This document shortly reports the results of the use of the LOGiC sizing tool. This introduction describes the input values used to perform the calculations.The system is assumed to be located at or close to dumadr.

Microgrids

In order to make this report comprehendable to the user the general properties of a microgrid are shortly discussed.
A microgrid is a local energy system that is capable of generating, storing and delivering energy locally. Microgrids can be both connected to the main grid (grid-connected microgrids) as well as being completely isolated (off-grid microgrids). The microgrid considered in this assessment is a off-grid microgrid. This means that the microgrid has to generate all electrical energy consumed in the grid locally and that no extra energy can be bought from external parties. Shortages are fulfilled by using a back-up diesel generator. There multpile possible reasons to apply a microgrid:

- No grid is available (remote location)
- There is a grid availble, but is is not reliable (enough)
- The wish to generate the own energy locally as a stakeholder or a community

In all cases renewable sources are often considered as a possible source of energy for the microgrid, either from an economic or a sustainable driver. In the case of this microgrid the following sources are considered: wind power, solar power and a back-up generator combined with a storage facility.

System sizing

The calculation described above has resulted in the following system:

Component	Capacity	Unit
Installed solar power	11.54	kWp
Installed wind power	0.00	kW
Installed backup power	4.55	kW
Installed storage capacity	5.13	kWh
Power of storage facility	2.56	kW

Table 1: Sizing of the main components of the system

The system defined by the parameters above realises a levelised cost of electricity of €0.61 per kWh. the system does this at a renewable energy share of 28.7 %.

System economics

In order to assess the economics of the system the following economic parameters have been assumed:

Variable	Value	Units
Fuel price	1.30	€/liter
Annual change in fuel price	0.05	€/liter
Import tax	0.00	%
WACC	16.00	%

Table 2: Economic input variables

The investment costs associated with the use of the different main components are assumed to be:

Component	Investment costs		Units
Solar	€	2,800.00	kWp
Wind	€	2,500.00	kW
Backup generator	€	820.00	kW
Storage capacity	€	20.00	kWh
Storage power	€	500.00	kW

Table 3: Per unit investment cost of the main considered system components

Based on these the investment costs of the main components of the system are estimated as:

Component	Investment cost	
Solar modules	€	27,564.80
Wind turbines	€	0.00
Backup generator	€	4,575.46
Storage facility	€	1,678.89

Table 4: Investment cost of the system

The operational expenditure is estimated as:

Component	Annual pu OPEX		Units
Solar panels	€	25.00	kWp
Wind turbines	€	0.00	kW
Backup generator	€	0.05	kW
Storage capacity	€	6.75	kWh
Storage power	€	0.00	kW

Table 5: Operational expenditure of the main components of the system

Societal environment

Apart from the quantitative factors tht determine the sizing of the system in the technical sense, there are also societal, quantitative factors that

should be taken into account when making investment decisions regarding the installation of an (off-grid) microgrid. This section gives some important societal factors.

first

first societal factor

Conclusion

body text

Used input data and method

The timeseries used in and resulting from the calculations are listed on this page.

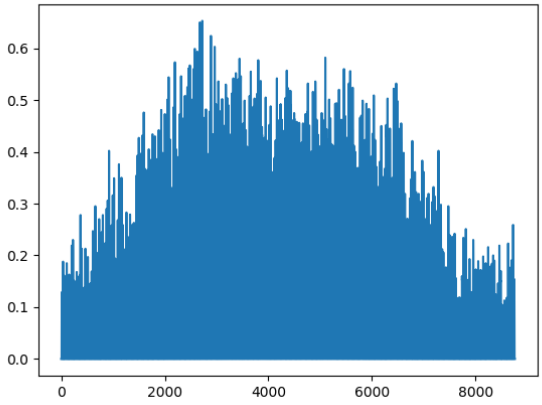

Figure 1: Time series of the solar energy production in kW per kWp of installed solar power

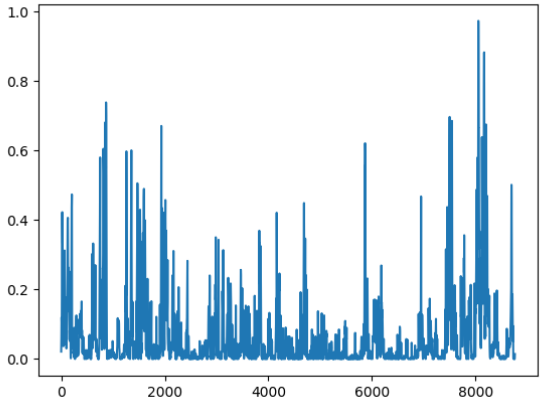

Figure 2: Time series of the wind energy production in kW per kW of installed wind power

Contributors

The Microgrid Assessment Tool has been developed by the LOGiC Team at the Off Grid Test Center.
The tool is based on the Offgridders tool, initially developed by Martha Hoffmann at the Reinier Lemoin Instute in Berlin, Germany.
Based on this work and with financial support by LOGiC the team was able to succesfully developt this implementation.
Other contributers to the tool are:

- Alex and Stan Bankras at Stalex (web development)
- Ewout van der Beek at NEDU (data interpretation)
- Wind Energy Solutions BV (general support)

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