

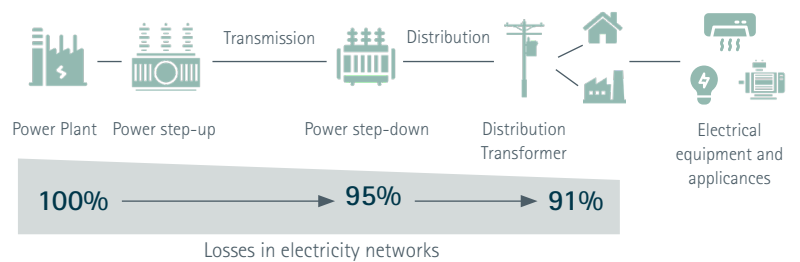


# Distribution Transformers (DTs)

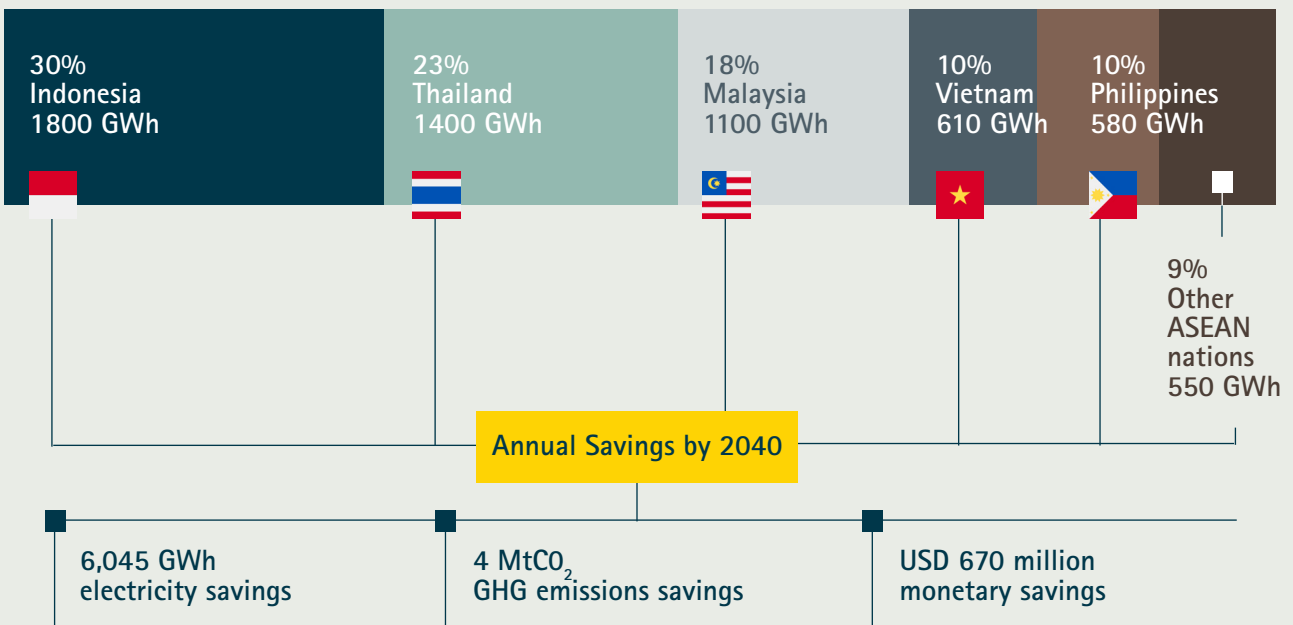
## Background

Based on IEA data, transmission and distribution (T&D) losses in electricity networks in APEC economies vary from a low of 2.8% to a high of 15.6% of final consumption.

About a third of transmission and distribution losses take place in distribution transformers (DTs). In parallel, many countries still have no mandatory EE policy for DTs.



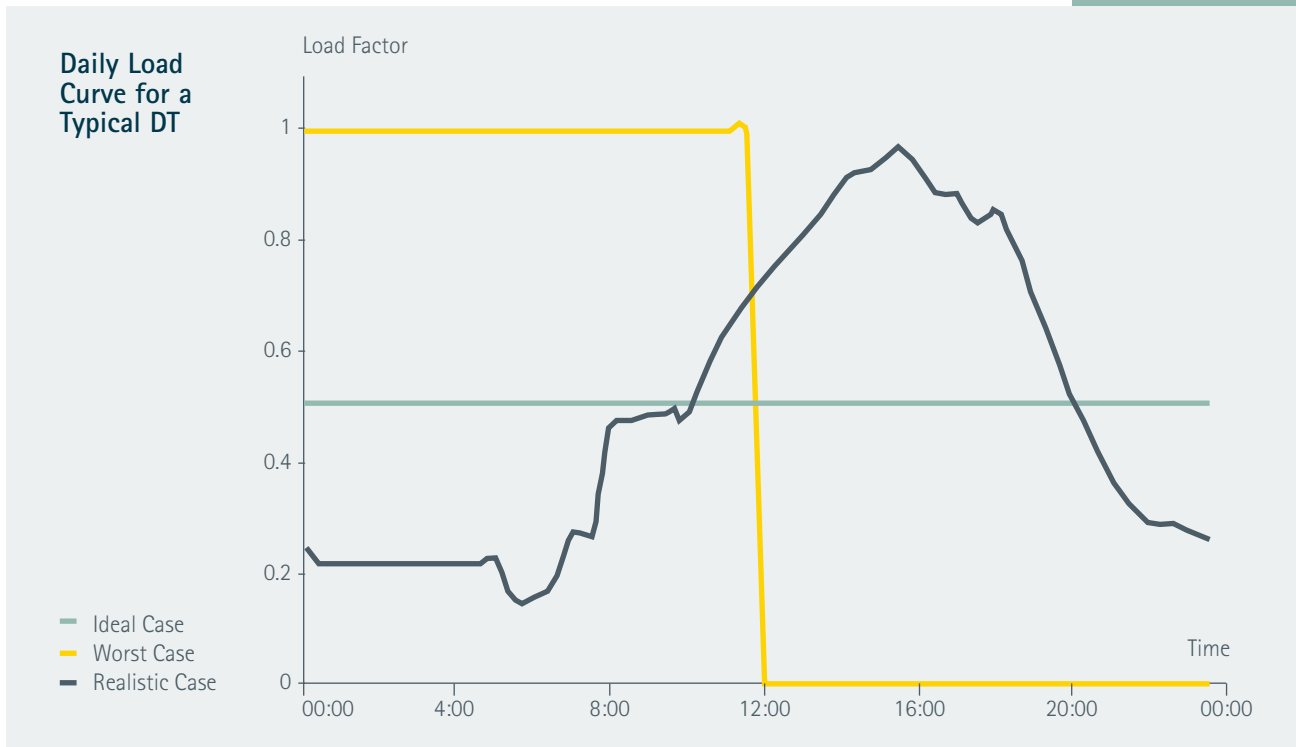
## Annual Savings Potential from the Adoption of Low-loss DTs in ASEAN



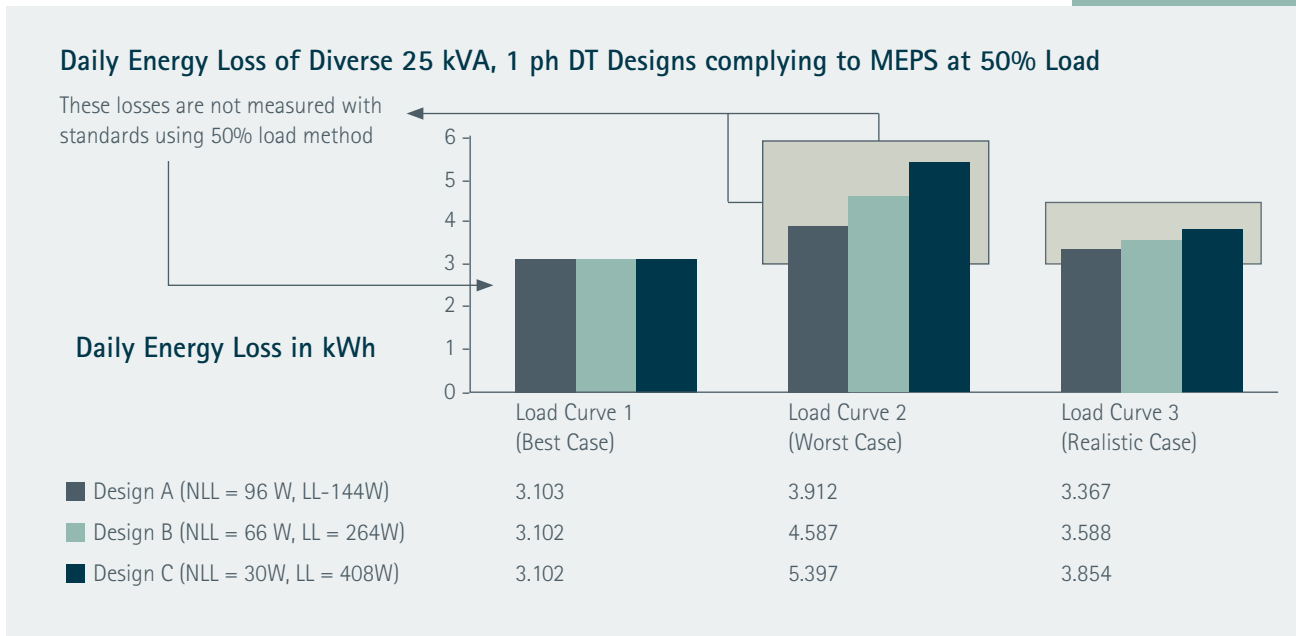
Source: United for Efficiency - <https://united4efficiency.org/>

## Promotion of Low Loss DTs - 50% Load versus Load/No Load Losses

Actual losses in a DT are determined by:  $\text{No Load Loss} + (\text{Load Loss} \times \text{Load Factor}^2)$



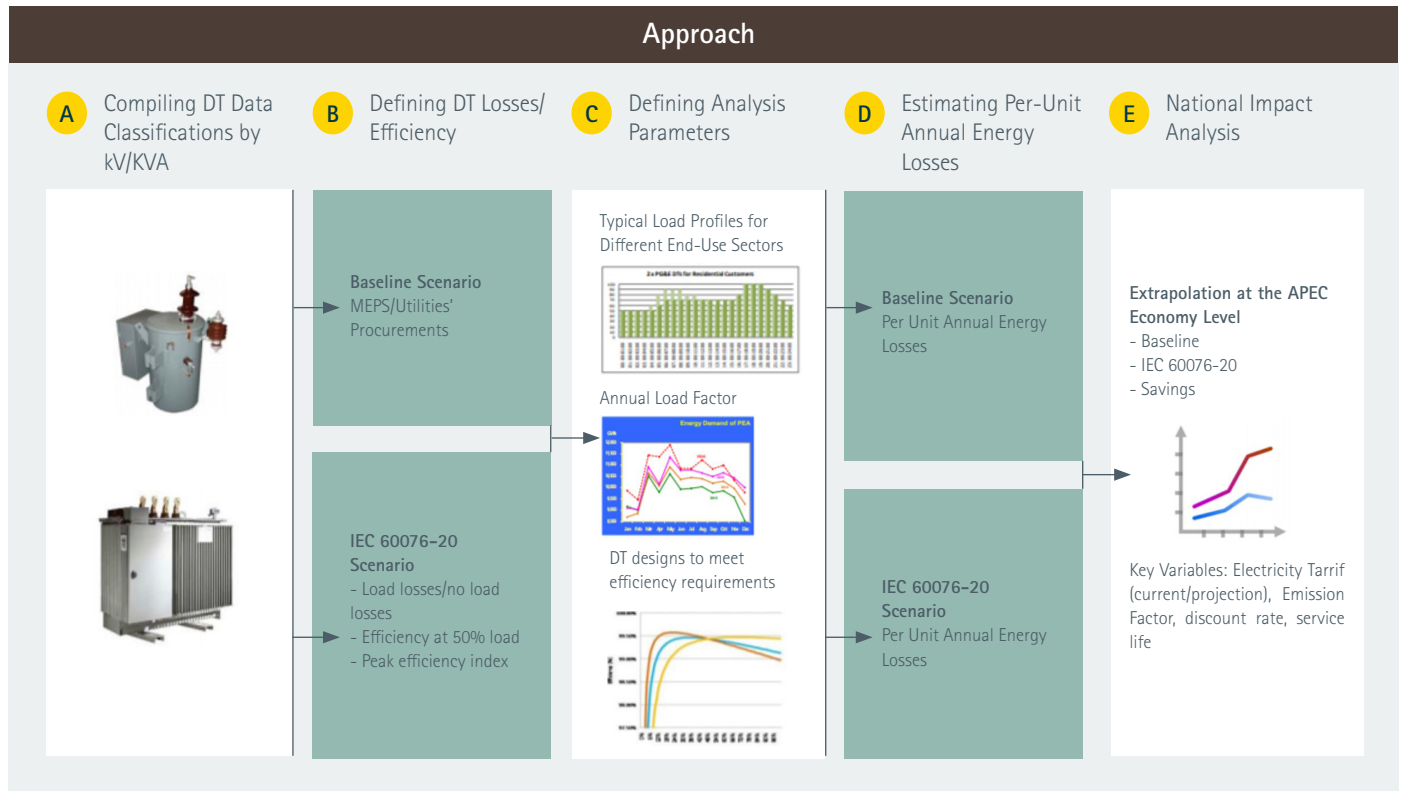
For practical reasons, many standards measure the energy efficiency of DT at 50% load ("Ideal" case). In reality, the load varies throughout the day, and the performance of DTs varies accordingly, as shown in the table below:



The IEC TS 60076-20 offers a better way of measuring the losses of a DT according to real conditions of utilization, as it does not consider 50% load only. For end-users, the IEC TS 60076-20 allows to select the most efficient DT to minimize future losses. For manufacturers, the IEC TS 60076-20 provides a framework to improve the design of their DT, as illustrated in the figure above.

# PROJECT

## APEC Distribution Transformers Survey: Estimate of Energy Savings Potential from Mandatory Efficiency Standards (MEPS)



### Results in APEC Region



32 terawatt hours (TWh) of electricity savings in 2030, roughly equivalent to the output of eleven 500MW power plants.



135 Mt of cumulative emissions savings between 2016 and 2030



20% reduction over the 157 TWh electricity distribution losses projected in 2030



19 billion USD in cumulative consumer financial benefits



18 million tons (Mt) of annual carbon dioxide (CO<sub>2</sub>) emissions reductions by 2030

#### Funding Agency



#### Project Partners



#### Implementation Period

2012 - 2013

#### Project Value

USD\$232K

# PROJECT

## Reducing Losses in Power Distribution through Improved Efficiency of Distribution Transformers

### ■ Detailed Comparative and Gap Analysis



[www.apec.org](http://www.apec.org)

### ■ International Dissemination Conference: 18-19 December 2017, Bangkok, Thailand

#### Multiplier Effect: HAPUA

Development of education campaign for non-utility market in cooperation with HAPUA (Heads of ASEAN Power Utilities / Authorities) – ongoing.

### ■ Stakeholders Consultation Workshop: 27-28 March 2017 in Jeju, South Korea

### ■ Policy Recommendations

- Adoption of IEC 60076-20 as testing standard
- Adoption of MEPS to regulate the non-utility market
- Education campaign on the advantages of low loss DTs, based on Total Cost of Ownership



Policy Recommendation



#### Funding Agency



**Asia-Pacific Economic Cooperation**

#### Project Partners



**International Copper Association Southeast Asia**  
Copper Alliance



#### Implementation Period

2016 - 2017

#### Project Value

USD\$189K



**International Copper Association Southeast Asia**  
Copper Alliance

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