INTERNATIONAL ENERGY STUDIES GROUP
ENERGY ANALYSIS & ENVIRONMENTAL IMPACTS DIVISION

BERKELEY LAB

Paying Attention to the Peak: Indonesia

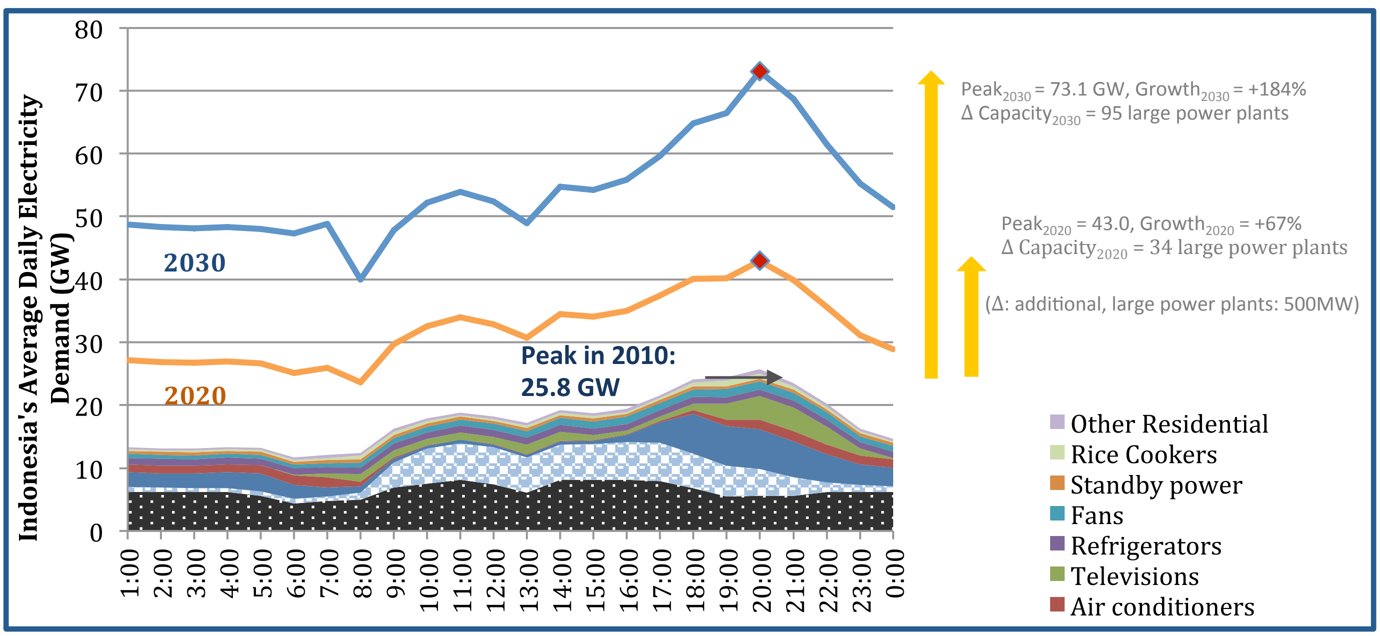
Deployment of super-efficient appliances in Indonesia could avoid the construction of up to 50 large power plants by 2030

Reducing Indonesia's Peak Demand via Energy Efficiency

Indonesia's daily peak electricity demand is increasing rapidly (5% annually from 2000-2009) and is projected to increase by at least another 184% by 2030, requiring the addition of the equivalent electricity generation of 95 500-MW power plants over the next 15 years (Chart 1). Adoption of energy efficiency policies today could significantly reduce future peak electricity demand while providing the same level of energy services supporting lighting, commerce, and industry.

Overall electricity demand and the daily schedules of electricity usage are currently major influences on Indonesia's peak load. In the future, peak load will be further influenced by growing demand due to increasing adoption of appliances and equipment such as refrigerators and air conditioners, and due to increasing use of electricity for lighting (Chart 1). By adopting policies to improve the efficiency of lighting and appliances on the market, the Government of Indonesia could reduce the future growth of average daily peak electricity demand while still allowing consumers to benefit from these energy services. Investments in generation, transmission, and distribution capacities might be postponed, reduced, or even eliminated through the adoption of energy efficiency policies. The need for as many as **fifty** 500-MW power plants could be avoided in 2030 if Indonesia adopted energy efficient policies that moved the market towards today's super-efficient equipment and appliances (Chart 2).

Chart 1. Modeled daily electricity demand in the Business-As-Usual scenario in 2010, 2020 and 2030



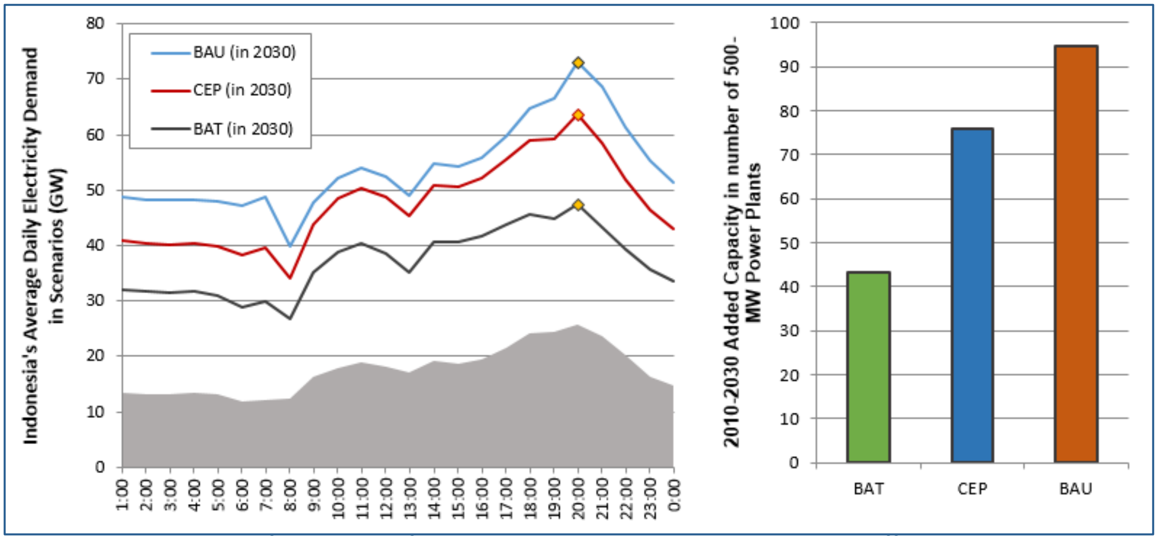
Methodology

Using available electricity load curves from PLN, Reliance Energy, the Indonesian Energy Outlook and Statistics (2006) and other sources, researchers at Lawrence Berkeley National Laboratory developed daily electricity demand forecasts based on future appliance usage using the Bottom-Up End-use Analysis System (BUENAS) model. The current analysis uses typical daily load curves from over ten end-uses (e.g., lighting, refrigeration, cooking, etc.) in the residential, commercial, and industry sectors in Indonesia in order to model the variation of the load over the average electricity demand (TWh). Results in 2010 are compared with national statistics in order to validate the model. The model then builds on the BUENAS scenarios of electricity demand in 2020 and 2030 to calculate the hourly and peak load demands in those years.

The scenarios analyzed are the following:

BAU: The Business-As-Usual scenario assumes frozen efficiency with the exception of lighting (assumes a progressive phase-out of incandescent lighting by 2030). Growth is driven by GDP and population, which lead to increased sales and increases in the total number of appliances in the stock in the residential, commercial and industry sector.
CEP: The Cost Effective Potential scenario takes into consideration efficiency targets that provide the maximum energy savings with a net benefit to the consumer (even with subsidized electricity tariffs). It is only available for the residential sector.
BAT: The Best Available Technology scenario evaluates the technical potential for energy efficiency afforded by the best technologies currently available on the market or designed from high efficiency components. It is only available for the residential sector end-uses, commercial lighting, air conditioners, and refrigerators.

Chart 2. Modeled peak demand for Indonesia in 2030, under different efficiency scenarios



Efficient technologies providing a net financial benefit to the consumers - even under subsidized tariffs - could avoid the construction of up to 33 large power plants by 2030. Air conditioners and refrigerators are the end-uses with the most potential for reducing peak load demand through implementation of energy efficiency policy.

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