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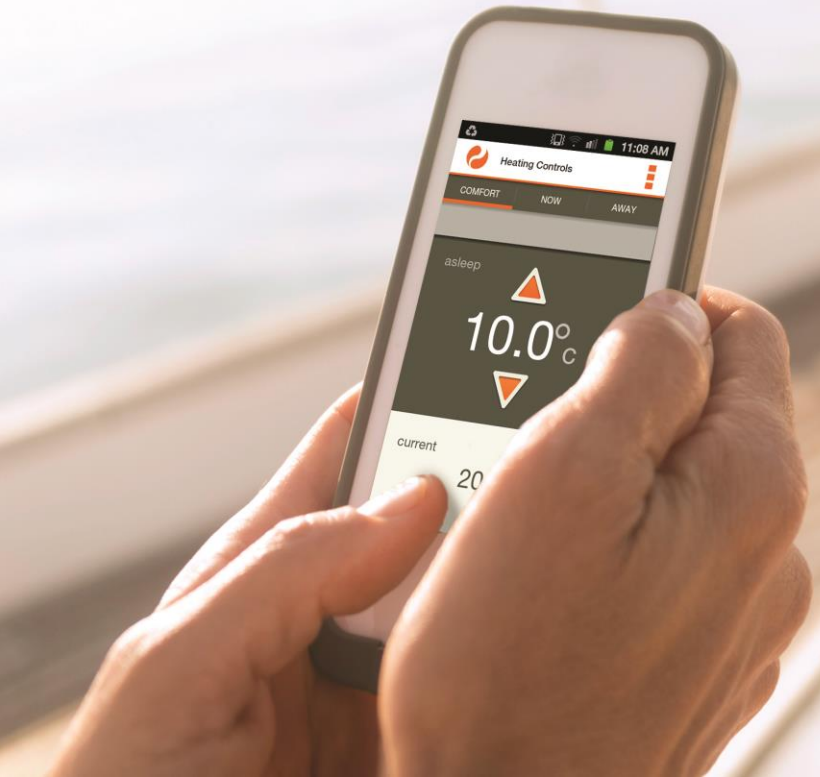
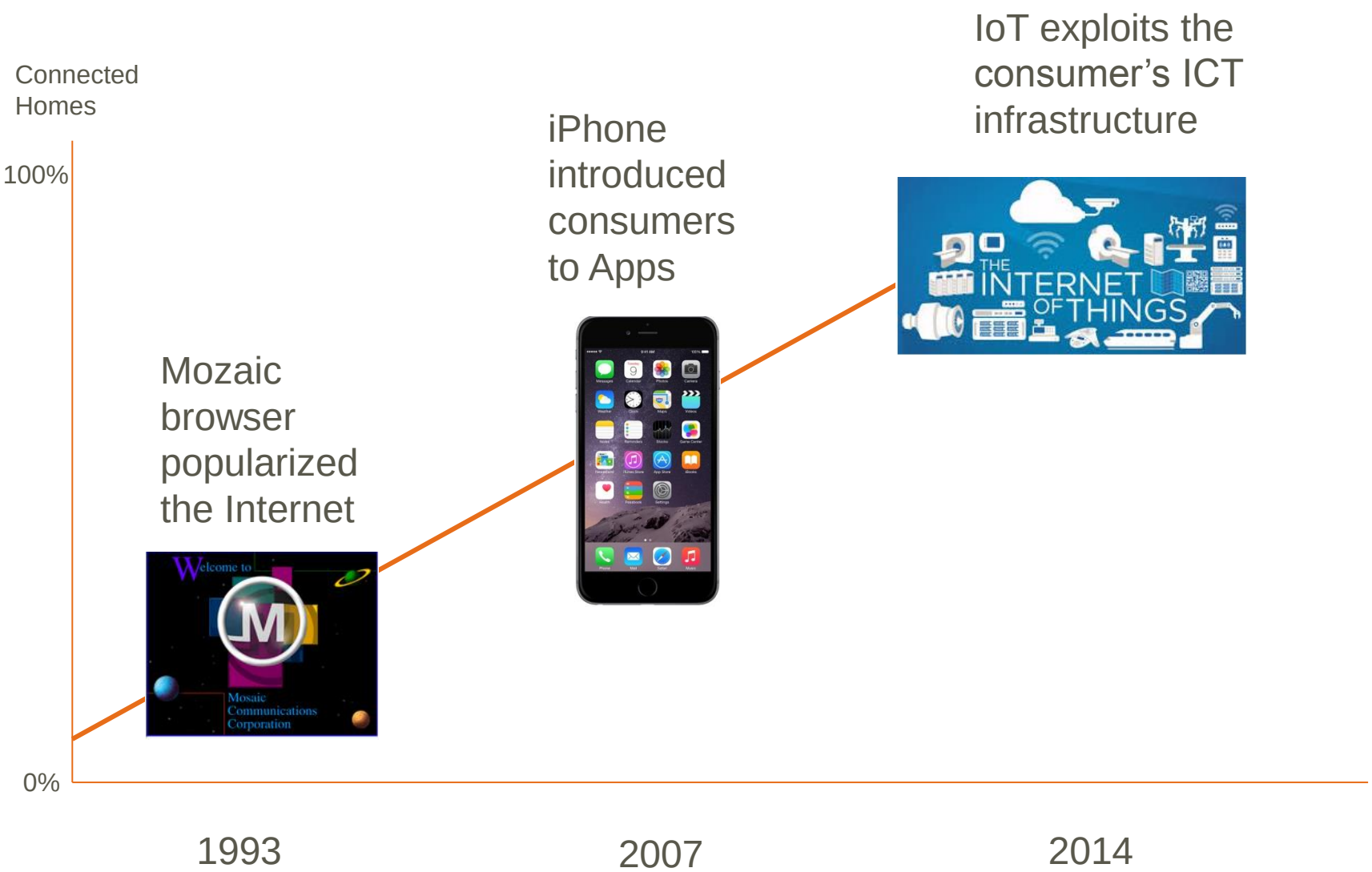
# What will the future energy system in the home look like?

*Technology Challenges and Regional Approaches for Integrating Renewables and Energy Security*




Providing intelligent home services for homeowners and businesses

# Evolution of the “information age”

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# The “Information Age” is about connecting with consumers

**Consumer trend is for self-directed life:**

- Cheaper
- Smarter / connected
- Informed / accessible
- More efficient / convenient

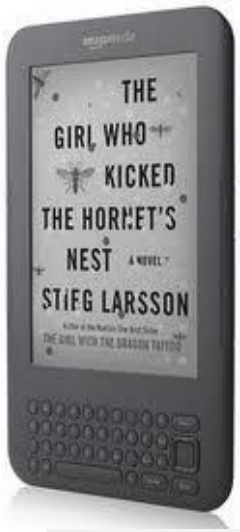
How should we connect with consumers?

From Bookstore

By fitting into their world

To online

and making it easier




To device

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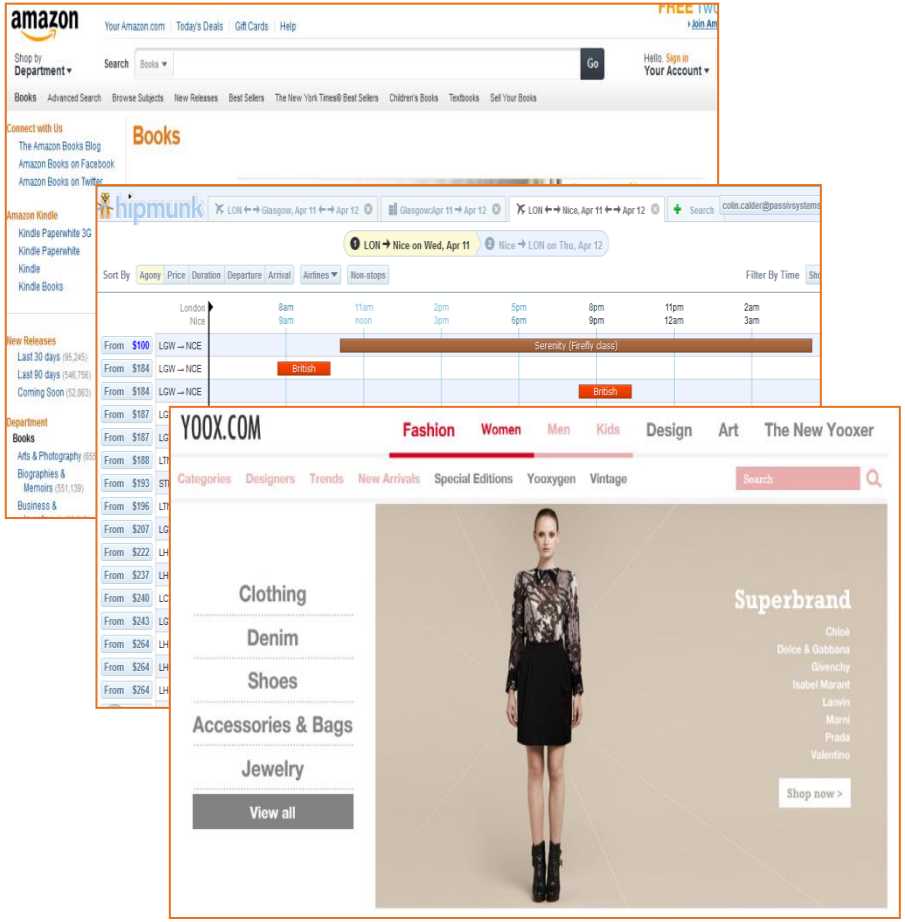
# The “Information Age” is about empowering consumers

**Key success factors:**

- Digitalization
- Web and App technology
- Individual empowerment
- Social media




Industry sectors:

- Retail
- Airlines
- Travel agents
- Telecoms
- Banking
- Healthcare

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# The “Information Age” is about to come to the energy industry

**Includes the No 1 HIT**
“Give me a better deal Mr Energyman”

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# Power system value chain

## OLD UTILITY WORLD

## NEW "CONNECTED" CONSUMER WORLD

Informed consumers who feel in control

Remote controls that minimise energy consumption and cost

Greater transparency around energy costs

Energy system listening and responding to consumer needs

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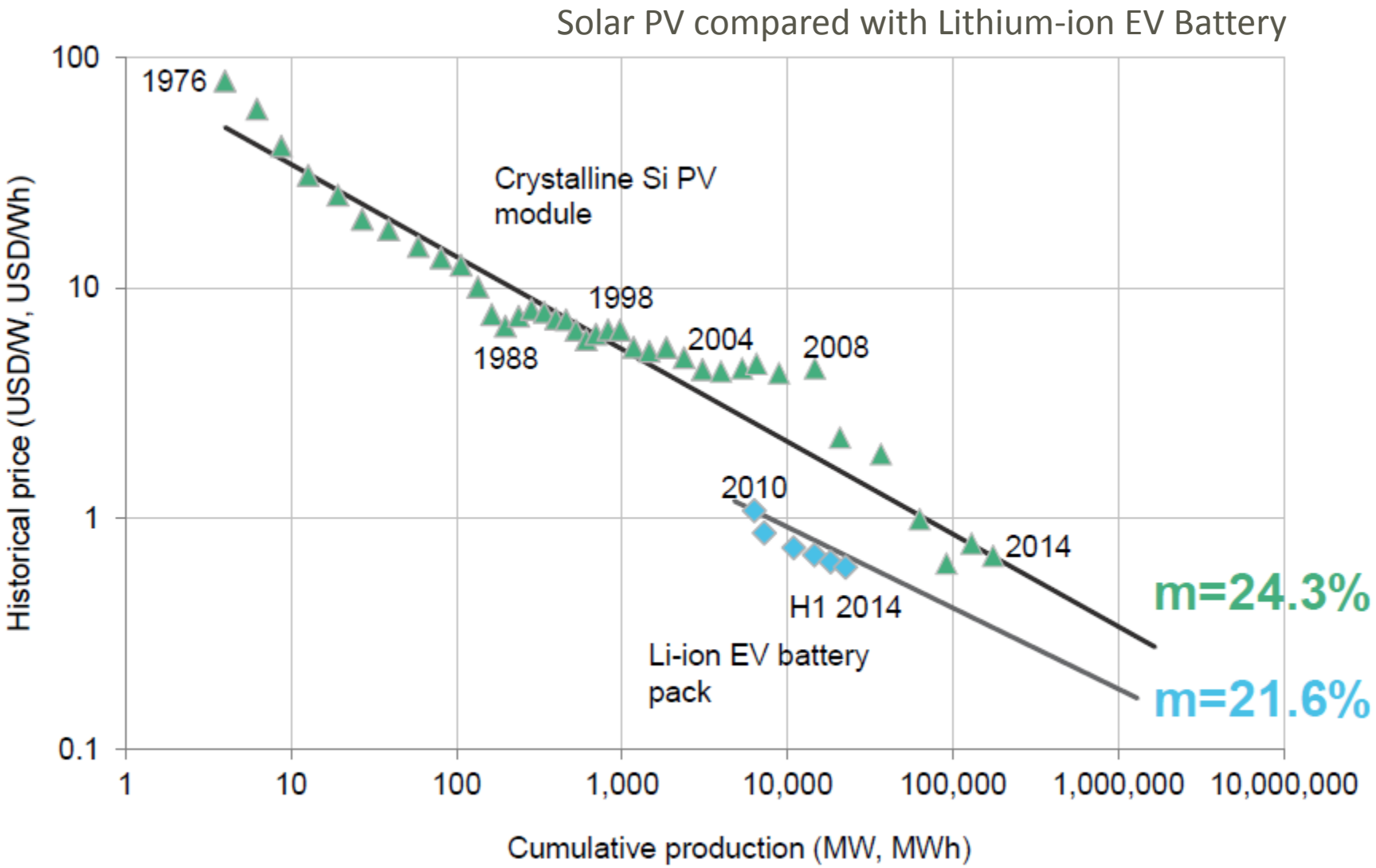
# Small scale energy trends




Note: Prices are in real (2014) USD.

Source: Bloomberg New Energy Finance, Maycock, Battery University, MIIT

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# Digital energy supply chain

**Key success factors:**

- Digitalization
- Web and App technology
- Individual empowerment
- Social media

Integrated residential energy management and services platform

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# PassivEnergy

- Our Physics Model and Predictive Control algorithms are able to model energy demand 24 hours in advance
- Our aggregation services enable equipment suppliers, service providers and asset owners to deliver better value services to their customers
- Our grid management services have been designed to integrate with energy trading systems and to respond to ToU tariffs

**Physics Model** | **Predictive Control** | **Local generation & storage** | **Performance management** | **Aggregated Capacity Pool** | **Trading Actions**

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# What market design needs to consider

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## TREND

- Mass adoption of smart phone technology and connected devices (IoT)
- Widespread adoption of renewable and storage technologies
- Increasing volatility in wholesale energy markets caused by renewable volumes
- Electrification of heat

## OPPORTUNITY

- Demand response capacity for grid balancing, correcting trading imbalances & opportunistic trading
- Local resilience combined with lower cost generation and distribution
- Incentivise consumers to use IoT devices to extract value from wholesale markets
- Use existing gas networks for grid balancing

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# Policy & regulatory barriers

- Properly functioning wholesale market
- Half hourly settlement for residential customers
- IoT standards for the energy market
- Government incentives causing market distortion e.g. capacity mechanism

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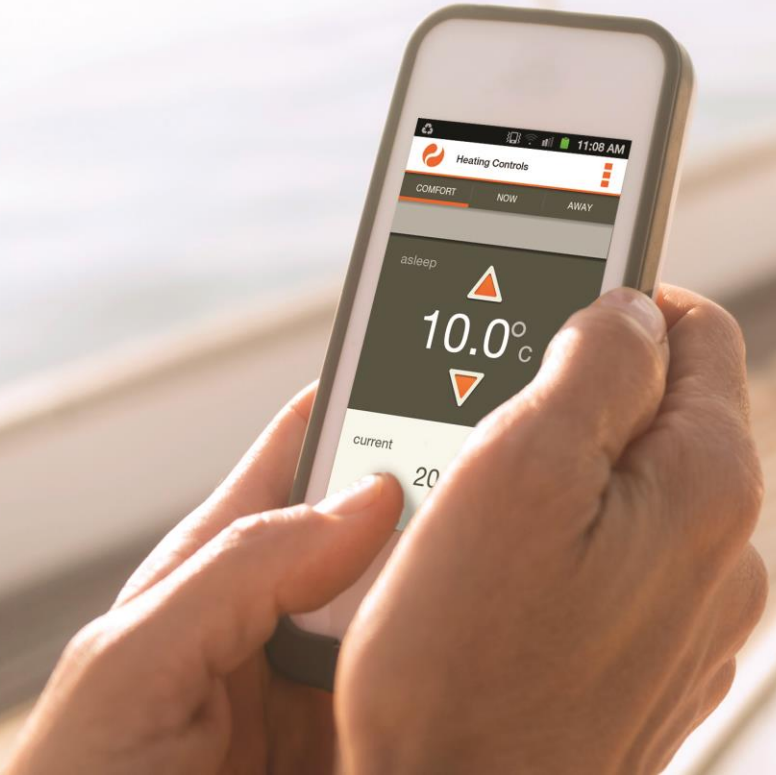


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