

NEW ZEALAND'S ENERGY EFFICIENCY AND CONSERVATION AUTHORITY AND THEIR SUCCESS

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Hypothesis

- ▣ New Zealand's government via the Energy Efficiency and Conservation Authority is more successful implementing individual efficiency and conservation change than the United States government.

What does this mean?

- ▣ In aspects of energy that an individual can affect, New Zealand is making greater strides towards more efficiency and conservation.

Visibility

- ▣ How can you utilize something if you do not know that it is there to help you?

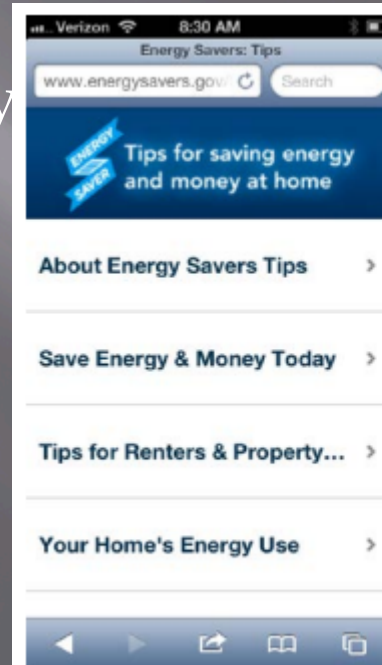
EECA's Energy Spot Campaign



- ▣ The Energy Spot campaign has been seen by 2.4 million New Zealanders
- ▣ 41% of those people changed their energy habits
- ▣ That means that over 50% have seen the Energy Spot campaign commercials

EERE Energy Savers: Mobile Tips

- Initiative by the Department of Energy's EERE was to create a mobile site called Energy Savers: Tips Mobile
- EERE paired with Verizon wireless to promote the tips
- In the past year the site was viewed by 214,693 people
- That means that less than 1% of Americans have utilized the site



VISITORS

214,993

VISITS

237,992

PAGE VIEWS

351,691

Single Entity

- ▣ Breaking each task down too much may result in nothing being accomplished
- ▣ “Too many chiefs and not enough Indians.”

OVERALL GOVERNMENT GOAL:
Grow the New Zealand economy in order to deliver greater prosperity, security and opportunities for all New Zealanders

GOVERNMENT ENERGY GOAL:
Make the most of our energy potential

GOVERNMENT ENERGY PRIORITIES: Draft New Zealand Energy Strategy

Efficient use	Secure and affordable energy	Develop resources	Environmental Responsibility
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AREAS OF FOCUS: Draft New Zealand Energy Strategy

Warm, dry energy efficient homes	Better consumer information to inform energy choices	Enhanced business competitiveness through energy efficiency	An energy efficient transport system	Reliable electricity supply	Develop renewable energy resources	Reduce energy related greenhouse gas emissions
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THIRD PARTY PARTNERSHIPS AND SUPPORT

EECA contributes to these outcomes:

- Enhanced business growth and competitiveness from energy productivity investment*
- An efficient, renewable electricity system supporting New Zealand's global competitiveness*
- A more efficient transport system with a greater diversity of fuels and renewable energy technologies*
- Greater value for money from the public sector through increased energy efficiency*

EECA is responsible for these outcomes and impacts

RESIDENTIAL

- Warm, dry energy efficient homes with improved air quality to reduce ill health and lost productivity*
- Increased public understanding of the benefits associated with energy efficiency leading to action and energy cost savings in households

PRODUCTS

- Reduced energy use and costs through business and consumer uptake of energy efficient products*
- The products available to New Zealand businesses and consumers are more energy efficient
- Consumers are better informed about products and vehicles that use less energy and use this information to make purchasing decisions

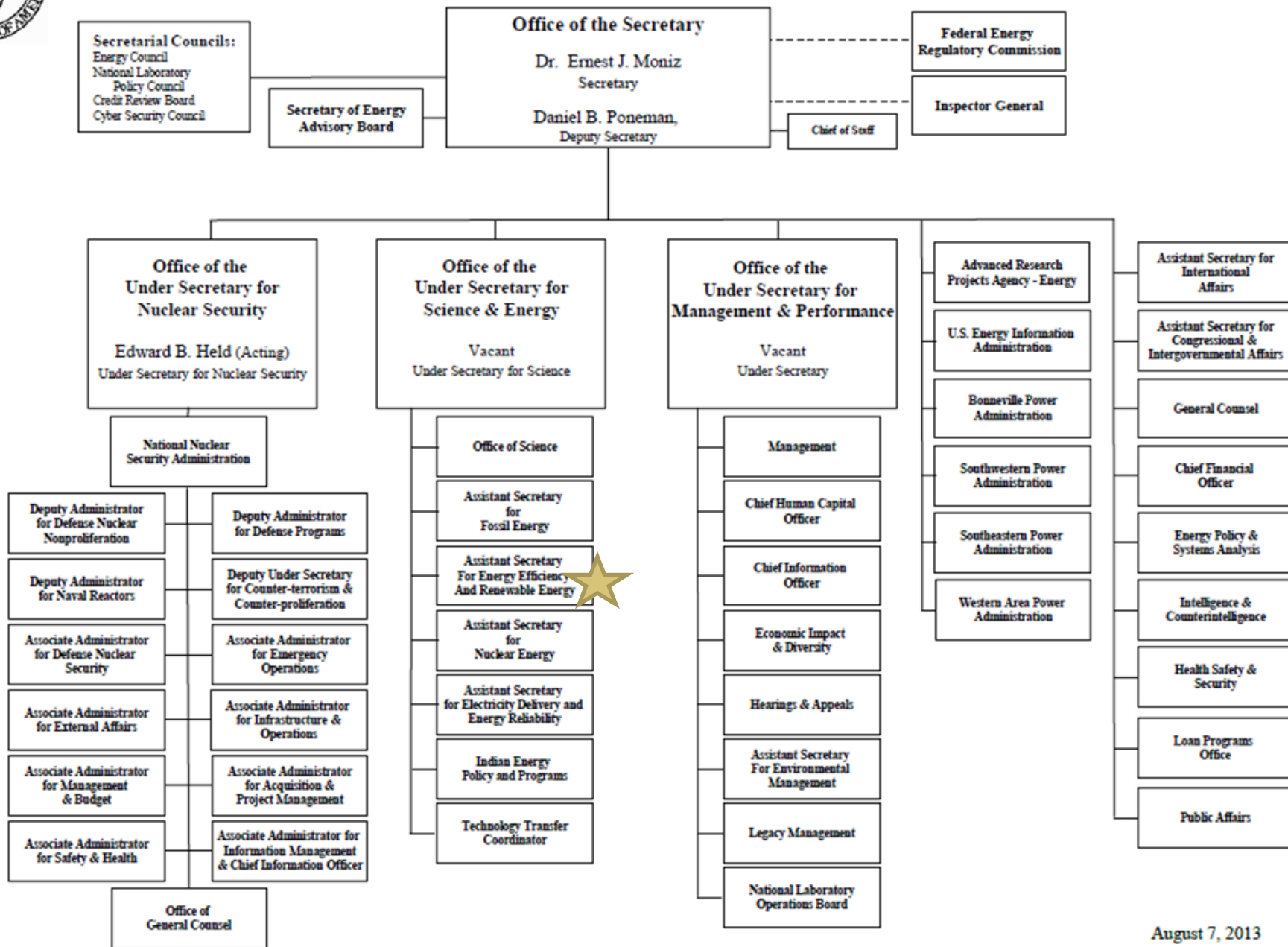
BUSINESS

- Improved energy efficiency in business enables business growth
- Improved energy efficiency in business transport enables business growth
- Increased investment in new and renewable energy resources
- Increased production capacity of New Zealand biodiesel for use in the New Zealand fuel stock

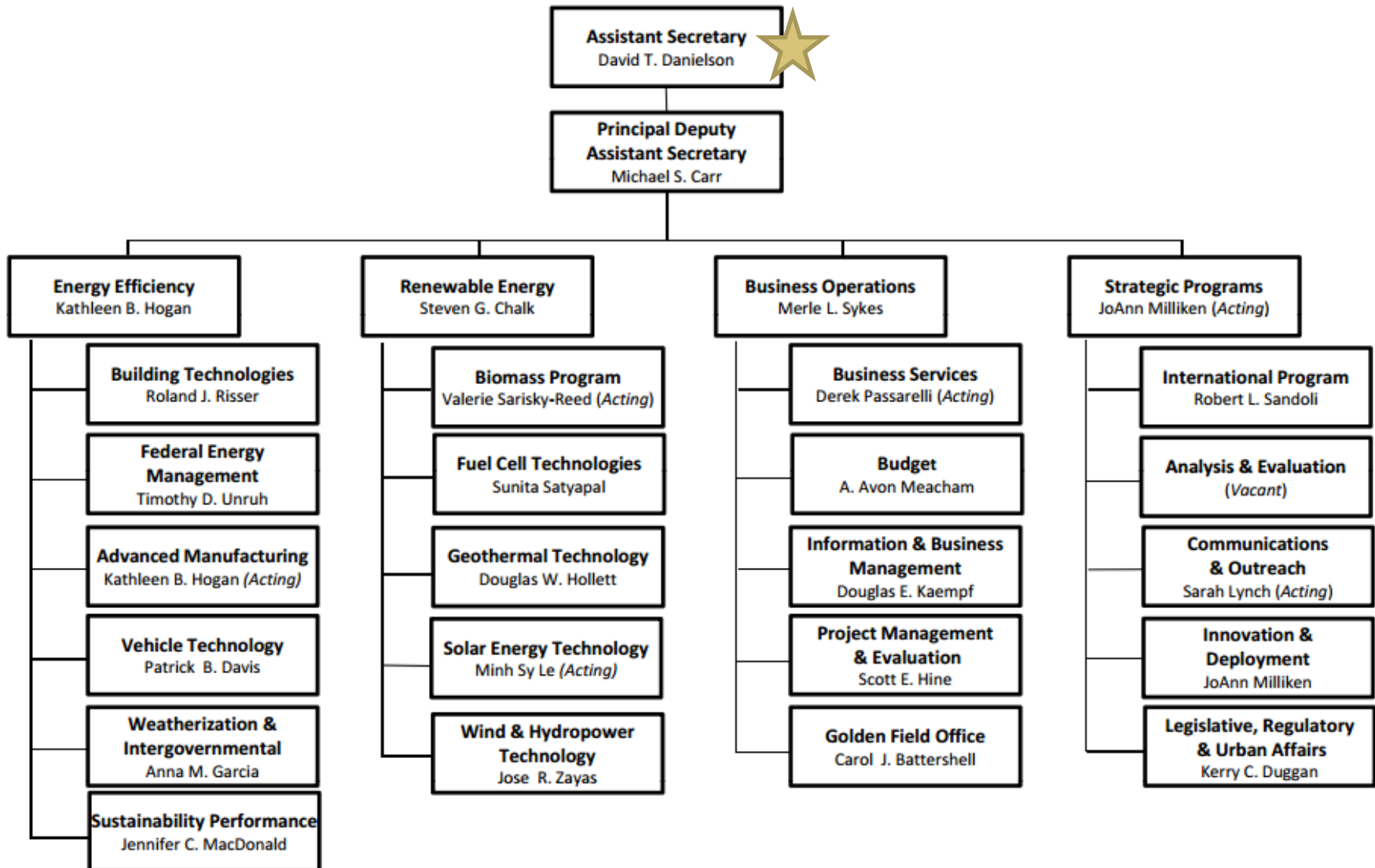
*New Zealand Energy Efficiency and Conservation Strategy outcomes



DEPARTMENT OF ENERGY



EERE Organization Chart



EECA

- ▣ For the Energy Efficiency and Conservation Authority of New Zealand, a single annual report is published covering all aspects of their entity.
- ▣ Benefits of programs, funding, research, and awareness and information.



DOE

- ▣ The Department of Energy only provides a report that outlines the number of Freedom of Information Requests.
- ▣ Under the DOE there are many reports that come out annually.
 - DOE - EERE - Vehicles Technology Office
 - ▣ Advanced Combustion Engine Research and Development
 - ▣ Advanced Power Electronics and Electric Motors
 - DOE - Vehicle Technologies Office
 - ▣ Energy Storage Research and Development
 - ▣ Fuel & Lubricant Technologies
 - ▣ Lightweight Materials
 - ▣ Propulsion Materials
 - ▣ Vehicle and Systems Simulation and Testing
 - DOE - EERE - Federal Energy Management Program
 - ▣ Annual GHG and Sustainability Data Report for FY 2013
 - ▣ Federal Facility Annual Energy Reports and Performance
 - DOE - EERE - Fuel Cell Technologies Office
 - ▣ Fuel Cell Technologies Office Annual Report
 - DOE - EERE - EPA Act Transportation Regulatory Activities
 - ▣ State and Alternative Fuel Provider Fleet Program Annual Report

Quantifying Progress

- ▣ “What is measured gets managed”

Recipient Reporting Summary by Project

For Quarter Ending December 31, 2010 - ARRA Awards Subject to Section 1512

Total Awarded and Total Outlaid are as of Quarter End.

Data from FR.gov is as of 1/29/2011 9:42:31 PM

DOE Program Office Name	DOE Project Name	Total Awarded	Total Outlaid	FR.gov Jobs
Advanced Research Projects Agency - Energy	Advanced Research Projects Agency - Energy (ARPA-E)	368,191,856	47,197,526	538.26
	Program Direction - ARPA - E	11,287,164	4,433,355	26.97
Advanced Research Projects Agency - Energy Sum:		379,479,020	51,630,882	565.23
Departmental Administration	Departmental Administration	45,591,097	24,147,188	103.35
Departmental Administration Sum:		45,591,097	24,147,188	103.35
Electricity Delivery and Energy Reliability	Enhancing State and Local Governments Energy Assurance	51,525,173	7,573,658	92.9
	Interconnection Transmission Planning and Analysis	80,000,000	3,648,005	33.63
	Program Direction - OE	21,035,711	3,751,848	24.05
	Smart Grid Investment Grant Program (EISA 1306)	3,481,345,304	648,322,483	2,235.52
	Smart Grid Regional and Energy Storage Demonstration Project (EISA 1304)	684,829,413	54,739,545	232.41
	State Assistance on Electricity Policies	48,618,919	7,273,135	122.23
	Workforce Development	99,545,446	3,224,670	83.4
Electricity Delivery and Energy Reliability Sum:		4,466,899,966	728,533,345	2,824.14
Energy Efficiency and Renewable Energy	Advanced Building Systems	67,032,755	7,217,542	116.93
	Advanced Materials RD&D in Support of EERE Needs to Advance Clean Energy Technologies and Energy-Intensive Process R&D	46,583,820	22,804,143	63.81
	Battery Manufacturing	1,989,574,816	461,008,781	1,109.36
	BetterBuildings: Buildings	62,000,000	25,322,745	15.66
	BetterBuildings: EECBG	390,040,000	34,407,802	119.03
	Buildings and Appliance Market Transformation	51,643,513	14,340,236	60.55
	Clean Cities AFV Grant Program	298,500,000	41,818,810	86.14
	Combined Heat and Power (CHP), District Energy Systems, Waste Heat Recovery Implementation and Deployment of Efficient Industrial Equipment	150,480,042	34,528,141	145.97
	Commercial Scale Biorefinery Projects	81,975,766	2,236,561	38
	Commercial Vehicle Integration (SuperTruck) and Advanced Combustion Engine R&D	106,055,410	12,515,813	106.64
	Community Renewable Energy Deployment	21,227,468	749,358	1.74
	Concentrating Solar Power	22,198,218	4,016,124	4.1
	EE Appliance Rebate Programs	297,728,000	237,947,272	113.25
	EE Conservation Block Grant Program	2,779,968,613	666,981,284	4,332.00
	EGS Technology R&D	111,882,165	33,707,269	179.3
	Enabling Fuel Cell Market Transformation	41,554,259	26,349,230	48.66
	Energy, Water & Emissions Reporting and Tracking System	5,472,500	4,999,019	12.97
	Enhance and Accelerate FEMP Service Functions to the Federal Government	15,412,085	14,115,772	12.7
	Fundamental Research in Key Program Areas	106,104,867	25,228,424	123.62
	Geothermal Demonstrations	62,972,866	4,673,129	54.64
	Ground Source Heat Pumps	62,018,081	18,073,266	132.85
	High Performance Computing	18,858,888	11,881,558	81.87

EECA Quantifies Their Success

In 2012/13 our Residential initiatives delivered more than

\$598m

in energy savings and health benefits⁴

EECA BUSINESS™ initiatives in 2012/13 delivered

\$136m

in energy savings and improved transport safety.¹⁰

EECA's Warm Up New Zealand: Heat Smart

- ▣ “Home owners or tenants may be eligible if they have a Community Services Card and are at risk of a health issue linked to cold damp housing - such as a respiratory condition. Children under 17 years or people over 65 will be prioritized because they are most likely to benefit from insulation.”
- ▣ You may get the Community Services Card if you are:
 - 18 years old or over (or 16-17 years old in full-time tertiary study)
 - on a low to middle income (the amount depends on your family situation)
 - a New Zealand citizen or permanent resident

EECA's Warm Up New Zealand: Heat Smart

- ▣ This year EECA helped insulate 60,300 houses
- ▣ Bringing the total number of homes retrofitted through the Warm Up:New Zealand Heat Smart program to 224,400
- ▣ That is nearly a quarter of the homes that were originally estimated to have sub-standard insulation (over 900,000 homes)

PA Department of Community and Economic Development Energy Conservation and Weatherization Program



- ❑ The Weatherization Assistance Program empowers community organizations to help recipients make their homes more energy efficient, saving money and keeping homes warmer.
- ❑ Who It Helps - Incomes 200% or Below the Federal Poverty Income Level

Local Community Development

- ▣ South Central Community Action Program, Inc
- ▣ Helped weatherize 150-200 homes last year
- ▣ Customers of this weatherization program are either referred by their utilities company, or find the program via word of mouth
- ▣ Long wait list for this program

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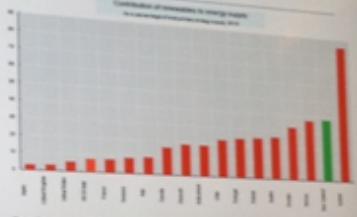
NZ – among the world's leaders in renewable energy



Data Source: OECD Factbook 2011, Economic, Environmental and Social Statistics
Note: Renewables still the minority source of energy



NZ – among the world's leaders in renewable energy



Data Source: OECD Factbook 2011, Economic, Environmental and Social Statistics
Note: Renewables still the minority source of energy for New Zealand



“The method for accessing the programme meant that it was very easy for members of the public to follow through the process and get their insulation installed to a good quality. The approach means that the public are empowered to make the change themselves and have choice in the matter.”

-Hamish Trolove

Senior Engineer at Energy Efficiency and
Conservation Authority

Warm-up New Zealand

- ▣ The Government is investing \$100 million over three years and more than \$50 million funding will need to come from project partners, such as trusts, and other community organizations.

EECA's funding

- ▣ Budget 2013 allocated \$100 million of operating funding over three years to the Warm Up New Zealand: Healthy Homes programme, targeting low-income households for home insulation, particularly households occupied by children and/or the elderly.
- ▣ Warmer, drier homes provide real benefits to New Zealanders (estimated 46,000 homes will be insulated)

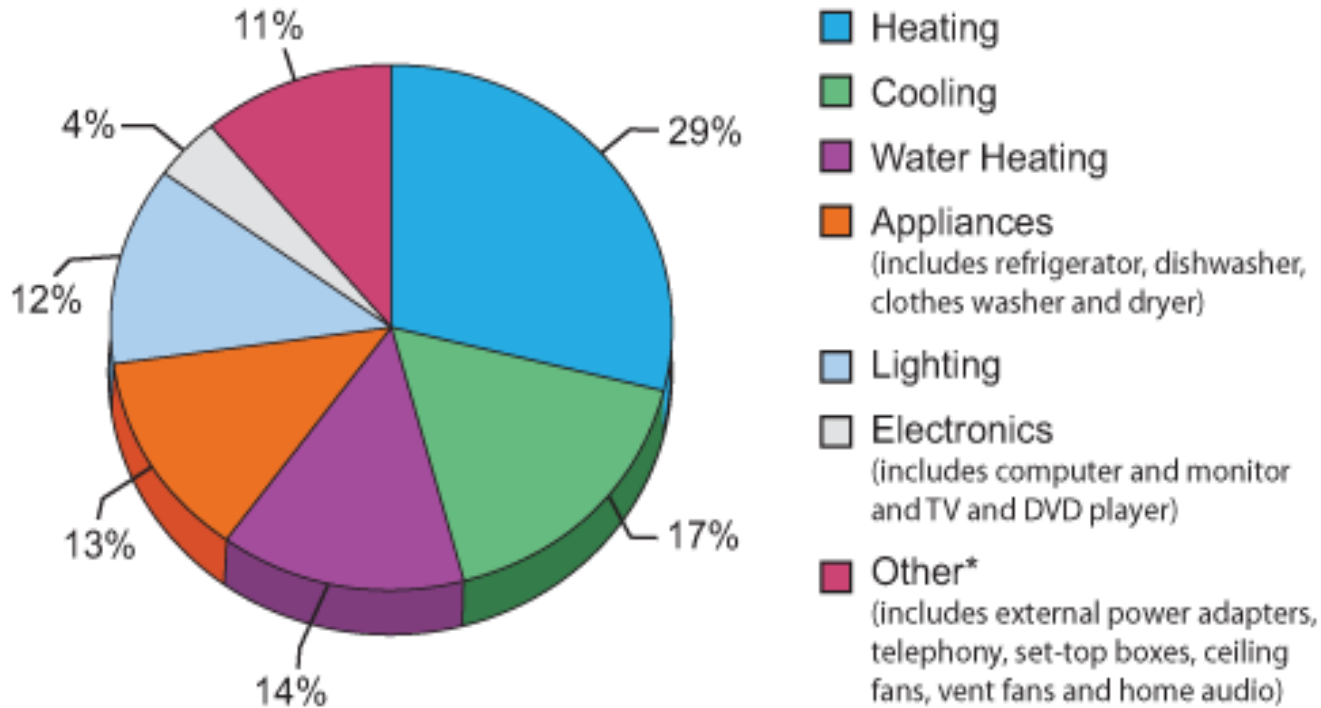
Comparable to United States

- ▣ Energy Star
- ▣ ENERGY STAR is a U.S. Environmental Protection Agency (EPA) voluntary program that helps businesses and individuals save money and protect our climate through superior energy efficiency.

Energy Star

Where Does My Money Go?

Annual Energy Bill for a typical Single Family Home is approximately \$2,200.



Keystone HELP

- ▣ Local loan programs
- ▣ Keystone HELP®, or the Keystone Home Energy Loan Program, is Pennsylvania's Special Financing Program for Energy Efficient Home Improvements

Comparing EECA to US programs

- ▣ Warm up New Zealand
- ▣ Advertisements during prime time television
- ▣ Energy Star Product
- ▣ EECA business/ funds energy audits for businesses
- ▣ Energy Star- voluntary & gives practical info and advise on energy efficiency at home
- ▣ Not advertised as much
- ▣ Only Funding comes from Local/ state loan programs

Ads

- ▣ <http://www.youtube.com/watch?v=BH-6WopGb9g>

Energy Efficiency Resource Standard (EERS) program

- ❑ State-implemented program under the DOE
- ❑ Mainly implemented and managed by utilities
- ❑ Require that electric and natural gas utilities offer programs and incentives to encourage their customers to reduce energy use by a specified amount each year
- ❑ If all states were to adopt their own EERS, the United States could significantly lower energy costs, reduce air pollution, mitigate climate change, and improve energy reliability.
- ❑ Despite the successes in various individual states, no federal EERS mandate currently exists

EERS

- ▣ Potential benefits to the states and utilities, as well as residential, commercial, and industrial customers, based on existing state EERS programs including
 - Reduced variable costs for utilities
 - Job creation due to new energy efficiency roles
 - Reduced or eliminated need to construct new conventional power plants that emit carbon dioxide
 - Lower energy bills for residential, commercial, and industrial customers through reduced energy consumption
 - Reduced environmental impacts through lower GHG emissions and reduced pollution.

EERS

- ▣ As stated, not every state has begun to adopt their own EERS
- ▣ Studies have shown that people are more willing to invest in programs that have a short time between investment and return. This could be a drawback with energy efficiency measures (funded by investments) as they must short payback periods.
 - * EECA is funded by the government
- ▣ This is why we should move forward, with more localized (state) oriented and focused programs such as the EERS
 - Similar to a more direct intervention to achieve energy efficiency such as how EECA operates

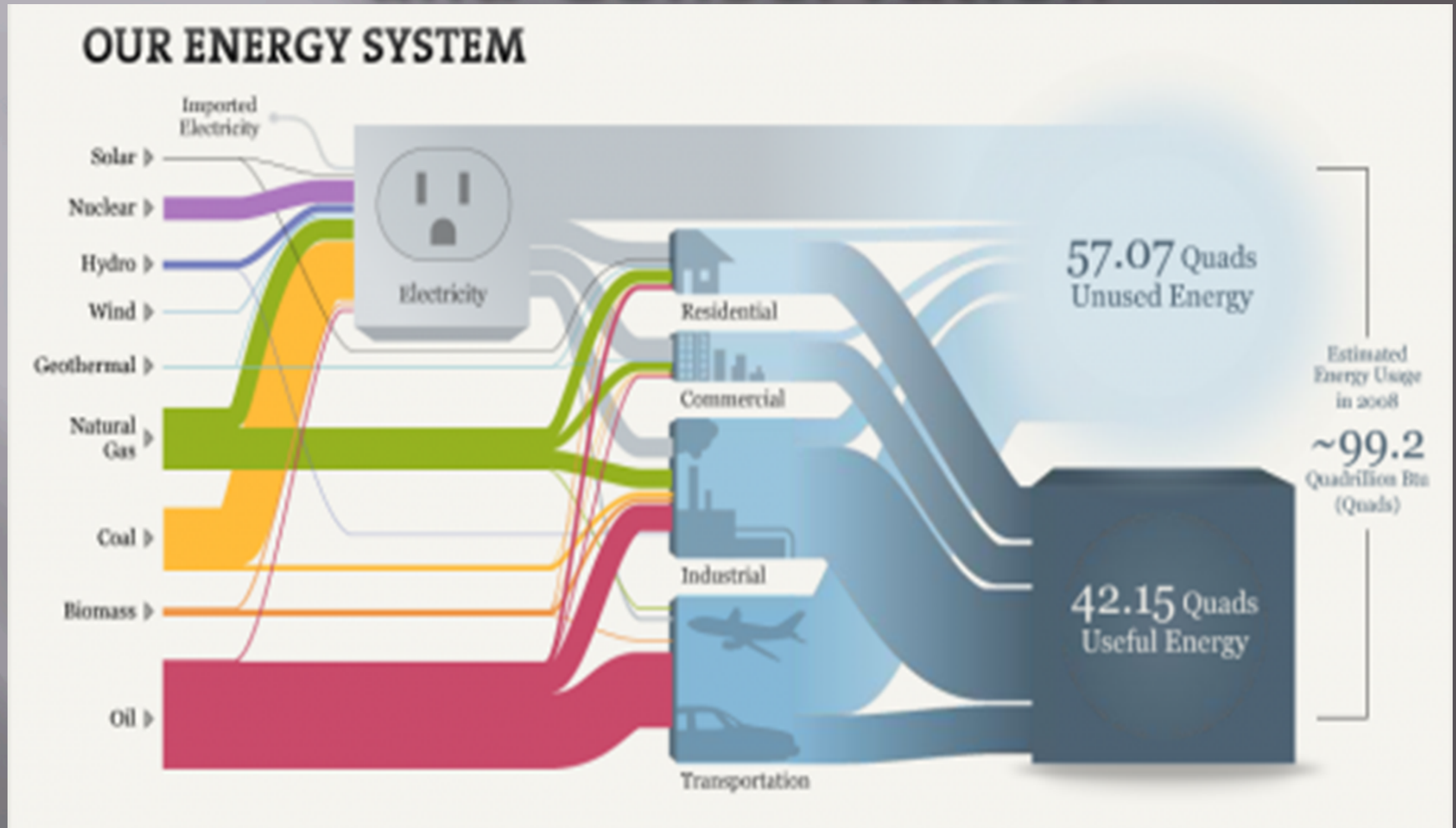
Why should we move forward?

- ▣ “Without deviation from the norm, progress is not possible.”

Why do we believe efficiency and conservation are important?

- ▣ Instating efficiency and conservation habits and techniques is a way that each person can make a difference towards a more sustainable future
- ▣ This is by no means the only step that needs to be taken, but we have to start somewhere

Importance of Energy Efficiency and Conservation



<http://needtoknow.nas.edu/energy/interactive/our-energy-system/>

Importance of Energy Efficiency and Conservation

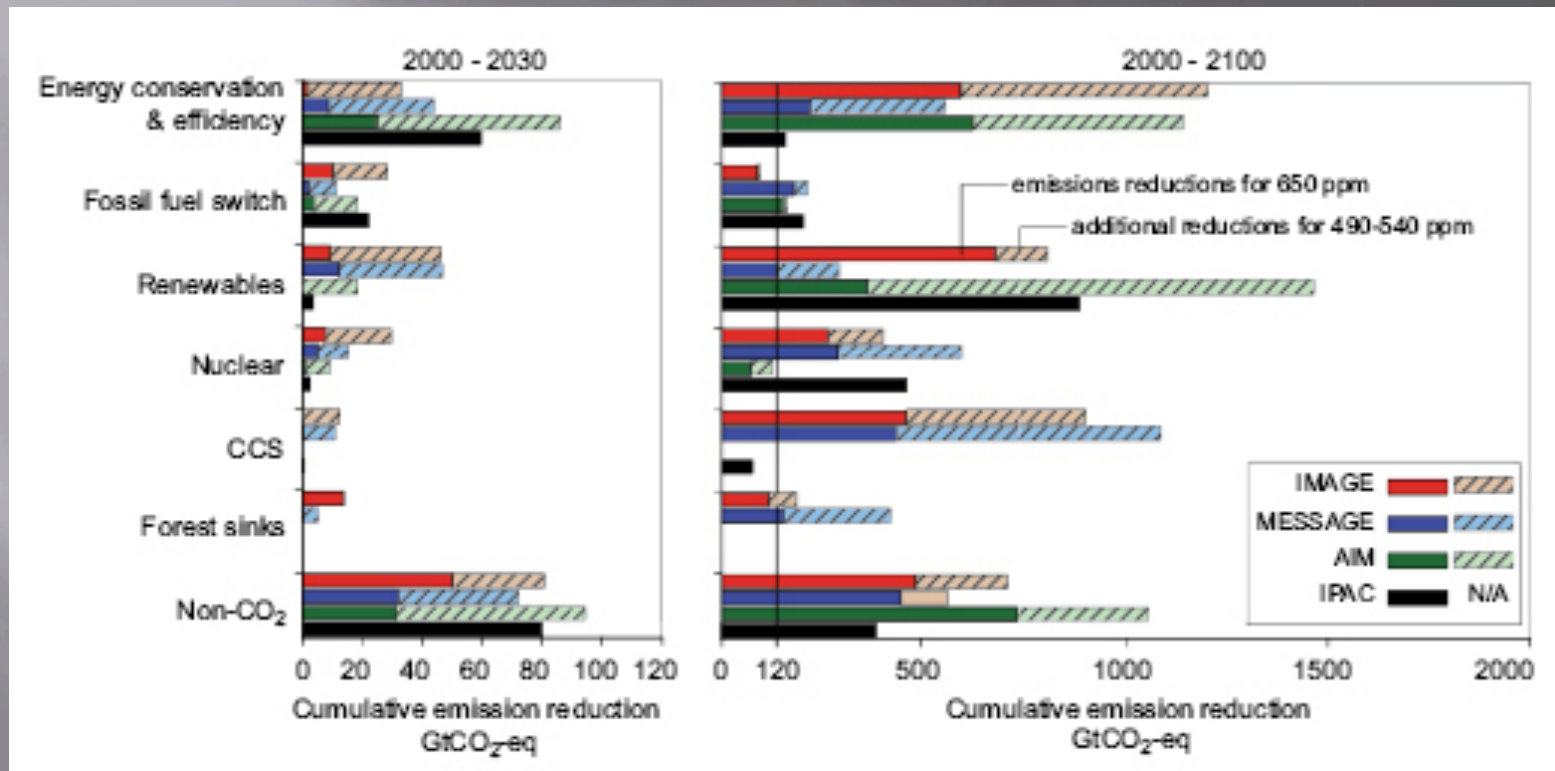


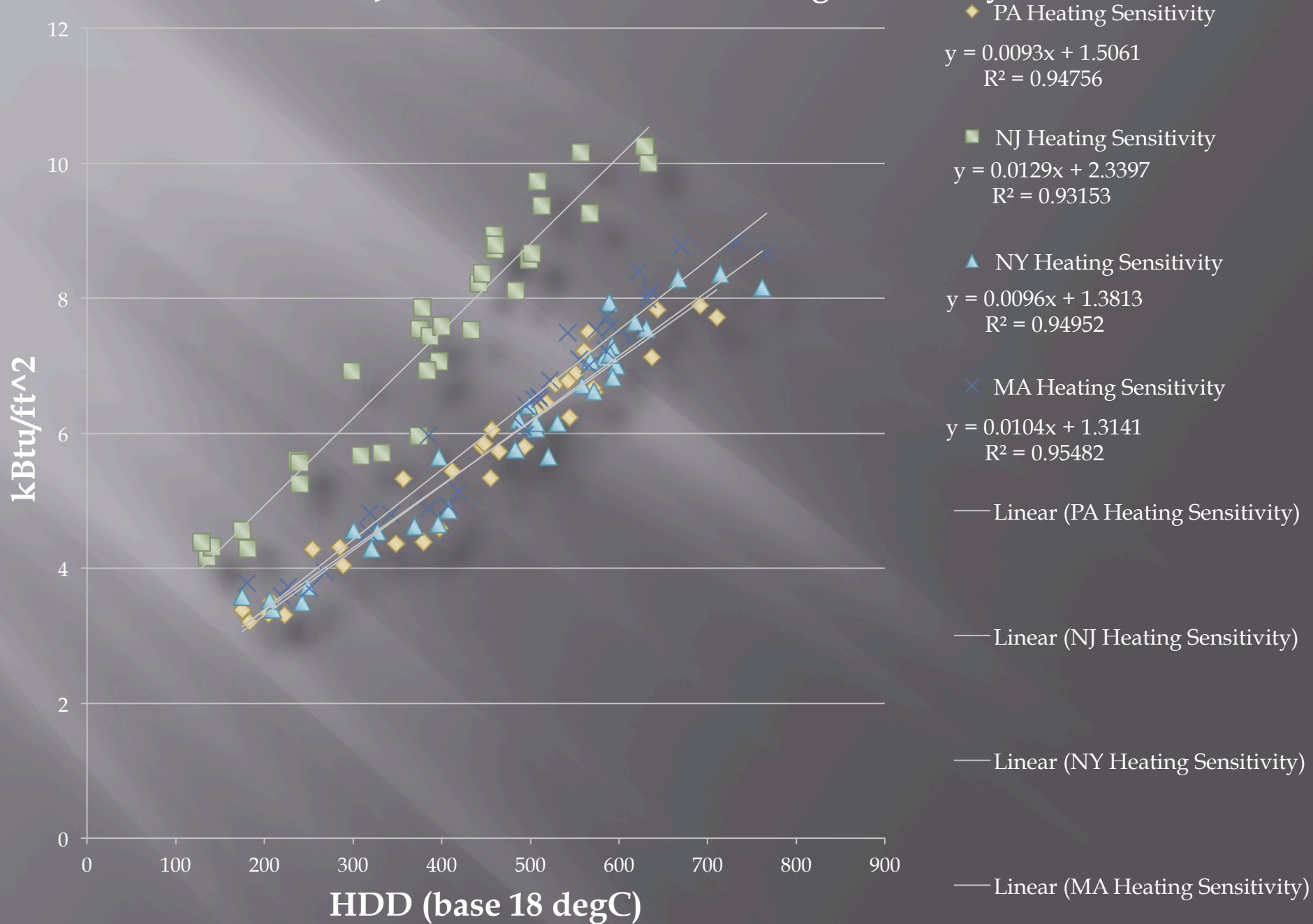
Figure 3.23: Cumulative emissions reductions for alternative mitigation measures for 2000 to 2030 (left-hand panel) and for 2000-2100 (right-hand panel). The figure shows illustrative scenarios from four models (AIM, IMAGE, IPAC and MESSAGE) for stabilization levels of 490-540 ppmv CO₂-eq and levels of 650 ppmv CO₂-eq, respectively. Dark bars denote reductions for a target of 650 ppmv CO₂-eq and light bars the additional reductions to achieve 490-540 ppmv CO₂-eq. Note that some models do not consider mitigation through forest sink enhancement (AIM and IPAC) or CCS (AIM) and that the share of low-carbon energy options in total energy supply is also determined by inclusion of these options in the baseline. CCS includes carbon capture and storage from biomass. Forest sinks include reducing emissions from deforestation.

Data source: Van Vuuren et al. (2007); Riahi et al. (2006); Hijioka, et al. (2006); Masui et al. (2006); Jiang et al. (2006).

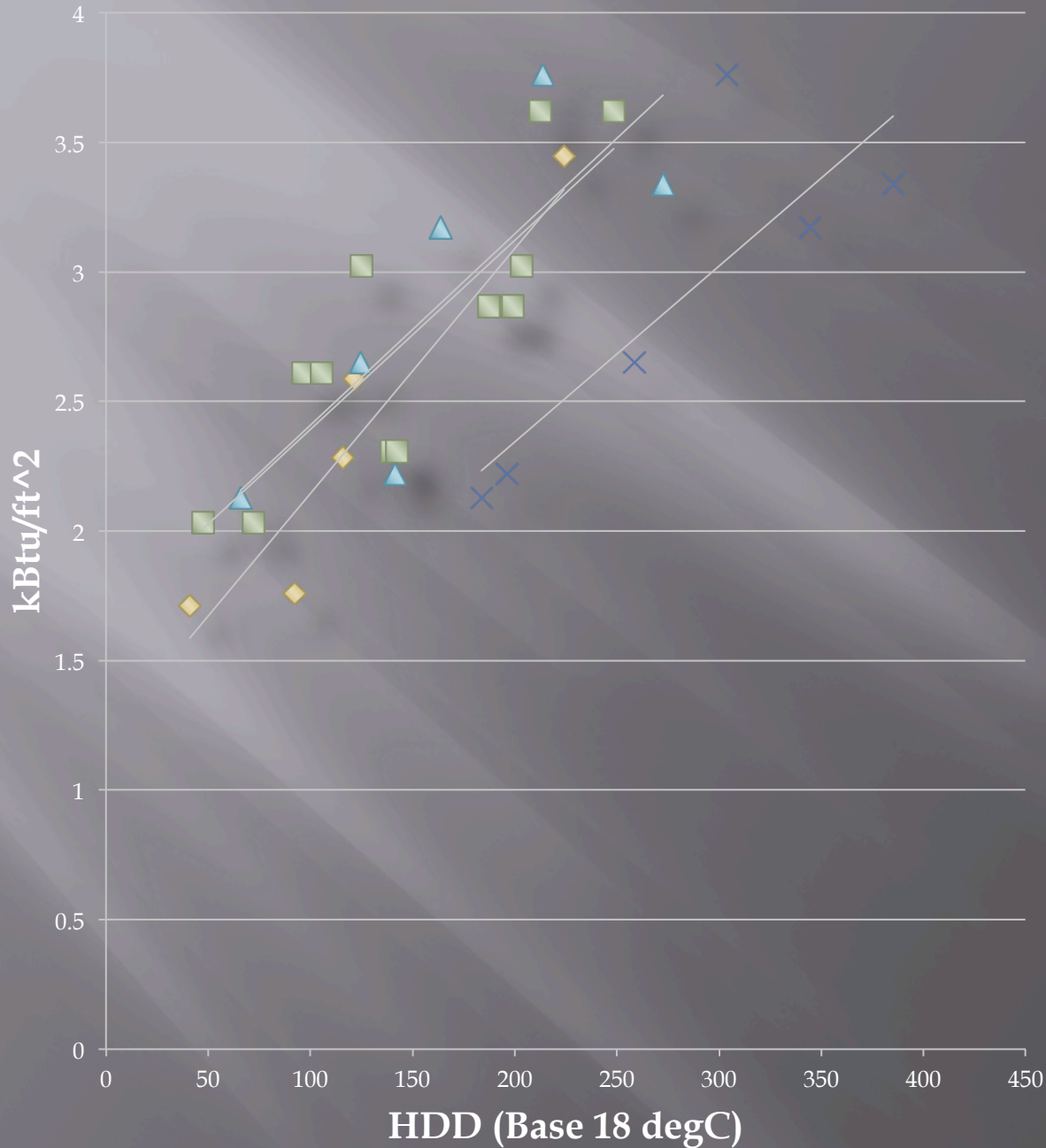
Relevance

- ▣ Insulation campaign
- ▣ How do homes compare?
- ▣ Are homes in NZ more/less efficient?

PA, NJ, NY, and MA Home Heating Sensitivity



NZ Heating Sensitivity



◆ Northland Heating Sensitivity

$$y = 0.0095x + 1.1996$$
$$R^2 = 0.90284$$

■ Auckland Heating Sensitivity

$$y = 0.0073x + 1.6622$$
$$R^2 = 0.71433$$

▲ Bay of Plenty Heating Sensitivity

$$y = 0.0074x + 1.6705$$
$$R^2 = 0.66303$$

× Canterbury Heating Sensitivity

$$y = 0.0068x + 0.9856$$
$$R^2 = 0.70461$$

— Linear (Northland Heating Sensitivity)

— Linear (Auckland Heating Sensitivity)

— Linear (Bay of Plenty Heating Sensitivity)

— Linear (Canterbury Heating Sensitivity)

Results

USA

- NJ – 0.0129 kBtu/ft² per HDD
- MA – 0.0104 kBtu/ft² per HDD
- NY – 0.0096 kBtu/ft² per HDD
- PA – 0.0093 kBtu/ft² per HDD

New Zealand

- Northland – 0.0095 kBtu/ft² per HDD
- Bay of Plenty – 0.0074 kBtu/ft² per HDD
- Auckland – 0.0073 kBtu/ft² per HDD
- Canterbury – 0.0068 kBtu/ft² per HDD

Results

- ▣ Overall, the USA consumes more energy per square foot
- ▣ This could be from the different lifestyles and energy use choices

Conclusions

- ❑ Energy conservation and efficiency in the USA is not coming from the same place but from multiple sources, where as in NZ it is coming from one entity, EECA.
- ❑ This allows a more direct impact on the people's energy choices and habits.
 - For example, Hybrid cars, CFL light bulbs, etc.
- ❑ In the USA, the multiple sources of information cause confusion and frustration for the individual looking for energy efficiency information leading to disbanding their search
- ❑ In NZ, funding for energy efficiency programs does not go through multiple levels like it does in the US, which leads to quantified results and transparency.

How do we move forward?

- ▣ Formation of a national level organization, similar to EECA, that provides comprehensive and complete information, programs and funding for individual efficiency and conservation in the United States
- ▣ Form a few solid goals for the organization to accomplish and put efforts towards these goals

- ▣ Annually provide at the beginning of the year a statement of intent and outline focused goals to accomplish for the certain time period
- ▣ At the end of the year, compile a report outlining successes and areas with room for improvement
- ▣ Aim to keep goals on track and produce results

- ▣ Within the national organization, have a sector that is aimed towards quantifying the success of the investments and efforts made.
- ▣ In order to see the effect made and where to invest further or less in following years.

- ▣ Create one comprehensive website with information easily available on where and how to access and utilize the programs and services available

- ▣ Provide campaign like Energy Spot to provide visibility and emphasis on the importance of individual efficiency and conservation
- ▣ Run this campaign during the Super Bowl and other primetime television hours

Empower the People

- ▣ “Overall the EECA approach has been facilitation and ensuring quality is maintained. It is also based on ensuring that those partaking in the programmes have a level of empowerment that means that they don't feel that the interventions are foisted on them. EECA also works hard to ensure all of the stakeholders who will be involved in the delivery are on board and supportive of the programme.”

-Hamish Trolove

Sources

- ▣ EIA.gov (US home energy use)
- ▣ Weatherdatadepot.com (degree day data)
- ▣ Branz.com (NZ home energy use)
- ▣ energywise.govt.nz
- ▣ http://cliflo.niwa.co.nz/pls/niwp/wgenf.genform1_proc
- ▣ <http://www1.eere.energy.gov/wip/>
- ▣ <http://www.eeca.govt.nz/node/3107>
- ▣ http://www1.eere.energy.gov/office_eere/pdfs/eere_orgchart.pdf
- ▣ http://www.newpa.com/webfm_send/2767
- ▣ <http://www.newpa.com/community/individuals-and-households#weather>