

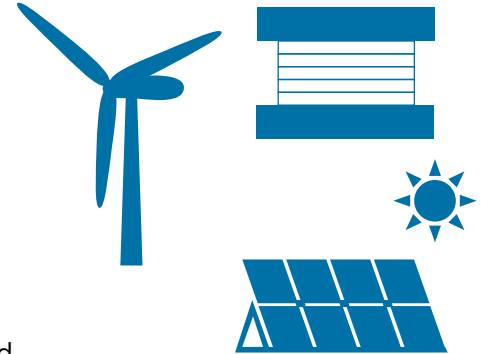
OmegaLand Renewable Energy Library

Renewable energy equipment unit model for Visual Modeler

What's Renewable Energy Library?

The Renewable Energy Library is an optional add-on library for "Visual Modeler", the plant dynamic simulator at the core of the integrated dynamic simulation environment "OmegaLand".

The library consists of modular equipment units for wind power generation, solar power generation, and water electrolysis systems. The wind power unit represents power output fluctuations by taking into account wind speed occurrence characteristics and turbine characteristics. The solar power unit calculates power generation from installation conditions and weather data. The water electrolysis unit reproduces the amount of hydrogen produced according to the supplied electrical power.



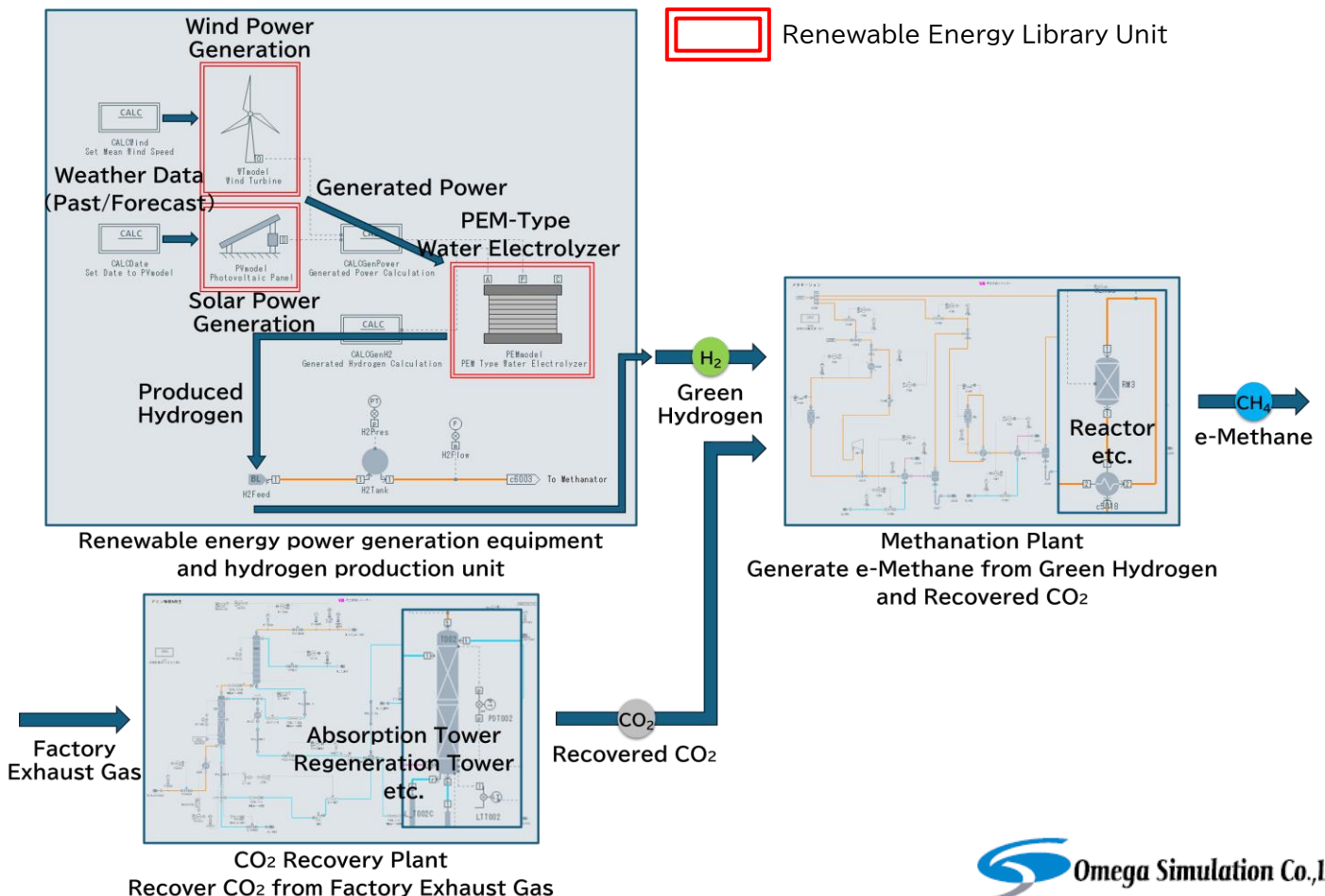
Why do we need Renewable Energy Library?

In recent years, the adoption of renewable energy facilities such as wind and solar power generation has been expanding in response to decarbonization initiatives. Since the power output of these facilities varies depending on weather and environmental conditions, it is important to consider their impact on power supply-demand balance and energy utilization during system design and operation. By utilizing the Renewable Energy Library, dynamic simulation of power generation fluctuations from wind and solar power systems, as well as hydrogen and oxygen production from water electrolysis systems according to the available power output, can be performed within the simulator. Furthermore, when combined with plant models developed in Visual Modeler, the library can be used for power supply-demand balance studies, analysis of the impact of renewable energy fluctuations on plant operations, and evaluation of optimal operating plans.

Supports the operation and planning of renewable energy facilities

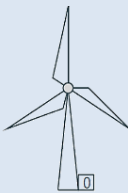
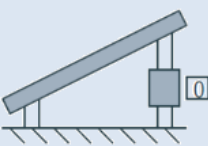
Configuration Example

Example of a carbon-neutral process model built with the Renewable Energy Library.



Provided Unit

The table below summarizes the units provided in the Renewable Energy Library.

Unit	Description
 Wind Power Generation	Using the average wind speed as input, the wind speed is calculated by a probabilistic wind condition model based on the Weibull distribution, and the amount of power generation is calculated from the calculated wind speed by a dynamic model that takes the inertia of the wind turbine into account.
 Wind Power Generation (DCS)	The basic functions are the same as those of the unit described above. This unit allows the average wind speed to be input via a nozzle connection.
 Photovoltaic Power Generation	Using meteorological data such as the calculation start date, the installation conditions of the PV panels, the ambient temperature, and the global horizontal irradiance, the solar position and other parameters are calculated, and the amount of power generation is calculated.
 PEM Water Electrolysis	Using electric power supplied from an external source, the amount of hydrogen production is calculated. This model is a unit model consisting of voltage estimation, heat balance calculation, electrolyzer pressure calculation, and material balance calculation.

For more information, please contact

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