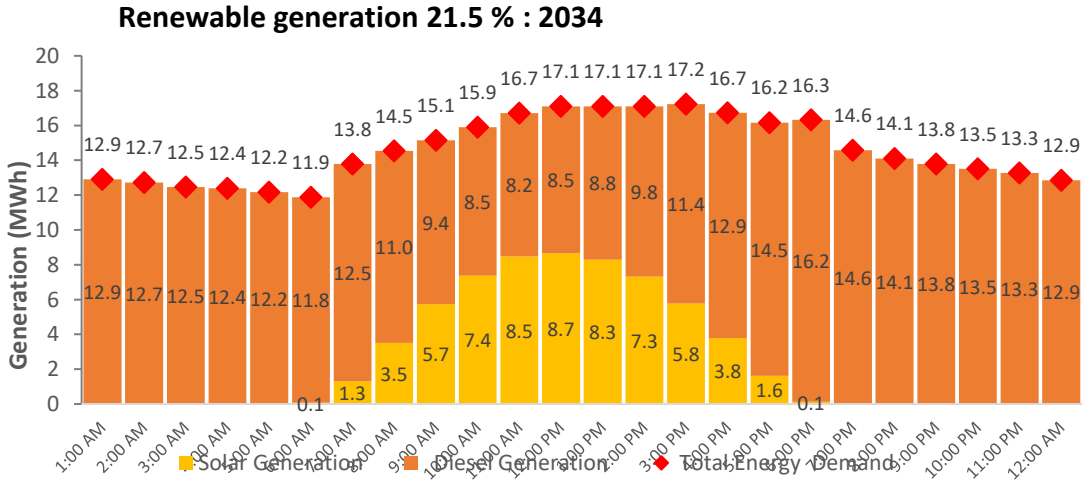




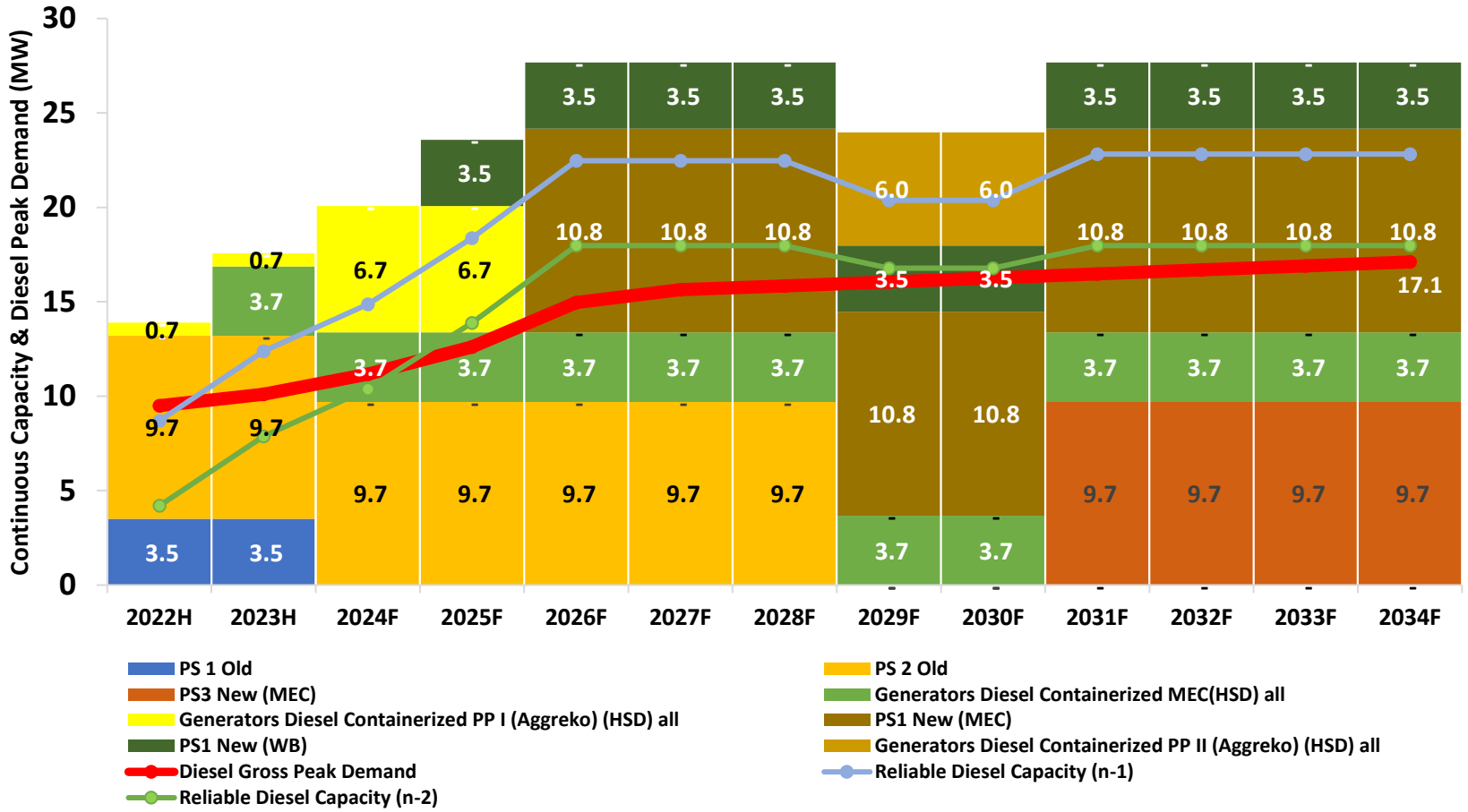
Solar penetration will exceed 60% in coming years…the instantaneous penetration could be as high as 80% to 90%, during low demand periods, creating stability issues. Energy contribution from solar is expected to reach about 23% by 2030







To ensure MEC keeps providing reliable supply and meets future demand, diesel generators for PS-1 and PS-2 must be purchased and installed (about 20 MW).



The diesel generation capacity addition is crucial for meeting national RE goals as it will enable higher levels of solar and wind to be connected to the grid to reduce fossil fuel consumption. This will also require investments in strengthening the distribution network.

Grid study confirms that the hosting capacity of grid is low and suffers from lack of inertia

- Grid cannot sustain (n-1) loss of 4.5 MW of generation. That will cause frequency to dip to below 59.3 Hz given lack of inertial response in the grid.
- The grid can accommodate only 3.5 MW of PV during the maximum load and 1.29 MW of PV during the minimum daytime load after which the frequency stability is compromised.
- Investments in thermal generation for firm capacity and inertia, and in distribution for strengthening the grid for interconnecting higher levels of RE, are required.
- Solar installations must be matched with sufficient energy storage to help smoothen intermittency and provide grid balancing services when needed.

Investments to the tune of $90 million are needed in the next few years to prepare the grid for future demand and higher levels of RE.

Thank you!