

Why data matter for energy efficiency policies

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Data and indicators are essential at all stages of the policy cycle





- Inform design based on current state and ambition
- Adapt policy during its implementation
- Understand policy performance
- Evaluate what happened and why

Each individual measure requires appropriate data to be effective

Why does effective policy design require appropriate data?



Case study: defining MEPS in the absence of national market data



Policy design without appropriate data may not be optimal



Efficiency rating of selected air conditioners in national/regional market – data collected after MEPS



Without appropriate data,

minimum energy performance levels were set too low to impact the market

Evaluating policy impacts requires tailored data





Impacts are assessed compared to "control" group (what would have happened)

Integration of data in policy work is vital, as in IEA approach













Energy efficiency data/indicators feed all IEA policy analysis and projections. Conversely, IEA data quality assessment benefits from broader IEA expertise



What data to track efficiency progress: the IEA experience on indicators

Energy intensity extensively used as efficiency target - also in this region \fbox 🙆

Example: Thailand



Reduce El by 20% in 2020 30% in 2025 based on 2005 level



How to interpret the economy-wide energy intensity decrease?





At national level:

- Have we been more efficient in supply or demand side?
- ...and in what sectors/enduses?
- Has the economic structure changed?
- What are the implications for future energy needs?

More detailed information on demand is essential: End-use efficiency data and indicators

Efficiency indicators to assess how measures affect overall intensity 😡 🎱

Economy-wide target: decrease of energy intensity



Efficiency indicators require "energy end-use" and "activity" data

"Energy end-use" data more sharply track demand trends

- What are the largest end-uses within the energy consumption?
- How are they changing over time?
- What are the priority areas for policy?



Source: IEA Energy Efficiency Indicators Highlights

Energy demand for each end-use is driven by specific "activities" (e.g. residential: more people; more dwellings; larger dwellings; etc)

Indicators link energy end-uses with appropriate activity data is in the second second

Residential energy consumption index (IEA20) High level indicators Residential 110 Residential/capita 100 (1990=100) Residential/dwelling 90 Residential TC*/dwelling 80 Space heating TC/dwelling 70 Space heating TC/floor area End-use indicators 1995 1990 2000 2005 2010 Data for IEA 20 * Temperature correction using heating degree days

End-use (efficiency) indicators better support sectoral policy... and require more disaggregated data than traditional energy balances

Appropriate activity data vary across sectors of energy demand



TABLE ENERGY INTENSITY BY MA	NUFACTU	RING SUB \$	SECTORS				
หน่วย : พันดันเทียบเท่าน้ำมันดิบต่อพันล้านบาท unit : ktoe / thousnad million baht				Indexed global energy consumption/tonne of crude			
สาขา	2552 2009	2553 2010	2554 2011	2555 2012	2556 ^p 2013 ^p	SECTOR	steel production
1. อาหารและเครื่องดื่ม	17.29	16.31	16.31	16.42	16.50	1. FOOD AND BEVERAGES	100
2. สิ่งทอ	3.39	2.87	3.05	3.74	4.20	2. TEXTILES	80
3. ไม้และครื่องเรือน	9.10	9.08	9.22	9.73	9.80	3. WOOD AND FURNITURE	60
4. กระดาษ	23.69	22.60	21.33	20.73	20.14	4. PAPER	40
5. เคมี	8.01	7.54	7.11	7.74	7.96	5. CHEMICAL	20
6. อโลหะ	74.47	72.97	67.74	67.32	62.31	6. NON - METALLIC	0
7. โลหะขั้นมูลฐาน	31.50	31.25	31.01	30.88	30.79	7. BASIC METAL	and an
8. ผลิตภัณฑ์โลหะ	1.45	1.44	1.67	1.67	1.74	8. FABRICATED METAL	K K K K K K K K K K K K K K K K K K K
9. อื [้] น ๆ	15.51	15.50	15.49	15.22	15.10	9. OTHER (UNCLASSIFIED)	Source: worldsteel

For example, activity data for industry: value added and physical production



Cooling is the fastest growing use of energy in buildings

Without action to address energy efficiency, energy demand for space cooling will more than triple by 2050 – consuming as much electricity as all of China and India today.

Share of final electricity demand growth to 2050



..and project energy demand economy-wide





World Energy Outlook 2017 | Global Energy Trends

Representation of energy efficiency by end-use sector* in the World Energy Model

Automation

Renewables

End-use data help quantify efficiency impacts from across sectors 🛛 😡



Figure 1.8 Decomposition of final energy use in IEA member countries and major emerging economies

End-use analysis: a tool to assess overall energy efficiency progress



Data for efficiency indicators: few key points

The energy balance is a starting point to study trends in energy demand





We need good demand-side data in the national energy balance

From balances to end-uses: data quality / data needs implications





We need consistent, more detailed information than in energy balances. Further data collection (e.g. surveys) and cooperation among focal points.

How are countries collecting end-use data?



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Results from an IEA survey for 160 practices from 40 countries

http://www.iea.org/statistics/

IEA online database of country practices http://www.iea.org/eeindicatorsmanual

Sharing experiences and learning from each other is very important $\textcircled{}^{\textcircled{}}$

		Background		
Country	Philippines			
Sector	Residential			
Methodology	Surveying			
Organisation	Department of E	inergy / Philippine Statistics Authority (formerly National Statistics Office)		
Name	2011 Household	Energy Consumption Survey (HECS)		
Purpose	The primary goa consumption in programs that a particularly expa	I of HECS is to generate comprehensive and reliable data/information and analy the residential sector of the country which is essential in formulating and impler im to improve the quality of life of the Filipinos, in accordance with the governm inding energy access and strengthening consumer and welfare protection.		
Data collection purpose	The specific obje Provide detailed conditions affect Establish the fue Determine the n Assess the curre implementation Measure and an Determine awar labelling program	The specific objectives are as follows: Provide detailed information on the changing energy consumption patterns in Filipino househole conditions affecting energy use; Establish the fuel/energy mix of the residential sector based on its energy consumption; Determine the most energy consuming appliances, devices and equipment used for household a Assess the current energy efficiency and conservation techniques in the residential sector vis-a-v implementation of energy consumption regulation for household appliances and equipment: Measure and analyze the incidence of inter-fuel substitution in the households; and Determine awareness and/or perception of the household on major energy issues (i.e. nuclear e labelling program, renewable energy, natural gas) in the energy sector.		
		Data collection		
Comple design	Multi stage sam	ling design using the 2003 Master Sample (MS) developed by the Philippine Stat		

HECS FORM 1 NSCB Approval No.: NSO-1114-01 Expires: December 31, 2012

CONFIDENTIALITY

This survey is authorized by Commonwealth Act 591. All information obtained will be strictly held confidential.



Republic of the Philippines
NATIONAL STATISTICS OFFICE and DEPARTMENT OF ENERGY



2011 HOUSEHOLD ENERGY CONSUMPTION SURVEY

Booklet ____ of ____ booklets

PART I - A. GEOGRAPHIC IDENTIFICATION AND OTHER INFORMATION

GEOGRAPHIC IDENTIFICATION CODES		INTERVIEW RECORD
Province	H	Visit Indicator 1 2 3
Mun/City	+++	Date of Visit
Barangay	+++	Time Began
EA	\square	Time Ended
SHSN		Result Code*
HCN		FINAL RESULT CODE*
Number of Households in the Housing Unit		*RESULT CODES
Name of Respondent Sex 1 Male 2 Female Relationship to the Household Head		01 - Completed Interview 02 - Refusial 03 - No household member at home or No competent respondent at home at time of visit 04 - Entire household absent for extended period of time 05 - Vacaint housing unit 06 - Housing unit destroyed
Address		OF - Address not a nousing unit OE - Housing unit not found O9 - Critical or flooded area 10 - Others (specify)

CERTIFICATION

I hereby certify that the data gathered in this questionnaire were obtained/reviewed by the undersigned personally an in accordance with instructions.

	THE OWNER AND ADDRESS OF TAXABLE PARTY.	THE OWNER AND ADDRESS OF TAXABLE PARTY OF TAXABLE PARTY.	STREET, STREET
Signature over Printed Name of	Date	Signature over Printed Name of	Date Reviewed
Enumerator	Accomplished	Supervisor	

Emerging opportunities for end-use statistics from digital world





Many of our readers have him into issues with their smart meters, escore we wave and

Microwave		Kettle	Toaster
ma mana	Microwave		1 11
		maked, based test	

Every appliance has its own energy draw on the power line

Beyond models, EIA has begun testing new technologies to objectively measure end use demand. Recent research shows:

- So-called "NILMs" (Non-Intrusive Load Monitoring) are definitely *the* hot topic, and shared by different interests:
 - Energy Efficiency, Demand Response, Measurement & Verification, Energy Audits, Appliance Diagnostics, Cost of Service, etc.

In this initial pilot study of NILM technologies, EIA will conduct analyses to...

- Compare usage <u>patterns</u> between NILM device and respondent, (e.g., number of clothes washer cycles
- Compare usage <u>characteristics</u> (e.g., self-reported versus observed water temperature for a clothes washer or heated drying for a dishwasher)
- · Compare actual consumption by end use to the RECS 2015 model results

We'll prioritize the research in three tiers in preparation for the 2020 RECS:

Priority	Products
Tier 1	Refrigerators, Dishwashers, Clothes Washers, Dryers, Cooking, Air Conditioning, Heating
Tier 2	Computers, Televisions, Home Entertainment
Tier 3	Lighting, Rare End Uses, Residual

Pilot experiences across countries to assess statistical applicability



IEA energy efficiency statistics tools

The IEA Efficiency statistics: pdf publication and excel database



- Data from IEA Members
- Annual updates
- Cover four sectors
 (residential, services, industry
 and transport)
 - ✓ End use data
 - Energy efficiency indicators
 - ✓ Carbon intensity indicators

IEA Energy Efficiency Indicators Database (2017 edition) **Table of Contents** What's inside Residential carbon indica The first edition of the IEA energy efficiency indicators contain Services carbon indicator End use en ervices energy indicators industry energy indicators industry carbon indicators Carbon inte Overall, a se Energy efficiency indicators For detailed info consult the data Download o Energy Eff http://data.iea.org/ Download o Energy Eff the EA Online Bookshop Energy data products are available the EA data services This is a short ve http://www.iea.org/media/statistics/ EnergyEfficiencyIndicators.xls

 Available online for download

https://webstore.iea.org/energy-efficiency-indicators-2017-highlights

Energy efficiency indicators: an area of fast inrernational development

2017

IEA indicators manuals: publications and online courses

iea 🙆

- Global tool; self-paced and interactive
- For policy makers and statisticians
- Use by all countries is welcome



https://edx.iea.org/

Online courses accessible any time



- Detailed end-use energy / activity data and indicators are vital for energy demand policy and planning, across sectors and end-uses.
- Data collection needs appropriate resources Having no data will cost more!
- Collaboration among **statistics and policy** experts and **across institutions** that may contribute relevant data is essential to enhance outcomes.

The IEA is committed to facilitate national work and exchange across countries, with a view to strengthening the long-term institutional capacities



www.iea.org #energyefficientworld