

# **Design and Optimisation of Hybrid Microgrids**

**OHMig<sup>TM</sup>**

**A Dynamic Model for Designing and Optimising  
DRE-based Hybrid Power Plants for Microgrids.**

## **A Decentralised Microgrid for Reliable Power and Energy Supply to Rural Customers.**

An Demand-driven financially-viable business model for social & economic progress without pollution and CO<sub>2</sub> emission.

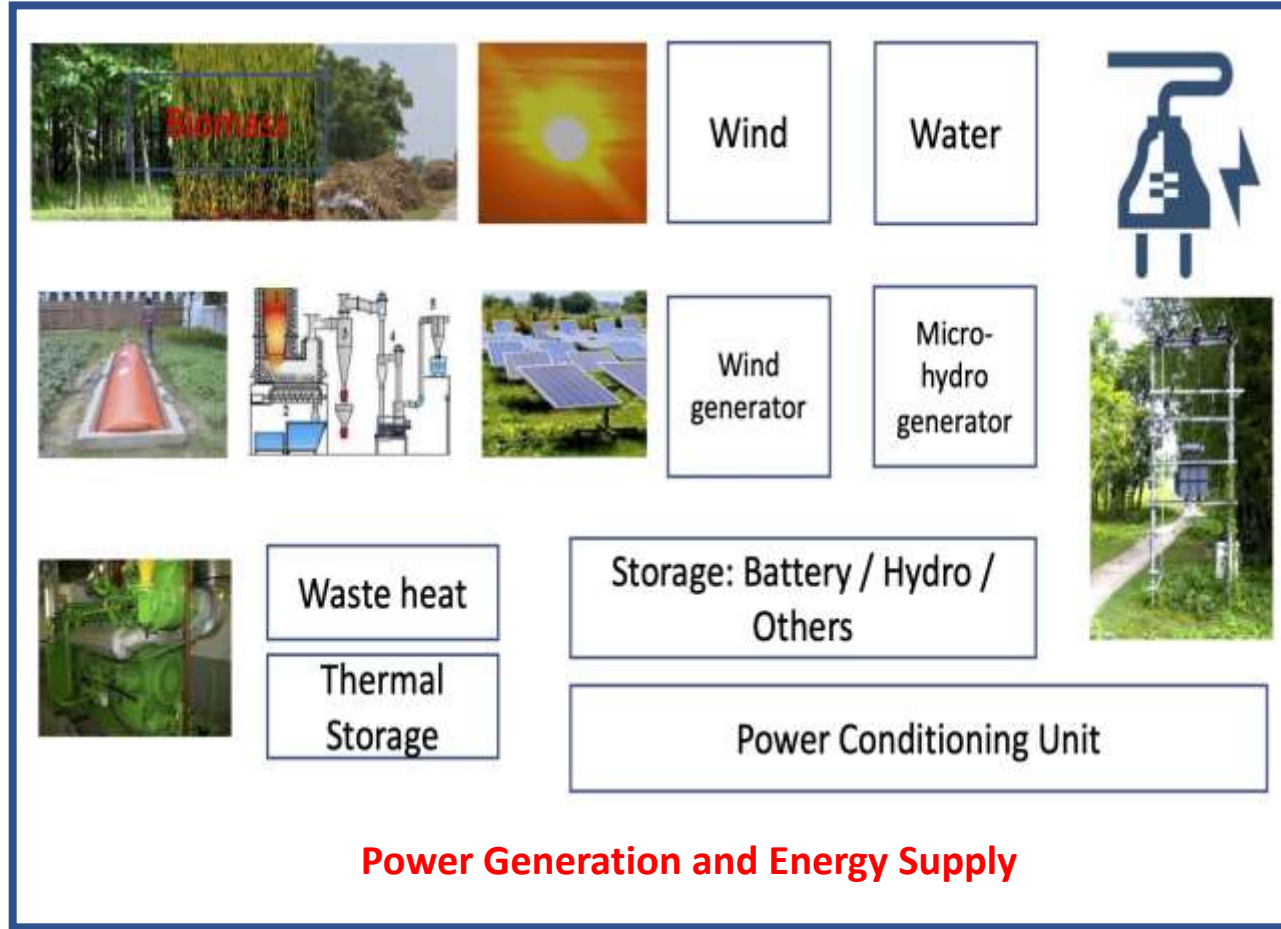
- Hybridised renewable energy power generation is based on local energy and other resources.
- The Microgrid supplies reliable and affordable power to at least one large and any number of smaller consumers of electricity, process heat, and process and/or comfort cooling.
- The configuration and ratings are optimised to meet the power demand at any time as defined by the load profile at the lowest generation cost. The parameters are:
  - Load profile of prospective customers.
  - Climatic and other local conditions.
  - Technologies and ratings of power generation and storage systems.
  - Capex and Opex.
  - Expected tariffs.
  - Financing conditions.
  - Linkage to local distribution grid.
  - Assessment of social and environmental impacts.
- Smart power system control and management is used for ensuring that connected loads are supplied with assured reliability and at the lowest cost.
- Planning and optimisation is done by a specially developed modelling tool using system dynamics simulation techniques.

## PROBLEM STATEMENT

- Microgrid Developers are required to size their plant to achieve high reliability in a financially viable manner. Microgrid developers are now moving to RE sources such as Solar which have intermittency. Often, the load demand is also highly varying.
- This is a challenge to Microgrid developers as if they undersize the system, they will not achieve the required availability and will lead to customer dissatisfaction. On the other hand, if they over size the system they will not be financially viable.
- Most commercially available software predict the performance of the system on an annual or monthly basis which may deem the system to be sized optimally but there may be deep/large variations on a day basis which will end up in improper load management.
- Sometimes, the software available either do not replicate the developer's requirement exactly or the developer may want to analyse variables which are not available within the software.



**Assessment and Analysis of Demand**



**Power Generation and Energy Supply**

**Assessment of local resources; selection of reliable technologies and configurations; calculations to ratings optimise ratings and generation strategy to meet specified demand at any time at the lowest cost.**



**Manage Generators and Storage (lowest-cost).**

**OHMig™ : Sequence of calculations for optimising a DRE-HYBRID Microgrid for reliable and profitable power and energy supply to Local consumers.**