



Automating Demand Response in Hotels and Homes

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Overview - Automating Demand Response in Hotels and Homes

- **Hotel Example - Using Chillers for Demand Response**
 - Suitability
 - Automation Methods
 - Challenges
- **Home Example - Battery System**
 - Suitability
 - Automation Methods
 - Challenges

Hotel Example - Using Chillers for Demand Response

Why are hotel HVAC chillers suitable for demand response automation?

- Can be turned down for short periods (~hour) without impacting users
- High electricity usage
- Normally centralised
- Normally designed for demand response

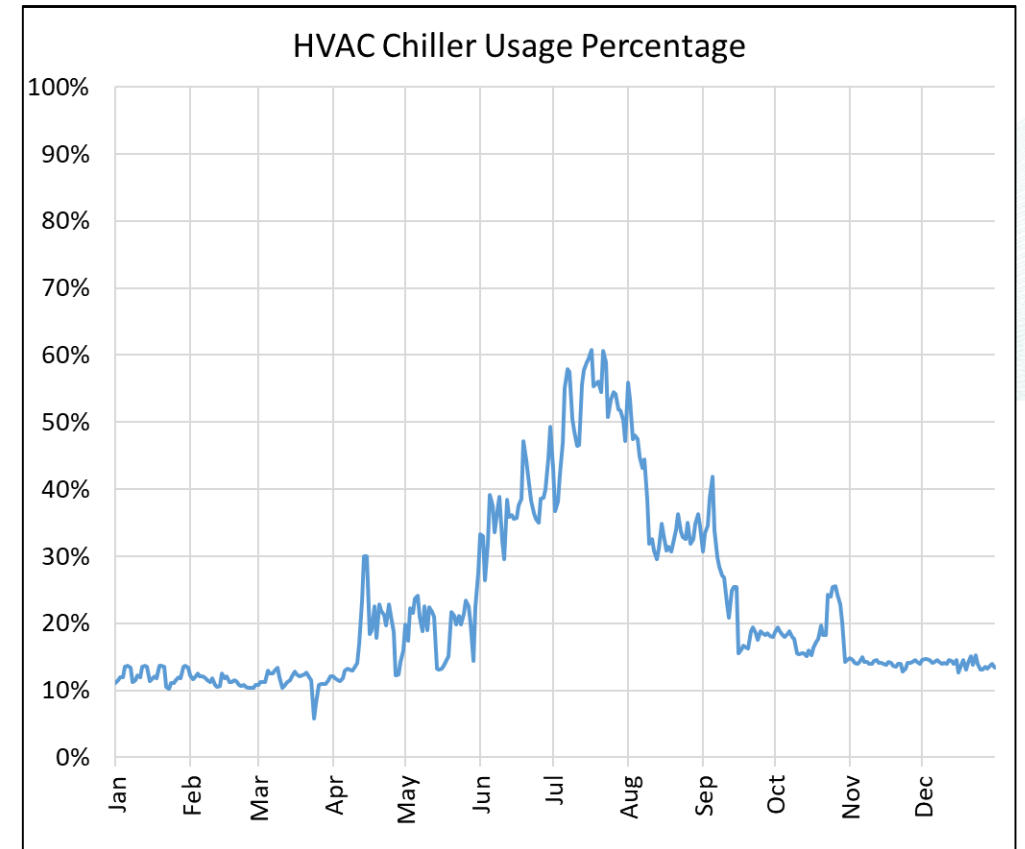
Hotel Example - Chiller Automation Methods

- **Automated Control via Building Management System (BMS)**
 - BMS-controlled chillers/air conditioning can be programmed to respond to an external signal
 - When the BMS receives the signal (Demand Response = 'On'), BMS instructs the chiller/ air conditioning to reduce usage until an 'Off' signal is received
- **Automated Control via Direct Interface**
 - Some chillers have a direct input that enables a chiller's normal schedule to be temporarily overridden by a new reduced usage schedule if an external signal is detected (normally a 12 volt input)
- **The External Signal**
 - The external signal is provided by a control device
 - The control device is installed on-site by the demand response aggregator
 - The installed device receives an external signal from the aggregator's system or locally via measurement equipment (e.g. a grid frequency monitor)

Hotel Example - Chiller Automation Challenges

Challenges of automating hotel chillers

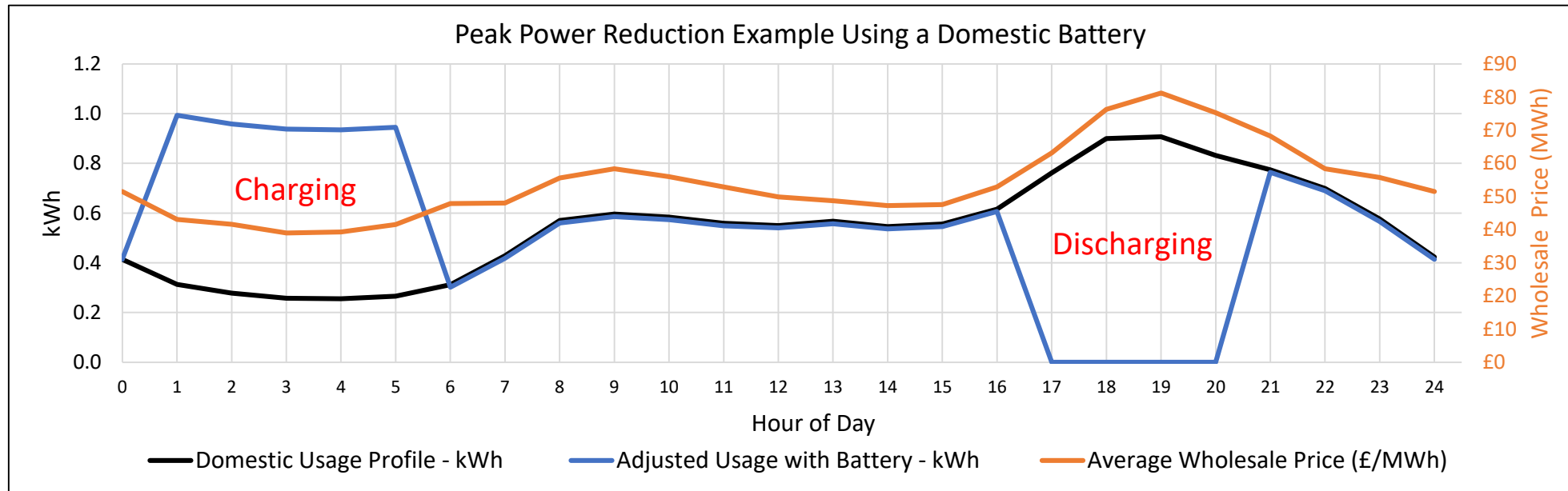
- Usage profile does not always match flexibility programmes
- Programming a company's BMS can be expensive and not work as intended
- Direct control is not always available and can cause system conflicts
- Additional metering may be required to provide proof of turndown
- A site may have physical access issues or communication signal dead zones disrupting effective equipment installation
- Cost vs Benefit issues



Home Example - Using Batteries for Demand Response

Why are home batteries suitable for demand response automation?

- Useable for demand response without impacting users
- Normally can be controlled remotely
- Normally have built-in metering
- Batteries provide flexible charging and usage timeframes



Hotel Example - Home Battery Automation Methods

- **Automated Control via Cloud-to-Cloud Integration**
 - Batteries that link to a manufacturer's cloud system (e.g. to provide smartphone access for consumers) can be linked into an aggregator's demand response platform
 - This link can then be used to send demand response control signals to the battery and receive metering information
- **Automated Control via Local Signal**
 - Batteries often have local control interfaces (via physical connections or local network interfaces)
 - Local control interfaces can be linked to onsite triggers
 - A frequency monitor, for example, can be linked to send an 'on' signal if the grid frequency drops below 49.7Hz (Static Frequency Response service)

Hotel Example - Home Battery Automation Challenges

Challenges of automating home batteries

- GDPR / consumer information privacy, security or loss of control concerns
- Limitations of 'cloud-to-cloud' interfaces (refresh rates, control options)
- Extent of compatibility of home battery hardware for demand response programmes (response times and duration)
- Communication limitations (Wi-Fi vs Mobile)
- Issues with meeting demand response service requirements (metering, frequency monitoring, testing)
- Cost vs Benefit issues

An aerial night view of a city, likely London, featuring a prominent cable-stayed bridge with a tall, curved pylon. The city lights are visible in the background, and a tram is seen on a track in the foreground. The image has a dark, moody atmosphere with a teal color overlay.

Thank you

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