Session 12: Tools and Products to Take Us to the Future

FIR AND THE FUTURE OF ENERGY
OPPORTUNITIES AND CHALLENGES

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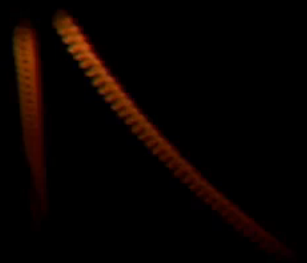

FIR and Future of Energy: At a Glance

Part I : FIR in Energy Production (Renewable)

Part II : Smart Grid

Part III : Demand Side Management

Part IV : AI, Big Data and Advanced Technologies

Part V : Way Forward

FIR for Renewable and Sustainable Energy

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100% Renewable will ensure
Affordable, Accessible, Clean Energy for the Planet.

62% from Coal in 1920

54% from Petroleum in 1979

18% from Renewables in 2015

100% from Renewables within 2050

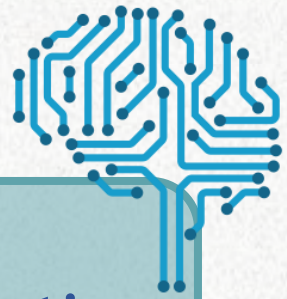
Major Challenges of Renewable Energy

Natural Phenomena affects availability of Renewables.

Volatile Production.

Reliability Issues on Power Production & Transportation.

Opportunities of FIR Integration in Renewable Energy



AI in
Power Production
Control

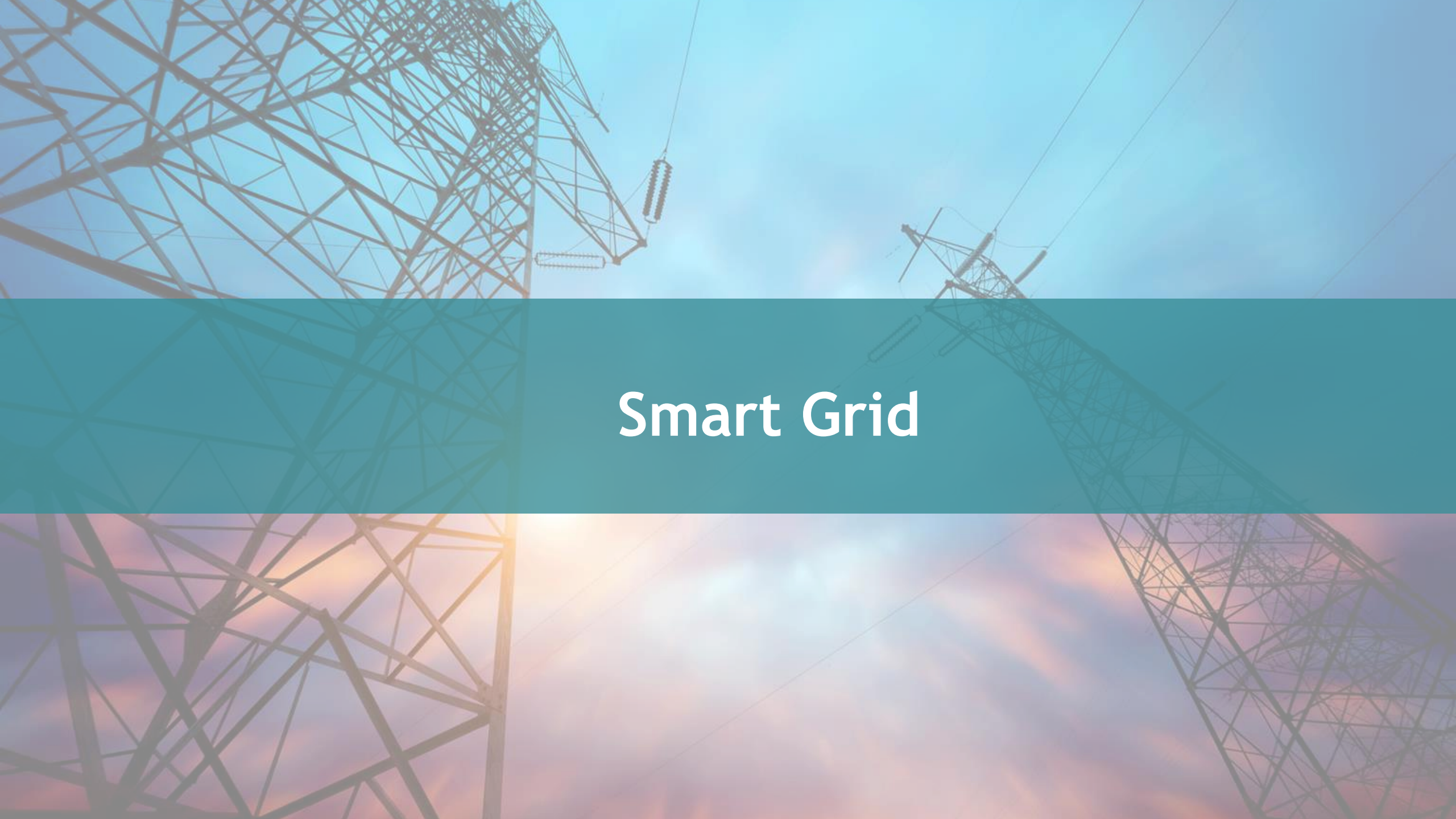
AI in
Weather
Forecasting

Big Data Analysis to
Predict Production
Volatility

Robotics for
Inspection,
Maintenance, and
Troubleshooting

AI driven Autonomous
Drones to Inspect
Wind Turbines and
Solar Panels

AI-driven analysis for
Reducing
Investment
and Costs



Smart Grid

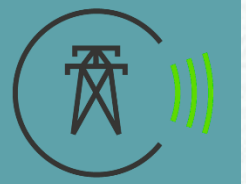
Smart Grid

8% - 15% Electricity Losses during T&D.

Smart Grid can reduce T&D loss.

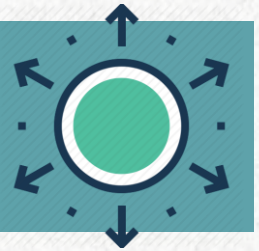
Smart Grid integrates Electricity, Communication and IT.

Existing Grid Related Challenges



Grid is moving from:

- Analogues to Digital;
- Fossil Fuel to Renewable Centric;
- Centralized to Distributed System.



Decentralized Grid for Renewable Integration.

Provision of Selling Excess Power from Consumer.

Role of FIR in Smart Grid

Blockchain
for enabling People to
Trade Electricity

Reduce Power Loss
&
Increase Efficiency

Reduces
Power Outage Duration & Frequency

Increases
Integration of
Wind & Solar

Demand Side Management (DSM)

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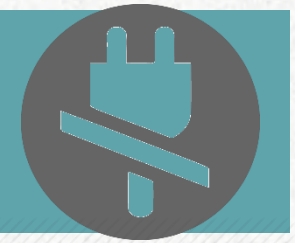
Initiatives & Technologies to Optimize Energy Usage

Effective DSM can reduce:

- **Electricity Usage;**
- **Expenses on Electricity;**
- **Electricity Production Requirement;**
- **Peak Hour Electricity Usages.**

Existing Challenges of DSM

Energy Price increase in Global Market.



Power Outage has significant economic impact.

CO2 and GHG emission increasing.

Role of FIR Integration

Smart Metering

Advanced Metering Infrastructure

Demand Response

Usage Control by Smart Devices

Solution for Future: AI, Big Data & Advanced Technologies

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Energy Storage: Tesla PowerWall

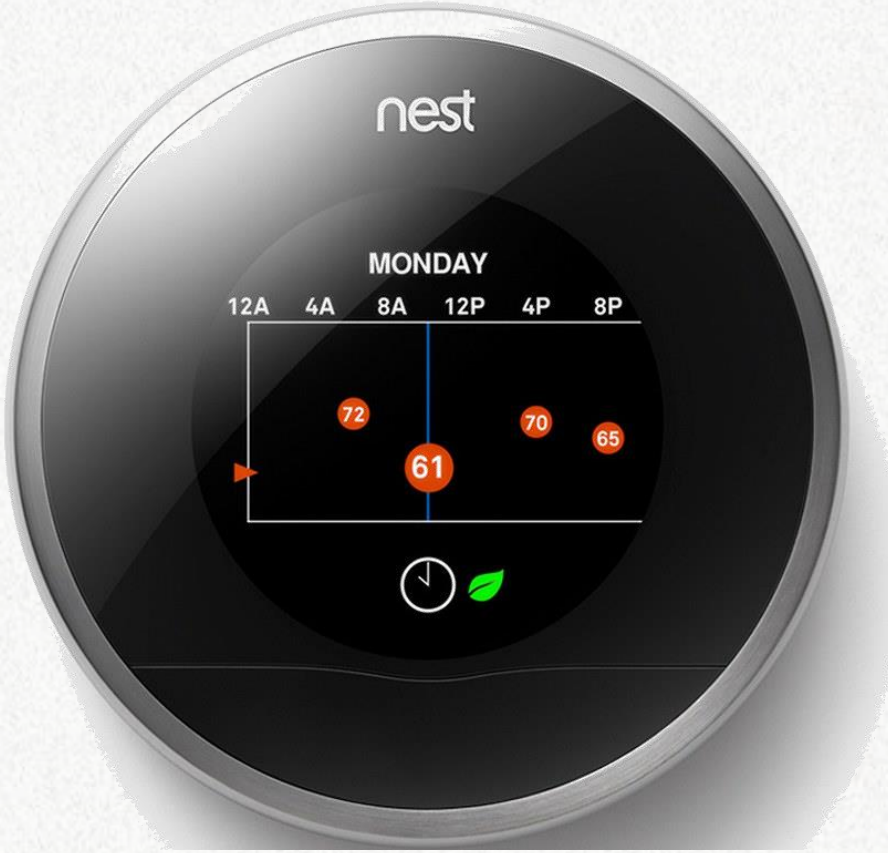
- **Rechargeable lithium-ion battery** stationary **Energy Storage** products manufactured by **Tesla.**

Electric Vehicle (EV)

- **Energy Efficient** and **Environment Friendly.**
- EV is expected to **Grow from 3 million to 125 million by 2030.**

TESLA

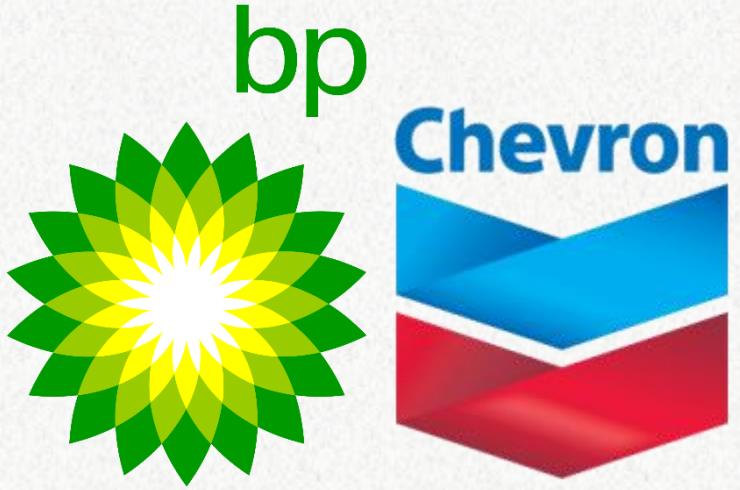
Energy Consumption: Google Nest



- **Googles'S NEST** adapts to **User Behavior** to **Reduce Energy Consumption**.
- Once installed, it begins **Learning the Habits of Its Occupants** and **Adjusts Temperatures** accordingly.

Energy Storage: BP and Chevron

- **AI for Energy Exploration** by **BP & Chevron.**
- **AI & Robotics** for **Oil Recovery,** and exploration of **Alternative Energy-related Assets.**



Way Forward

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Research on Social & Human Dimensions alongside technology.

Governance Model for the Energy Sector.

Building Capacity of the Stakeholders.

Manage FIR impact on Global Jobs of Energy Market.

Thank You

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