

# Electricity Demand Forecasting towards Future Energy Security in Electricity Supply: Indonesia Study Case

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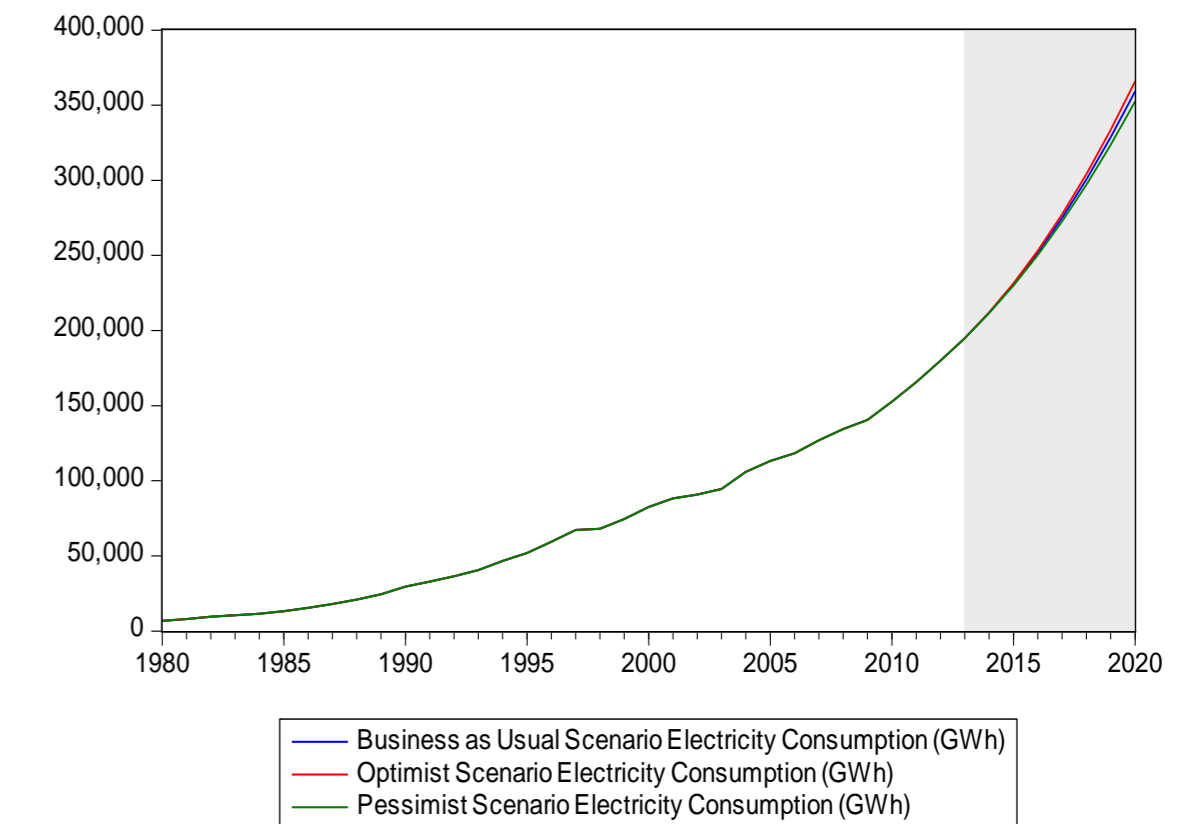


## INTRODUCTION

- Study examines future energy security in electricity supply in 2020
- Electricity demand and supply need to be balanced to support high economic growth
- Current condition: electricity infrastructure (power plants and transmission & distribution) is not sufficient, electricity shortage causes periodic blackout, and poor investment climate in electricity sector occurs due to electricity pricing policy (low electricity tariff)
- Acceleration and Expansion of Indonesia Economic Development 2011-2025 Master Plan (MP3EI) target: 66,421.5 MW total installed capacities in 2020

## METHODOLOGY

- Initial data analysis: deterministic trend and stationarity
- Long-run and short-run relationship analysis: cointegration and Vector Autoregression (VAR) analysis (impulse response and Granger causality)
- Time-series forecasting:  
Electricity Consumption = f(GDP, Electricity Consumption(-1))
- Forecasting model performance evaluation (in-sample and out-of sample method)
- Forecasting scenarios: business as usual, optimist, and pessimist ( $\pm 1.5\%$  estimated GDP)



	Electricity Consumption (GWh)	Electricity Supply Shortage (GWh)	Additional Power Plant Capacity Needed (MW)
Business as Usual Scenario	359,278.89	46,227.72	9,808.35
Optimist Scenario	365,955.39	52,904.22	11,224.93
Pessimist Scenario	352,631.55	39,580.38	8,397.95

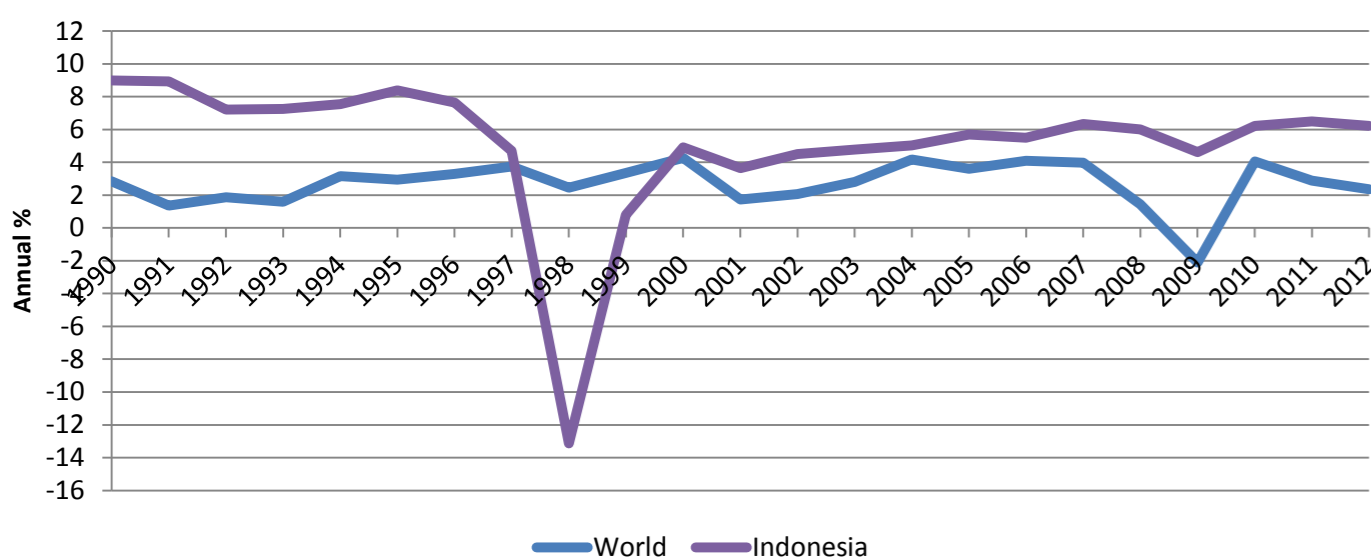
## RESULTS

- There are short-run and long-run relationships between GDP and electricity consumption
- Electricity crisis in 2020 would still occur, even under pessimist GDP growth scenario

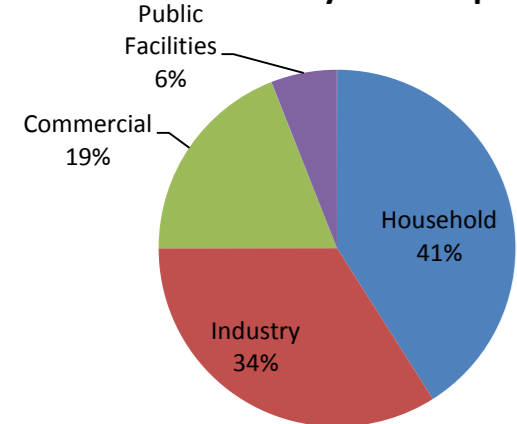
## CONCLUSIONS

- Electricity consumption increase is affected by GDP growth, in 2020 it would be doubled than in 2011 (exponentially increase) due to rapid GDP growth
- There would be no electricity supply security in 2020, estimated shortage would be around 39.5 – 53 GWh
- Pricing policy needs to be revised to encourage investment participation in electricity sector not only by state-owned but also private company
- Government should consider to build reliable large-scale high-capacity power plants, such as nuclear power plant, in order to sufficiently supply future electricity demand

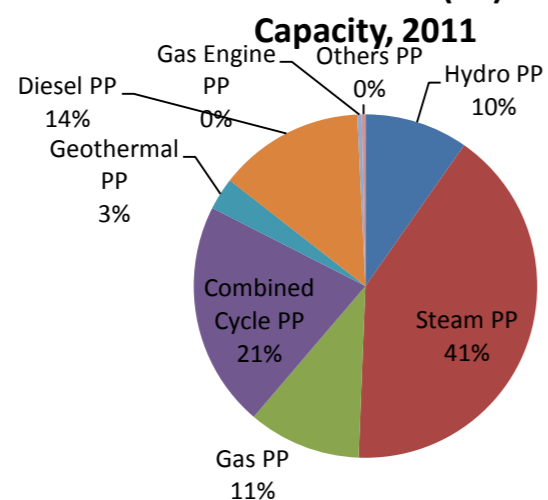
Indonesia vs. World GDP Growth, 1990 - 2012



Indonesia Electricity Consumption, 2013



Indonesia Power Plant (PP) Installed Capacity, 2011



Estimated GDP Growth by OECD

Year	GDP Growth (%)
2011*	6.49
2012*	6.26
2013*	5.78
2014	5.70
2015	6.26
2016	5.90
2017	5.80
2018	5.78
2019	5.75
2020	5.72

