



# Moixa Home Energy Systems

## DC Micronet Energy

Smart Grids & Cleanpower Conference

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<http://bit.ly/cleanpower>

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# Moixa Energy Holdings : Group Overview



- UK based Design led R&D in consumer energy
- IP through production, partner & venturing
- Focus on smart energy, DC & low power

**Moixa Energy** - launched award winning USBCELL intelligent batteries

**Moixa Technology - Home Energy Systems;**  
Smart detection, control and grid-shift of loads

- Monitoring, analysis and multi-platform control
- Easy install - microgeneration / off-peak storage
- DC micronets – power LED lighting & electronics

**R&D** grants and trials in energy efficiency  
(e.g. TSB efficiency in buildings,  
EU EuroStars, TSB Smart meters)



Founded by Simon Daniel (CEO) & Chris Wright (CTO)



(previously invented / licensed PDA  
Folding keyboard - 2m+ units)





# Focus: The long tail of rising energy consumption



1. Monitor & control high loads

**Rationale:**  
Intelligent control  
Change behaviour  
Change appliances



2. DC Micronets provide efficient DC power lighting & electronics

**Rationale:**  
Up to 30%+ of peak load is DC devices  
Number of medium/low DC power devices increasing exponentially, particularly with LED lighting and gadgets  
AC/DC adaptor conversion losses, cables and battery waste



**Rationale:**  
Power/Grid-Shift DC devices  
Scale up as PV prices fall  
45% of 2020 demand is gadgets/electronics

3. Provide rapid & easy to install microgeneration & storage



Falling PV prices



Local Microgen

# Technical insight: DC shift in homes

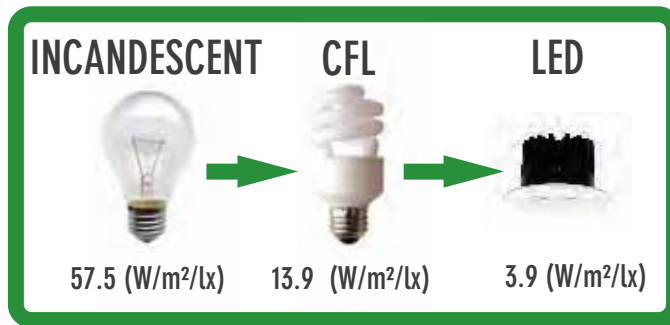


## Increasing DC Demand

More devices requiring AC/DC adaptors

Adaptor losses, wasteful (often 50% efficient), bulky, dangerous

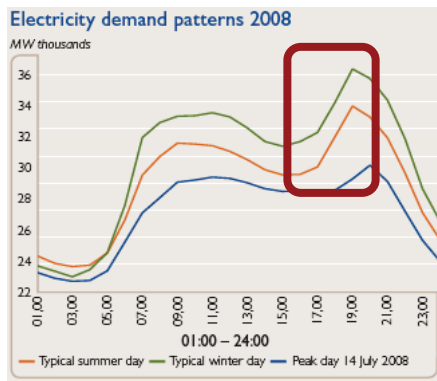
EST study - 45% of home load as gadgets/electronics by 2020, most of this will be DC.



## LED lighting as potential DC tipping point

Better renewable / DC-DC efficiencies - up to 97%

Potential to expand to DC appliances e.g. Off-the-shelf DC fridge reduces consumption from 250kWh to 28kWh



## Supply side: DC enables efficient solutions

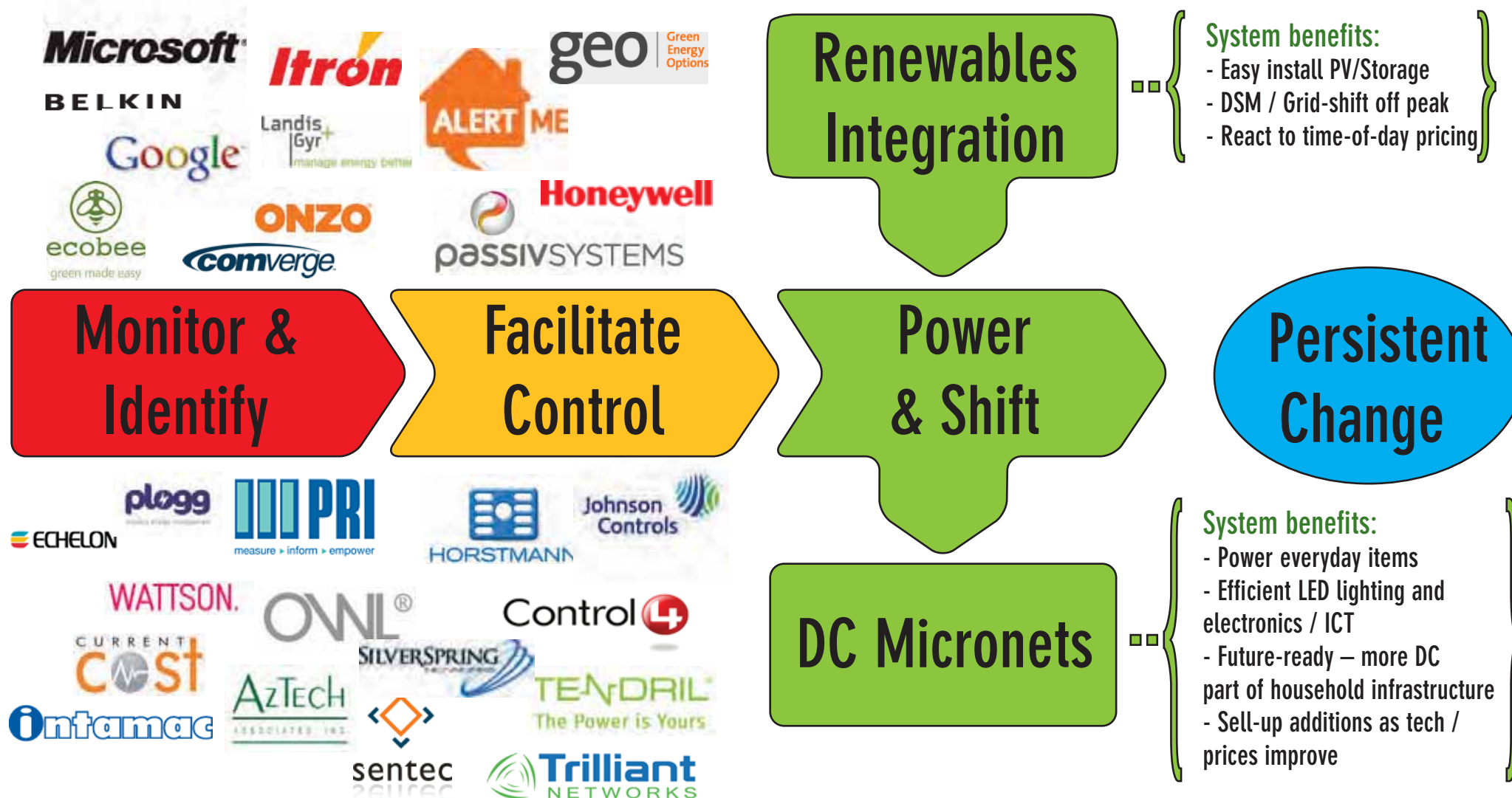
30%+ of peak load is DC devices, grid shift potential via DC networks

Microgeneration / storage is direct current, price & quality continues to improve



# Business model: Enable paths to action

Moixa Home Energy Systems: (1) monitor and detect usage (2) enable better control (3) create a way to power DC loads direct from microgen / stored (grid) power





# Moixa Home Energy System

Smart meter



Home Energy Hub



Control



Solar panels	95w output
Battery	75% charged
Power usage	
DC devices	total 83w
AC Mains	total 1.4kw
Heating	
Heating	15° internal
LED lighting	
LED lights	24w total

Power provision



Power storage



Integrate renewables





# Monitoring and Advice

Advice that contains a powerful call to action

Interface on multiple platforms



Advice is not the primary reason to access the interface - advice presented on control platform

Control



Advice



Advice that is:  
**MEANINGFUL**  
Useful information with context  
**ACTIONABLE**  
Advice is a call to action to make a change  
**TARGETED**  
Customised to the behaviour of the household



## Transparent technology

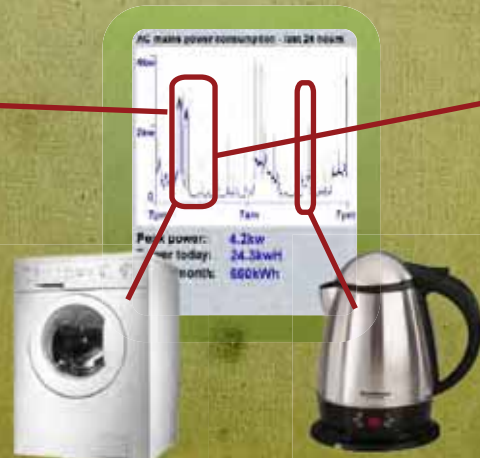
Technology that just works - for you!

Advanced Sensors

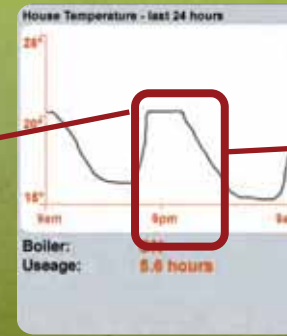


-Sensors embedded in RCD: accurate / easy to fit

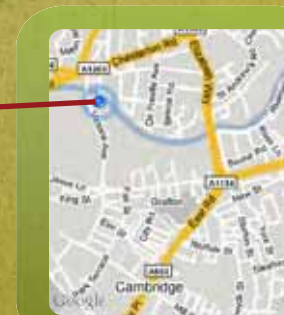
Sophisticated Analysis



Commercial in confidence.



Home temperature



Location aware

Intelligent software  
- analysis of use patterns  
- models occupancy  
- controls boiler optimally  
- takes account of ambient conditions





# Easy Solar - 15-minute PV install



1 - drill



2 - hammer



3 - screw



4 - support



Complete



7 - fit panel



6 - place frame



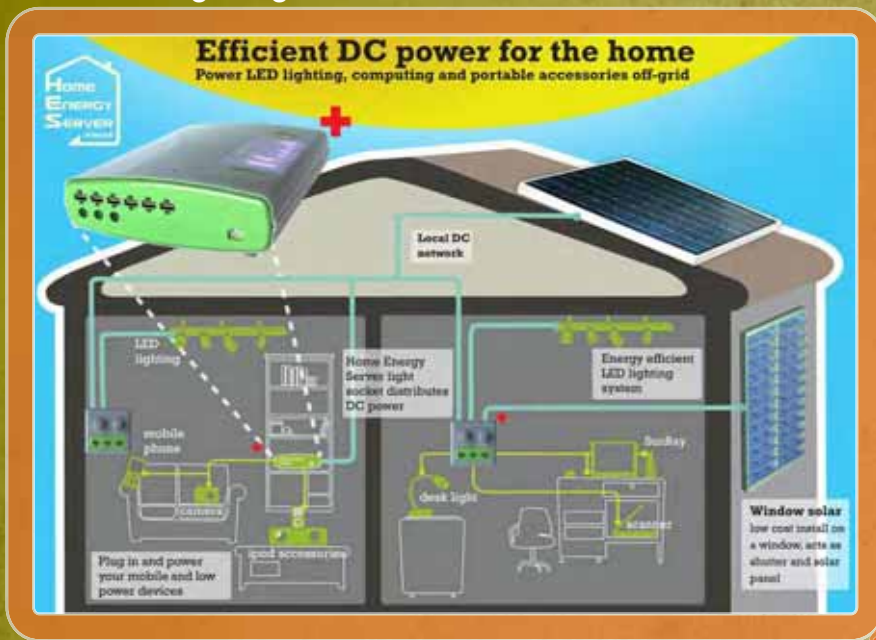
5 - assemble frame





# The technology - smart DC

Domestic lighting circuit reused as DC micro-network



**Advanced light switch**  
 -intelligent controls  
 -DC nodes to power devices  
 -Network socket to plug additional solar PV



- Simple, below 48V for safety and regulations
- Just disconnect your lighting circuit and plug it into our server
- No need to change any wiring
- Just change light fittings to DC and put in our light switches

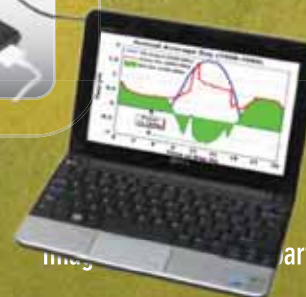
**DC-powered LEDs**  
 up to 97% efficient



**LiFe battery**  
 91% charge / discharge  
 cycle efficiency  
 after 7000 cycles  
 (20 year life)



**Home Energy Server**  
 powers DC devices 85-95%  
 direct DC conversion efficiency



# Progress : Technical & Market Evidence



- R&D, pending IP, early stage round (Jan 2010)
- Demonstrators and home pilots, industry validation
- Energy retailer - R&D Showcase
- Retrofit: TSB Retrofit for the Future: Peterborough
- BRE/AIMC4 Sandpit – demonstrator homes
- Joint supplier biz dev: lighting, PV, batteries
- EuroStars (500k+) R&D/Trials (UK, NL, EU)
- TSB Smart Grid – UK R&D/trials pending
- Channel partner development



Technology Strategy Board  
Driving Innovation