

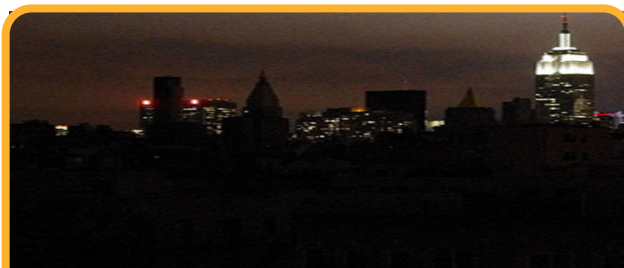


Distributed Energy Storage & Smart DC

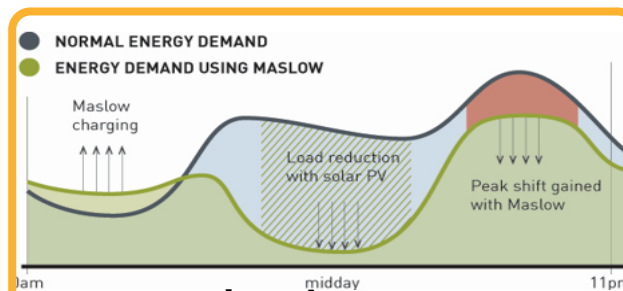
Time Shifting DC Demand

CIR Smart Homes & Cleanpower 2013
www.hvm-uk.com

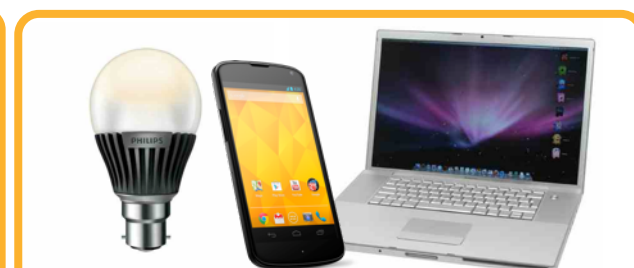
Chris Wright, CTO
chris@moixaenergy.com



Back up



Grid Balancing



Power Growth

Outage Risk?

STORM: 1 in 40 UK homes lost power last Monday

ELDERLY: 1 in 12 UK Homes on 'Priority Services Register'

OFGEM : 2014/2015 Winter generation margin to 2%

Fundamental Needs

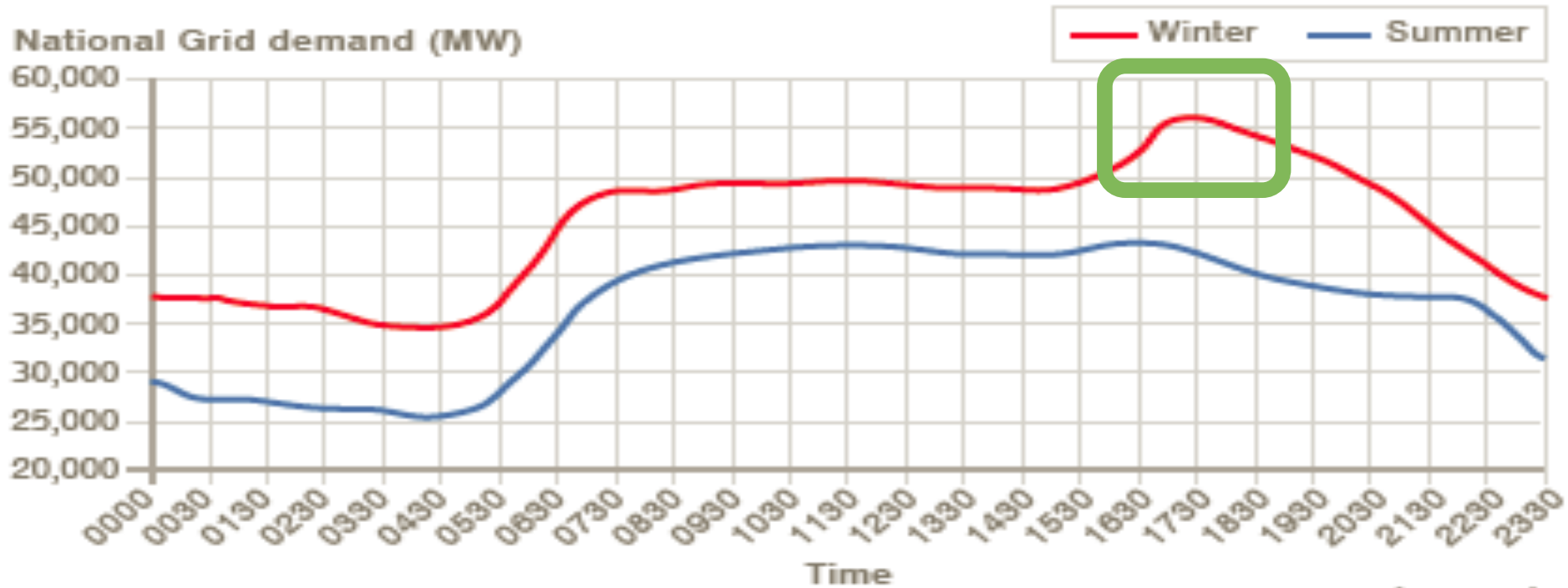
- Lighting
- Communication
- Computing
- Media
- Security

= DC

UK Electricity PEAK Demand

Costly: generation, distribution – and CO₂

TYPICAL SUMMER AND WINTER DEMANDS

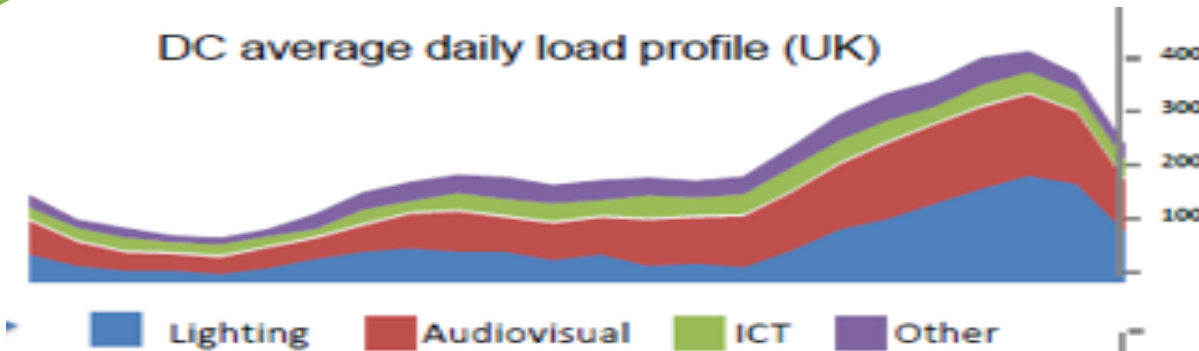


SOURCE: National Grid

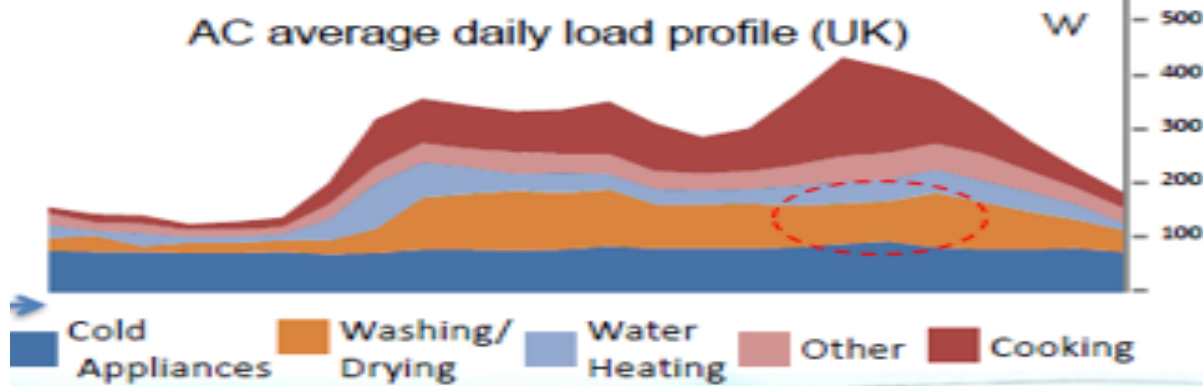
Reducing reserve: Future time of use pricing? Gas peaker supply risk?

Today: Every house facing growing electronics demand - used at peak

DC average daily load profile (UK)



AC average daily load profile (UK)



Issues: Higher cost, Peak prices, Fuel poverty. Efficiency waste (~ £100bn)



Meter Attached Storage LOW Power DC lighting and electronics



Powered by  maslow



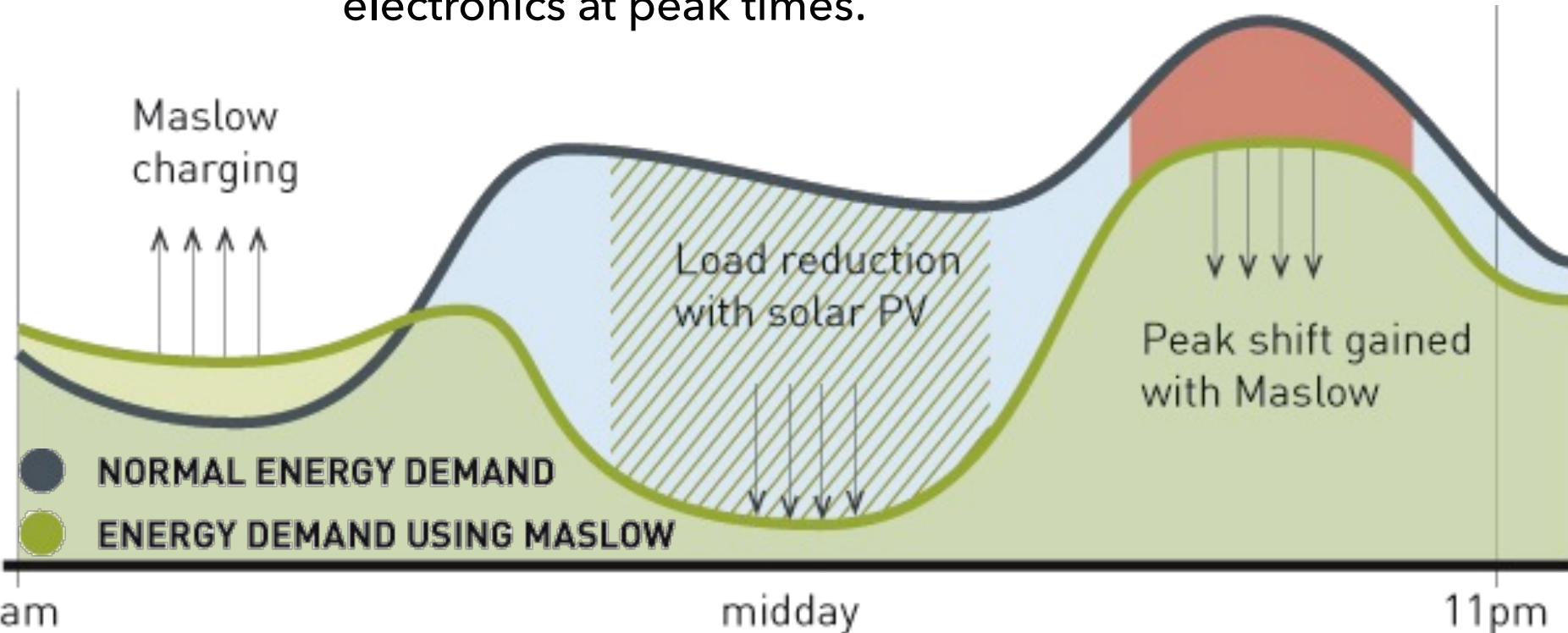
Daily Shift & back-up power

Smart local storage

Avoids peak prices, enables smart tariffs

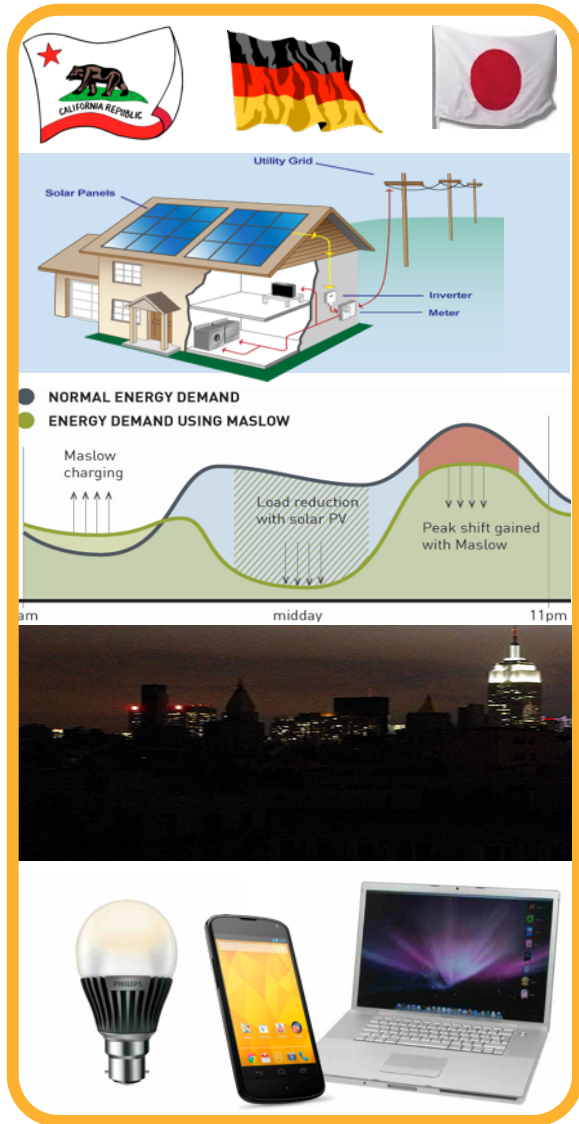
Balancing Peak with low carbon

Enables an assured peak reduction by using batteries powered off-peak – or from renewables – to power lighting and electronics at peak times.



Storage Importance and Value Drivers

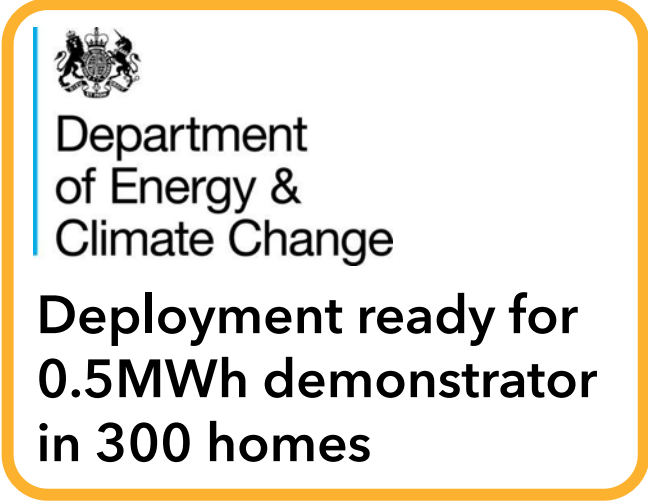
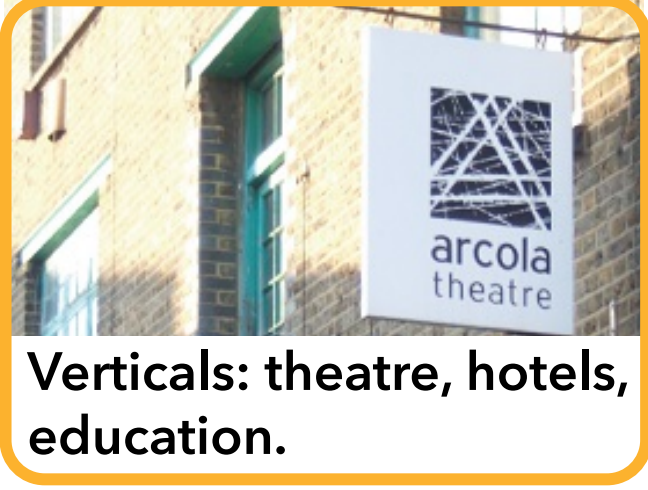
Increasing value pushing storage to the edge



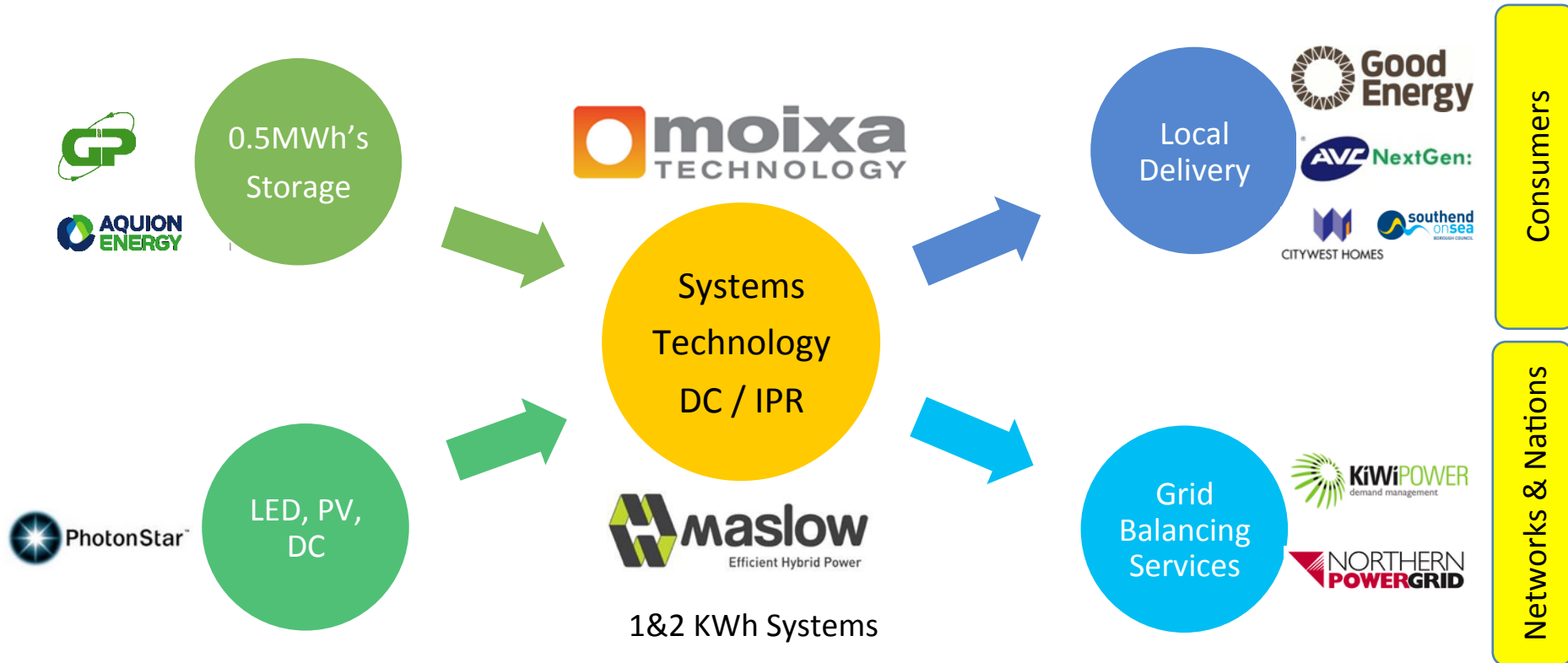
- **Grid Scale Storage** - significant growth market, \$114bn+ by 2017
- **Distributed storage** - network benefits & subsidy additional value streams from utilities/end users
- **Time shift** - opportunity to reduce and shift peak energy
- **Resilience** – keep the lights on to end users & distributed generation mitigation
- **Address DC Demand Growth** - base & peak, always on IOT 2020 - 50bn devices

Developing & deploying

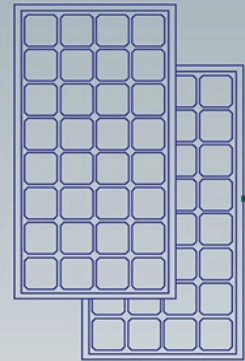
Residential installs, communities, commercial, DECC project



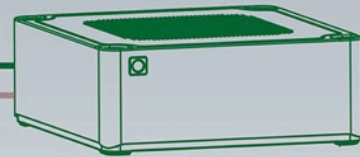
Moixa is leading a bid with partners to deliver a MWh grid-scale UK distributed storage pilot for DECC, to validate case for GWh+ by 2020



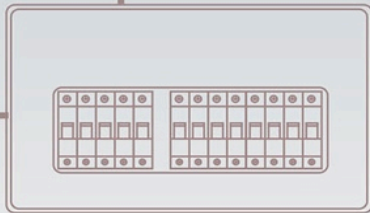
micro renewables



energy storage
& smart control

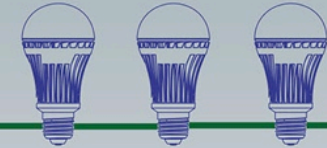


Maslow control unit



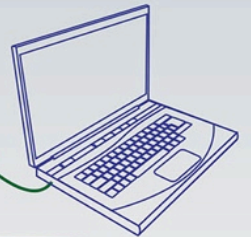
Backup AC power

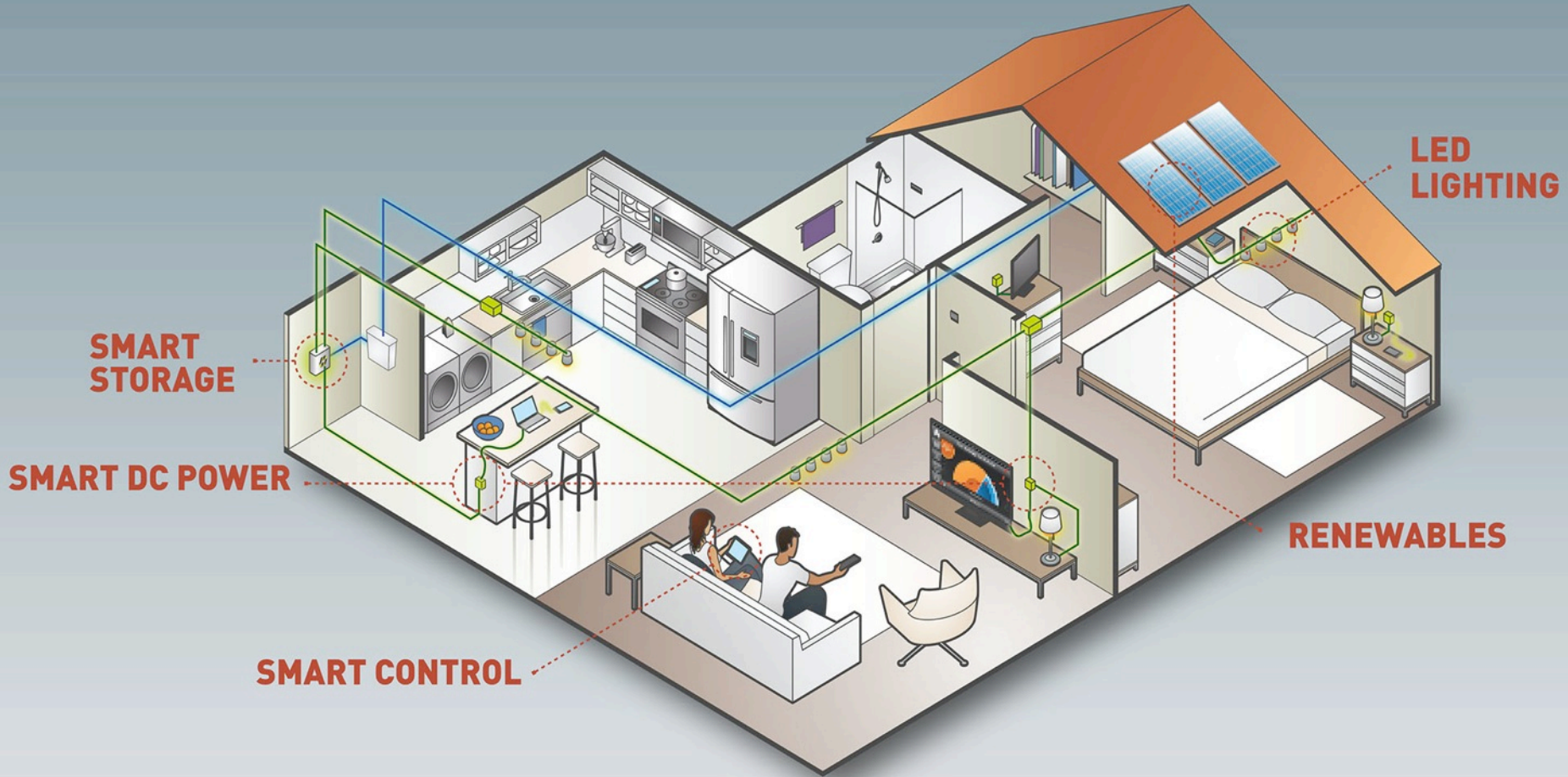
smart DC LED lighting



DC power for DC devices

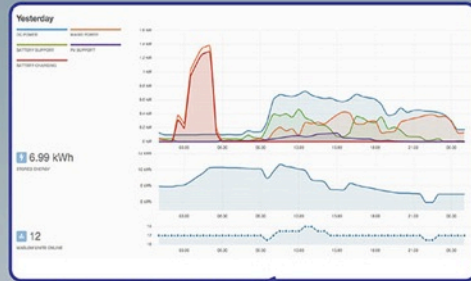
DC power hub







Kiwi Power aggregator interface to National Grid



system performance



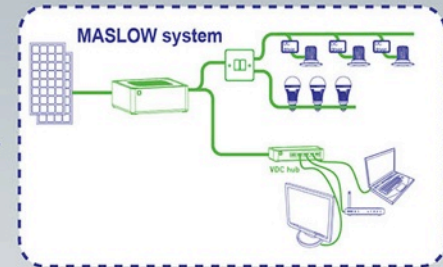
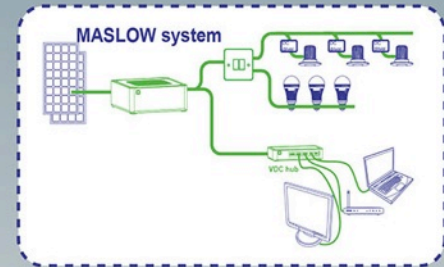
RESTful
JSON API

push data
1 min JSON

push data
1 min JSON

ethernet

GPRS



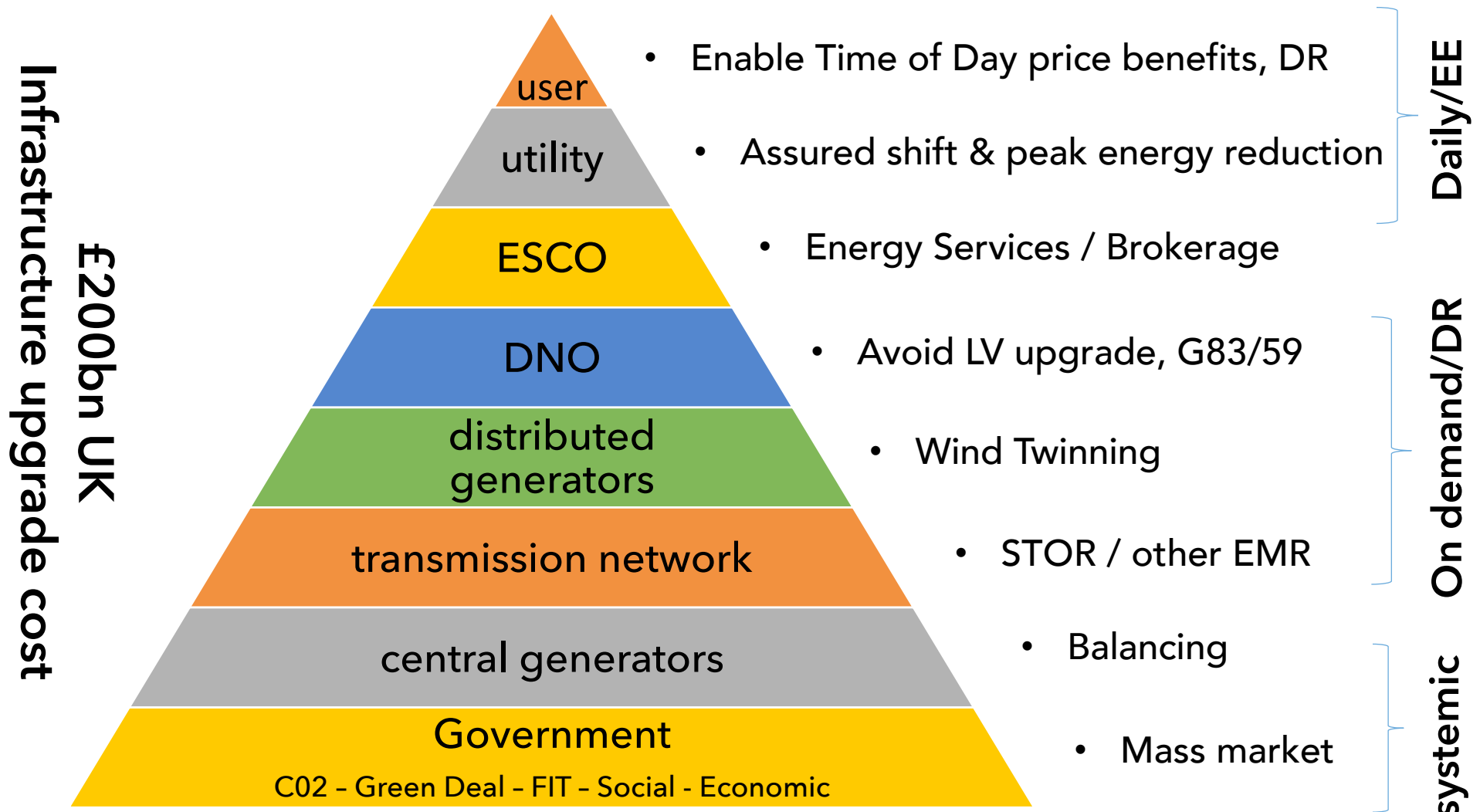
local substation
live data / power
support



Utility wind output
live data feed

Aggregate storage: Hierarchy of network needs

Storage at the edge of the grid, multiple participants

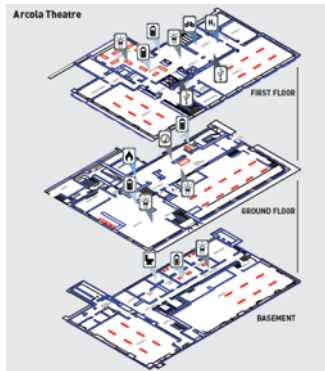


Potential to save billions across UK grid / consumer cost



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**Merchant
Square
2014/15**

