

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

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# **FIR AND THE FUTURE OF ENERGY OPPORTUNITIES AND CHALLENGES**

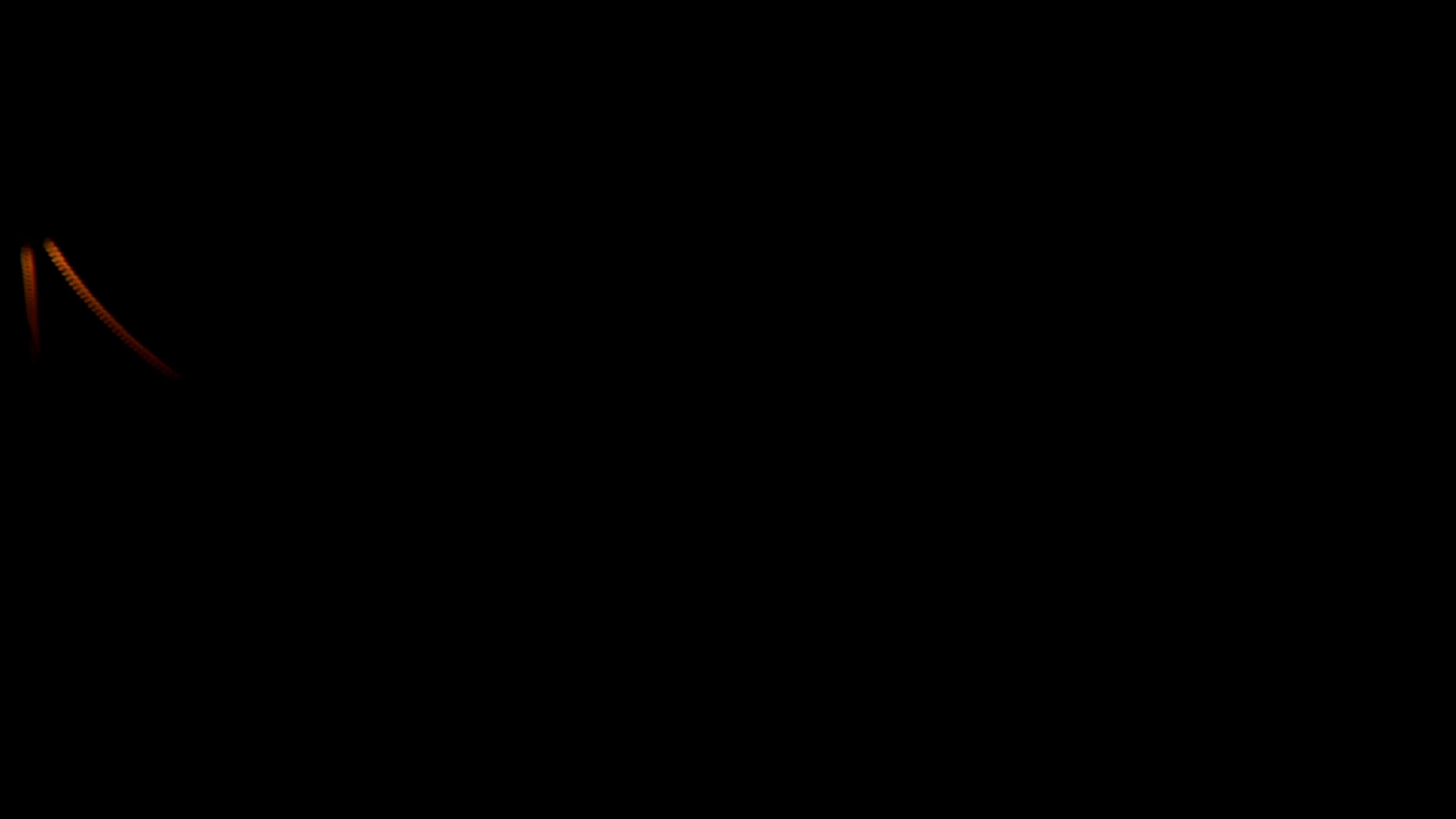


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HARNESSING INNOVATION TO POWER THE FUTURE

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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



A composite image featuring wind turbines in the upper half and a lush green landscape with trees and grass in the lower half. A teal horizontal band spans the middle, containing the title text. The background shows three wind turbines with white blades and orange tips against a cloudy sky. The foreground shows a rolling green hill with tall grass and several trees.

# FIR for Renewable and Sustainable Energy



# FIR for Renewable and Sustainable Energy

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



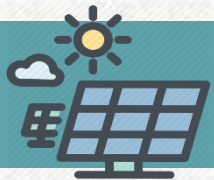
62% from Coal in 1920



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.



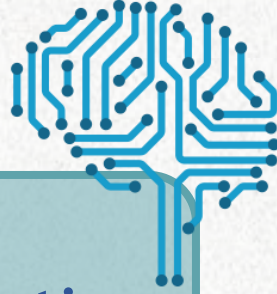
**Volatile Production.**



**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 Risks  
and Costs**





A low-angle photograph of high-voltage electrical transmission towers and power lines against a sky with soft, wispy clouds. The image is split horizontally: the top half has a light blue tint, and the bottom half has a warm orange and pink tint, suggesting a sunrise or sunset. A semi-transparent teal horizontal band runs across the middle of the image.

# 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**

The background of the slide features a stylized illustration of a wind farm. Several wind turbines are depicted in a light, muted green color against a sky with soft, white clouds. A solid teal horizontal band runs across the middle of the image, serving as a backdrop for the title text.

# Demand Side Management (DSM)



# Demand Side Management (DSM)

## Initiatives & Technologies to Optimize Energy Usage

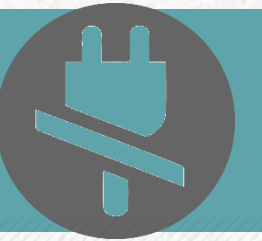
Effective DSM can reduce:

- 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.



**CO<sub>2</sub> 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



# Solution for future: AI, Big Data & Advanced Technologies

## 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**.

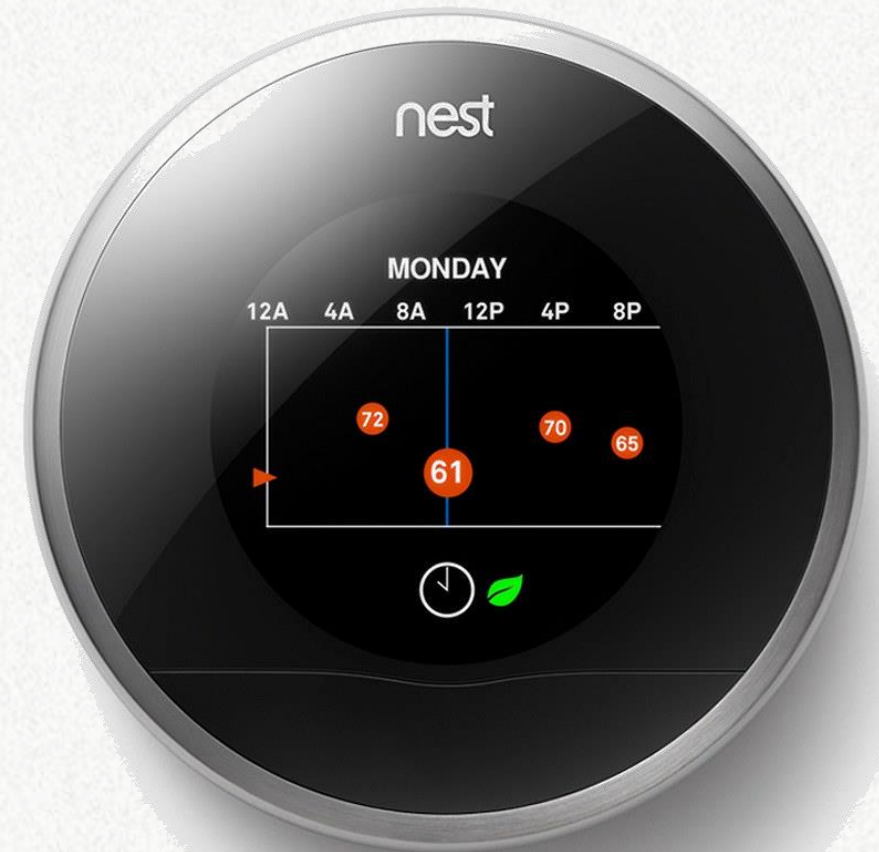


TESLA

## Energy Consumption: Google Nest

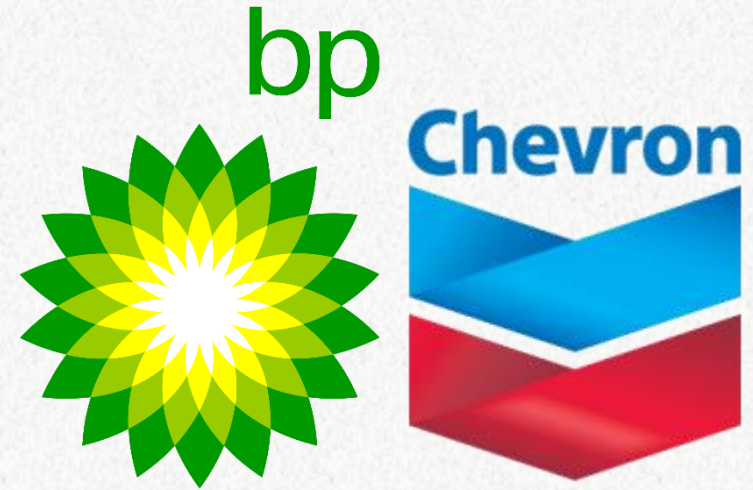


- **Googles'S NEST** adapts to **User Behavior** to **Reduce Energy Consumption**.
- Once installed, it begins **Learning the Habits of Its Occupants** and **Adjusts Temperatures** accordingly.



## 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



# Way Forward



**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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