



Task XIX: Micro Demand Response and Energy Savings

Final Management Report
Presented by Linda Hull





Outline of Presentation

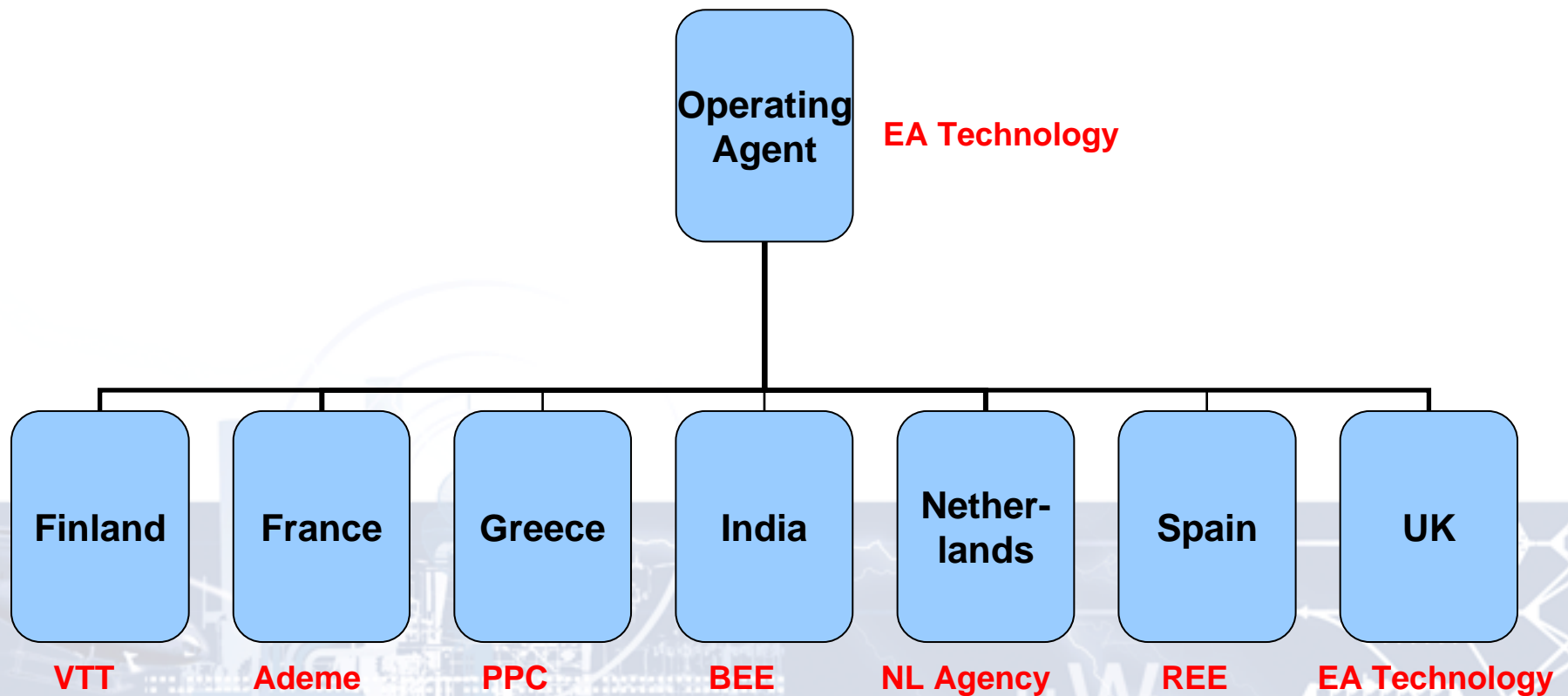
- Overview of project
 - Objectives and work programme
- Task Status Report
 - Objectives / Progress for last 6 months
 - Finance
- Final Management Report
 - Work Performed
 - Outputs
 - Achievements
- Matters for the ExCo
 - Approval of Final Management Report



Overview of Task XIX



Task XIX Project Participants





Task XIX – Summary of objectives

- Demand response and energy saving services in the residential and small and medium enterprise sectors
 - End-use monitoring and feedback
 - Time of use pricing
 - Remote / automatic demand control
- Identifying the business case for demand aggregators / energy saving service providers





Work Plan

- Subtask 1: Demand response and energy saving products
- Subtask 2: End use demand changes
- Subtask 3: Demand response & energy saving delivery mechanisms
- Subtask 4: SME customer costs and benefits
- Subtask 5: Residential customer costs and benefits
- Subtask 6: Business case estimation





Task Status Report



Objectives / Progress over last 6 months

- Finalise the scenarios to be used.
- Obtain the necessary data and information from the Task Experts on the country specific case studies.
- Refine Excel models and produce worked examples.
- Write the second report - The Business Case for Micro Demand Response and Energy Saving.

ALL COMPLETED END MAY 2010



Finance

Subtask Description	Original Budget (Euros)	Revised Budget (Euros)
1 Demand response and energy saving products	45,875	40,141
2 End user demand changes	54,895	48,033
3 Delivery mechanisms	39,025	34,147
4 SME costs/benefits	41,640	36,435
5 Residential costs/benefits	41,640	36,435
6 Business case estimation	42,825	37,472
Project management, ExCo liaison & reporting	48,795	42,696
Travel and subsistence	23,150	20,256
	337,845	295,614
Expenditure to end August 2010	£197,753	

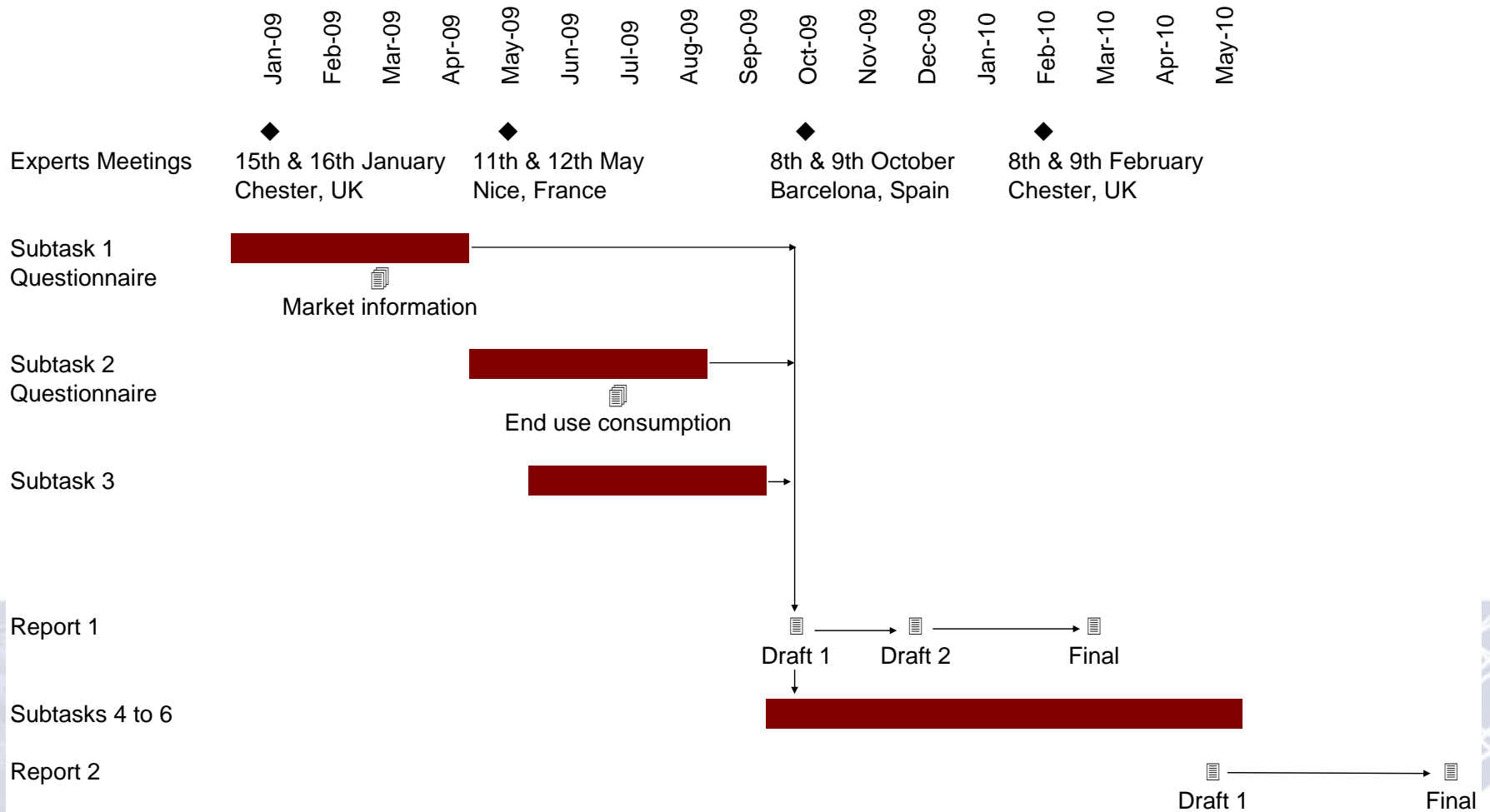
Final Management Report

- Work performed
- Reports
 - Report 1 } Overview
 - Report 2 } Lessons learnt and conclusions
 - Dissemination of results
- Recommendations





Work Performed – overview





**Report 1:
Micro Demand Response and Energy Saving Products:
Definition of Requirements & Options for Effective Delivery**

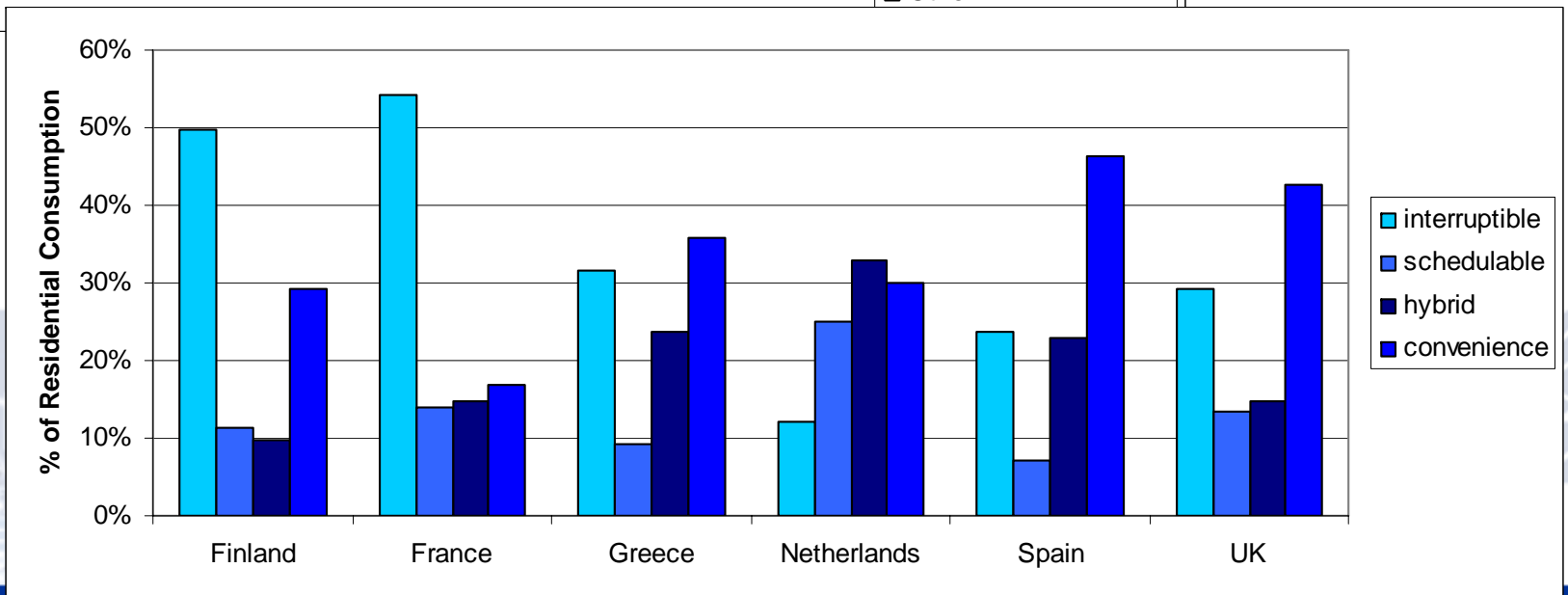
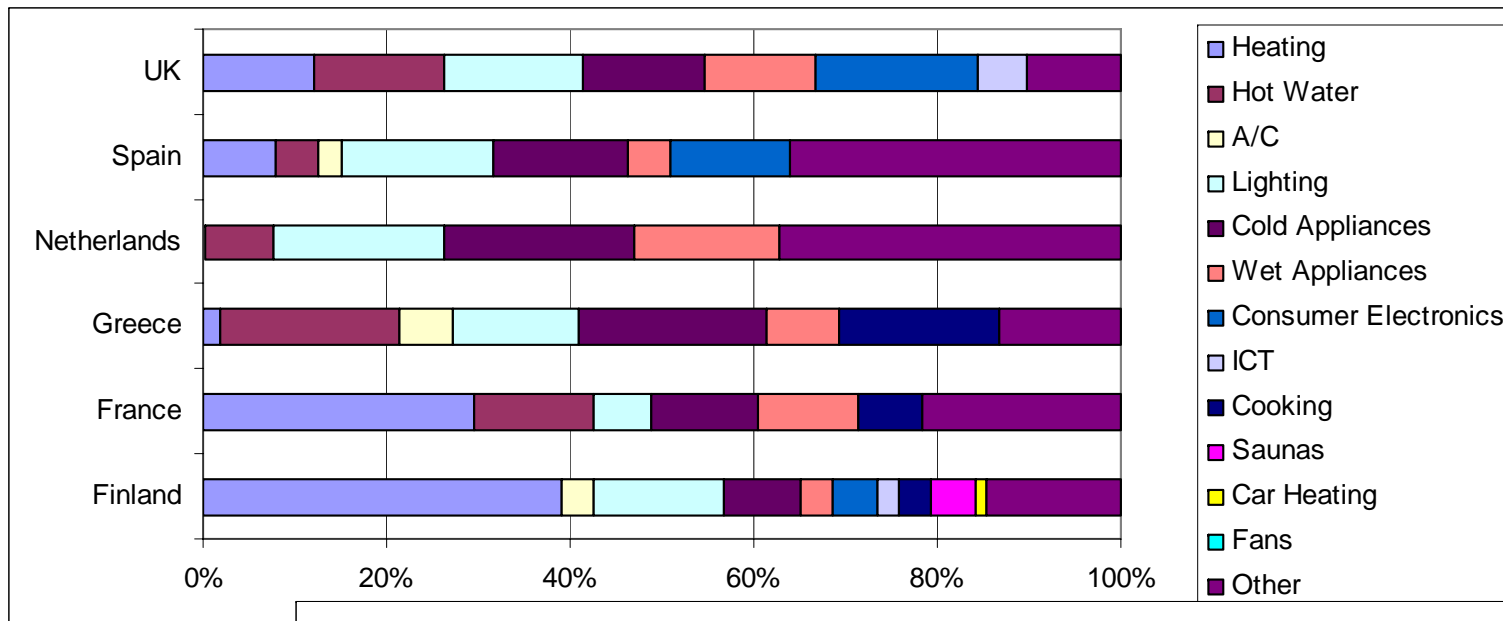




Micro Demand Response and Energy Saving Products: Definition of Requirements & Options for Effective Delivery

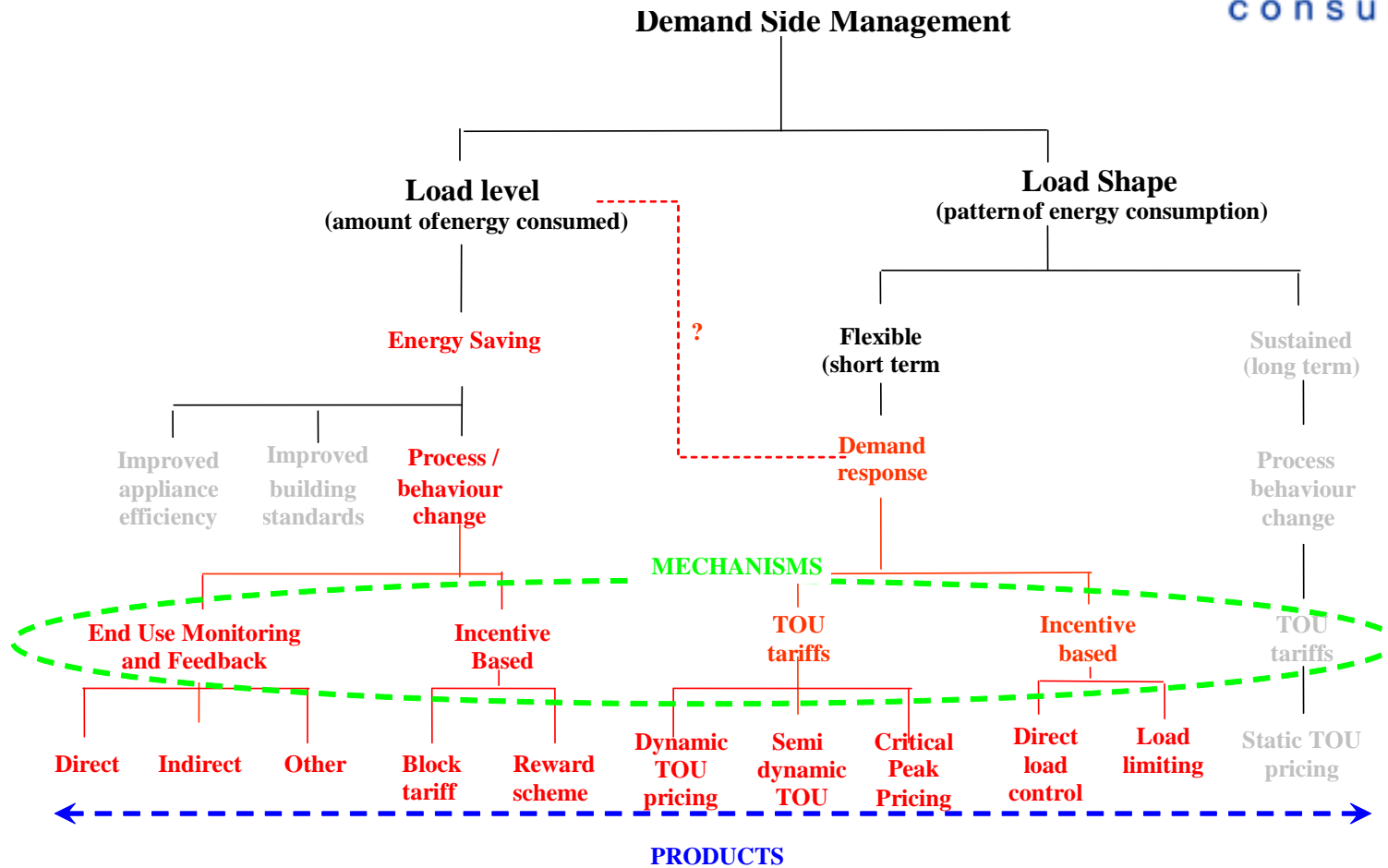
- Impact of market structure
 - Opportunities (drivers) for demand response and energy savings
 - The way participants interact with one another (barriers)
- Opportunities for demand response and energy savings
 - Types of loads – suitability for different products/services
 - Difficult to assess due to lack of data – particularly for SMEs
- Products and services
 - Advantages / disadvantages considered
- Review of pilots and case studies
 - Results wide ranging
- Technical architecture requirements
 - The minimum requirements

Residential energy end uses

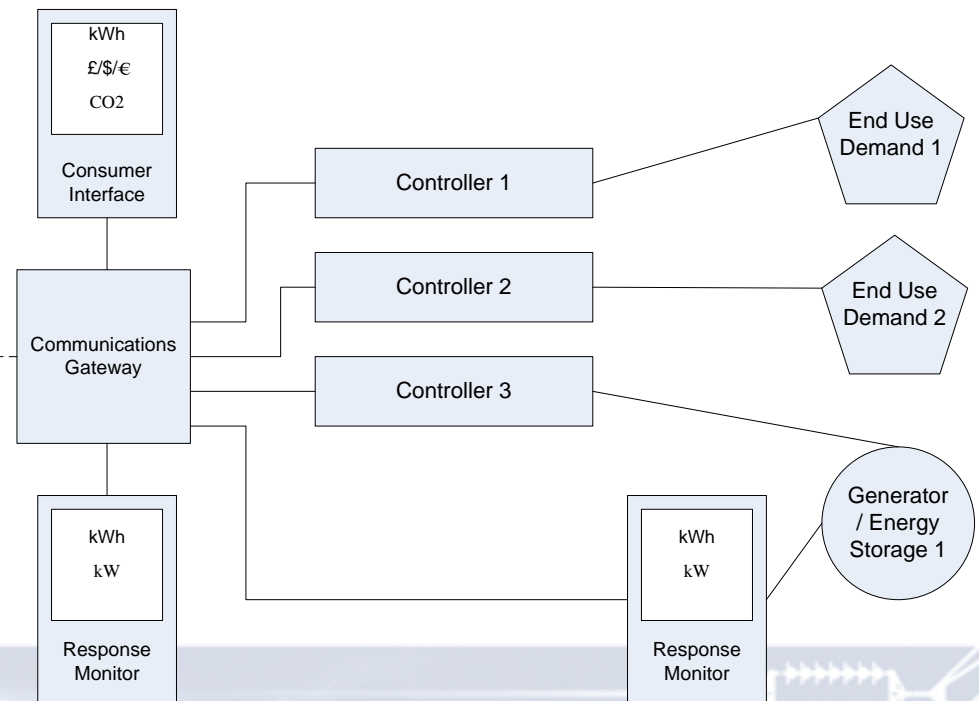




Products



- Controller
- Consumer Interface
- Response Monitor (Meter)
- Internal Communication
- Communications Gateway
- External Communication



----- Internal Communication
 _____ External Communication

Minimum Functionality Example

DR – Dynamic Time-of-Use Tariffs

Controller	Consumer Interface	Internal Communications
<p>*Trigger Mode: Manual [Automatic]</p> <p>*Demand Modification: On/Off [& Modulated]</p> <p>*Location: General Purpose Outlet (GPO) [Central Home Energy Management System]</p>	<p>*Information: Tariff Price & Historical consumption</p> <p>*Notification: Meter Display [VDU+Mobile/Pager] & Bills</p> <p>*Notification Frequency: Half-hourly/Hourly & Billing Cycle (monthly, quarterly, annually)</p> <p>*Input: None [Consumer Preference Input]</p>	<p>None</p> <p>[*Signal Flow: Duplex (Two-way)]</p> <p>[*Medium: Wireless]</p>
Response Monitor (Meter)	Communications Gateway	External Communications
<p>*Type: Interval Meter</p> <p>*Data Transfer: Manual Read Locally [Read Remotely]</p> <p>*Tariff: Tariffs can be applied retrospectively with time stamping</p>	<p>*Signal Flow: Simplex (One-way) [Duplex (Two-way)]</p> <p>*Situation: Customer Interface (Meter Display/VDU) [Controller (Central Home Energy Management System)]</p>	<p>*Signal Flow: Simplex (One-way) to Consumer [Duplex (Two-way)]</p> <p>*Connection: [To/]From Aggregator, ESCO or Supplier</p>

Report 1: Conclusions

- Impact of market structure is significant
 - Different drivers / opportunities for new products
 - Different barriers
- Lack of data on energy end use consumption
 - Time of day data
 - Small and medium enterprises
- No 'one size fits all solutions'
 - Products
 - Energy end uses



Report 2: Evaluating The Business Case for Micro Demand Response and Energy Saving



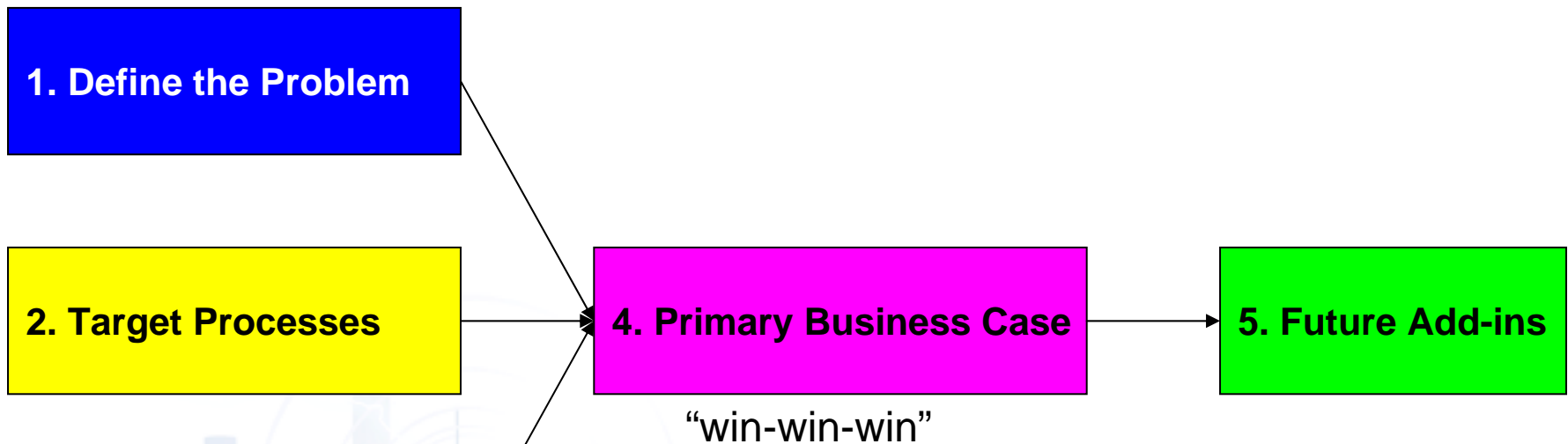


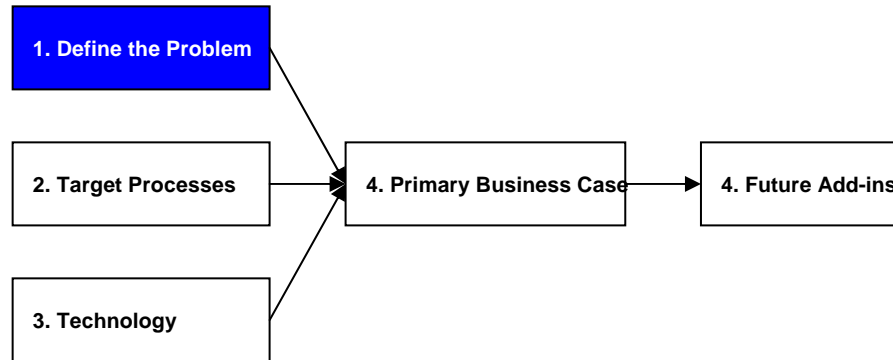
Evaluating The Business Case for Micro Demand Response and Energy Saving

- Step-by-step methodology
- Five country specific case studies
 - Finland: Dynamic control of residential storage heater loads
 - France: Dynamic control of residential storage heater loads
 - Greece: Subsidy for 'green a/c' equipment
 - India: Replacement of incandescent lamps with CFLs
 - UK: Direct load control of commercial air-conditioning loads



Step-by-step approach



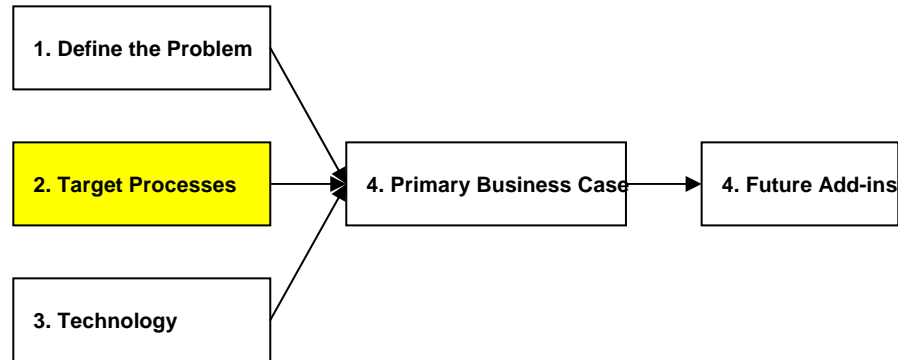


The problem?

- National Grid (TSO) increasing need for Balancing Services

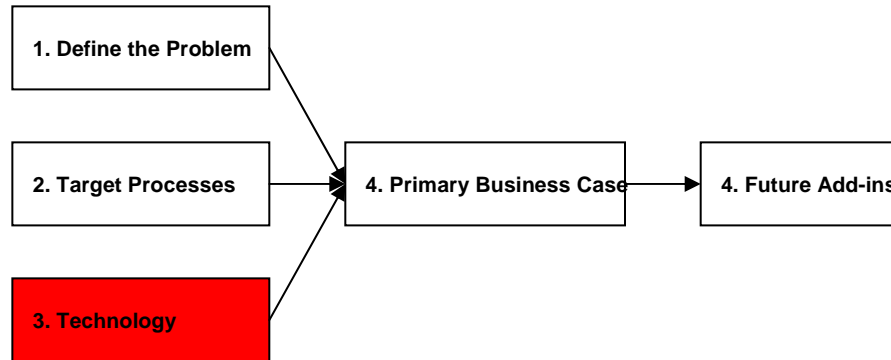
Reserve	2010/2011	Forecast 2025/26
Volume	3 TWh per annum	8 TWh per annum
Cost	£311m per annum	£690m per annum





Target Processes?

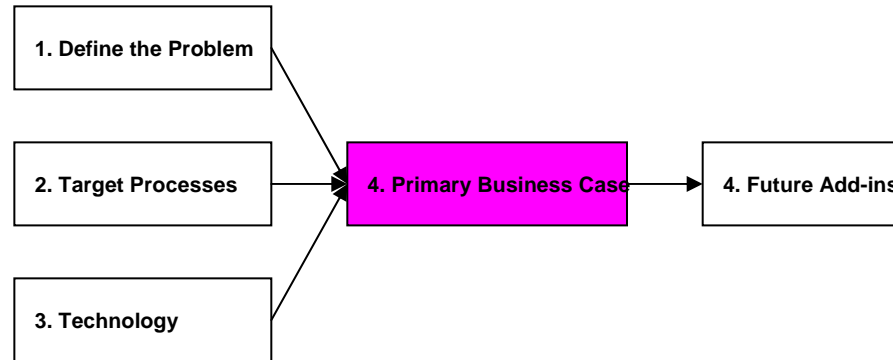
- Cooling and ventilation loads significant
 - ~10% to 20% of electricity used in services/commercial sector
- Three scenario's considered
 - Single split a/c unit (power consumption 2kW / cooling o/p 6kW)
 - Scenario 1: daytime / summer operation
 - Scenario 2: daytime / year round operation
 - Scenario 3: 24 hours per day / year round operation



Control, Monitoring, Communication Technology

- Control: automatic on/off control of compressor
- Meter: existing advanced metering (AMR)
- Comms Gateway: dedicated gateway needed
- Internal Comms: one way wireless (or wired)
- External Comms: one way PSTN, GSM or internet



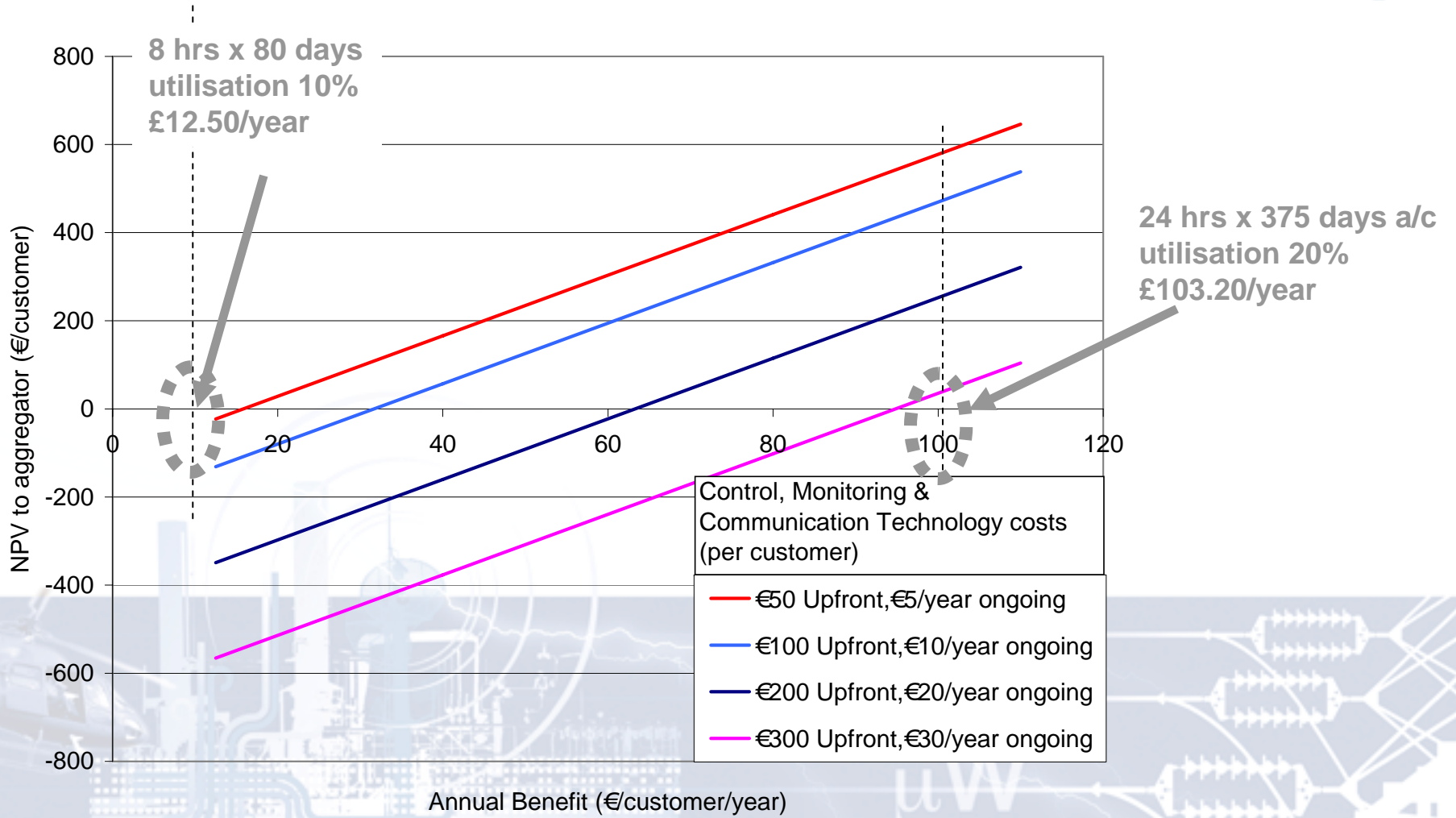


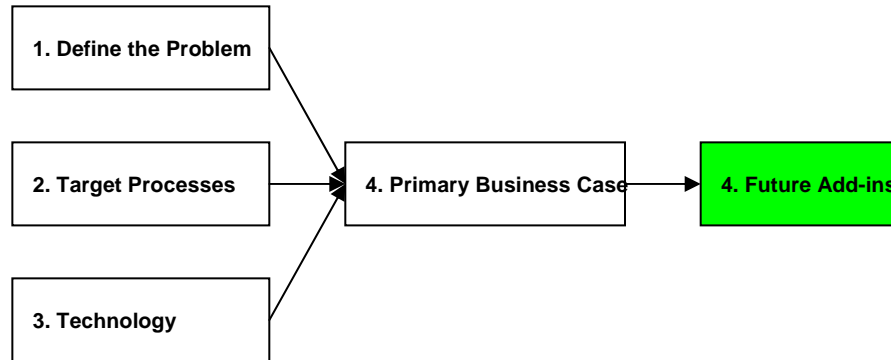
Primary Business Case

- **Aggregator:**
 - Expenditure: Purchase of controllers
 - Income: Provision of balances services to TSO
- **Consumer:**
 - Energy savings advice (sufficient?)
- **TSO:**
 - Avoided shortfall of reserve and equivalent price to conventional sources



UK: Direct Load Control of Commercial A/C (1 x 2kW)





Future Add-Ins (Secondary Business Case)

- Provision of frequency response
- Additional technology costs
 - Real-time control



Report 2: Conclusions

- Step-by-step approach provides a useful way of assessing business case
- Difficult to obtain robust data
 - Technology costs
 - Amount of demand available for specific products/services
 - Value of demand response
- Roll of smart metering needs to be considered
 - None of the case studies utilised smart meter functionality (when available)



Dissemination of Results

- Reports 1 & 2 confidential to participants until March 2011
 - After March 2011: Available from public area of IEA DSM web-site
- In country dissemination led by Experts
 - National focus meetings
 - Summary reports
 - National reports



Overall Recommendations

- Impact of market structure important
 - Market mapping could help interaction between participants
 - Role of regulation needs to be understood
- Difficult to assess level of demand response / energy savings
 - Need for improved energy end use information
- Technology costs
 - Need for on-going support of innovation in control and monitoring technology
- Smart meter
 - Third-party access



Matters for Executive Committee

Questions / comments

Approval of Final Management

