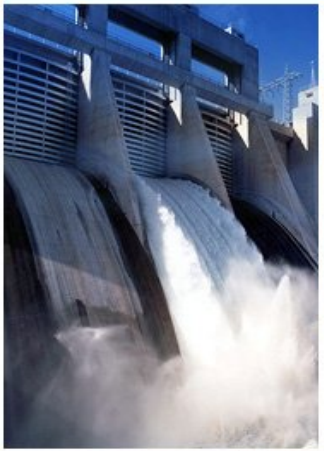


Innovative Retail Strategies in Smart Grid Solutions



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Smart Grid Needs a Strong Business Case

Objectives of Smart Grid:

- Enhanced System-wide Energy Efficiency
- Reduced Emissions
- Enhanced Grid Reliability, Availability and Power Quality
- Empowering Consumers

Key Players:

- Utilities – smartly generate/trade/deliver power energy
- Consumers – smartly consume/produce power energy
- Regulators – implement fair/reasonable Marketing and Operation Regulations
- Technology Providers – provide advanced technologies/solutions to all parties

Basic Questions:

- What drives the System-wide Energy Efficiency in the grid ?
- How to maximize it ?
- Who should initiate it ?
- What are the benefits to the key players?

Limitations of Current Power Market Structure

1. Transmission Level Wholesale Market:

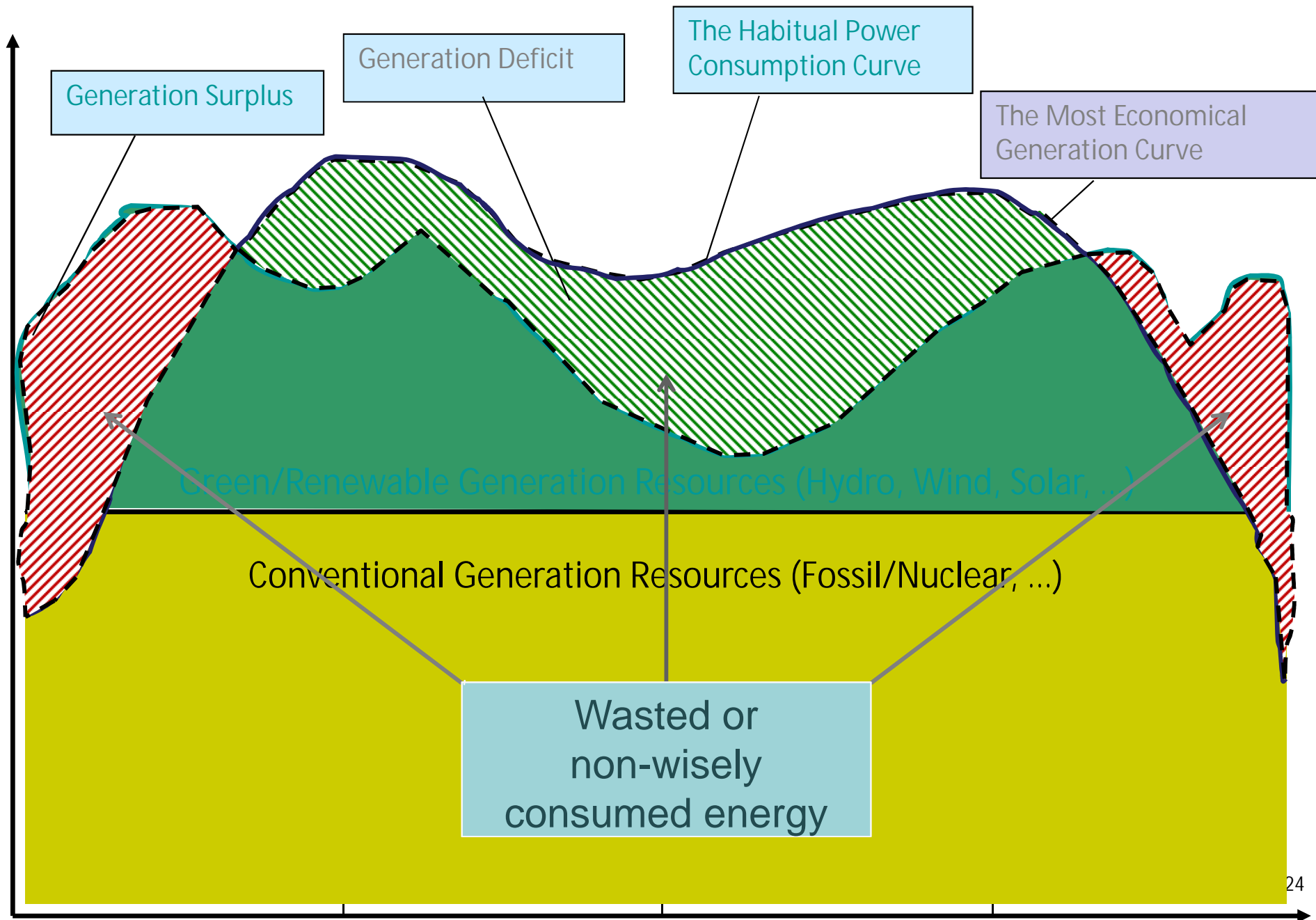
- Promotes competition among generation resources
- Habitual Demand is independent of Supply Competition
- Generation Planning/Scheduling based on Load Forecasting with good accuracy (+/- 2% error)

2. Regulated Distribution:

- Regulated rates based on annualized cost and revenue of utilities
- Static rates to consumers
- No incentives to empower consumers to use energy smartly

3. Passive Consumers:

- Habitual Consumption (convenience and comfortableness driven)
- No visibility to the cost dynamics in power generation and delivery
- Static rates do not promote smart consumption
- Resultant Peaks/Dips cause wasted resources and more emissions
Up to 40% – 60% of energy, either wasted or consumed inefficiently at improper times



Better Power Market Structure

1. Enables Smart Energy Consumption:

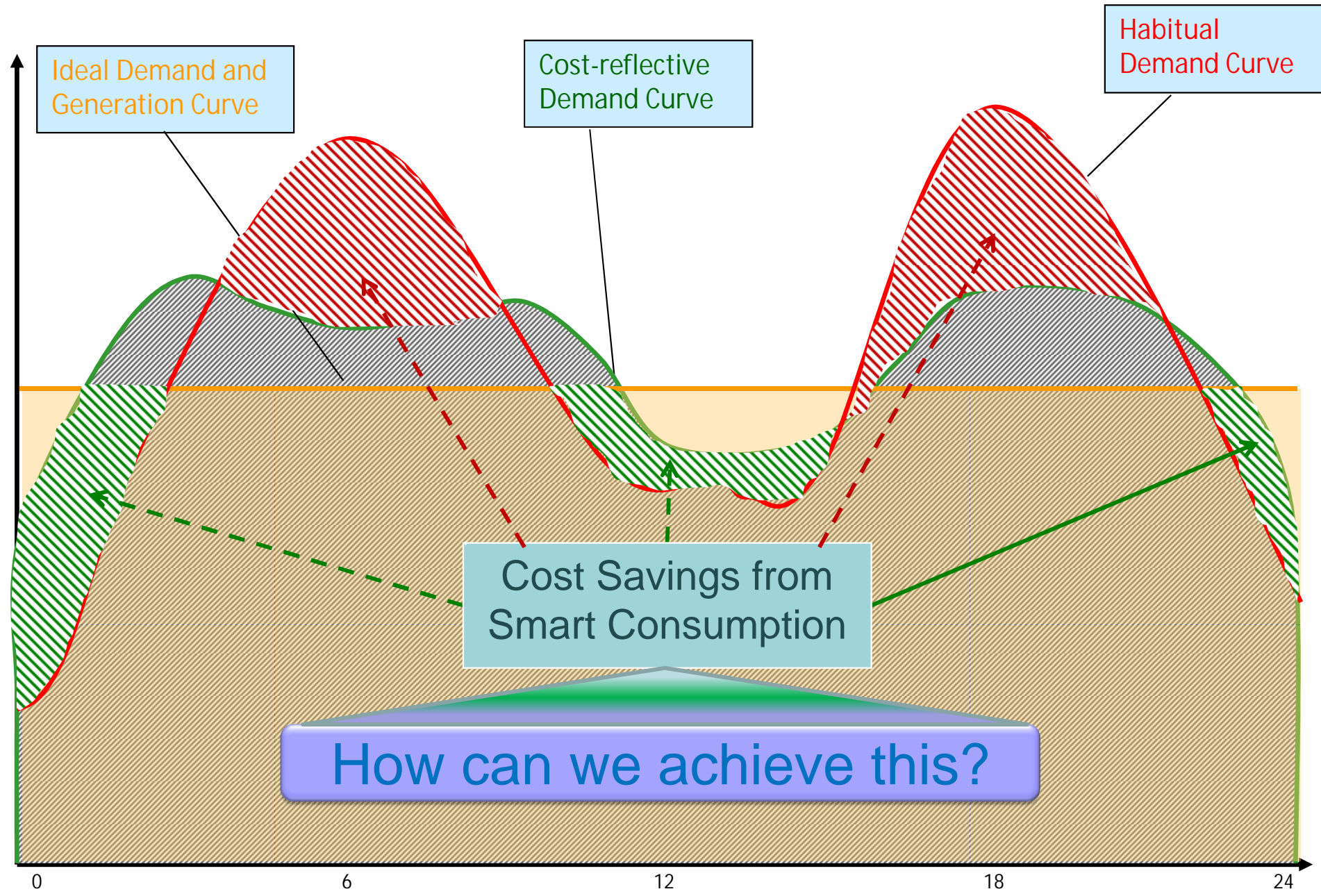
- Consumer's participation: visibility to the cost dynamics in power generation and delivery
- Cost-reflective Real Time Rates (Retail Power Marketing Mechanism)
- Smart consumption (using HEMS, Smart meters, ...)

2. Enable Smart Energy Generation:

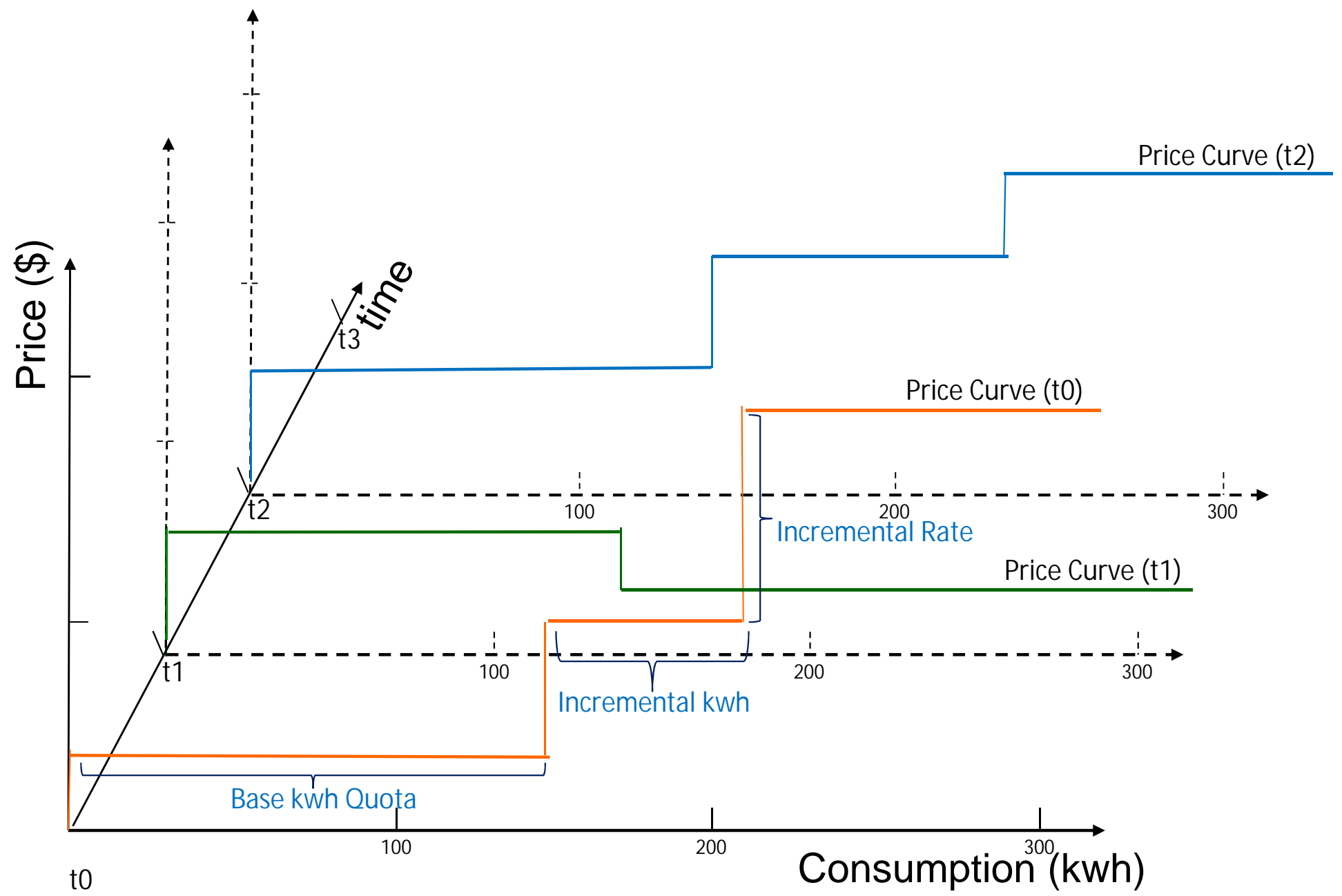
- Price-dependent demand forecasting
- Coordinated Wholesale market and Retail Market
- Smart Generation Planning

3. Enable DER Accessing:

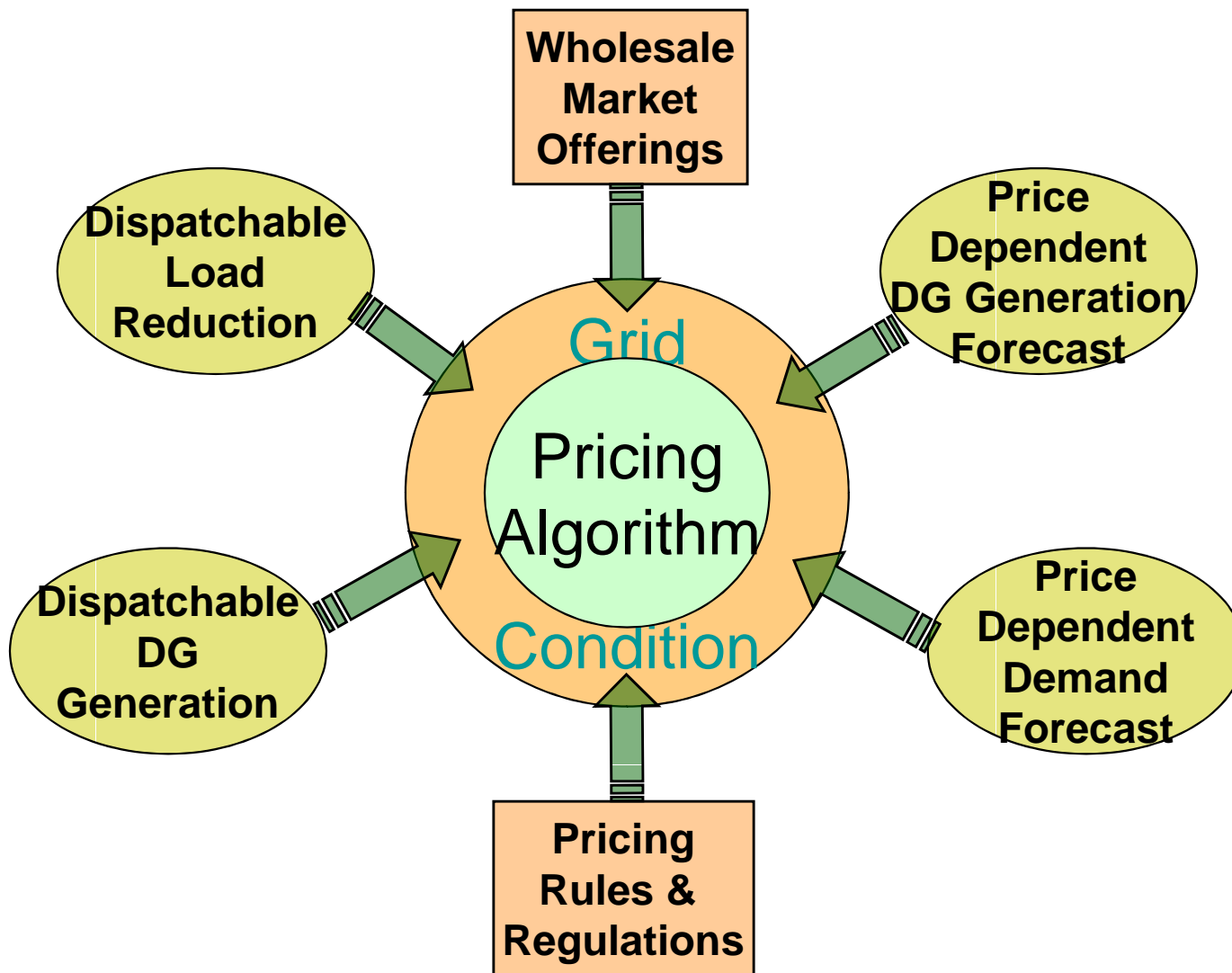
- Net-metering Capability: Consumers/Producers
- Renewables and DER accessing to the grid
- EV/PHEV connecting to the grid

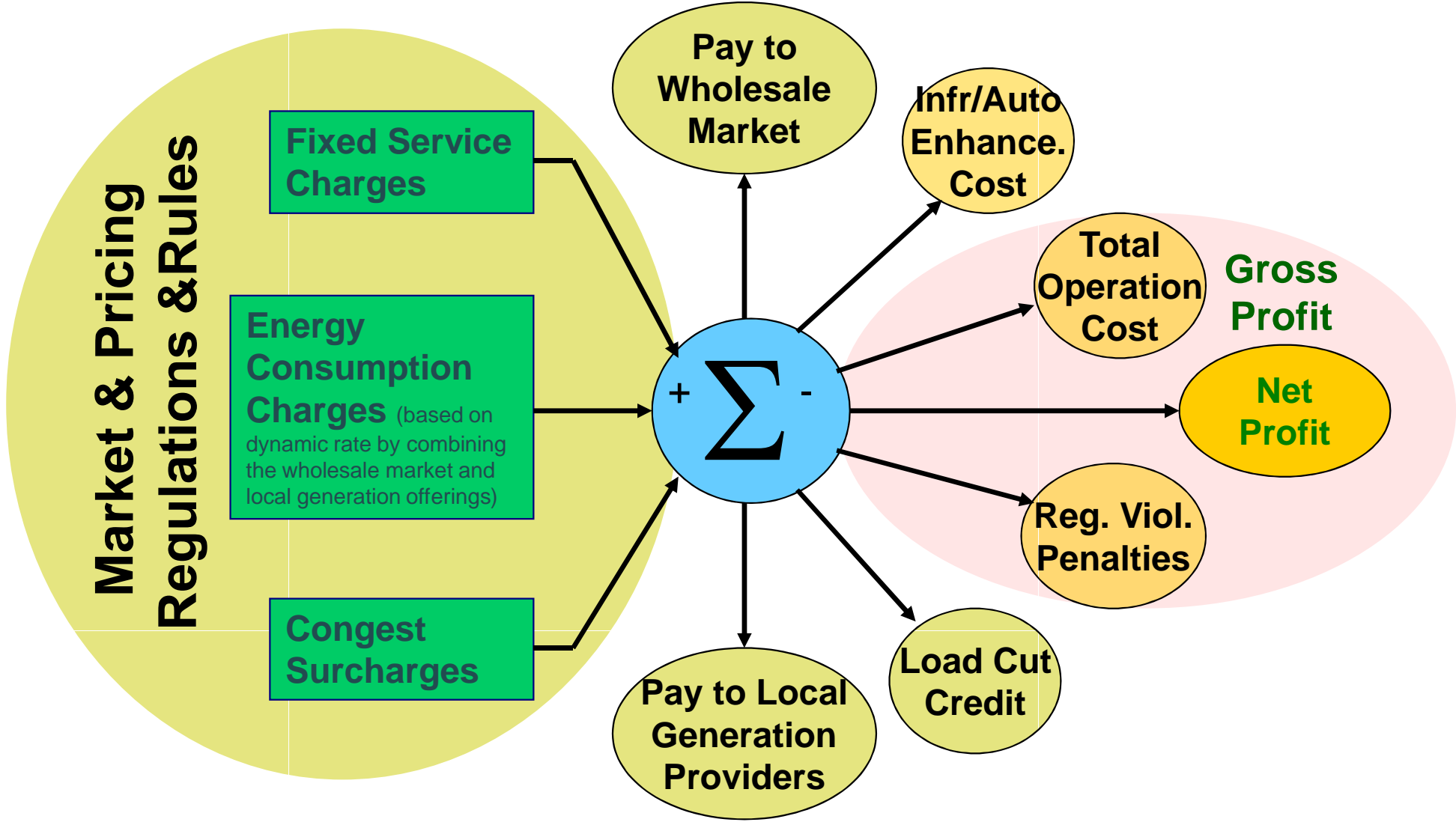


Dynamic Stairway Pricing



Roles	Responsibilities
Regulators	<ul style="list-style-type: none"> ➤ Initiate the RPM and CRP structure, ensure fair and effective pricing rules and policies, guarantee the energy providers and the consumers can effectively work towards maximizing the overall energy efficiency and appropriately get rewarded from the cost savings. ➤ Be responsible for governance of the RPM mechanism, closely monitor and audit energy providers and the utilities for their compliances to RPM rules, compliance to grid reliability and the efficiency guidelines ➤ Apply proper penalties to RPM traders and grid operators for severe violations or non-compliances to the market and grid operation regulations
Independent Power Providers	<ul style="list-style-type: none"> ➤ In open competition, the independent energy providers supply energy to individual consumers with CRP rate plans designed to incentivize consumers for smart consumption ➤ Dynamic rate schedules or signals have to be available to the end users in advance or in real time ➤ End users can be Energy Consumers or Producers and are allowed to freely switch providers upon contract completion
Distribution Utilities	<ul style="list-style-type: none"> ➤ Ensure grid reliability and availability to all consumers and energy providers ➤ Fixed charge for grid accessing, Charge for energy delivery and excessive use penalty ➤ Can play the role of energy provider at the same time ➤ Manage unavoidable congestions through applying penalties/rewards to the end users, no benefits allowed from congestion management
Consumers	<ul style="list-style-type: none"> ➤ Choose preferred providers ➤ Take the advantage of dynamic CRP and Stairway Rating, smartly plan consumption/producing ➤ Install Smart Meters and HEM units





Questions?

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