Predicting RE and Demand for Efficient Grid Management

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Introduction

Renewable energy (wind & solar) has become an important part of electrica generation in many countries and its importance is continuing to increase.

The amount of RE generation is growing rapidly and individual farms are growing in size and complexity.

The operation of the RE and its response to disturbances or other impacts on the power system is an increasing concern.

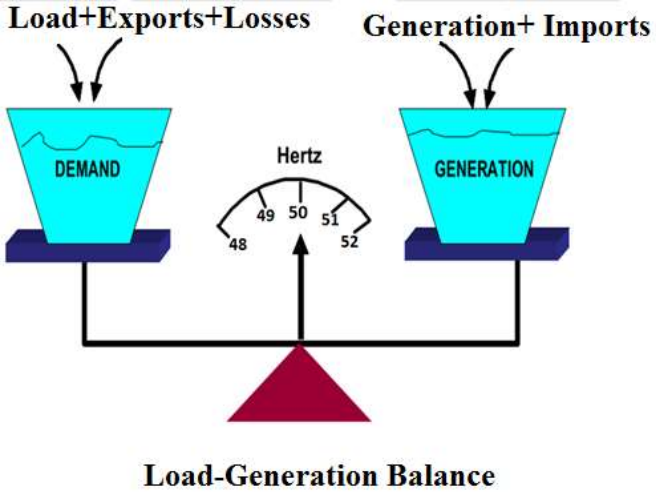
RE as a resource directly from the nature, is characterized by both variabilit and unpredictability and are thus coining them as Variable Generation (VG)

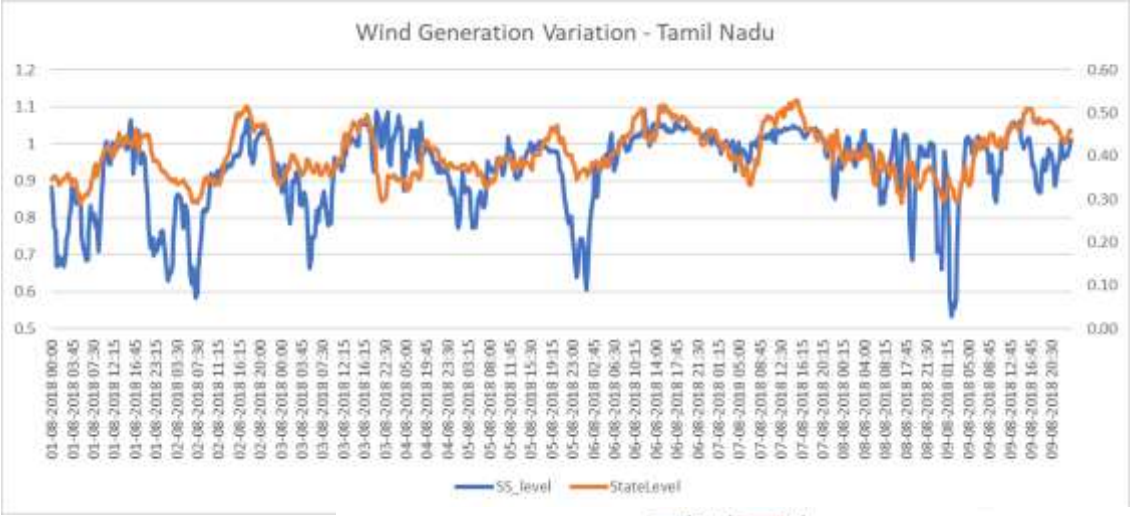
Introduction

Curtailment of generation from wind and solar is a growing concern across the world

There is a need for operating the Renewable Energy as a Virtual Power Plant which should behave similar the conventional power plants in its operational characteristics

Challenges in System Operations



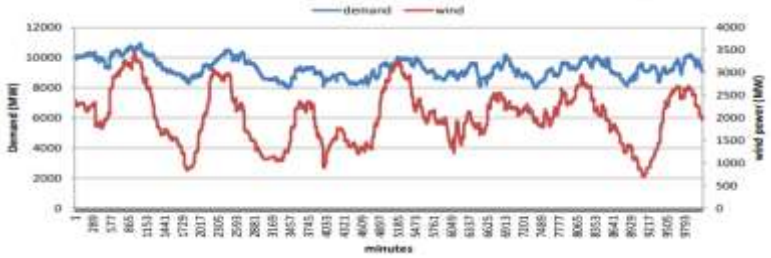


Conventional System

Only Demand is varying → Demand Forecasting → Generation follows the load

Addition of RE Generation

Both Demand and RE Generation are varying → Demand + RE Power Forecasting



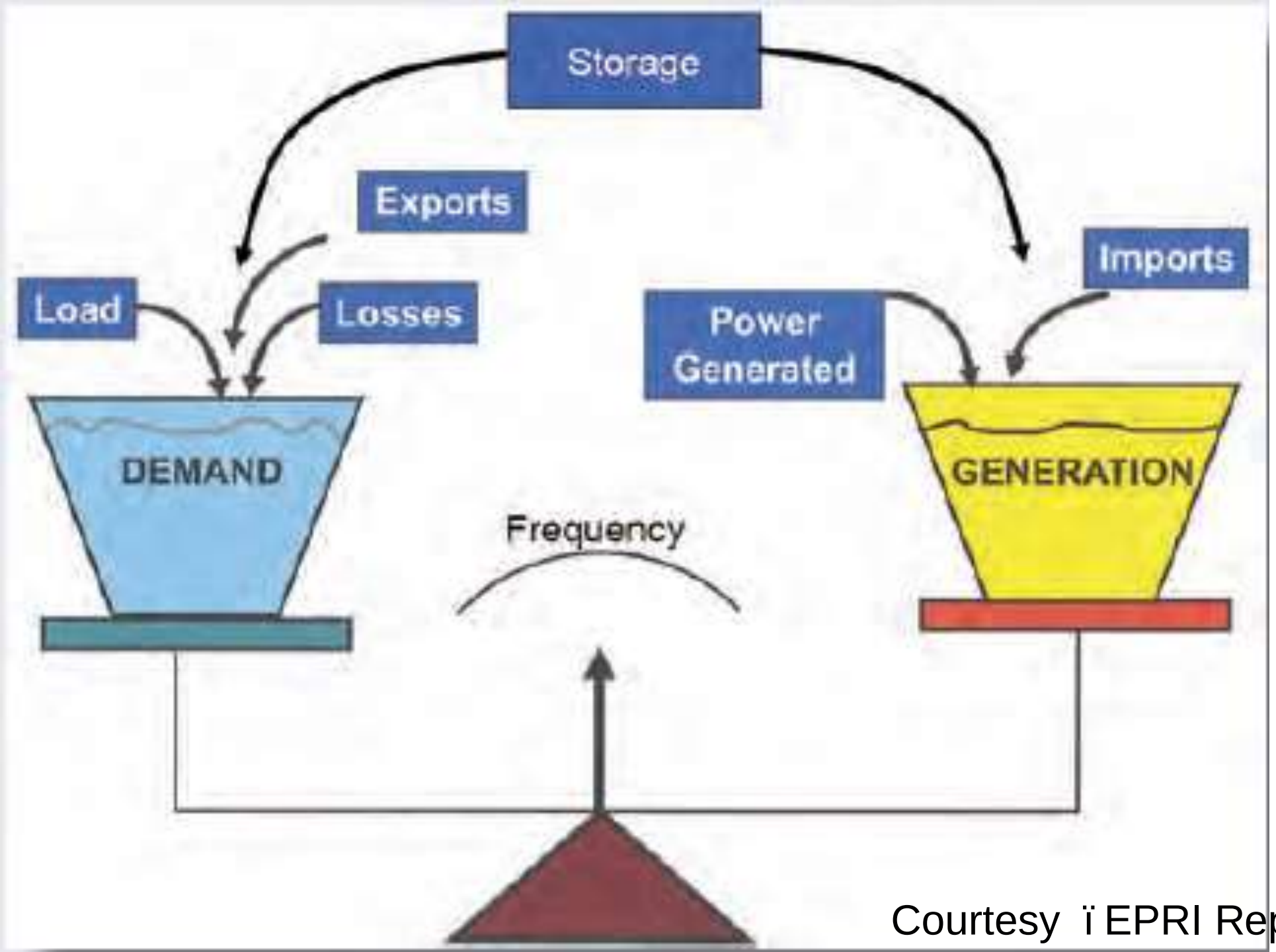
Efficient Grid Management

The objective of power system operation & control is to efficiently generate, transmit and distribute electric energy

For satisfactory operation of power system, the frequency should remain nearly constant

The frequency of the system is dependent on active power balance

Predicting Renewable Energy (RE) and demand becomes crucial, especially as the share of renewables in the energy mix increases



Courtesy ï EPRI Report

Need for change

Transmission system for renewables - waiver based

Usage based component

Reliability component quantification

HVDCt for system control

Short term open Access charges