Energy Efficiency Indicator in ADB energy projects

Energy efficiency in ADB's objectives

Energy Policy

Promoting energy efficiency and renewable energy

maximizing access to energy for all

Promoting energy sector reforms, capacity building, and governance

Energy Policy Results Framework

Output: ADB investments in energy efficiency and renewable energy expanded

Output indicators

More than $2 billion per year from 2013

Additional installed capacity, in MW, from renewable energy increased from baseline

Electricity savings, GWh increased from baseline

CO2 emissions, in ton of CO2-eq avoided per year increased from baseline

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Results Framework: ADB Energy Policy Implementation

Outcome	Outcome Indicators	Output	Output indicators
Improved energy efficiency and greater use of renewable energy in developing member countries	Share of renewable energy in total generation capacity increased from 2006 levels	ADB investments in renewable energy and energy efficiency expanded	More than $2 billion invested per year from 2013
			Additional installed capacity using renewable energy, in MW increased from baseline
	Energy consumed per unit of GDP, in tons of oil equivalent reduced from 2006 levels		Electricity saved, in GWh per year increased from baseline
			Reduction of carbon dioxide emissions, in tons of carbon dioxide equivalent per year increased from baseline

Climate investment targets

Climate finance target:

$6 billion by 2020

Climate mitigation:

$4 billion

Climate adaptation:
$2 billion

Clean energy target: $2 billion from 2013

Renewable energy

Energy efficiency

Climate resilience

ADB Project Cycle

When and how we track

- At entry
  - Project concept stage
  - Project report stage
    - Project design monitoring framework
- At project completion
  - Project design monitoring framework
  - Development effectiveness reporting, level 2 indicators
  - Project evaluation
- Main sources of data
  - Project documents & reports

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Energy efficiency projects in ADB

Supply-side:

Power generation and transmission and distribution

Demand-side:

Electricity end-users

Customer's (electric) meter is the boundary between the supply-and demand -side

Electricity savings, in GWh/year

- It is the difference between electricity or energy converted or used with and without the EE project or component
- Supply-side electricity savings could arise from:
  - Improved performance or output from power plants using lesser amount of fuel
  - Reduction of technical or system losses in transmission and distribution
- Demand-side electricity savings would come from:
  - Improved efficiency on how a given supply is being used (e.g. using efficient appliances, LED lighting) thus requiring less energy inputs

Methodology & data requirements

Electricity savings from reduction in technical/system losses in transmission and distribution

- $electricity\ savings = \left(\frac{sales}{(1-LLb)}\right) - \left(\frac{sales}{(1-LLp)}\right)$

LL_b = line loss baseline year (without EE project), %

LL_p = expected line loss with EE project, %

Other data needed if only rate of line losses are given:

- Sales = consumption in GWh per year

Methodology & data requirements

- Energy savings from improved efficiency of power plants

Given	Other data needed	Energy savings (ES), GWh-equivalent
savings in million tons of oil equivalent (TOE)	1 TOE – 11,630 GWh	ES = savings in MTOE x 11,630
savings in tons of coal equivalent (TCE)	lower heating value (HV) of coal (MJ/ton)	ES = savings in TCE x HV x (GWh/MJ)
Tons of CO2 reduction	country emission factor (tCO2/GWh)	$ES=\frac{tCO2\ reduction}{country\ emission\ factor}$
heat rate improvement (joules/kWh) due to rehabilitation works	annual generation in kWh=MW capacity x 8,760 hours x load factor/1,000	ES = generation x (heat rate improvement) x (GWh/MJ)*

** Applicable conversion factor from joule to GWh*

Methodology & data requirements

- Electricity savings from demand-side EE projects (e.g. reduction of non-revenue water

$$electricity\ savings = (NRW_b - NRW_p)\ x\ SEC, in\ kWh/m^3$$

Where, SEC = specific electricity consumption in kWh/m^3

- Non-revenue water data
- Baseline losses, %
- With EE projected losses, %

Pointers

- The right set of data is key
- Indicators serve to track and check how far we are going, where we are lagging, and how much more we should aim for
- Indicators can also help define and target specific energy efficiency intervention, approach or strategy to be more effective

Going forward

- Energy efficiency is a challenge for perceived and perhaps actual costs or disincentives but the appropriate and correct use of indicators, the first fuel (as EE has been touted to be) can be fully realized yet

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Thank you.