



2XEP Forum April 2014 Smart Appliances for Smart Consumers

Opportunities for improved energy productivity.
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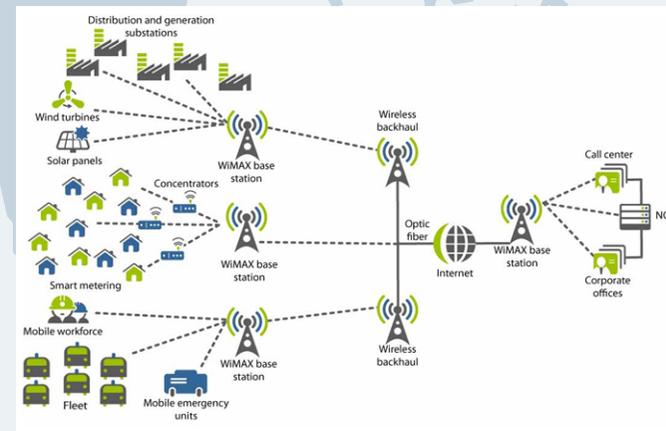
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- Smart appliances, Smart Grids and Connectivity – what does it mean?
- The Smart Consumer – Where are we now?
- Options to effectively use, recover and exchange energy – can appliance features improve energy productivity?
- The new perspective - Sustainable rather than Smart Appliances?
- Possible Approaches to improved appliance energy productivity – what is achievable?

Smart appliances, Smart Grids and Connectivity

- There has been a lot said about Smart Appliances, Smart Grids and Connectivity over the last few years.
- A number of successful examples have surfaced – but there still remains a lack of clear purpose.
- From a **Regulatory view**, the desire to reduce CO2 emissions and the progressive increasing cost of resources is forcing infrastructure towards efficient, flexible solutions capable of integrating renewable resources.

**REGULATORS CALL IT THE
SMART GRID AND TO THEM IT
LOOKS LIKE THIS**

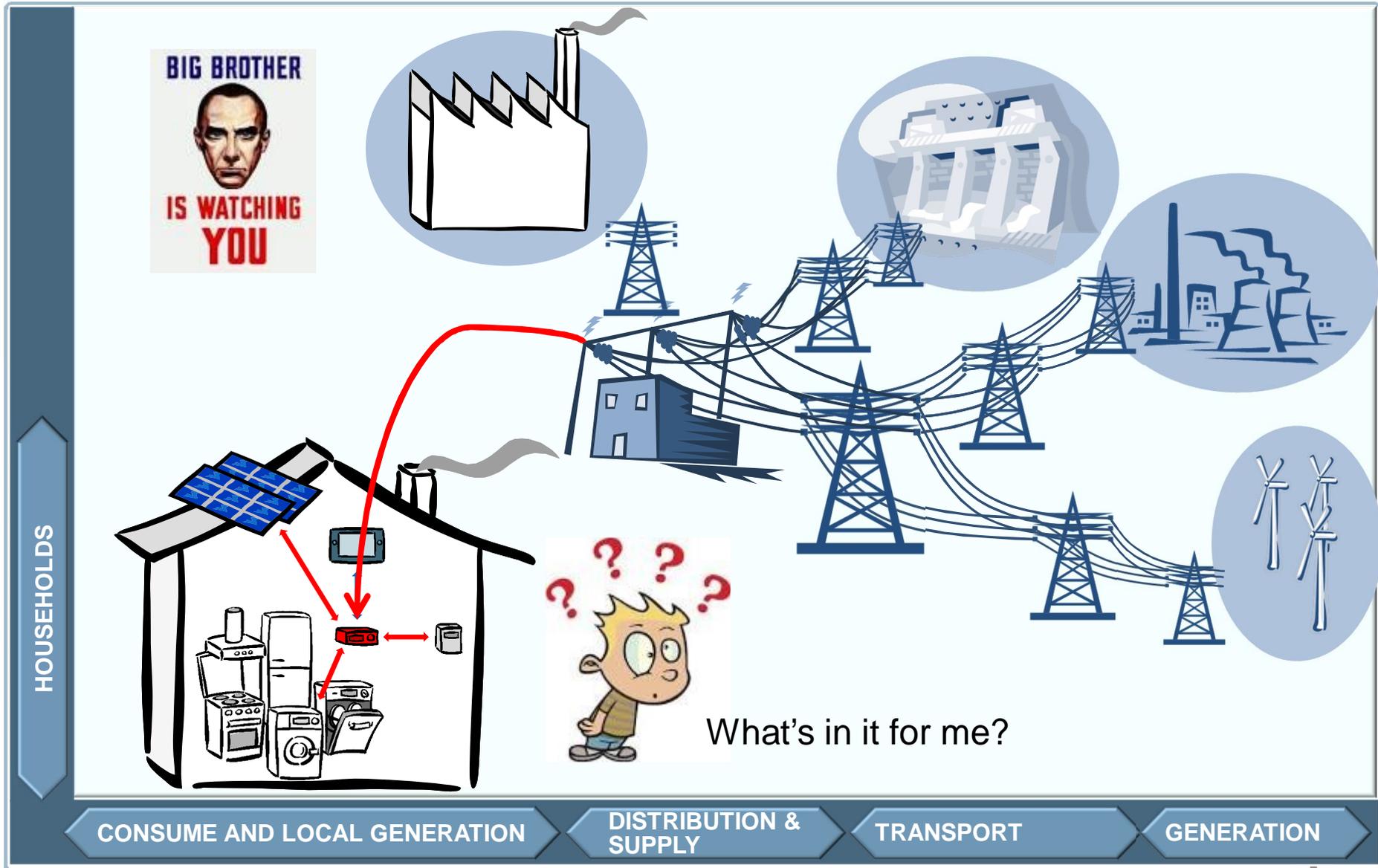


Smart appliances, Smart Grids, Connectivity and Energy Productivity

- It is argued that Smart Grids will be able to influence the use of energy in order to better balance energy production and consumption avoiding peak demands and inefficient use of assets, with consequent energy productivity improvements.
- The development of appliances able to interact with Smart Grid policies, ***while maintaining performance and user needs***, is an essential step towards a full exploitation of Smart Grids development.
- This process to date has been largely driven by a “Push Down” approach.
- How successful have we been?

The Smart Grids Scenario today – The Smart Consumer perspective

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Some history from Electrolux's point of view

Thinking of you


8 SEPTEMBER, 2000
NEWSROOM

We started this
14 years ago!!!

Electrolux Screenfridge premieres today in 50 Danish homes

(ELUX) Starting today, for a trial period of five months, 50 Danish homes outside Copenhagen will test the world's first intelligent refrigerator, the Electrolux Screenfridge. The purpose of the field test, conducted by Tele Danmark and e2 Home (the joint venture company between Electrolux and Ericsson), is to test the Intelligent Living concept in its intended environment and to study customer reaction to electronic household services.

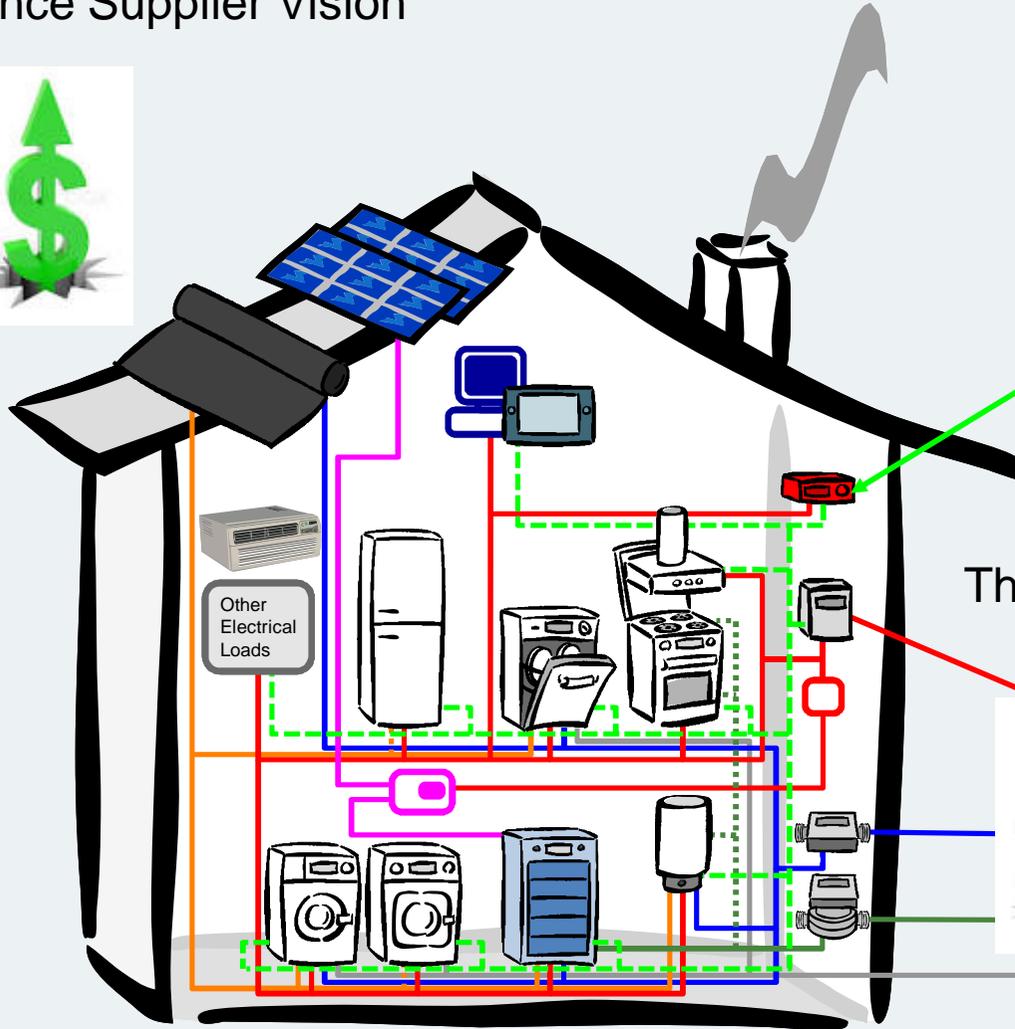
AND TODAY?

*“Everything that can be connected will be connected!
That’s why Electrolux is working on new technology that
allows consumers to communicate with their appliances
via an app on their smart phone or tablet”.*

The Ultimate Smart Appliances / Smart Consumer Vision

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The Appliance Supplier Vision



The Consumer Vision



Internet

The Utility Supplier Vision



Electric energy

Cold water

Natural Gas

Grey water

Smart appliances, Smart Grids and Connectivity – The Challenges

- There are clear incentives and goals for stakeholders –
 - For Regulators and Environmentalists it is reduced energy, improved efficiency and sustainability – (such as a doubling of energy productivity by 2030)
 - For Utility Suppliers it is more efficient and effective use of resources leading to higher profits
 - For Appliance Manufacturers it is the opportunity to sell more products with Bells and Whistles
- For Consumers, it is not so clear.
- To date, the irresistible offer to consumers has not been made. After all, while it may be savvy to turn on my air conditioner before I get home, do I really want to control how my clothes washer and my refrigerator interact?

Smart appliances, Smart Grids and Connectivity – The Options

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- There are certainly signs that entertainment appliances with connectivity will increase in popularity – because this enhances the experience.
- However, appliances that do a chore are not seen in the same light. Why have a “Screenfridge” if my smart phone can do everything I want?
- The opportunity to improve energy efficiency and energy productivity will arise from more than connectivity – it will evolve from other technical matters and social pressures.

Smart appliances, Smart Grids and Connectivity – Options (cont)

- For household appliances made by Electrolux – such as Refrigerators, Dishwashers, Clothes Washers, Dryers, Ovens etc the real consumer need is Effectiveness and Ease of Use. Energy Efficiency is only a bonus offering.
- The Smart appliances of tomorrow will offer consumers better performance at lower cost (capital and running), with enhanced usability that makes life easier.

This is NOT the solution



This is



Smart Sustainable Appliances: How do we progress?

To improve energy productivity, **Smart Consumer Appliances** will play an **active role** in automated home energy management systems:



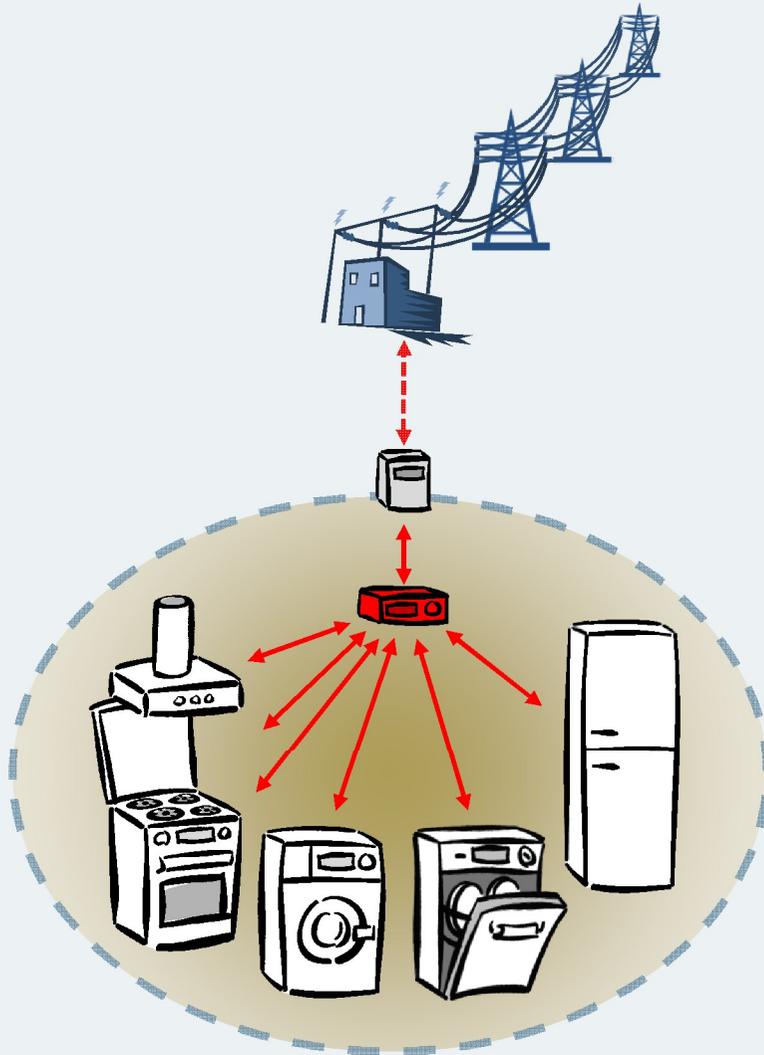
- By being able to **completely control the processes** and be fully **responsible** for the final result;
and
- By matching REAL LIFE needs (such as the ability to identify and optimise types and size of loads) rather than meet artificial targets in laboratory energy and performance tests.

Smart Sustainable Appliances: How do we progress? (cont)

For example, the performance tests and energy rating for clothes washers are based on a “Full Load” (typically 8kg).

- In real life, consumers wash 4kg in each load and want short cycle times (certainly less than 1 hour).
 - To minimise water and energy use, and yet still obtain minimum wash standards manufacturers resort to very long cycle times. These can be several hours long.
- Refrigerator performance and energy is measured at 32C, with no door opening and no processing load
- This is obviously not a real life situation and actually overstates the energy used
 - There is progress here – the new IEC standard to be published this year will incorporate multiple temperature energy tests including door openings and processing loads

Smart Appliances for Smart Consumers: Summary of options



Smart Appliances for Smart Consumers will be:

- Able to ***automatically and without user intervention***, operate in more balanced, cost-effective conditions determined by resource availability, resource costs and consumer needs
- ***Very efficient*** in their performance with improved processes and the ability to reuse water and heat,

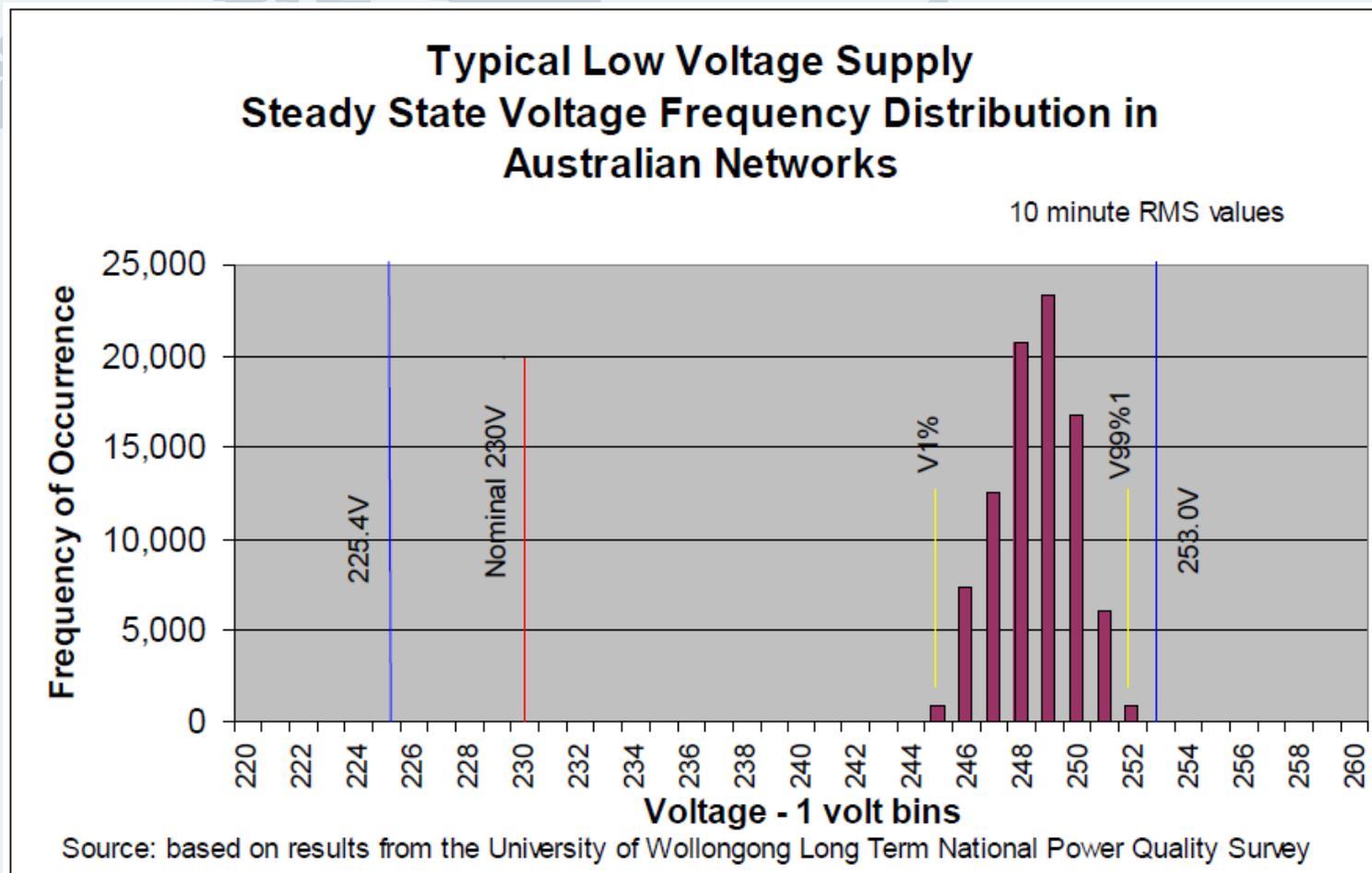
Smart Sustainable Appliances: their role for smart use of energy

What other factors apart from optimised performance are available to double Energy Productivity in the Appliance Sector?

- Technology and product design can improve energy efficiency. Some examples are by:
 - Improved heating (for example heat pumps)
 - Storage and transfer of water and heat (through product integration)
 - Improved thermal efficiency (through better insulation)
 - Improved mechanical efficiency (for example inverter fed drives)
- Optimisation of supply voltage and product efficiency and performance

The Voltage Optimisation Opportunity

A number of studies have shown that the distribution voltage is close to the allowable maximum

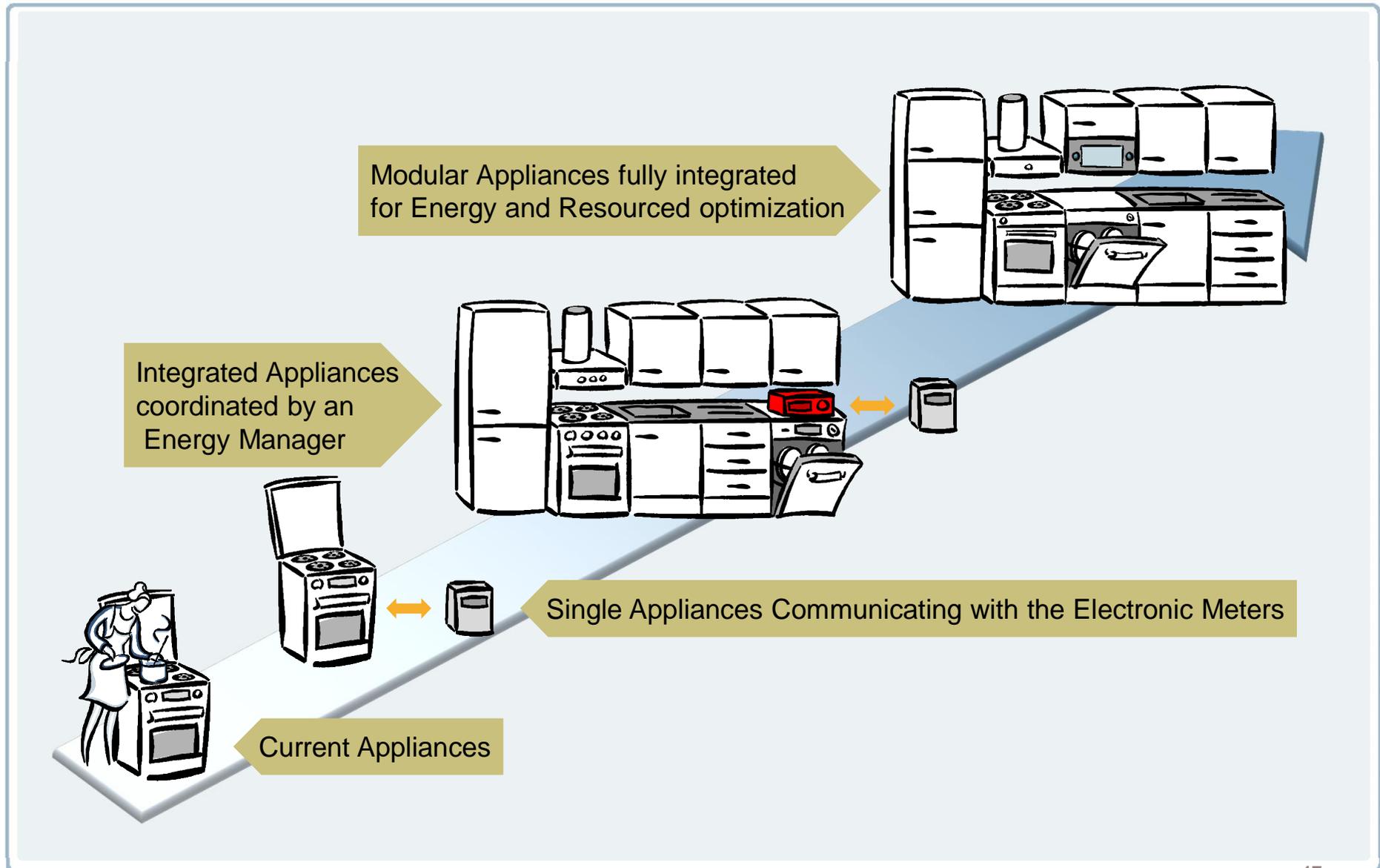


The Voltage Optimisation Opportunity

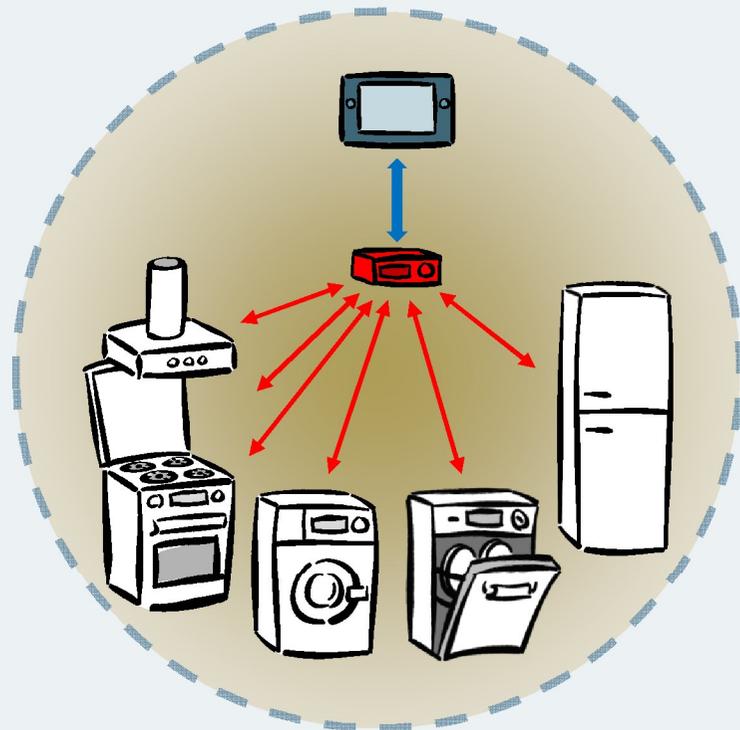
- Since 2005, Australian appliance standards have mandated 230V as the voltage for all performance and energy consumption tests but supply voltage has remained at 240V.
- The energy consumption of major appliances would drop by more than 2% for a 10V (4%) voltage drop.
- Performance would not be affected as it has been optimised for 230V.
- Energy consumption of other loads inside houses would also reduce.

**RESIDENTIAL SAVINGS > 1000 GWh or 2.2% and almost
1 million Tonnes of CO2 per year**

Smart Sustainable Appliances: The Solutions Roadmap



Smart Sustainable Appliances: The integrated Solution



- **Cross-products integrated solution** based on connected Appliances coordinated by a Home Appliances Controller.
- The Home Appliances Controller is likely to be an internet-based device linked to the Energy Meter and to any browser-based device via Wi-Fi Network.
- The system offers the following Integrated Functions:
 - Energy Monitoring and Statistics on appliances Usage
 - Power leveling and Appliances' Usage Planning
 - Remote access

THE DEVELOPMENT OF SMART SUSTAINABLE APPLIANCES FOR SMART CONSUMERS WILL REQUIRE:

- Selection of Key Partners to establish a powerful consistent Consortium interested in a win-win perspective
- Definition of the main objectives & clear development plan
- Definition of the general architecture and the devices involved (common functionalities & message exchange)
- Identity of the technological infrastructure, components, communication technologies and the communication protocols AND:
 - **Consumer Demand driven by a clear desire for enhanced operability, ease of use and improved energy productivity**

The technological barriers to developing Smart Sustainable appliances with improved energy productivity can be addressed, but we need to engage consumers with an irresistible offering so that everyone can become a “Smart Consumer” by default

THANKYOU!