

# Smart Metering Workshop

## Energy Saving, Metering and Smaller Customers

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**Operating Agent Task XI**

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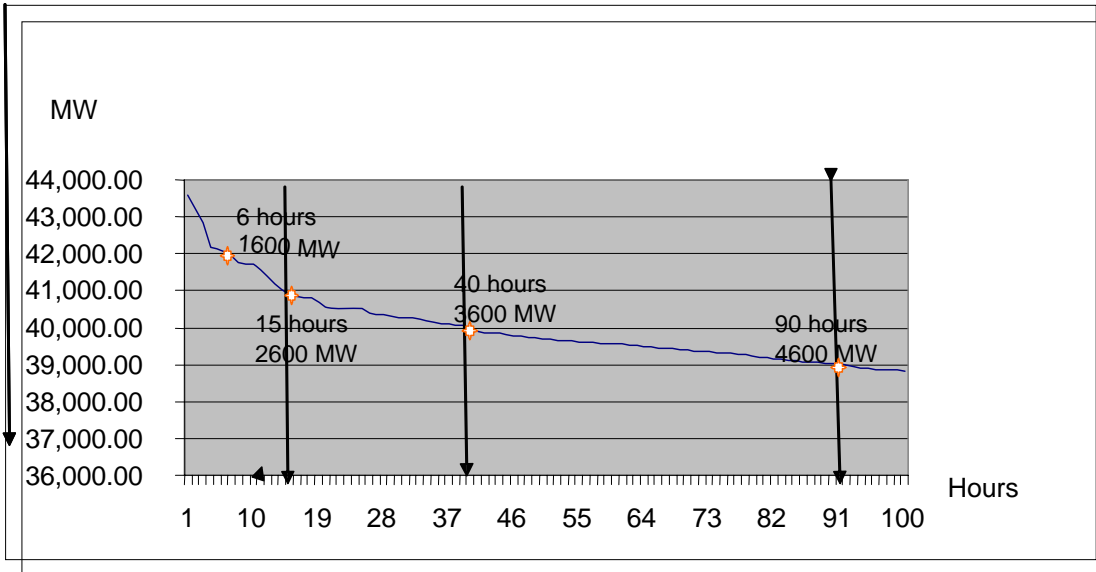
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# Background

- Up to 40% of electricity is used by smaller customers
- Saving energy is major objective of governments
- 2 ways customers can save electricity
  - reducing use
  - shifting use
- Maintain system security

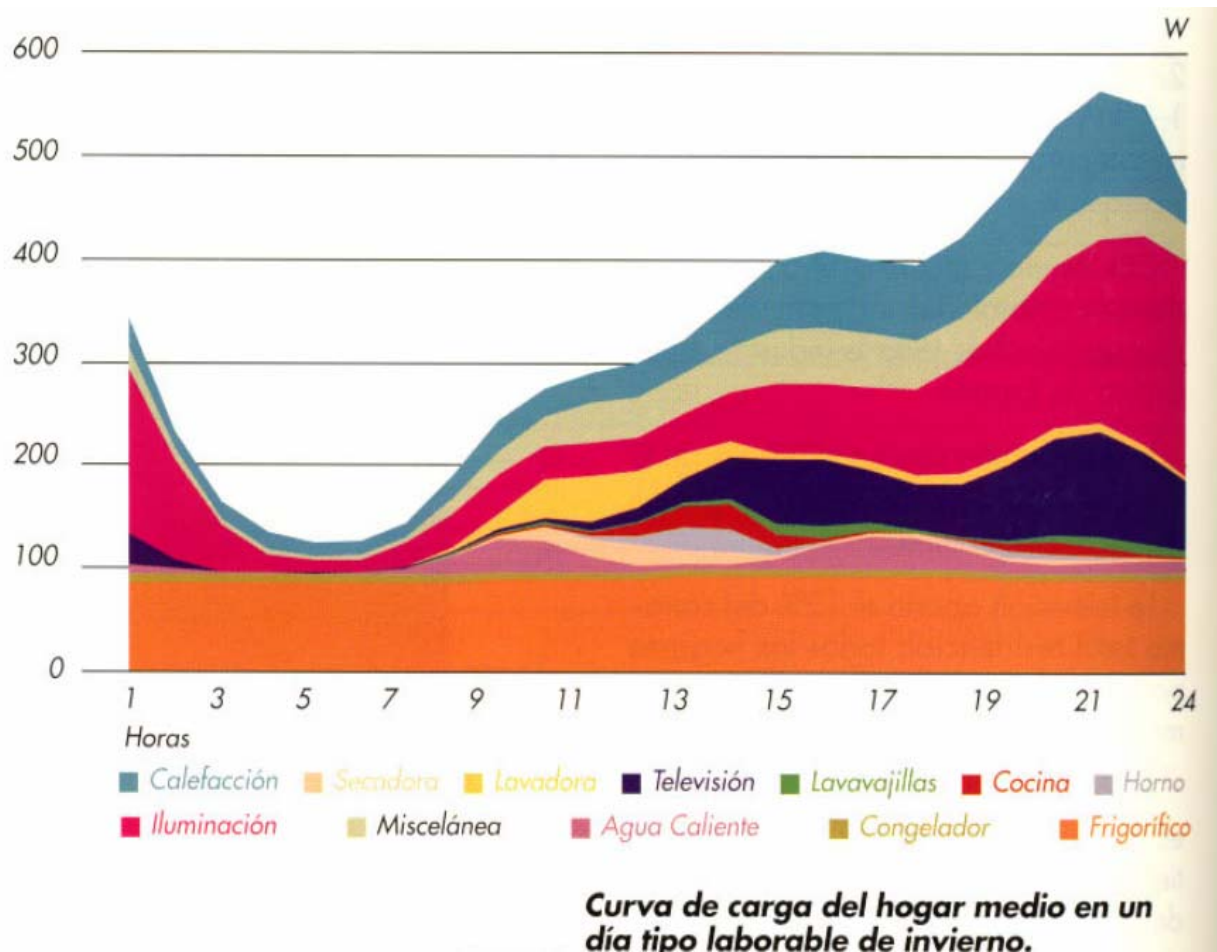
# Annual Duration of use of generation capacity 2004/2005



2000MW for 15 hours (Spain)

5000MW for 170 hours (UK)

# Individual End Use Contribution to Peak Demand



# DR and Switched End Uses

- Potential Smaller Customer Demands
  - Storage heating, cooling and water heating (switch energy “in”/”out”)
  - Direct space heating (modify thermostat settings)
  - Direct water heating (modify thermostat settings)
  - Direct space cooling (modify thermostat settings)
  - Embedded generation (start out of heat led regime)
  - Fridges and freezers (switch off for short period)
  - Washing machines (disable for period, change time schedule)
  - Cooker (disable for period)
  - Sauna, car heaters (disable for period)
  - Direct electric showers (disable for period)

# Energy Saving Methods

- wise use education; use more efficient end uses
  - customers reduce use
- Move from high to low price times(tariff)
  - reduced losses and maybe save CO<sub>2</sub> from generation

# Energy Saving Methods

- Demand participation in system operation (Dynamic TOU pricing/DSB)/Remote Switching
  - Reduce standby generation
  - maintain system security
  - increase valley space for wind generation

# Energy Saving Motivators

- INFORMATION as motivator
  - provide end use costs and how to save
  - provide demand shift potential, how to participate and the benefits (financial and environmental)



# Energy Saving Mechanisms

- EUMF
- TOU Pricing + Remote switching
- Dynamic TOU/Critical peak pricing + Remote Switching
- Demand Side Bidding + Remote Switching

# EUMF

- Feedback end use information, cost and CO2 (displays)
- Demand disaggregation
  - very “smart” metering
  - modelling (interview data+real time disaggregation and feedback)
- 10% savings estimate
- Put national disaggregation data on bills now

# Fixed TOU Pricing

- Fixed times and rates
  - saves energy and CO2
- Manual/automatic/remote demand shift to lower price times
  - communication enabled TOU meter to switch end uses(not really “smart” metering)
    - “smart” end uses
    - slightly “Smart” metering for profiles development data collection

# Dynamic TOU/Critical Pricing

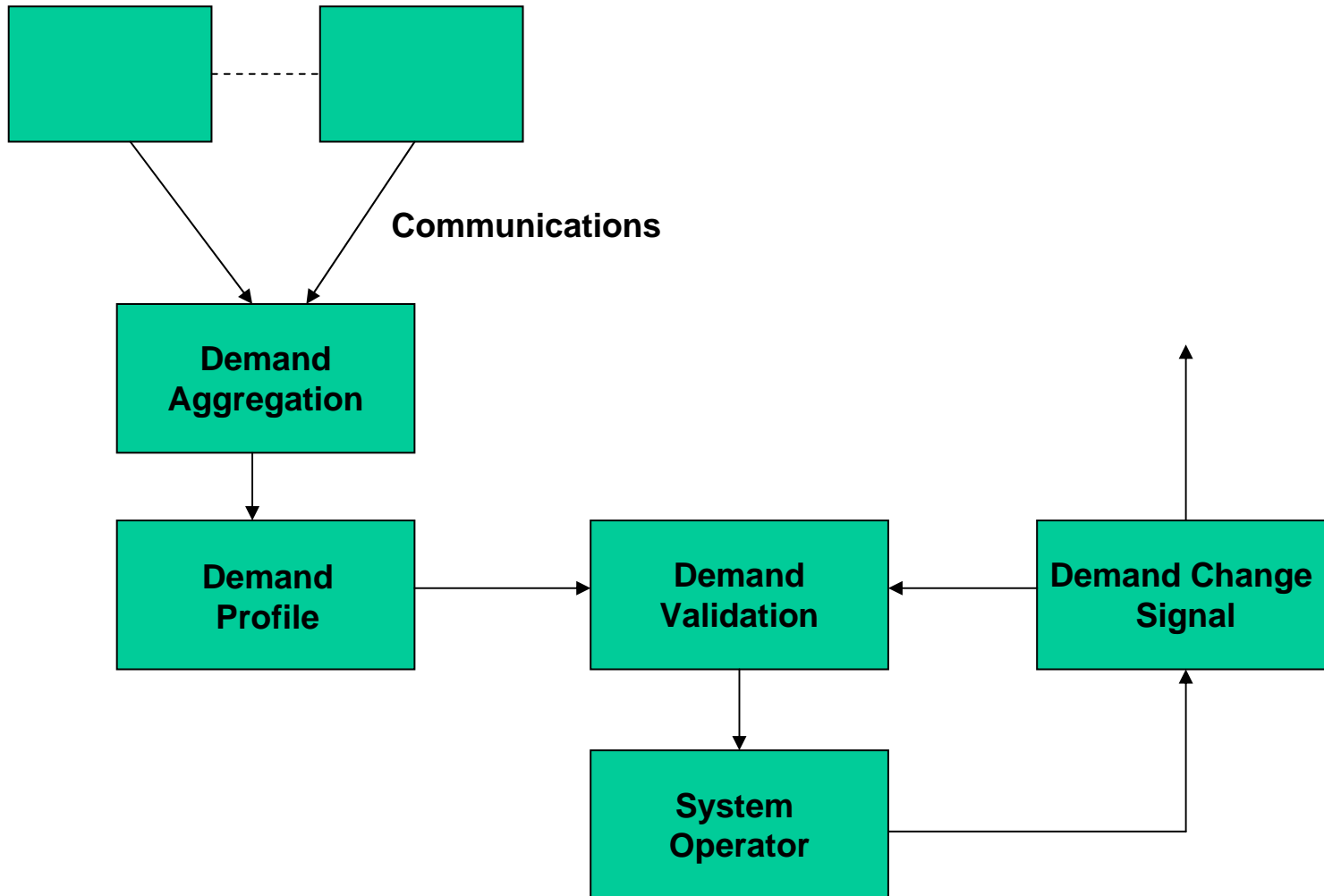
- DR participating in system operation
  - automatic/remote switching (24 hrs)
  - communication enabled end uses
  - meter not really “smart”, 2 rate?
  - saves energy and CO2
- Meter provides information to help customers reduce demand?
  - very “smart” meter
- Impacts profile settlements

# Demand Side Bidding

- DSB is validated Dynamic DR
  - saves energy and CO2
- Contracted DR to System Operator
- Motivated by price and payment
- High price dissuades customer over ride (TOU meter plus comms to end uses)
- Validation of “available”/ “turndown”
- Validation by modelling DR or “smart” remote metering

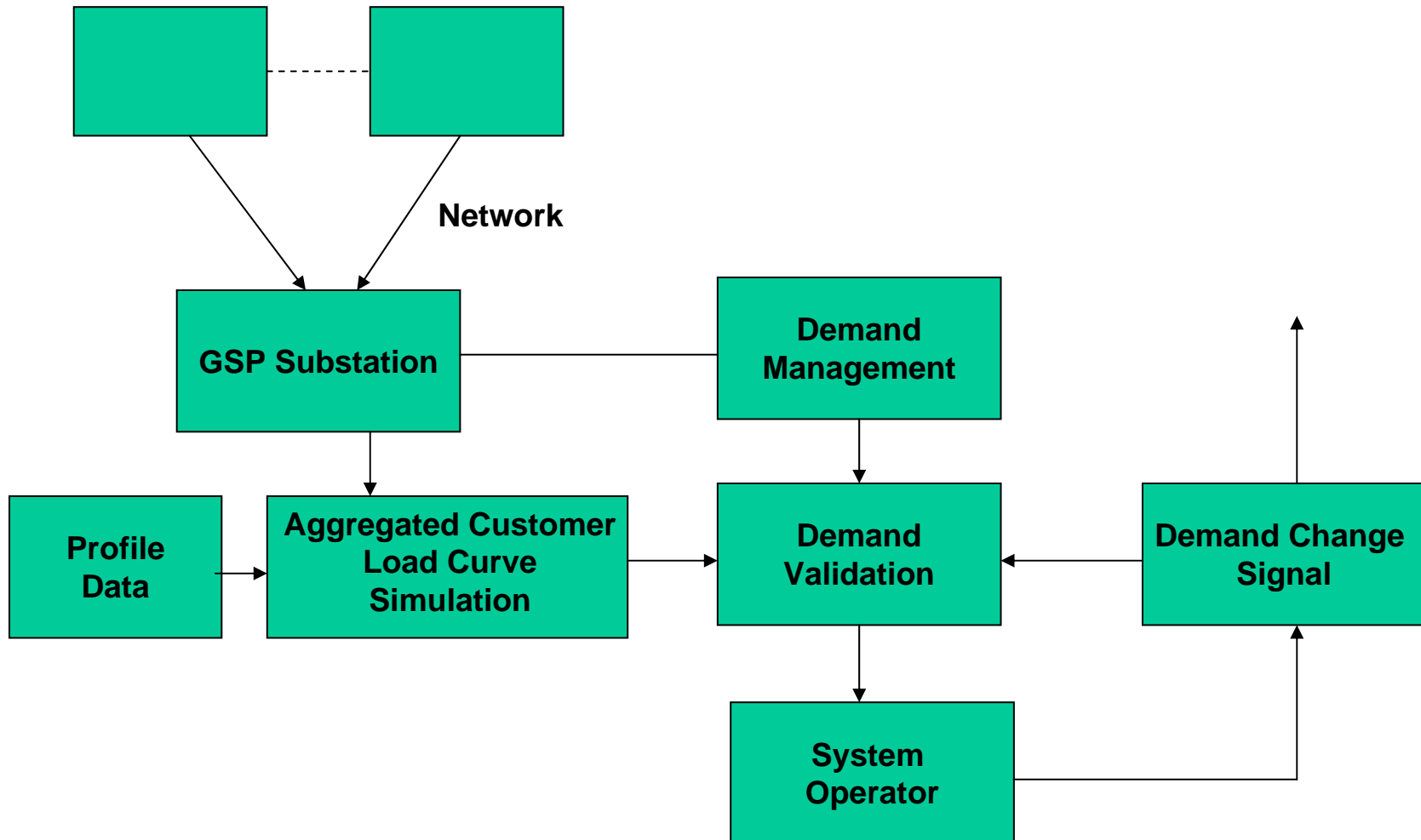
# Remote Metering Solution for Demand Validation

100000 Customers



# Statistical Modelling Solution for Demand Validation

100000 Customers



# Energy Saving and Metering

- EUMF - potential 10% E saving
  - very “smart” metering/interviews
- Tariff TOU-E savings + system security
  - simple meter, “smart” end uses
- Dynamic TOU-E savings + system security
  - simple meter, “smart” end uses
- DSB-E savings + system security
  - simple meter, “smart” end uses
  - validation by modelling or remote TOU metering



# Task XI Reports

**Subtask 1 - Smaller Customer Energy Saving by End Use Monitoring and Feedback**

**Subtask 2 - Time of Use Pricing for Demand Management Delivery**

**Subtask 3 - Demand Side Bidding for Smaller Customers**

**Subtask 4 - The Impact of Dynamic Demand Changes on Profile Settlement Systems**

**Subtask 5 – Demand “available” and “turndown” Mechanisms for Market Bidding of Smaller Customer Demand**

**Final Report –TOU Pricing and Energy Use for Demand Management Delivery**

# Overall Conclusions

Demand shift and energy savings based on EUMF, TOU Pricing and DSB for smaller customers is technically feasible

Significant further study is needed to motivate customers, model DR for profile settlements and demand validation and provide future proof, cost effective remote end use switching and communication

# Route to Implementation

- ESCO Route attractive
  - Proposed new Subtask to investigate ESCO delivery of smaller and SME customer EUMF and Demand Response and Energy Savings

# How to Motivate Energy Saving DR Delivery

- Governments/Regulators set Smaller/SME customer DR targets for Suppliers and System Operators
- Large campaign to educate customers
- Provide financial incentives (accreditation EEC)