‘Smartness’ Labelling and Energy Labelling

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Energy labelling – the story so far

• Energy labelling is one of the great policy successes of our time
• Over 90 countries have labelling schemes
  • Mostly backed by regulation; this is why they are trusted
• Vast amount of data on label design, consumer behaviour, manufacturer responses, impact on energy-efficiency trends
• Constant pressure to add other aspects of product performance to the label – partly so these statements can be standardised
  • For example: product load capacity, heat/cool output, noise
• Latest aspect finding its way into energy labelling is ‘smartness’
Problems with adding ‘smartness’ labelling

• Energy consumption, efficiency and product specification metrics on energy labels are based on standard product definitions and verifiable tests

BUT there are very few workable standards related to ‘smartness’
  • ‘Workable’ means suppliers can build complying products, regulators can test them
  • Only in Japan (Echonet), USA (Energy Star) and Australia (AS/NZS 4755)
  • None of them use the term ‘smart’ – which is left as an undefined marketing term

• A more energy-efficient appliance is highly likely to benefit the user

BUT benefits of a ‘smart’ appliance are contingent on user’s access to communications, tariffs, incentives etc. (may not be available where they live)

• Conflicting messages: ‘smart’ appliances often less energy-efficient (but may contribute to greater economic efficiency of the system as a whole)
What makes a product ‘smart’?

• Ability to interact with the external environment, beyond the traditional user interfaces (on-board controls, line-of-sight remote controls and thermostats);

• Ability to change mode of operation in response to changes in internal or external conditions;

• Ability to receive and respond to information about the state of the electricity supply system, without user intervention.
Product types covered by ‘smart’ standards  
(shading shows products also covered by energy labelling)

<table>
<thead>
<tr>
<th>Product category</th>
<th>US EPA Energy Star “connected” criteria</th>
<th>Australia/New Zealand Standard AS/NZS 4755</th>
<th>Japan Echonet Lite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air conditioner – window-wall</td>
<td>✓ 7</td>
<td>✓ 0</td>
<td>✓</td>
</tr>
<tr>
<td>Air conditioner – split unit</td>
<td></td>
<td>✓ 784</td>
<td>✓</td>
</tr>
<tr>
<td>Air conditioner – central/ducted</td>
<td></td>
<td>✓ 44</td>
<td>✓</td>
</tr>
<tr>
<td>Electric resistance heating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pool pump controller</td>
<td></td>
<td>✓ 0</td>
<td></td>
</tr>
<tr>
<td>Water heater – heat pump</td>
<td></td>
<td>✓ 0</td>
<td>✓</td>
</tr>
<tr>
<td>Water heater – resistance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerator &amp; freezer</td>
<td>✓ 41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clothes washer &amp; washer-dryer</td>
<td>✓ 0</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Clothes dryer</td>
<td>✓ 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dishwasher</td>
<td>✓ 0</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Light fixtures</td>
<td>✓ 241</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Connected thermostat</td>
<td>✓ 1</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Energy/battery storage system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electric vehicle charger (EVSE)</td>
<td>✓ 0</td>
<td>✓ (a)</td>
<td></td>
</tr>
<tr>
<td>Photovoltaic/battery inverter</td>
<td>✓ (b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controller for other devices</td>
<td>✓ 0</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
US labels indicating ‘smart’ capability (maybe)

May be 10% less efficient than other Energy Star products – need to check website to find out!
Australian labels indicating ‘smart’ capability

[Image of Australian energy rating labels for cooling and heating]
Proposed Zoned Energy Rating Label for ACs

© Commonwealth of Australia 2015
Japanese labels indicating ‘smart’ capability
Similarities

• All three systems refer to published standards covering aspects of “smart” performance
  • although each standards approach is different, covers different products;

• None actually use the word “smart”, so this term is still left to the mercy of the market;

• All rely on having products with the smart capabilities listed on websites
  • but only the Australian label actually refers to the website address.
Differences

• USA:
  • Good: there is a trail from the energy label to the ‘smartness’ label
  • Bad: the ‘smartness’ label is opaque – applies to non-smart products as well

• Australia:
  • Good: energy efficiency ‘smart’ capability on the same label
  • Bad: not particularly salient for consumers (energy suppliers do not use it)
  • Likely to be abandoned rather than improved

• Japan:
  • Good: distinctive logo for ‘smart’ products (and system components)
  • Bad: no link to energy label

• European Union also considering labelling for ‘demand side flexibility’
  • Preparatory Study on Smart Appliances (Task 7 Report, August 2017)
Recommendations – ‘smartness’ labelling

• Don’t claim lower energy use unless it can be quantified
  • (as with the Energy Star “Connected Thermostat” criteria);

• Do not confuse energy efficiency with economic or tariff benefits
  • Consumers can understand the difference if properly explained
  • Do not offset economic/tariff benefit against an energy consumption value or efficiency rating - weakens trust in the energy label for uncertain benefit

• Use a consistent mark or logo for all elements and components which a consumer will need to purchase to realise the ‘smart’ capabilities

• Energy labelling regulator should own and control the mark or logo

• Logo use should depend on verifiable compliance with published standard or specification
More recommendations...

• Permit (voluntary) addition of the logo to energy labels
• Permit use of the logo on appliances which are not required to have energy labels (e.g. because no category exists for them)
• Qualifying products should be listed on label regulator’s website (e.g. Energy Star and Australia) or industry group (e.g. Echonet)
• Third party service providers (e.g. electricity utilities, aggregators) should refer to the websites to identify appliances and components eligible for incentives such as special tariffs or cash incentives.
THANK YOU – ANY QUESTIONS?
## Capabilities typically described as ‘smart’

<table>
<thead>
<tr>
<th>Primary Capability</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Remote user interaction</td>
<td>a. User control via smartphone app</td>
</tr>
<tr>
<td></td>
<td>b. Communication of energy use, settings etc. to user or authorised external agent</td>
</tr>
<tr>
<td>2. Auto-adjust in response to user-origin information</td>
<td>c. User enters electricity tariff details and preferences for operation in high- and low-price periods</td>
</tr>
<tr>
<td></td>
<td>d. Appliance monitors usage, loading or occupancy patterns to modify current or future operation</td>
</tr>
<tr>
<td>3. Auto-adjust in response to external-origin information</td>
<td>e. Appliance downloads tariff details from user’s electricity supplier, or monitors dynamic prices</td>
</tr>
<tr>
<td></td>
<td>f. Appliance responds to signals from an external agent (authorised by the user)</td>
</tr>
<tr>
<td>4. Interoperability and standardisation</td>
<td>g. Inputs standardised (communications pathways, protocols or commands)</td>
</tr>
<tr>
<td></td>
<td>h. Responses standardised</td>
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</tbody>
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