



RENEWABLE ENERGY SUPPLY

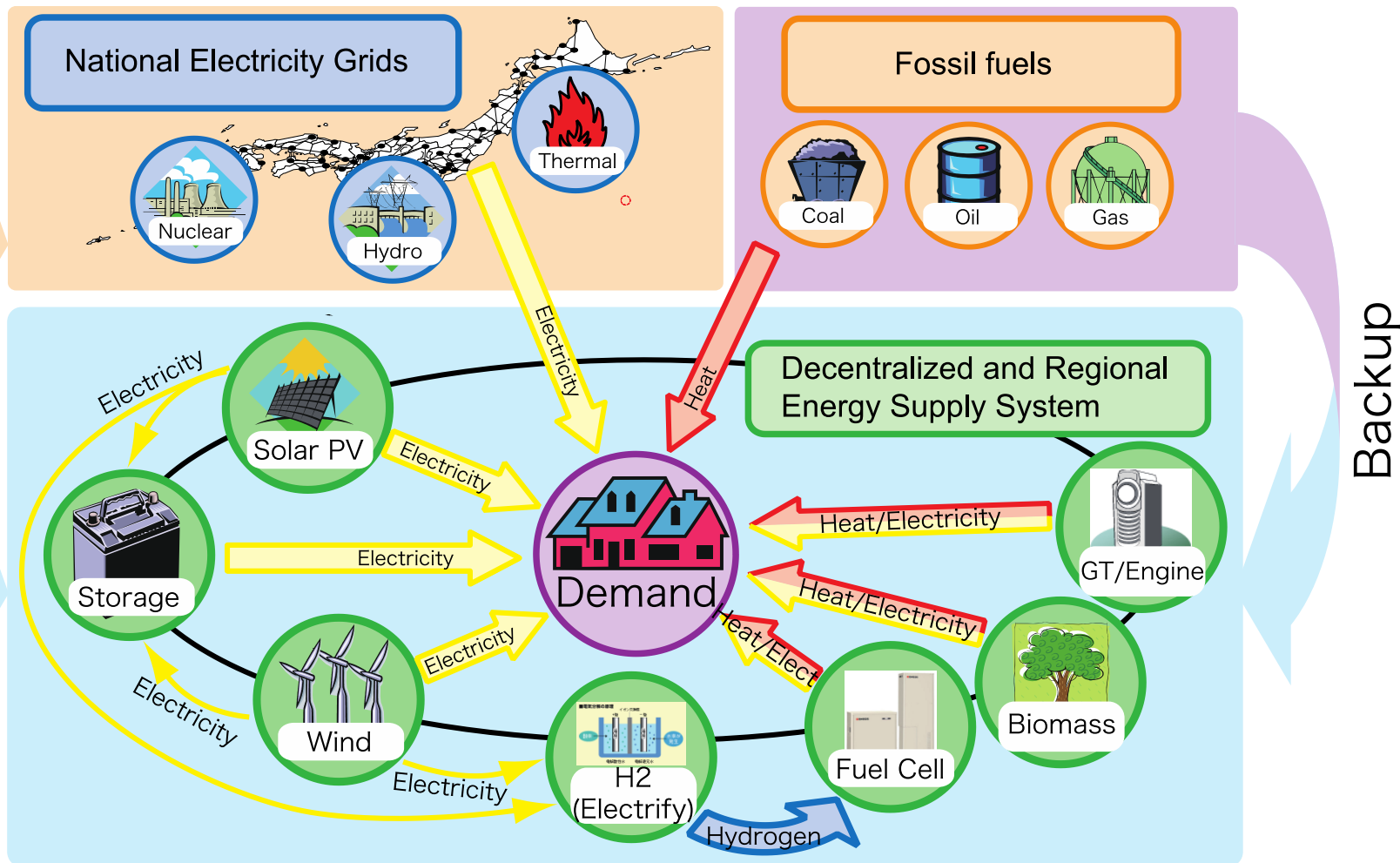
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National Institute for Environmental Studies (NIES)

The 17th AIM International Workshop (17-19 February, 2012)
At Ohyama Memorial Hall, National Institute for Environmental Studies

Toward Low Carbon Energy Supply System

Cooperation between Centralized and Decentralized Energy System



Backup

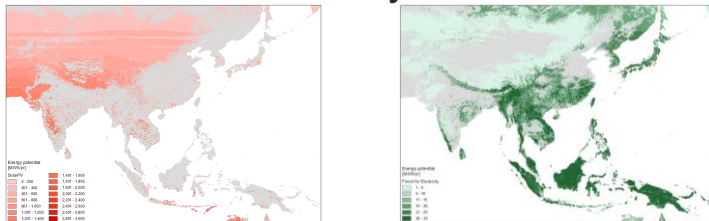
Goal: Assessment of the feasibility and the design of a low carbon energy supply system with renewables

Approach and Expected Contributions

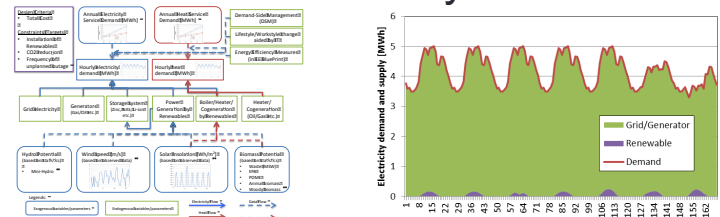
1. Assessment of the technical potential of renewable energy using geo-referenced data
 - Expected Contribution to: Global Models (AIM/Enduse, CGE, BCM), Asia LCS (S-6, SATREPS), EMF
2. Designing local energy supply system with renewables based on simulation analysis of hourly demand-supply balance of energy.
 - Expected Contribution to: Asia LCS (S-6, SATREPS), A-1103

Assessment of the feasibility and the design of a low carbon energy supply system with renewables

Technical Potential of Renewables based on GIS analysis



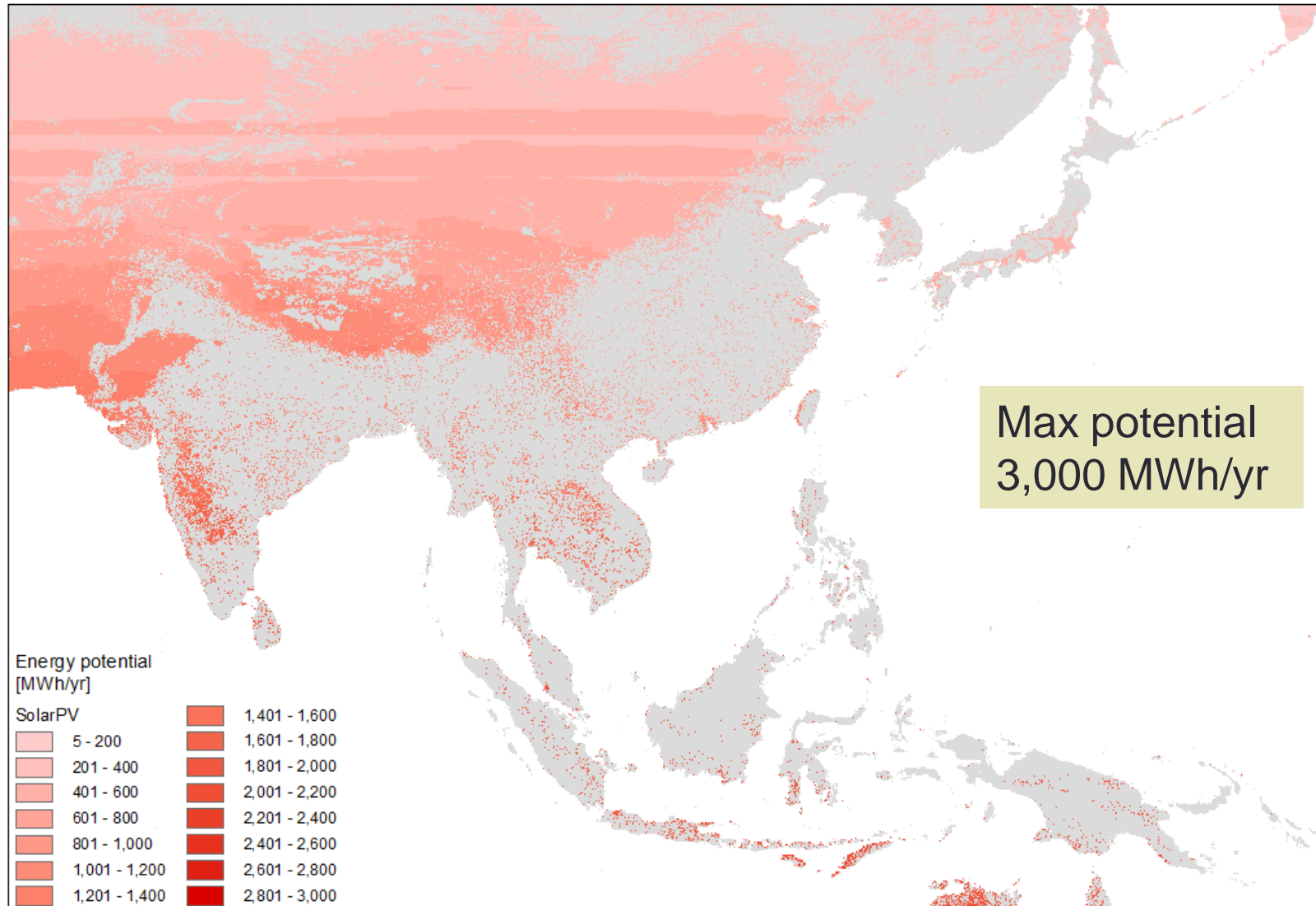
Designing energy system based on simulation model analysis



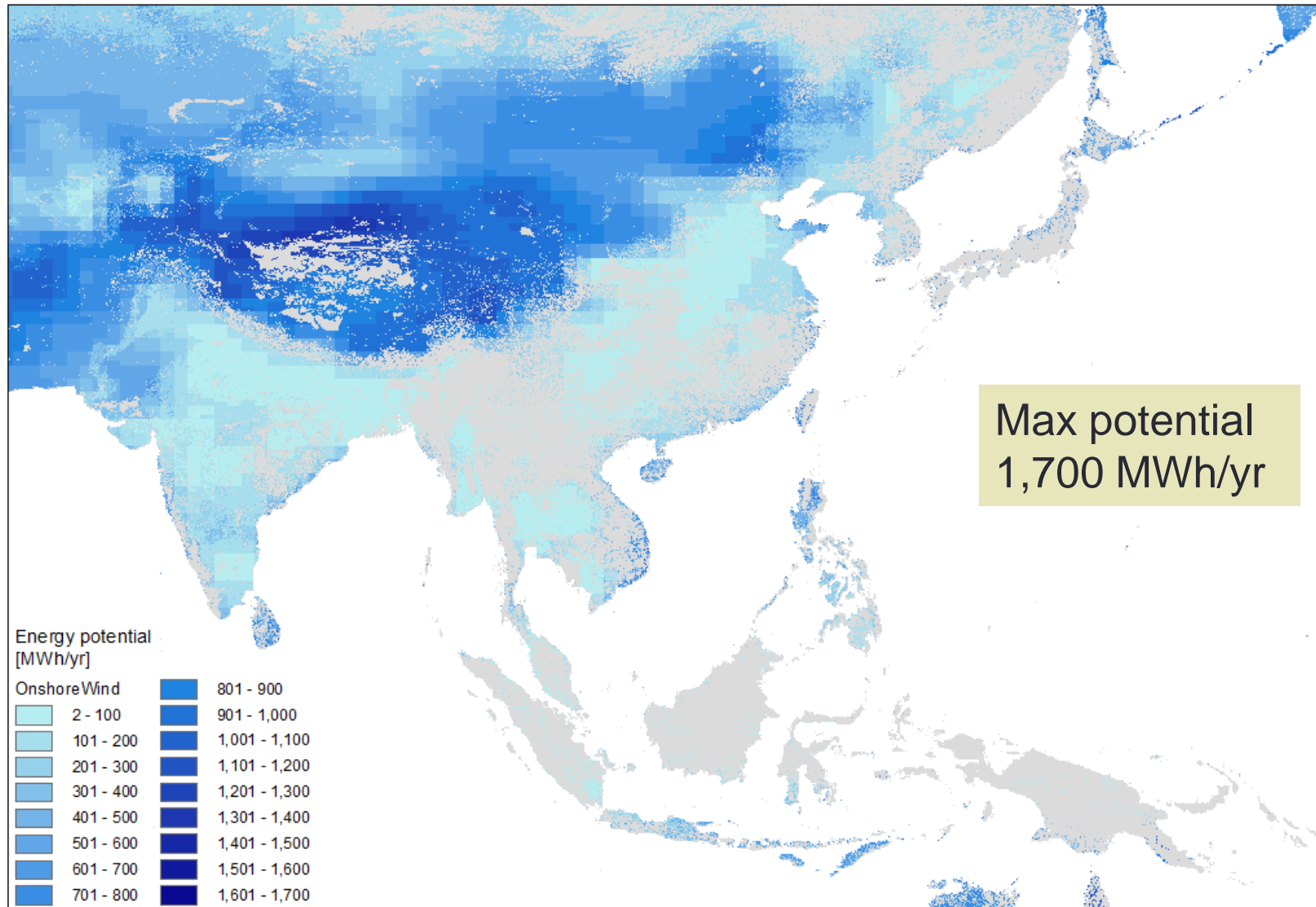
1. Assessment of Technical Potential of Renewables: Overview

- **Covered types of Renewables**: Solar, Wind (Onshore)
 - Biomass potential estimation is currently under development.
- **Input**: Global data for Insolation, Wind Speed, Land Cover, Elevation and Wilderness Area
 - Data Source: NASA LaRC Atmospheric Science Data Center, National Geophysical Data Center, Sierra Club and World Bank
- **Output**: Technical potential by Country and Grid (30'x30'), Resource cost curve
- **Model Manual**: Available from AIM Web site
(<http://www-iam.nies.go.jp/aim/datalibrary.htm>)

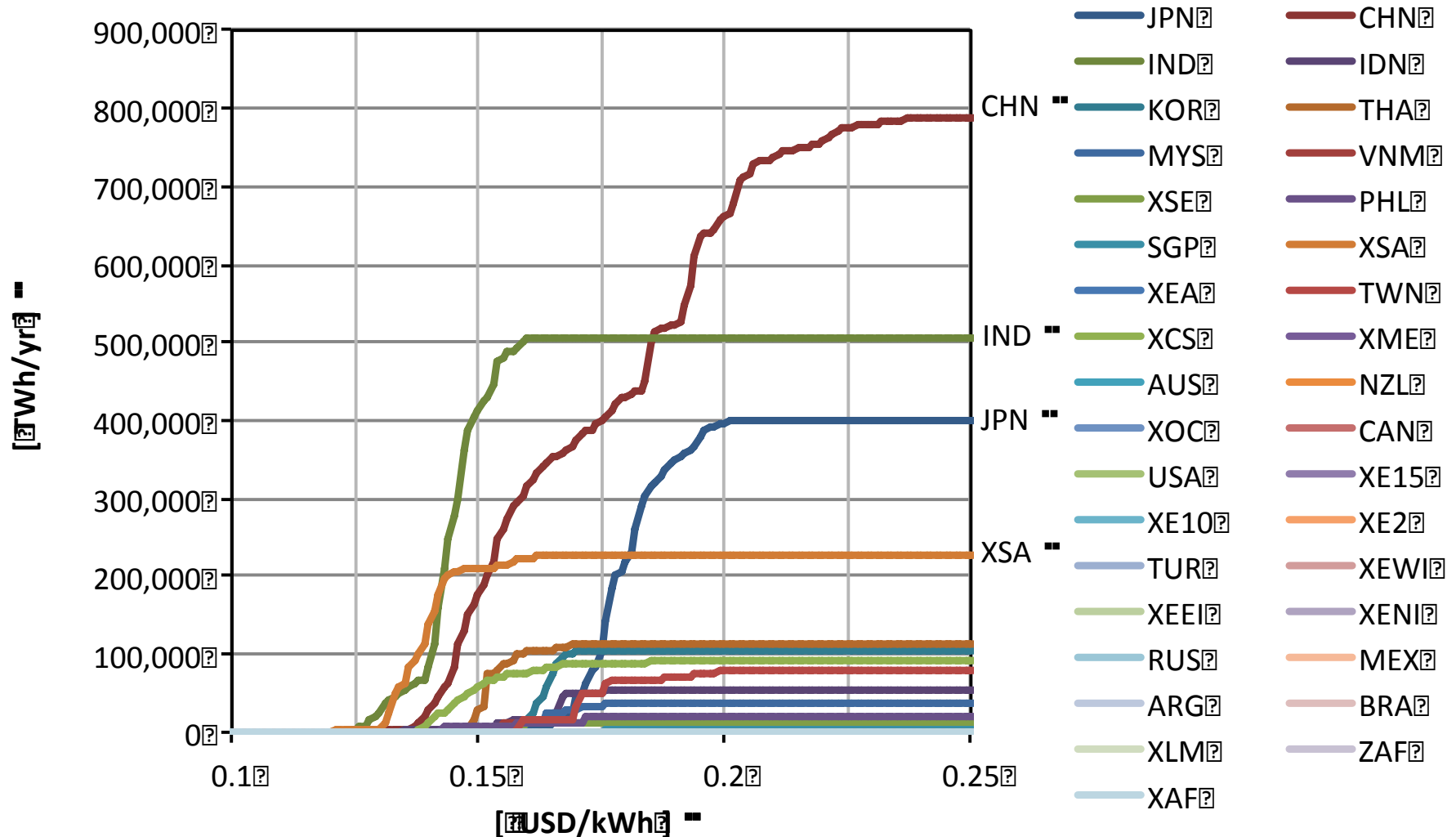
1. Assessment of Technical Potential of Renewables: Example of Outputs – Potential for Solar PV



1. Assessment of Technical Potential of Renewables: Example of Outputs – Potential for Onshore Wind



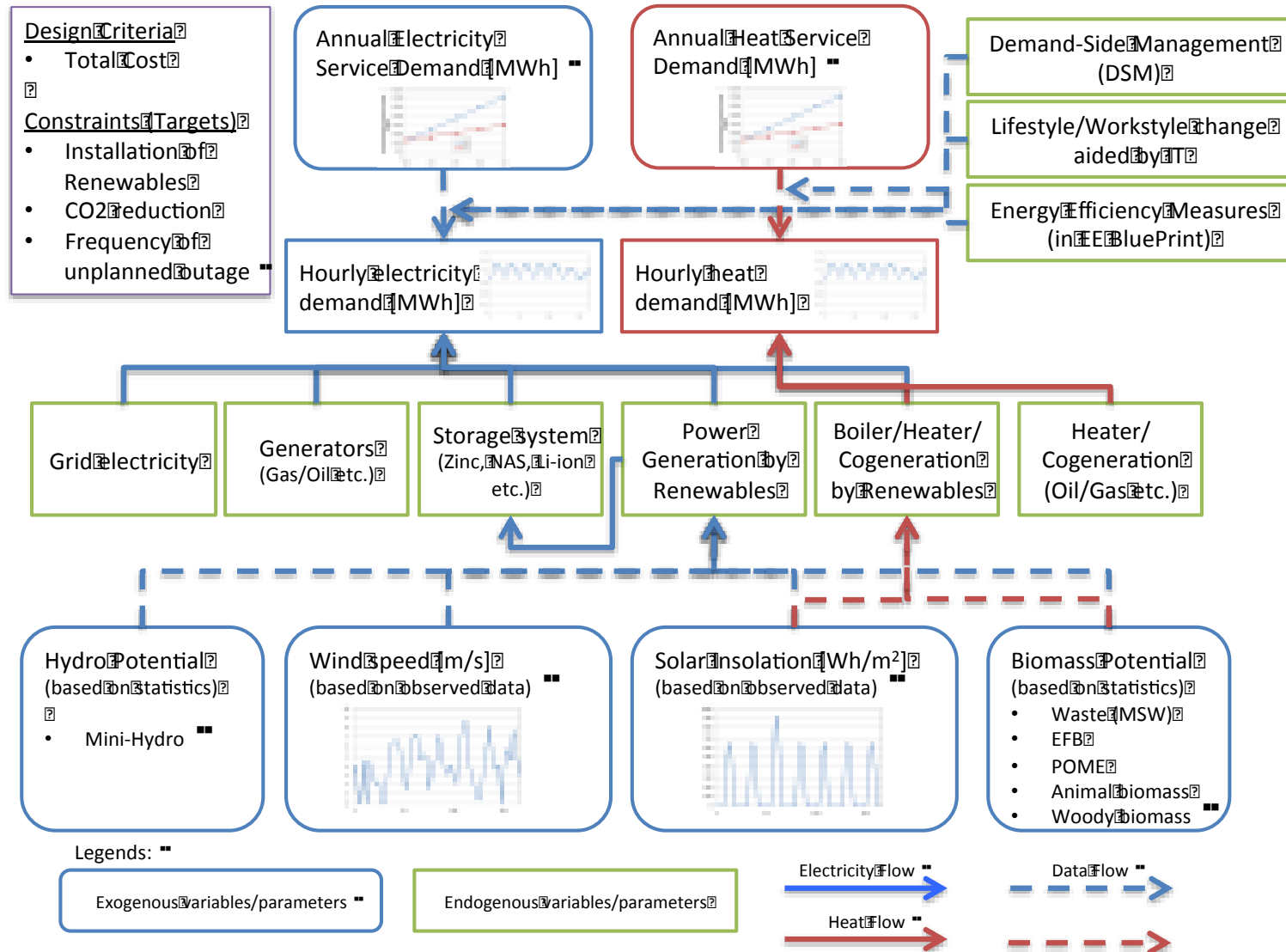
1. Assessment of Technical Potential of Renewables: Example of Outputs – Resource cost curve for Solar



2. Designing energy system based on model analysis: Overview

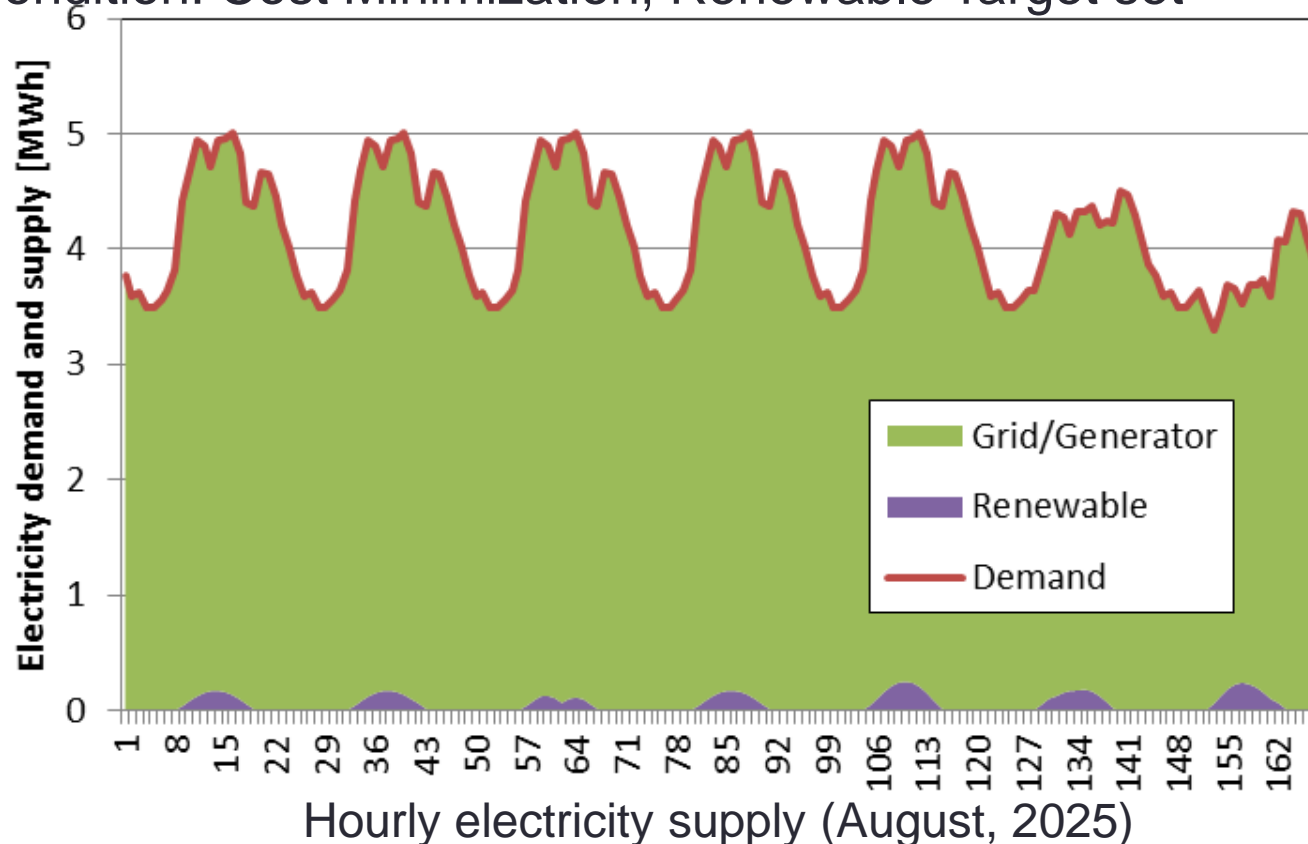
- **In Collaboration with**: Tetsuya Hidaka, Yuri Hayashi, Kei Gomi, Gakuji Kurata and Yuzuru Matsuoka (Kyoto Univ.)
- **Target Region** (Currently): Iskandar, Cyberjaya (Malaysia), Kansai region (Japan, by Hidaka)
- **Input**: Hourly energy demand, hourly condition for renewables, technological potential for renewables, target for renewables, and performance and cost information for system elements
- **Output**: System configuration, hourly energy balance and total energy consumption, system cost, GHG emissions, and frequency of unplanned outage.
- **Model Manual**: Japanese version is almost available, and English version will be available by April, 2012.

2. Designing energy system based on model analysis: Overview of AIM/ESM [Local]



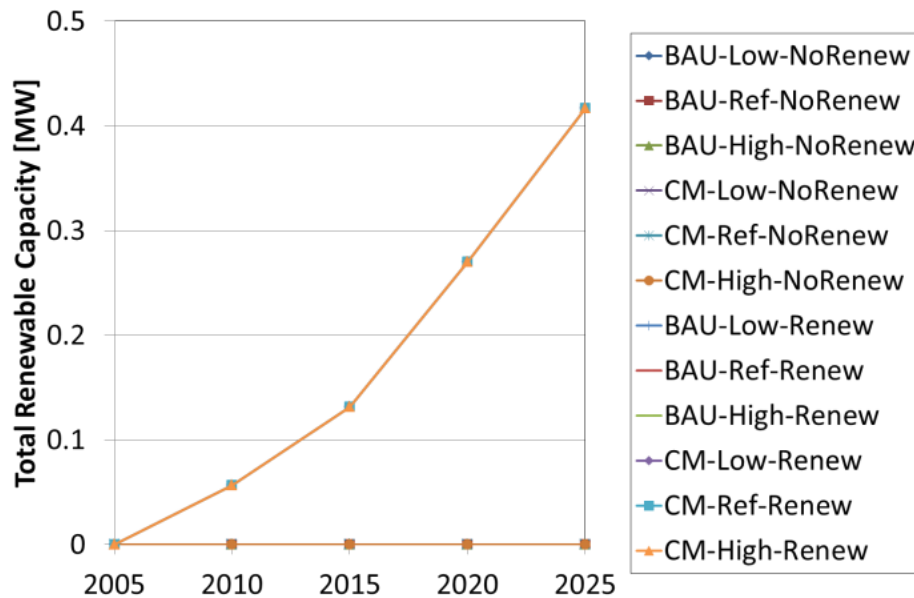
2. Designing energy system based on model analysis: Example of outputs – Hourly energy balance (From preliminary analysis of Iskandar Malaysia)

- PV supplies small part of electricity demand in daytime, and almost of electricity demand is covered by grid.
- Condition: Cost Minimization, Renewable Target set

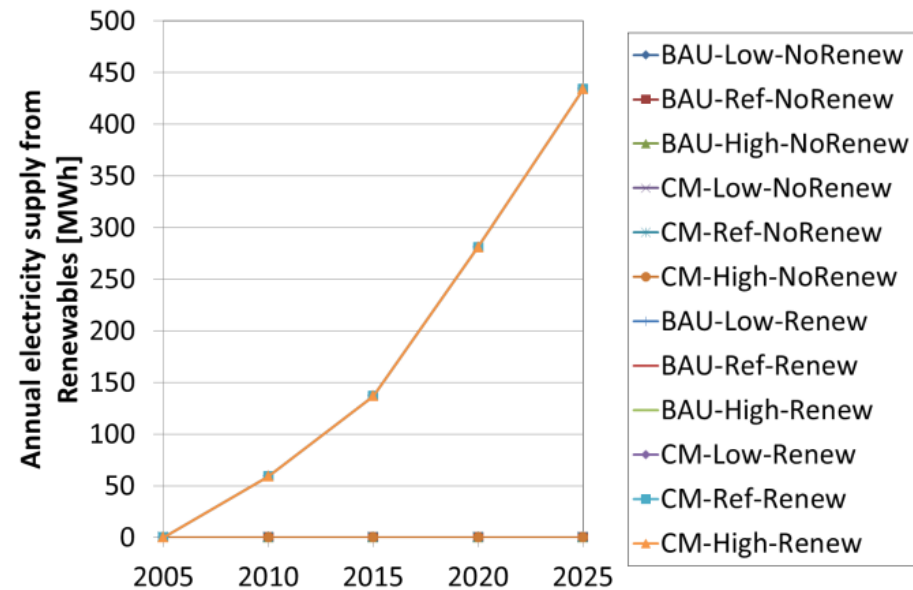


2. Designing energy system based on model analysis: Example of outputs – System Configuration and Annual Energy Consumption (From preliminary analysis of Iskandar Malaysia)

- Renewables does not install from now to the future under the cases that has no renewable target (NoRenew cases)
- Renewable target increase in the installation of renewables, especially PV



Total capacity of renewables [MW]



Annual electricity supply from renewables [MWh]

Thank you for your attention!

Your comments and suggestions are always welcome!

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