Energymark:
A kitchen table approach to reducing household energy consumption

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Science into Society
Thursday 1st December, 2011

Energy Transformed Flagship

National Research Flagships
Energy Transformed

CSIRO
CSIRO: a snapshot

Australia’s national science agency

One of the largest and diverse in the world

Ranked in top 1% in 13 research fields

Internationally recognised staff

Award winning talent

Building national prosperity & wellbeing
Majority of Australians are concerned about climate change and GHG mitigation **BUT** they do not necessarily relate their own energy behaviours as being part of the problem.

The step between concern and action can often be huge particularly with the presence of information asymmetries and lack of incentives.
Research Question

How can CSIRO create national momentum around the topic of climate change and its relation to energy; that will change the way Australians think and act about energy and climate change mitigation?
Creating social change around energy:  
*Focus group results*

- Safe environment
- Deliberative processes
- Trust in the messenger
- Education at all levels
- Balanced, accurate information
- Engagement

**Theoretical frameworks**

- Social identity theory
- Social network theory
- Cognitive dissonance theory
- Theory of planned behaviour
- Theory of reasoned action
- Consumer uptake and societal acceptance
Our Water Mark
Australians making a difference in water reform
Energymark behaviour change model

**Actual behaviour**

**Intended behaviour**

**Attitudes**

**Values**

**Energymark interventions**

- Structured tracking
- Peer pressure
- Personal, self-generated plan
- Social commitments
- In-depth education from trusted friends
- Focused and engaged audience

**Inform** **Consult** **Involve** **Collaborate** **Empower**
Program Components

Communication

Information provision

Engaged group convenors

Social networks

Goals (reminder, commitment, social norms and diffusion)

Feedback

Embedded evaluation
Some of the topics

The Big Picture Session 1: W

Energy Transformed

National Research Flagships

Climate change can be due to natural composition of the atmosphere or in land mass or we have some understanding, how we affect it and how it affects us.

Discussion questions:
- What do you understand by climate change? What causes it?
- What climate changes have you noticed in your everyday life?
- How would the changes in climate affect industries or communities in your region?
- What effects do climate changes have on Australia? What are your views on Australia's carbon emissions?
- When discussing climate change, what are your key issues and concerns?

We live in a greenhouse in the glass the planet prevents radiation from getting out. Similarly, some gases in the Earth's atmosphere prevent some of the heat the Earth receives from the sun from reaching the ground, thus creating the greenhouse effect. Carbon dioxide (CO2), methane (CH4), and nitrogen oxide (N2O) are some of the greenhouse gases (GHGs) that are key contributors to climate change.

In the past, naturally occurring climate change caused by Earth's geographic and solar radiation patterns, and has increased or decreased over time. However, during the 20th century, human activities such as burning fossil fuels for energy, deforestation, and industrial processes have significantly increased the levels of GHGs in the atmosphere, leading to accelerated climate change.

Greenhouse gases trap heat in the atmosphere, leading to increased global temperatures, known as the greenhouse effect. This effect is crucial for maintaining a habitable environment, but when the concentration of GHGs increases, it can lead to climate change, which has severe impacts on ecosystems, economies, and human health.

In Australia, the carbon footprint is estimated to be 19.9 metric tons of CO2 per household. This is calculated by adding the estimated emissions from electricity consumption, transport, and other sources. It is important to note that the carbon footprint calculation includes both direct and indirect emissions, such as emissions from the production and transportation of goods and services.

The figures below depict the current carbon emissions in the Northern territory and the potential for reducing these emissions. The graphs show a trend of increasing emissions over the years, with a significant spike in recent years. The dashed line represents the emissions if current trends continue, while the solid line represents the emissions if emissions were reduced by 50%.

Sources:
- https://www.environment.gov.au
- https://www.abc.net.au
There has never been a more important time to save energy. Not only is it becoming more vital with every passing year to reduce our greenhouse gas emissions, but rising energy prices over the next few years are putting an ever-increasing strain on households across the country.

The CSIRO Home Energy Saving Handbook shows us exactly what we can all do as individuals to cut our energy use without cutting back on our lifestyles. It is possible to be environmentally aware, save money and be just as comfortable!

In an easy-to-read style, this book offers practical advice on how to measure and reduce your carbon footprint in all aspects of modern living, including:

- Simple energy-saving tricks around the house
- Maximising your home’s potential for easy heating and cooling
- Ways to save on shopping and transport
- Making the most of your garden
- Tips for building and renovating your home
- What to look for when considering renewable energy

CSIRO is at the forefront of research in understanding the impact of energy use on climate change. By saving energy, and money, we can each do our bit to help the planet. The CSIRO Home Energy Saving Handbook is essential reading for the whole family – you’ll be amazed at how much each of us can do, and how much it can save us.
# Trial Stages

<table>
<thead>
<tr>
<th>Stages</th>
<th>Dates</th>
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<tbody>
<tr>
<td>Concept testing</td>
<td>2008-09</td>
</tr>
<tr>
<td>Multiple Contexts</td>
<td>2009</td>
</tr>
<tr>
<td>Large scale</td>
<td>2010-11</td>
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</table>
Community Participation

“Education on climate change and greenhouse gas emissions is key to gaining positive responses.”

“Thank you for making the effort to inform and value the average person’s opinion.”

“Hope this can be offered to more people.”

Total: 1392
Changes in beliefs, attitudes and knowledge

The highest priority should be given to economic considerations.
Both the economy and the environment are important, but the economy should come first.
The economy and the environment are equally important.
Both the environment and the economy are important, but the environment should come first.
The highest priority should be given to protecting the environment, even if it hurts the economy.

Percentage

Pre-Energymark Post-Energymark
Climate change
Greenhouse gas emissions
Government initiatives to reduce greenhouse gas emissions
Electricity conservation in the home
Electricity conservation in the workplace
Increasing the price of electricity to reduce greenhouse gas emissions

Average Rating

Pre-Energymark Post-Energymark
No knowledge
High knowledge
1-no knowledge
2-moderate knowledge
3-high knowledge

Self-rated knowledge:

The higher the knowledge, the higher the rating.
Energymark carbon mitigation impact

Average annual tonnes of CO\textsubscript{2}E per Energymark household

<table>
<thead>
<tr>
<th>Segment</th>
<th>Average improvement</th>
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<tbody>
<tr>
<td>Total</td>
<td>20%</td>
</tr>
<tr>
<td>Energy</td>
<td>23%</td>
</tr>
<tr>
<td>Transport</td>
<td>16%</td>
</tr>
<tr>
<td>Spending</td>
<td>21%</td>
</tr>
<tr>
<td>Food</td>
<td>30%</td>
</tr>
<tr>
<td>Waste</td>
<td>16%</td>
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Before Energymark

<table>
<thead>
<tr>
<th>Segment</th>
<th>Tonnes of CO\textsubscript{2}E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>6.4</td>
</tr>
<tr>
<td>Transport</td>
<td>3.1</td>
</tr>
<tr>
<td>Spending</td>
<td>1.2</td>
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<td>Food</td>
<td>0.8</td>
</tr>
<tr>
<td>Waste</td>
<td>2.6</td>
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After Energymark

<table>
<thead>
<tr>
<th>Segment</th>
<th>Tonnes of CO\textsubscript{2}E</th>
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</thead>
<tbody>
<tr>
<td>Energy</td>
<td>3.2</td>
</tr>
<tr>
<td>Transport</td>
<td>5.3</td>
</tr>
<tr>
<td>Spending</td>
<td>5.0</td>
</tr>
<tr>
<td>Food</td>
<td>0.8</td>
</tr>
<tr>
<td>Waste</td>
<td>2.6</td>
</tr>
<tr>
<td>Area of Focus</td>
<td>Top Actions</td>
</tr>
<tr>
<td>--------------</td>
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</table>
| **Energy**   | • Changed to gas hot water system (some starting the process of solar)  
               • Reduced use of heating and cooling systems  
               • Changed to washing in cold water only  
               • Switched off all non-essential appliances and lights  
               • Getting rid of second white goods (e.g. extra fridges and freezers) |
| **Waste**    | • Began composting or using scraps in the garden  
               • Reused packaging or asked for packaging to be removed at the shop  
               • Learnt how to maintain or repair goods rather than replace them  
               • Went to various websites to find out how to recycle goods and other waste |
| **Spending** | • Bought goods from second-hand stores or bought used goods online  
               • Began to purchase more organic fruit and vegetables  
               • Found new ways to entertain the family without using the car, external services or consuming excessively |
| **Transport**| • Reduced the use of air travel (e.g. for work related travel, used video and phone as an alternative)  
                • Reduced use of the car or utilised the car more efficiently (e.g. ensured trips were planned better so the car was only used once rather than several individual trips)  
                • Increased use of public transport |
Qualitative findings

Range of responses on the discussion summaries

• Climate change (attitudes, values, beliefs)
• Energy technologies (fossil fuel, CCS, renewable)
• Behaviours (individual, household, work, community, national, global)

Barriers to behaviour change

• Economic
• Education and/or information (inadequate)
• Trust and individual impact
• Personal or cultural reasons
• Political barriers
• Living arrangements
• Physical and structural issues
Social Network

Evidence of information diffusion
By the 4th session, each node has communicated/discussed about Energymark to an average of 13 additional actors external to their Energymark network.

Evidence of information diffusion:

This node has already communicated with 20 actors by the middle of the Energymark process.
By the 8th session, each node has communicated/discussed about Energymark to an **average of 34 additional actors** external to their Energymark network.
What we have learnt so far

• **Who delivers the program** – trusted advisor, access to expertise

• **Re-development of the materials** in multiple formats – e.g. graphical or audio – addresses literacy problems

• **Further developed to suit business/industry stakeholders** as well as local government level

• **Recruiting group convenors** needs to be tailored for each individual community – not always a one size fits all approach

• **Local government agency in support** of the program – provides access to community groups

• **Immediate feedback** – use of smart meters

• **Better assistance with goal setting** – help prioritise

• **Low socio-economic** demographic not captured
## Next Steps

<table>
<thead>
<tr>
<th>Stage</th>
<th>Date</th>
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<tbody>
<tr>
<td>Large Scale (New South Wales)</td>
<td>Ends March 2012</td>
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<tr>
<td>Sustainability of original behaviour change</td>
<td>Ends June 2012</td>
</tr>
<tr>
<td>Low socio-economic alternate program</td>
<td>Ends June 2012</td>
</tr>
<tr>
<td>Social media/online approach + timeframes</td>
<td>TBC</td>
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</table>
Is there a business case for Energymark?
Comparison of household energy efficiency interventions

PERCENT ELECTRICITY SAVINGS BY TARGETED HOUSEHOLDS

- Energymark: 20%
- Home energy audits: 15%
- Insulation: 10%
- Smart meters: 5%
- Home energy reports: 3%
- Carbon price of $23: 2%
- Utility demand-side management: 1%
Intervention impact matrix
TWO PRIMARY DRIVERS OF CARBON MITIGATION IMPACT PER HOUSEHOLD

Depth of personal interaction

- Personal
  - Home insulation program
  - Home audits
  - Home energy reports
  - Awareness campaigns
  - Smart meters
- Tailored
  - Low cost LEDs
- Generic

Breadth of opportunities covered

- Single change
- Home energy only
- Home, transport, consumables

Plus further impact from:
1. Social/peer driven interaction
2. Long term (8-12 month) program
Three boxes represent an Australia-wide Energymark program targeted toward 1%, 10% or 100% of population; Energymark is only opportunity (box) on cost curve that includes program or transaction costs; there may be some overlap between Energymark and other individual opportunities on the curve; Energymark cost savings will depend on portfolio of individual actions taken to achieve savings.
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Thank you

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