

# *Building Energy Efficiency & Demand Response End Use perspective*

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ERC Symposium day  
9<sup>th</sup> May 2013



Global Cleantech Cluster  
Energy Efficiency  
Award 2012



SEAI  
Sustainable Energy  
Innovation Award 2011

# VISION | MISSION | VALUES



# BUILDING EFFICIENCY MARKET | TODAY



Building Portfolio



Oblivious Building Occupants

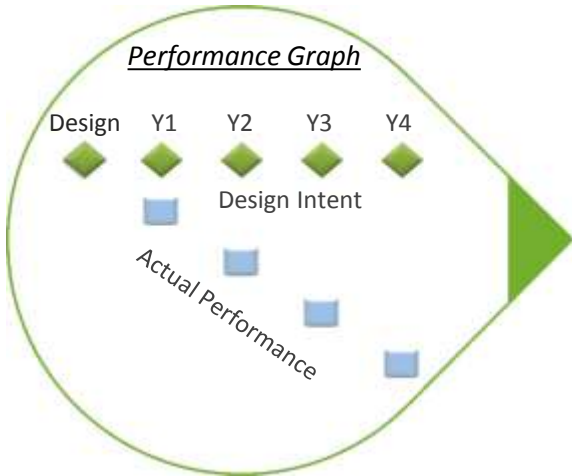


Confused Energy Manager

## Challenges of Traditional Energy Management



Individually Managed by Stand-alone BAS



Building Drift

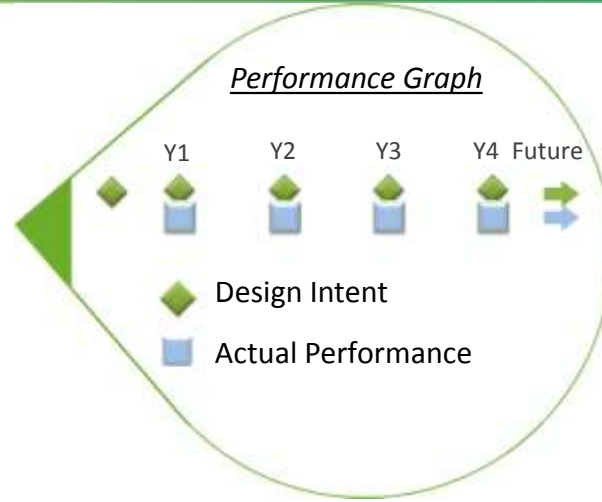


Growing Energy Bills

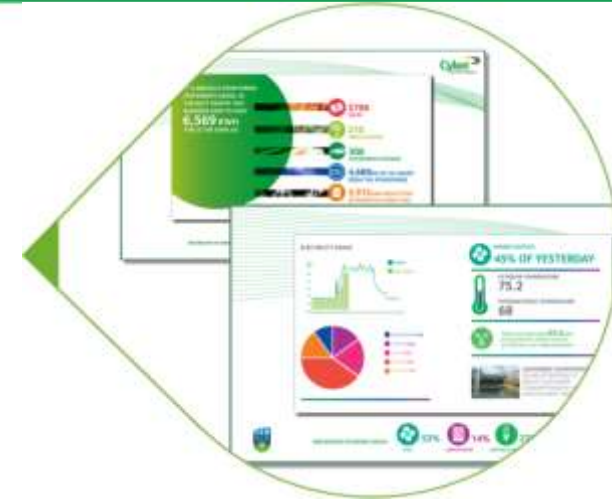
# BUILDING EFFICIENCY MARKET | TOMORROW



Building Portfolio controlled via BAS



Prevention of Building Drift



Educated Energy Conscious Public

## Cloud Based Virtual Energy Manager

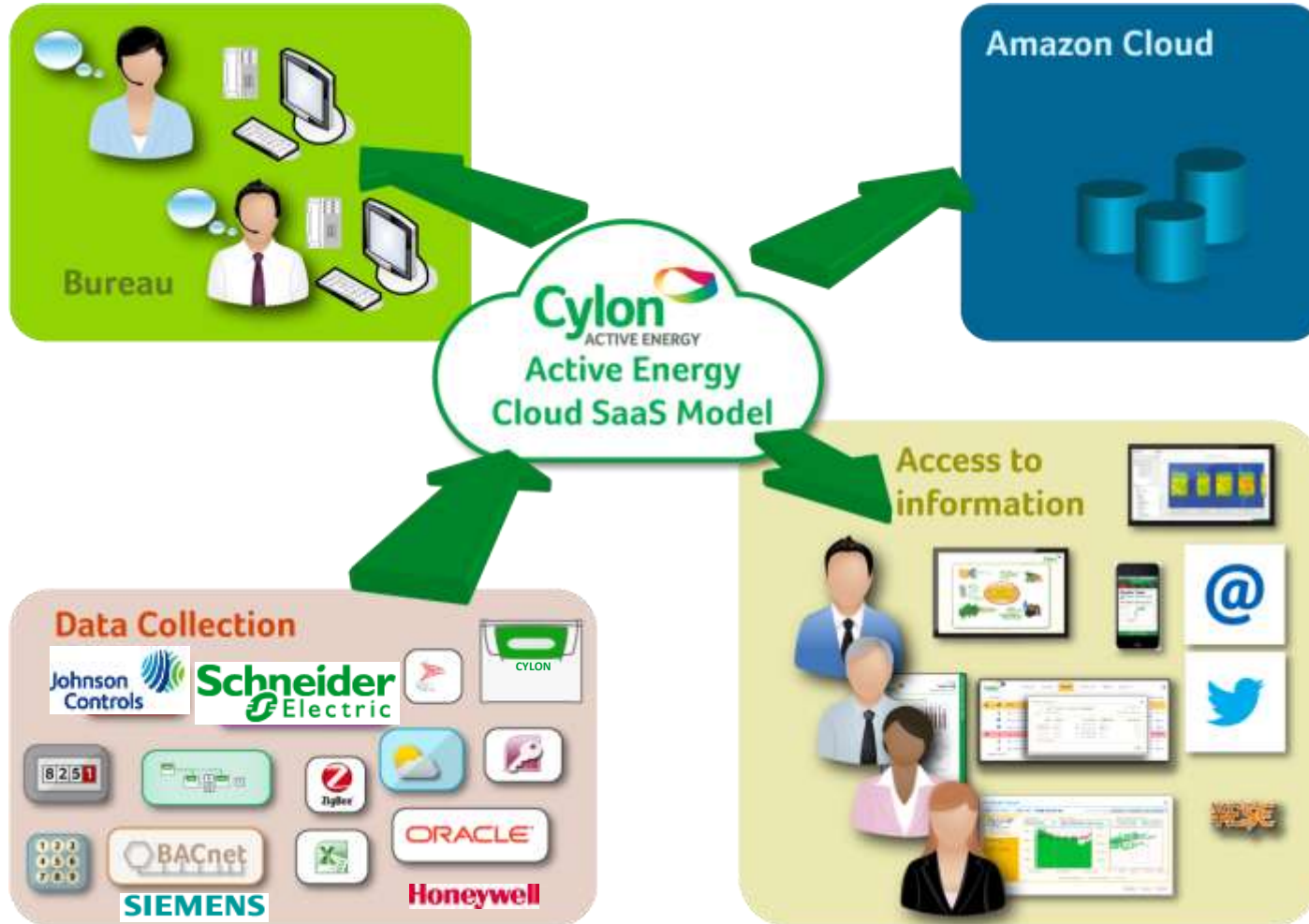


Remote Energy Bureau | Continuous Commissioning  
Demand Response | Smart Grid

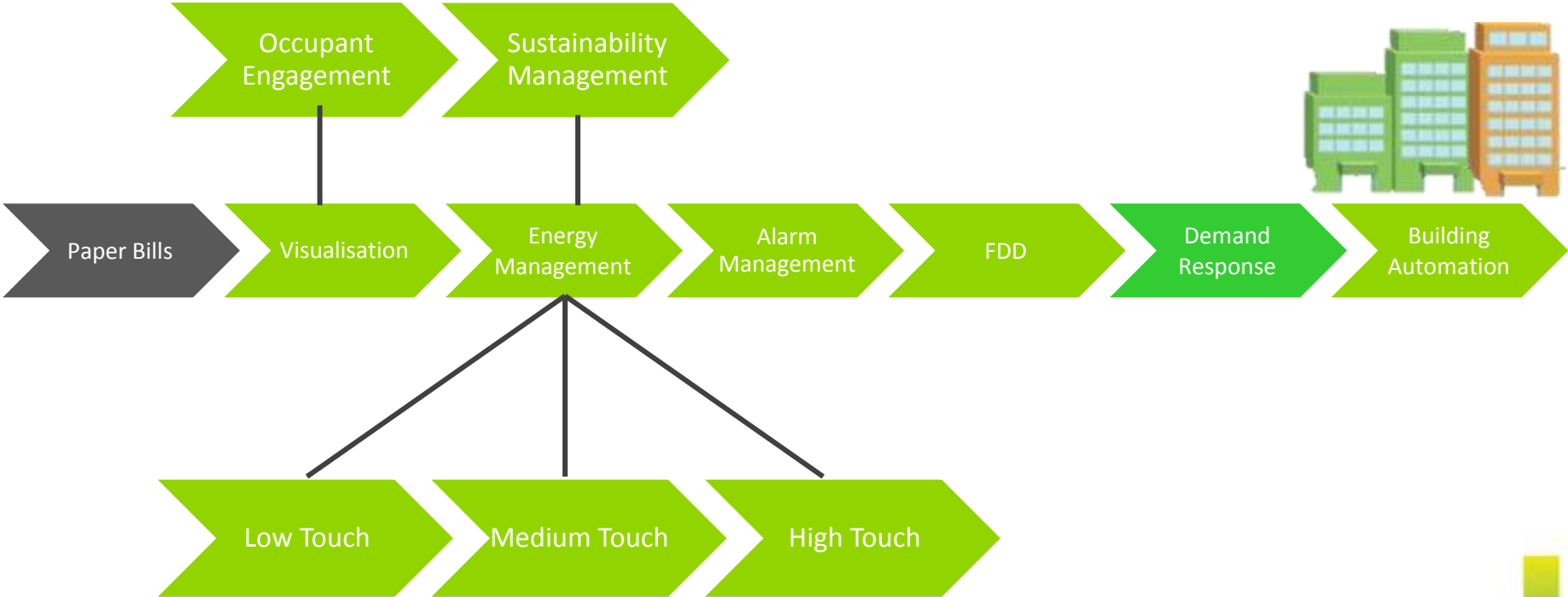


24/7 Access with Web Enabled Devices

# OUR SOLUTION ARCHITECTURE



# BUILDING ENERGY EFFICIENCY



# DR APPROACHES IN A BUILDING

	<b>Efficiency and Conservation (Daily)</b>	<b>Peak Load Management (Daily)</b>	<b>Demand Response (Dynamic Event Driven)</b>
<b>Motivation</b>	Economic Environmental protection Resource availability	TOU savings Peak demand charges Grid peak	Price (economic) Reliability Emergency supply
<b>Design</b>	Efficient shell, equipment, systems, and control strategies	Low power design	Dynamic control capability
<b>Operations</b>	Integrated system operations	Demand limiting Demand shifting	Demand shedding Demand shifting Demand limiting
<b>Initiation</b>	Local	Local	Remote

# DR LEVERS IN A BUILDING

## ● Component Strategies

### ● HVAC Systems

- Global temperature adjustment.
- Passive thermal mass storage
- Fan variable speed drives Fans, Pump
- Chilled water temperature increase
- Chiller quantity reduction
- Rebound avoidance strategies

### ● Lighting Systems

- Zone switching
- Stepped / Continuous dimming

### ● Miscellaneous Equipment

- Electric Vehicle Chargers

## ● Non-Component-Specific Strategies

### ● Demand limit strategy

- BEMS have the capability to minimize the whole building peak demand from exceeding a pre-specified peak *demand limit*

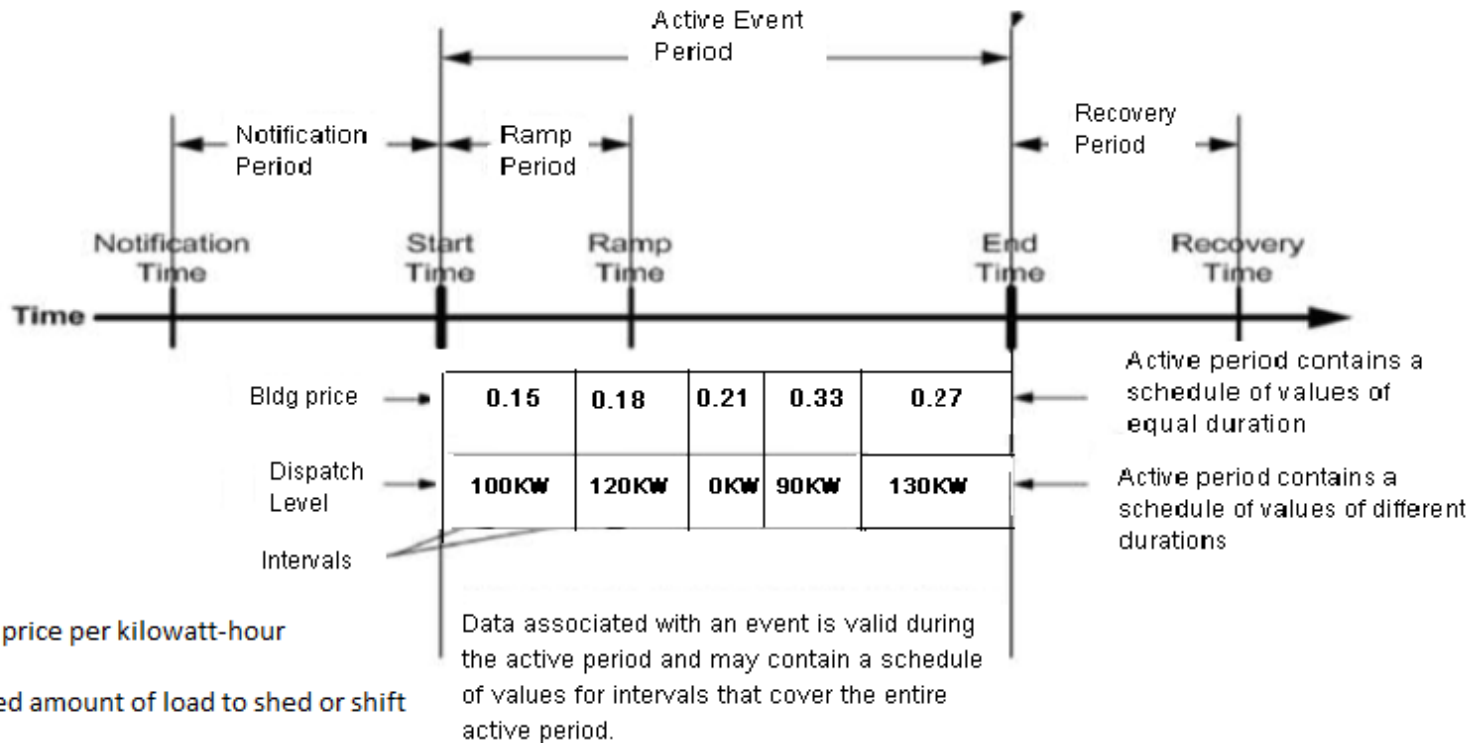
### ● Price-level response strategy

- Real time pricing, a type of price-based demand response program or tariff, provides a dynamic electricity price to motivate customers to shift or reduce consumption during high-cost periods.



# OPENADR 2.0

Note that it is possible to specify events with no end time, i.e. open ended.



PRICE\_ABSOLUTE – The price per kilowatt-hour

LOAD\_AMOUNT – A fixed amount of load to shed or shift

Note: In this example each element is a simple scalar, but the structure still holds even if each instance is a more complex type with multiple attributes

# OPPORTUNITIES / CHALLENGES

## ● Opportunities

- Industrial, Commercial, Retail
- New technology will enable lighting energy to be included more easily
- Real Time Connected buildings emerging
- DR Standards available
- Learning from UCD & Activation Energy project
- SEES Pilot DR application using standard

## ● Challenges

- Lack of DR market mechanism in Ireland like the US have
- Lack of easy tool to assess buildings for DR
- Less DR levers in Irish / Northern European buildings as heating the primary demand required which is direct with fossil fuel. In US cooling is a major demand powered by electric power
- Need Building controls expertise to set up the BEMS correctly

# THANK YOU

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● Questions?

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# EDUCATION & COMMERCIALISATION SESSION

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## Introduction