ENERGY INDICATORS

Energy Efficiency Policies in ASEAN Region

Jakarta, 18-20 October 2011

Programme Monitoring and Evaluation

Key Insights from IEA Indicator Analysis

Nathalie Trudeau
International Energy Agency

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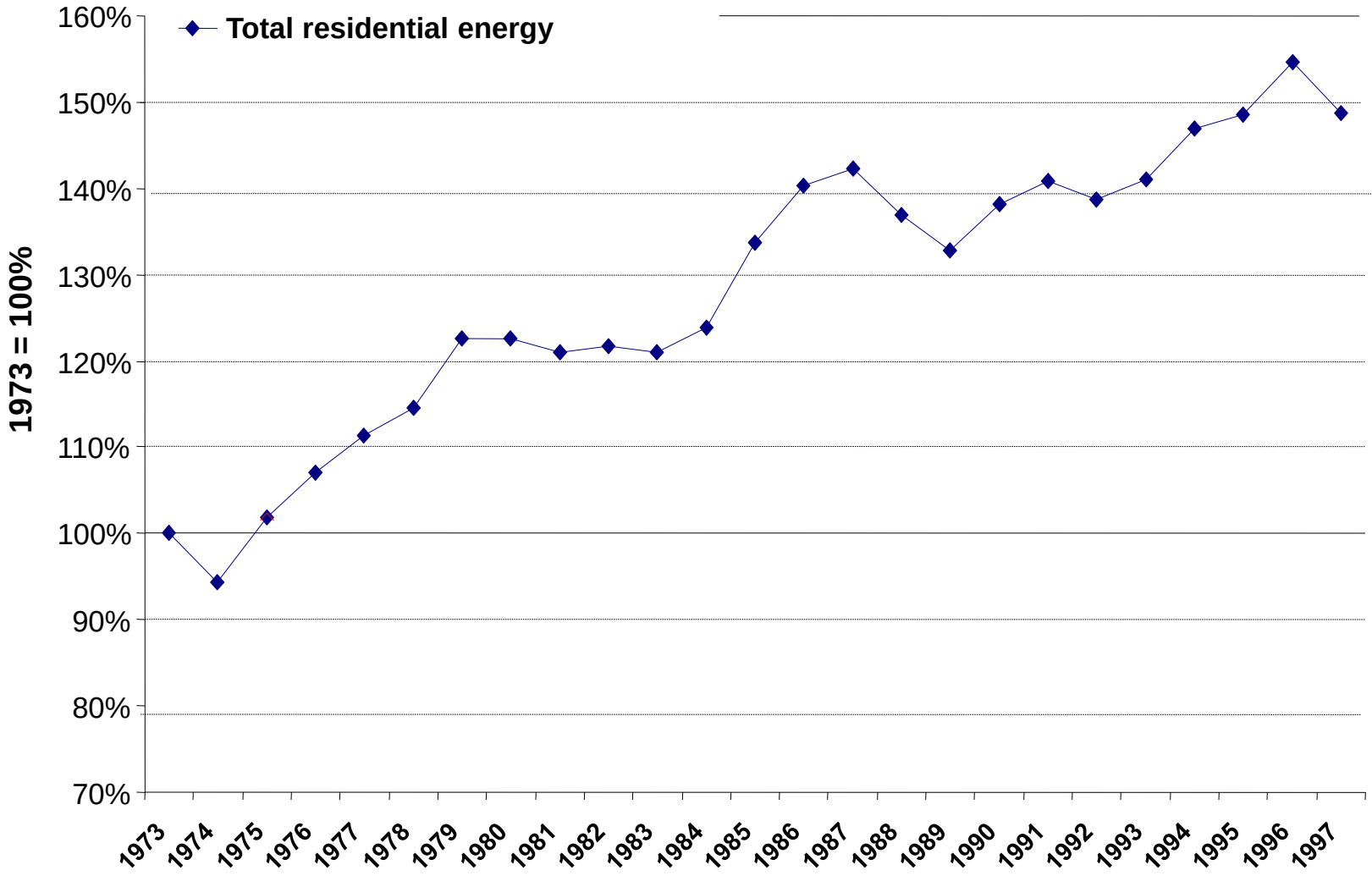
Why go beyond aggregate energy consumption data?



Example of Canada's Residential Sector

Key Insights from IEA Indicator Analysis

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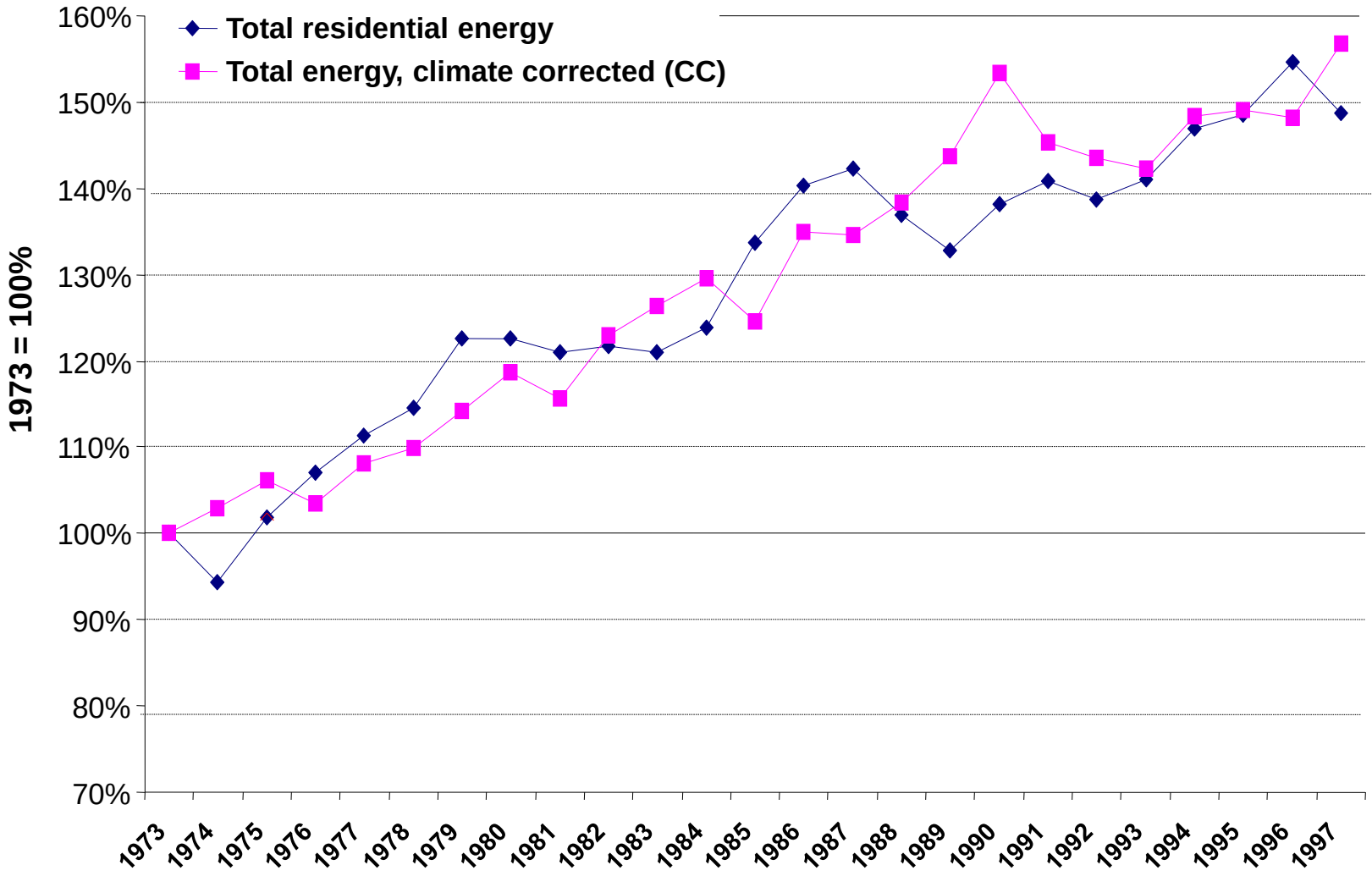

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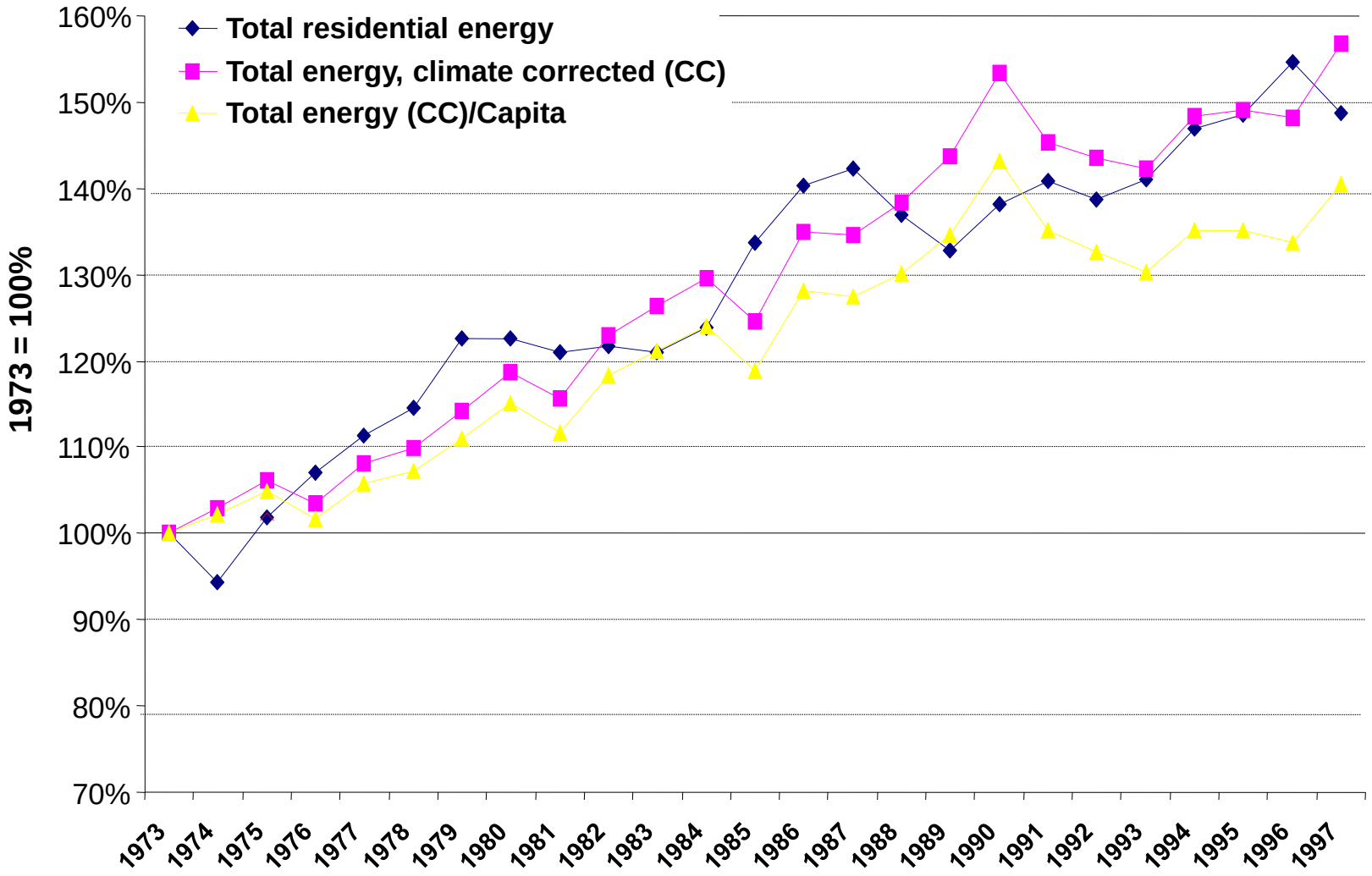

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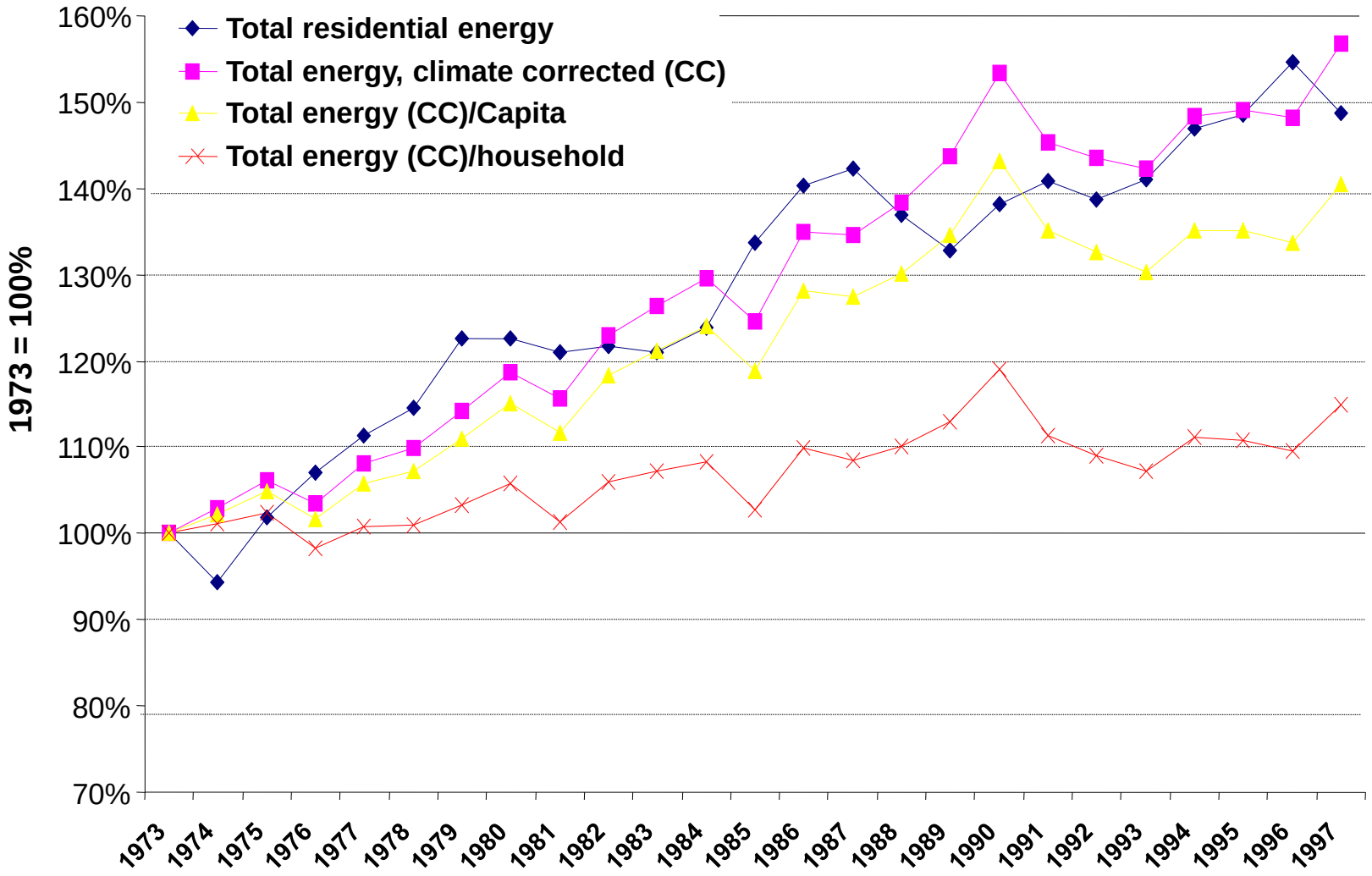

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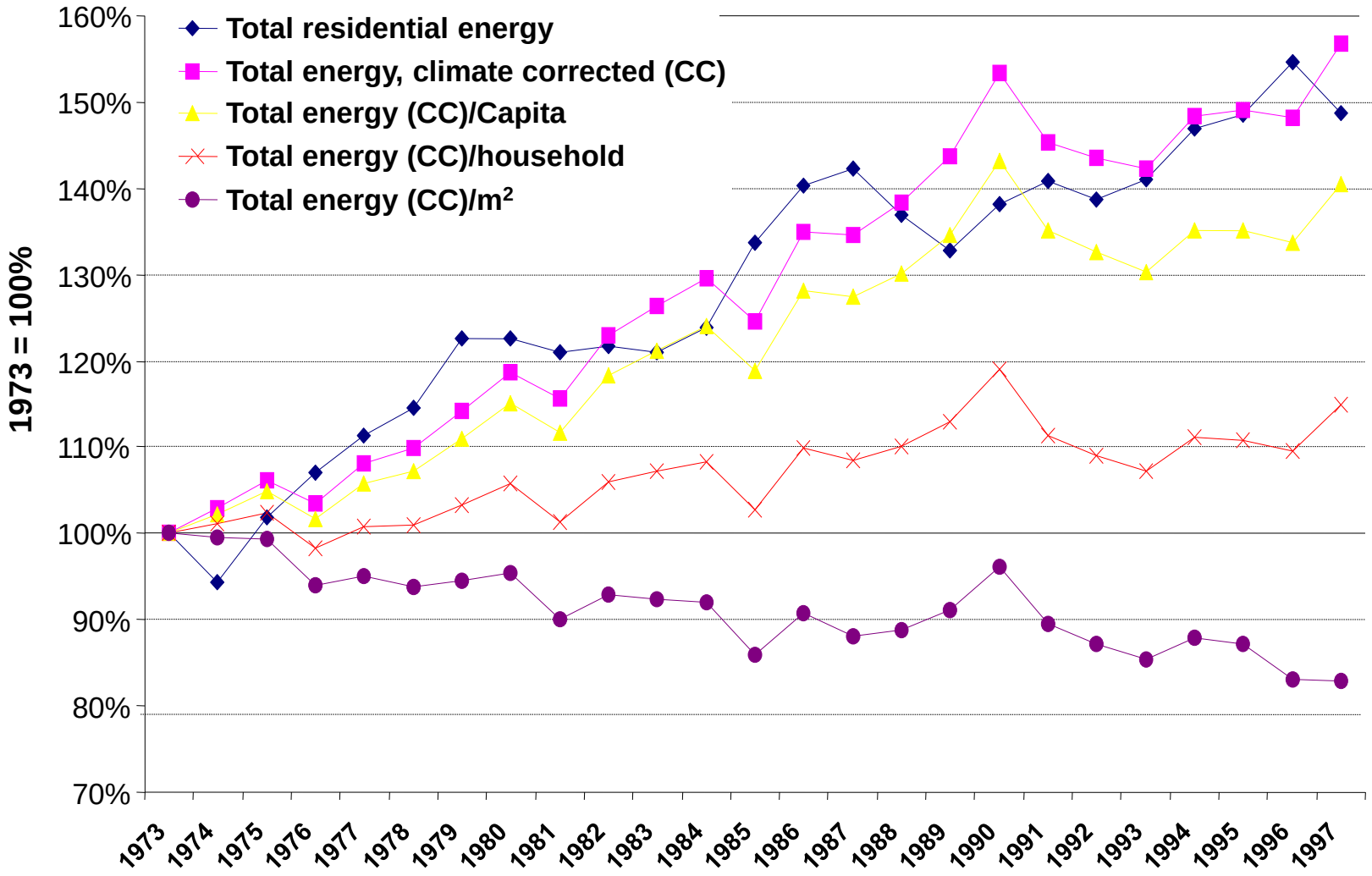

Example of Canada's Residential Sector

Key Insights from IEA Indicator Analysis

The need to go beyond the energy balance

1) to provide strong foundation for policy-making

- Indicators defined at the level of an energy balance tend to be aggregate
  - Energy self sufficiency/energy mix/reliance
  - Energy intensity per GDP/energy intensity per capita…
- The lack of essential data can lead the policy-making process towards the wrong energy policy choices
- Going beyond the level of an energy balance:
  - Provides an even stronger foundation for policy and market analysis;
  - Can better inform the policy decision process;
  - Help policy makers select policy instruments best suited to meet domestic and international policy objectives.

The need to go beyond the energy balance

2) to monitor and evaluate policy relevance/impact

- Define the proper indicators and/or monitoring tools to assess policy performance
  - Development of baseline if need be
  - Gather relevant information to perform benchmark
- What are the expected outcomes of the programme
  - Uptake in efficient technology/equipment
  - Reduction in energy consumption
- Based on selected measurement/evaluation method, assess the actual impact of the programme
  - Evaluate programme impact against expected results
  - Develop strategies to improve programme impact or outreach

Developing the right indicators to evaluate and monitor policy/programme

- What is the goal of the policy?
  - Change consumers' behaviour
  - Reduce electricity/energy consumption
  - Maximum uptake of energy efficient equipment or best available technology
- Which indicator(s) is (are) required to assess the goal of the policy
- Which indicator(s) is (are) required to quantify the policy impact
- Which indicator(s) is (are) required to monitor the success or failure of the policy/programme
- Which indicator(s) is (are) required to assess the sustainability of the policy/programme

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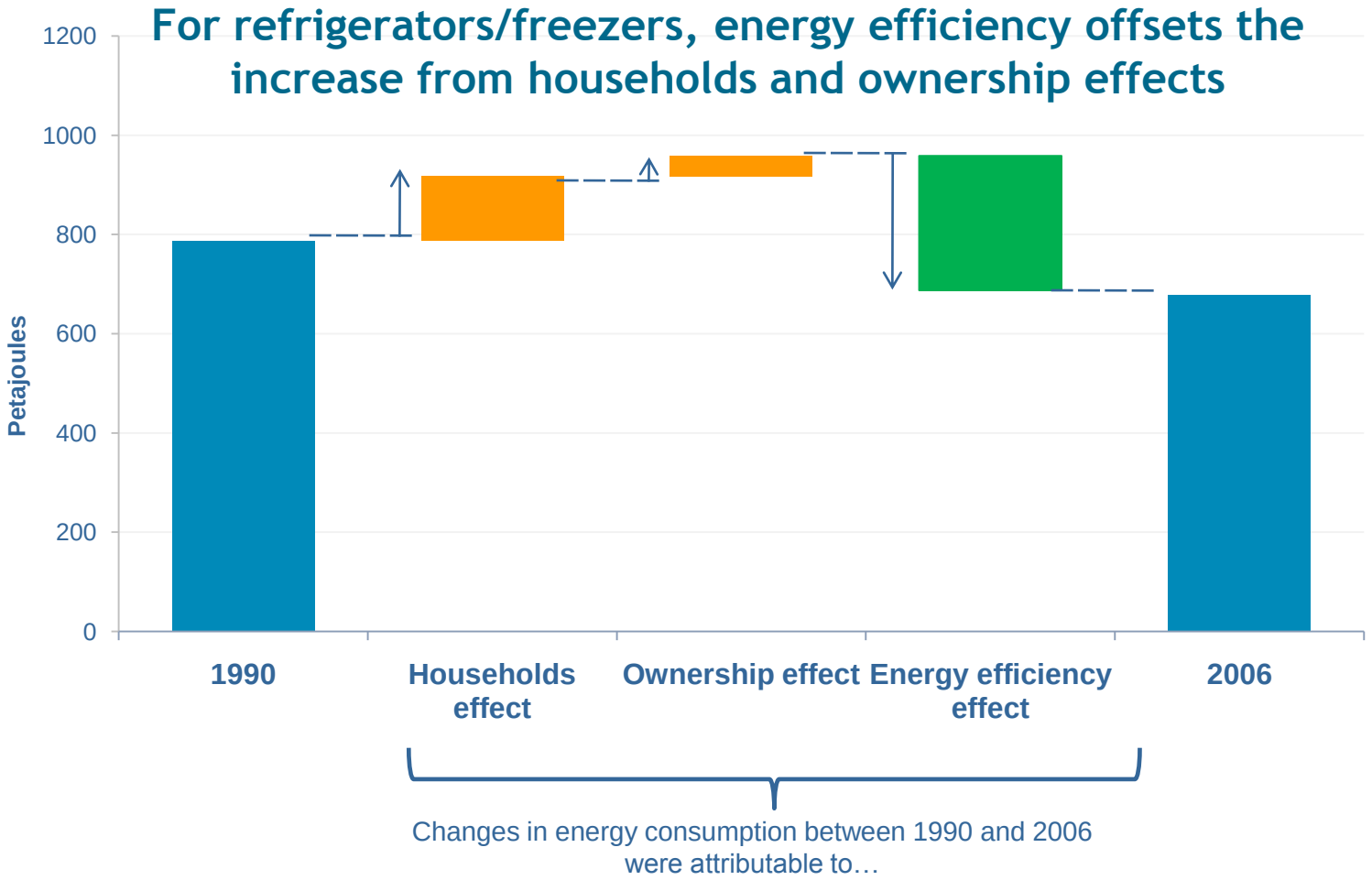
Decoupling energy consumption data with stock data



Analysis based on detailed data may be sufficient in some circumstances…

Key Insights from IEA Indicator Analysis

An example - Canada's National Programmes

- ecoENERGY Efficiency Initiative
  - ecoENERGY Retrofit
    - Homes
    - Small and Medium Organisations
  - ecoENERGY for Buildings and Houses (new)
  - ecoENERGY for Equipment
  - ecoENERGY for Industry
  - ecoENERGY for Personal Vehicles
  - ecoENERGY for Fleets
  - EcoENERGY for Biofuels
- Clean Energy Systems for Buildings and Communities
- Federal Buildings Initiatives
- Renewable Diesel Demonstration Initiatives

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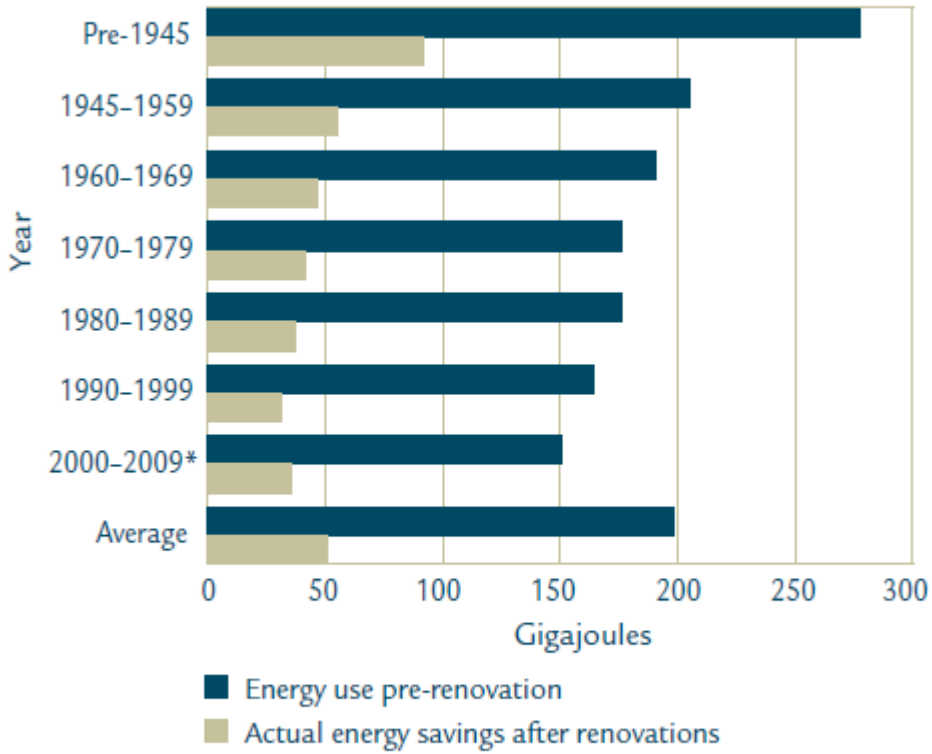
ecoENERGY Retrofit - Homes Canada

Residential Energy Use and Energy Savings per Household, Pre-1945 to 2000–2009



*Data for 2007 are from ecoENERGY Retrofit – Homes (previous data source was EnerGuide for Houses).

Key Insights from IEA Indicator Analysis

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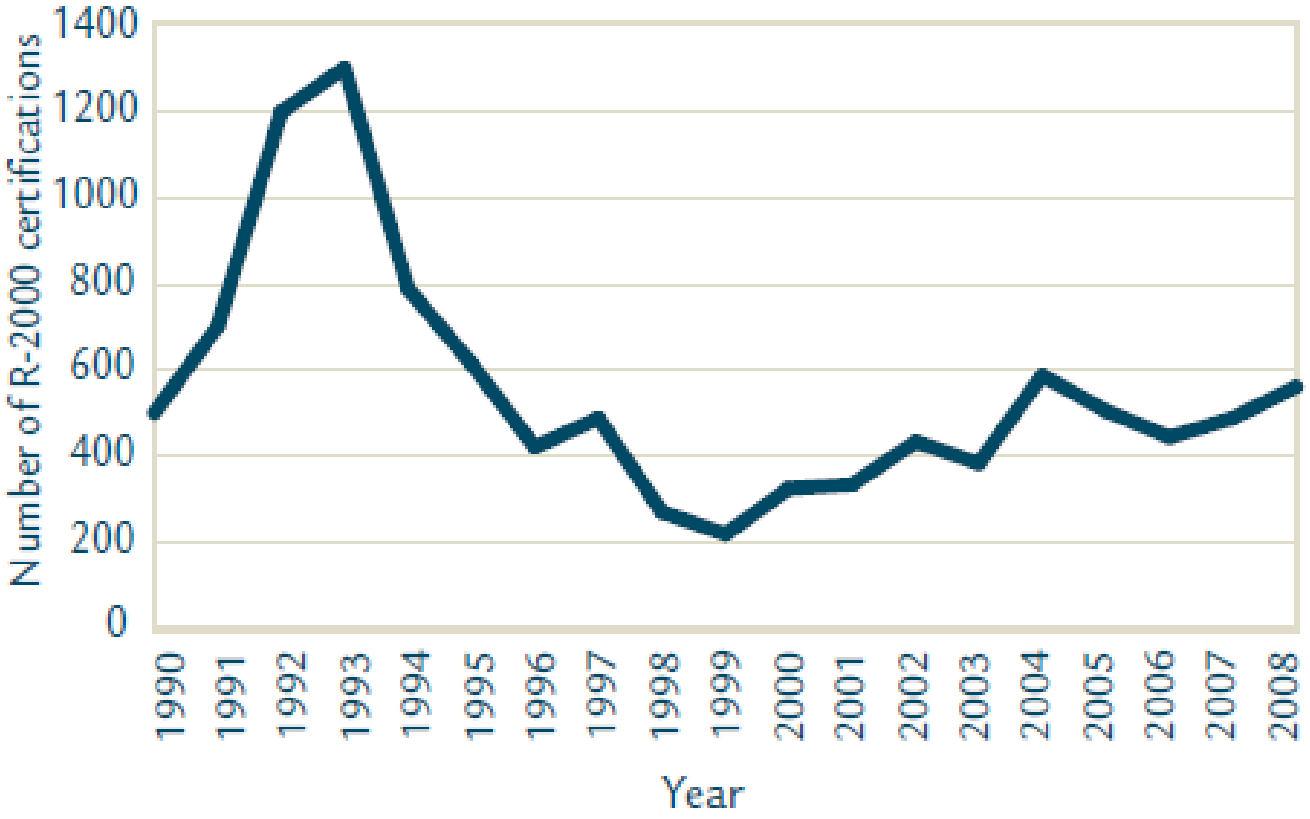
ecoENERGY for Buildings and Houses Canada

Number of R-2000 Housing Certifications, 1990 to 2008



Source: NRCan national housing database and internal data.

Key Insights from IEA Indicator Analysis

The overall impact of numerous programmes

The overall impact is "usually" lower than the sum of impacts from individual programmes

An example for the residential sector

Consumers behaviour have an impact on the overall results (e.g. Free-ridership and rebound effect)

Other non-efficiency drivers will impact the overall results (e.g. House size, occupancy rate, appliance size, floor area heated or cooled)

The overall impact of numerous programmes (example)

Ban on incandescent lighting

- Reduced electricity consumption
- Reduced heat loss by bulb
  - More space heating required
  - Less space cooling required
- Reduced energy conservation?

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The overall impact of numerous programmes (example)

High-efficiency appliances

- Reduced electricity/fuel consumption
- In some case, reduced heat loss by appliances
  - More space heating required
  - Less space cooling required
- Larger appliances?
- More appliances?

Key Insights from IEA Indicator Analysis

The overall impact of numerous programmes (example)

Building envelope retrofit

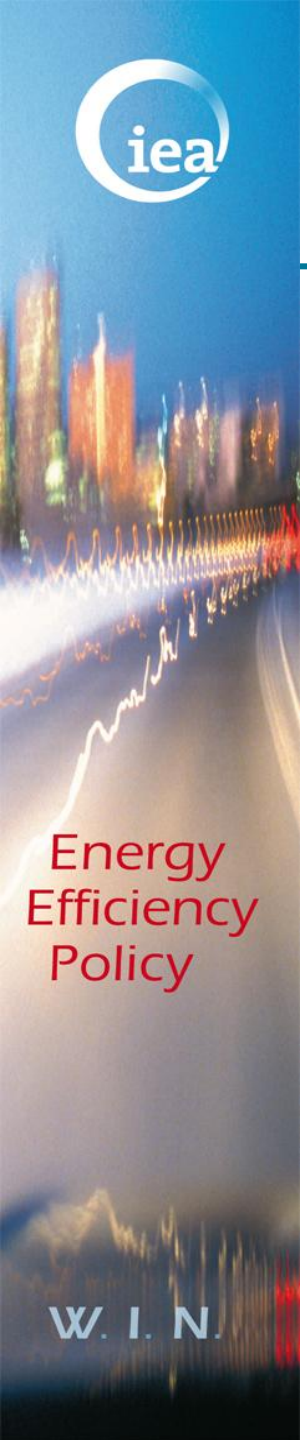
More stringent building codes

- Reduced energy consumption for heating and cooling
- May require extra ventilation
- Given the same floor area, allow the use of smaller heating/cooling equipment

The overall impact of numerous programmes (example)

High-efficiency heating and cooling equipment

- Reduced energy consumption for heating and cooling
- Efficiency gains may be lower than anticipated
  - Losses through inefficient envelope (including windows)



25 Energy Efficiency Policy Recommendations Across 7 Priority Areas

1. Across sectors

1.1 Measures for increasing investment in energy efficiency;
1.2 National energy efficiency strategies and goals;
1.3 Compliance, monitoring, enforcement and evaluation of energy efficiency measures;
1.4 Energy efficiency indicators;
1.5 Monitoring and reporting progress with the IEA energy efficiency recommendations themselves.

2. Buildings

2.1 Building codes for new buildings;
2.2 Passive Energy Houses and Zero Energy Buildings;
2.3 Policy packages to promote energy efficiency in existing buildings;
2.4 Building certification schemes;
2.5 Energy efficiency improvements in glazed areas.

3. Appliances

3.1 Mandatory energy performance requirements or labels;
3.2 Low-power modes, including standby power, for electronic and networked equipment;
3.3 Televisions and “set-top” boxes;
3.4 Energy performance test standards and measurement protocols.

4. Lighting

4.1 Best practice lighting and the phase-out of incandescent bulbs;
4.2 Ensuring least-cost lighting in non-residential buildings and the phase-out of inefficient fuel-based lighting.

5. Transport

5.1 Fuel-efficient tyres;
5.2 Mandatory fuel efficiency standards for light-duty vehicles;
5.3 Fuel economy of heavy-duty vehicles;
5.4 Eco-driving.

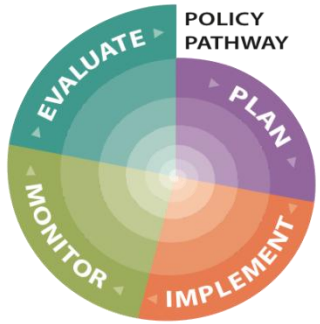
6. Industry

6.1 Collection of high quality energy efficiency data for industry;
6.2 Energy performance of electric motors;
6.3 Assistance in developing energy management capability;
6.4 Policy packages to promote energy efficiency in small and medium-sized enterprises.

7. Utilities

7.1 Utility end-use energy efficiency schemes.

Policy Pathway series: Overview

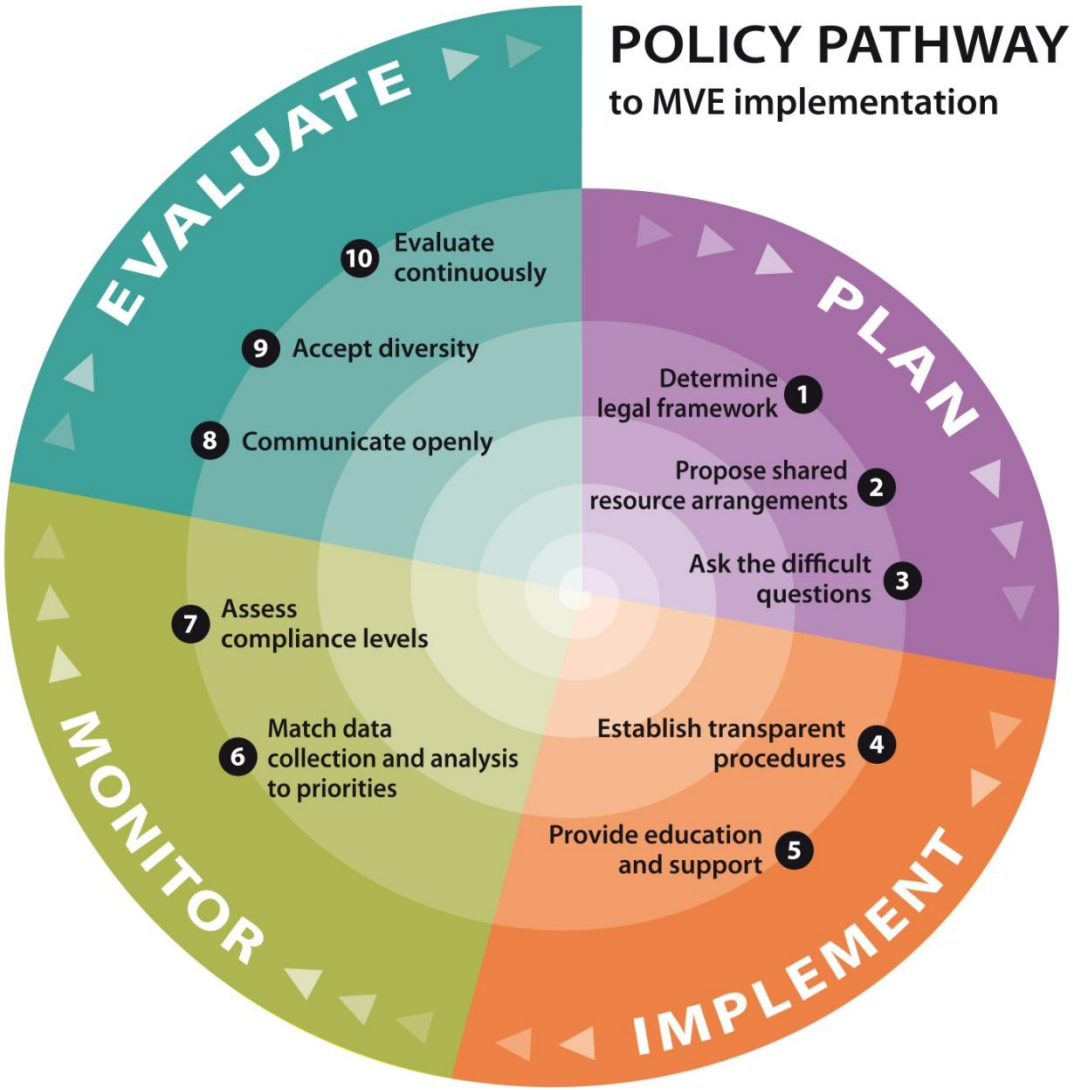


- Each policy pathway is based on one of the 25 IEA energy efficiency recommendations
- Policy pathways highlight existing best experience in implementing such policies
- Policy Pathways help countries both to implement new measures and to improve efficiency of existing systems
- The first policy pathway on monitoring and verification of compliance for appliance was launched in Paris October 2010
- The second pathway on Energy Performance Certification of Buildings was launched in Singapore in November 2010
- The next Policy Pathway on Public-Private Partnerships for energy efficiency finance will be released in November.

Policy Pathway

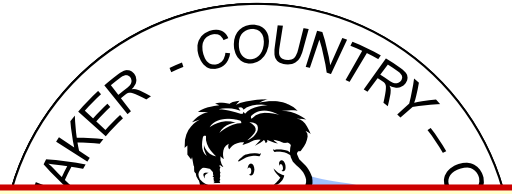
The equipment MVE Policy Pathway

Policy Pathway



“The Three Faces of the Same Coin”

Collect, process, release the necessary detailed statistics



Importance of a dialogue between the three parties for having a better understanding of the needs, expectations as well as problems and issues of the other parties

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"To measure is to know"

Lord Kelvin, 1824 – 1907

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