REE Demand Participation Workshop

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Why should customers participate?

- Income Stream
  - Generate an income stream to offset energy costs
- Environmental Benefits
  - Load management results in lower CO_2 emissions
- BETTA
  - TNUoS costs will increase under BETTA
- Aggregation to 10's of MW
- Environmental, "feel good"

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UK Demand Side Aggregator

- Demand reduction by SO single instruction
- Aggregator has contracts with SO
- Aggregator has contracts with customers
- Aggregator has 24 hr managed control room
- Aggregator manages demand using communications with customer end uses
- Aggregator schedules customer demand switching to maximise profit in meeting contract with SO
- Hundreds of megawatts at present

Frequency Response Service

- Instantaneous trips if Frequency falls below trigger point

- Gaz de France ESS aggregate to provide "total service" to SO

- Gaz de France ESS paid for MWh provided to SO

- Gaz de France ESS take commission and communications costs then pay each customer for MWh

Standing Reserve

- 20 minute notice to reduce load or start up standby generators
- Gaz de France ESS act as customer agent to provide service to SO
- Gaz de France ESS paid
  - Daily "Option fee" for MWh capacity
  - "Utilisation Fee" for MWh delivered when called
- Gaz de France ESS take commission then pay customers for each MWh provided
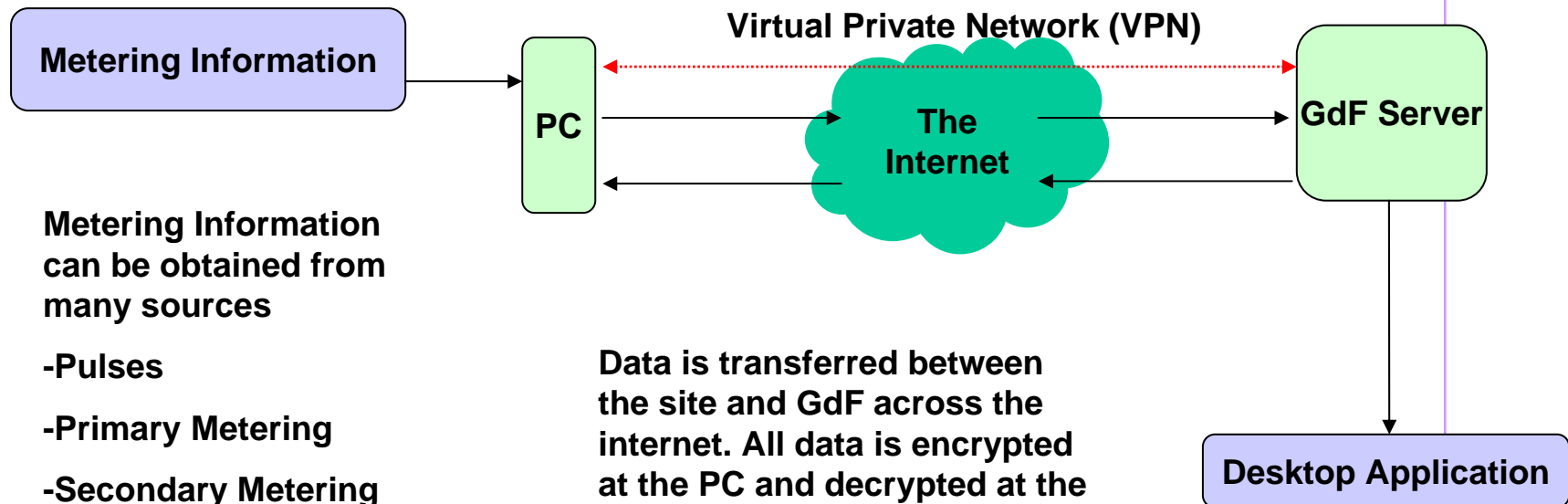
Demand Turndown

- 2 hours notice to load manage for up to 3 hours
  - Provides "Margin" and hence system security
  - Telephone instructions from SO
  - Used in event of large generator failure
- Manual provision of half-hourly data each week
  - Shows site was "available"
- Utilisation payments paid by SO
  - Sites paid for MWh delivered during calls
  - Gaz de France ESS take commission
- Runs Winter 04 (Nov 04 to March 05)
  - 40MW current participation with Gaz de France ESS

Export Contracts

- Sites with on-site generation
- Gaz de France ESS purchase export from customers
- Standard 6 day tariff (peak, peak shoulder, weekend, winter day, summer day and night)
- Paid on metered volume exported
- As simple as buying electricity
- >1MW aggregation

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Customer Real Time Metering

Metering Information

Virtual Private Network (VPN)

PC

The Internet

GdF Server

Metering Information can be obtained from many sources

-**Pulses**

-**Primary Metering**

-**Secondary Metering**

-**Customer Loggers**

-**Third Party Loggers**

It is read on site by a GdF supplied PC

Data is transferred between the site and GdF across the internet. All data is encrypted at the PC and decrypted at the server, allowing for completely secure communications.

Desktop Application

Benefits of Real Time Metering

- Real time metering to monitor efficiency of demand forecast
- Identify problems of "availability"
- RTM combined with accurate forecasts and frequent updates from customers
- Improved demand forecasting reduces imbalance costs and hence lower prices
- Validation

How can smaller customers participate?

- Aggregation
- Different validation needed for smaller customers
- Will customers respond to TOU/RTP prices, hour ahead, fixed tariffs, peak pricing?
- How much saving can be produced (money, CO_2?)
- Different notice/response times
- Remote demand switching?

Individual End Use Contribution to Peak Demand
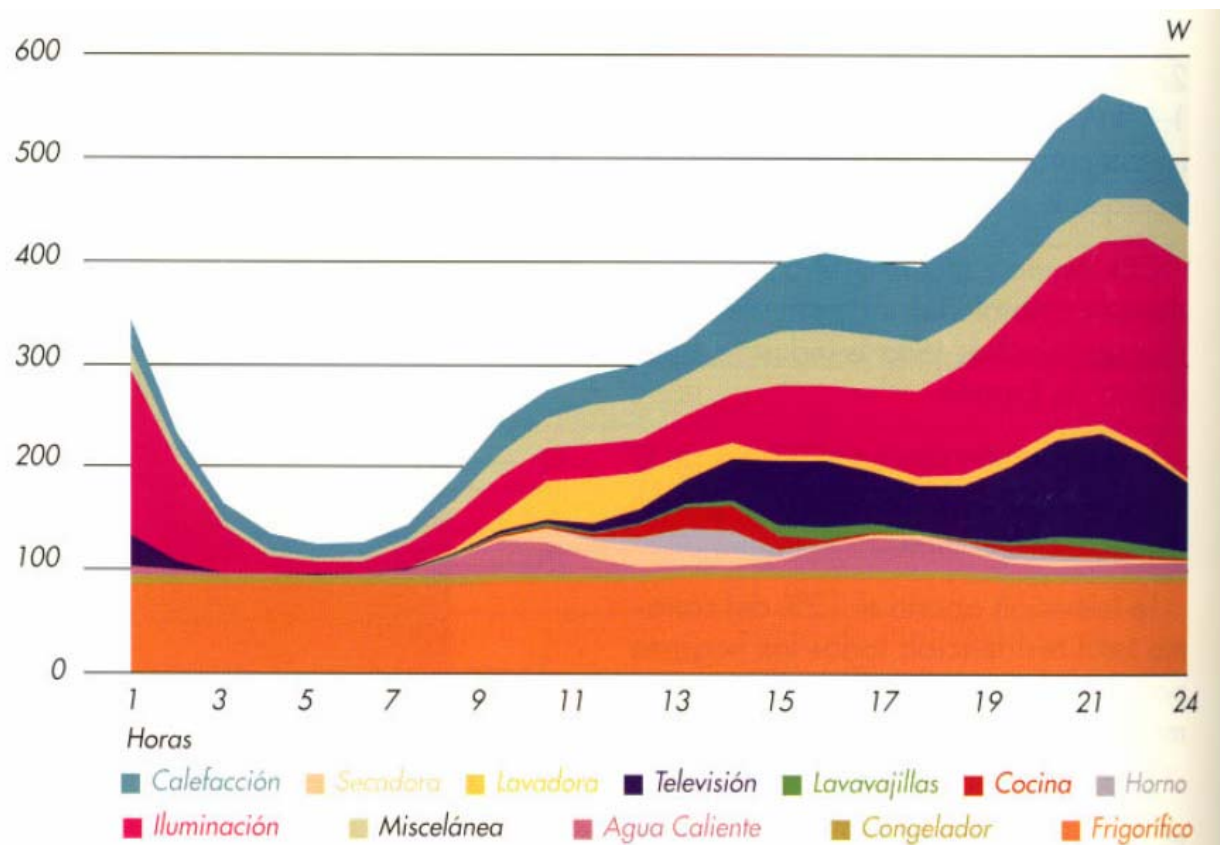
Curva de carga del hogar medio en un día tipo laborable de invierno.

Applications and Operation for Smaller Customers

- Potential loads are:
  - 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)

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Subtasks 1,2,3

- Subtask 1 - Quantify demand disaggregation/ feedback methods, benefits and viability
- Subtask 2 - Quantify impact of time of use pricing for smaller customers
- Subtask 3 - Quantify bidding, validation and control mechanisms for smaller customer DSB

Results of Aggregated Smaller Customer Trial

Correlation of MW achieved vs Time of Call off
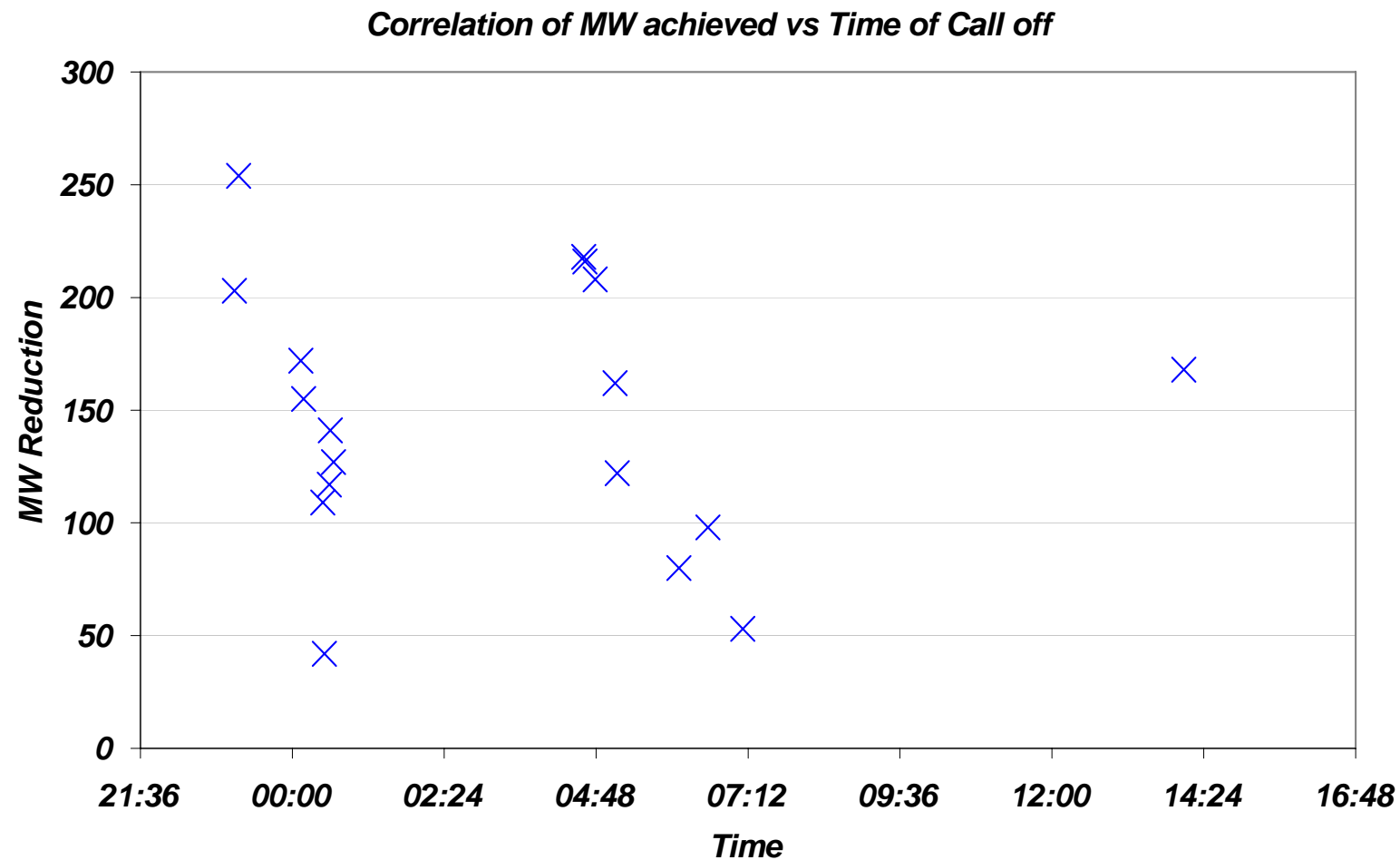
Summary of Results/Conclusions

- Annual Payment of Euro 234 available as incentive
- Automatic intervention preferred by customers
- Combinations of Tariff, Dynamic, Real Time in same household
- If no customer override, then single rate metering
- Supplier/ESCO/Aggregator needed

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Summary of Results/Conclusions

- Can be implemented using existing technology

- Space heating, cooling, refrigeration, water heating, embedded generation

- 0.5-3kW potential per customer

- Customer motivations requires development

- Economics attractive if one way communication acceptable

Proposed Extension Subtasks

- Subtask 4:
  - Understand smaller customer willingness to modify end uses demand
  - Profile settlements
- Subtask 5:
  - Evaluate methods for validating demand
  - Define business architectures