

# Optimum power system distribution in India considering feasibility of electrification process and the dynamic change in socio-economical environment

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## **(1) Overview**

Electrification is crucial in order to pursue modern economic activities and to solve the issue of energy poverty. In rural India, the ratio of households that have access to electricity is now about 55 %. Decentralized power systems could be a solution to solve the lack of electrification in rural India. Various options exist for decentralized power systems; however there are many cases where a lack of financial resources has prevented the process of electrification. Therefore a feasibility study that considers demand and purchasing power of consumers is important to evaluate the electrification work.

## **(2) Methods**

In this study, a dynamic evaluation model that considers income and demand of consumers, economics, energy logistics, state of the power grid and weather conditions is developed for planning sustainable electrification works. Following four types of electrification, namely, national grid extension, diesel generator connected to a micro-grid, biomass gasifier connected to a micro-grid, and a small wind turbine connected to a micro-grid are compared in about 5000 regions by linking to respective geographic information.

## **(3) Results**

According to the simulation, the electrification rate will reach 100% within twenty years by choosing appropriate type of electrification. The most feasible power system changes dynamically according to changes of regional characteristics. The appropriate type of electrification for each region is plotted on a mesh map and an optimum power system distribution in India as shown in figure 1 is acquired.

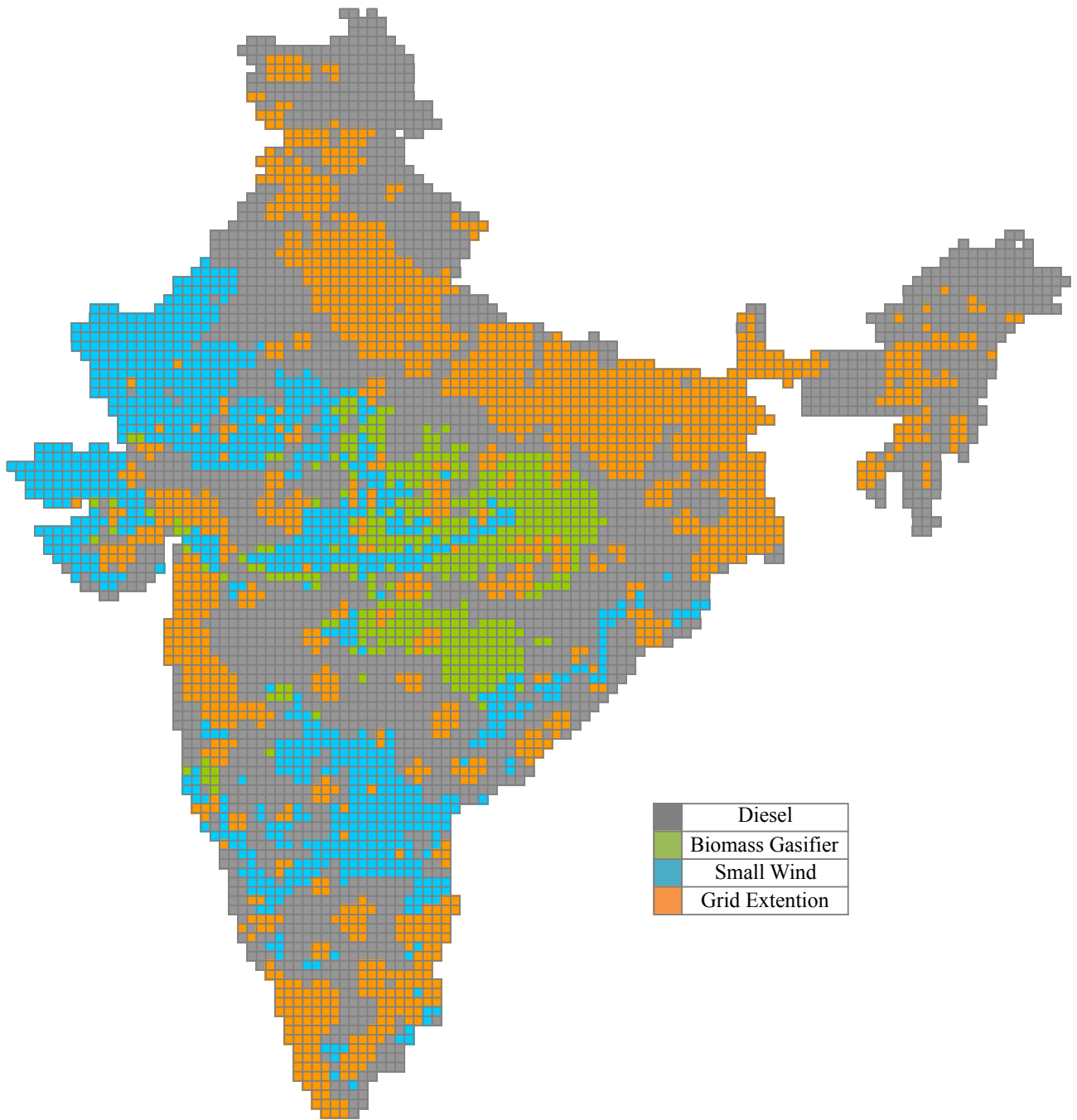


Fig.1. Optimum power system distribution in India

#### (4) Conclusions

The general guidepost of power system selection for electrification work in India is indicated from the results of this study.