Study on the feasibility of using ENERGYSCOPE for long-term energy planning in Cuba

1. Introduction

Long-term energy planning is one of the priority tasks on which all the countries of the world are focused. Cuba is a developing country that presents serious economic problems and extreme weather conditions. The deterioration of energy technologies, limited energy resources, the occurrence of high intensity tropical cycles, high environmental temperatures, economic embargos, among other factors, require the provision of a tool to help deciding more sustainable strategies.

2. Goals

- Assimilation of the Swiss ENERGYSCOPE (Moret 2017) model methodology.
- Analyze the adjustment of the model to the Cuban energy system.
- Identify the possible factors that limit the adaptability of the model.

3. Methodology

The Swiss EnergyScope is a model based on identifying optimal energetic strategies by minimizing total annual costs or GHG emissions. The temporal scale of projection of the scenarios is 20 years.

Main model input: the end-use energy demand, the resource availability, the annual cost of the technologies involved in the simulation.

Model output: annual energy production, CO2 emission per resource, maintenance cost, operation cost, investment cost, total annual cost.

4. Results - 2015

- Good performance
- Bad performance

Projection 2035 is performed
Projection 2035 is not performed

5. Conclusions

1. The ENERGYSCOPE model is not capable of adequately simulating the Cuban energy system.
2. The result suggest the ENERGYSCOPE model not to be generalizable.
3. The results obtained for the year 2015 demonstrate the AMPL source solver is more suitable for this type of scenario.
4. In order to successfully apply the ENERGYSCOPE model to Cuba, the way the model manages energetic system should be reformulated, especially excluding Power2Gas, Gasification and the District heating network.