

# IntiGIS 2 Model

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# Introduction

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**IntiGIS2 is a tool for:**

- Calculating Levelized Electricity Cost (LEC) for different Electrification technologies.
- Determining the most competitive electrification technology options to electrify un-electrified communities.
- Generating reports of cost of applying various electrification technologies.
- Performing what-if analysis on a number of parameters.

# Introduction

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## History

- Originally developed at CIEMAT (SPA) by Javier Dominguez Bravo *et. al.*
- Worked with older systems not supported presently.
- Not optimized for modern computers.
- User Interface (UI) in Spanish

## Redevelopment

- Redeveloped by The Energy Center, KNUST (GHA) under the ECOWREX II project, by a team led by Franz Alex Gaisie-Essilfie.
- Target newer systems (operating systems and GIS software requirements) with long-term support.
- Optimized algorithms.
- Updated UI to English.

# Running the Model

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# Inputs

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## DATA REQUIREMENTS

- Area of study
- Households density
- MV and LV power lines
- Solar irradiance raster
- Average wind velocity raster

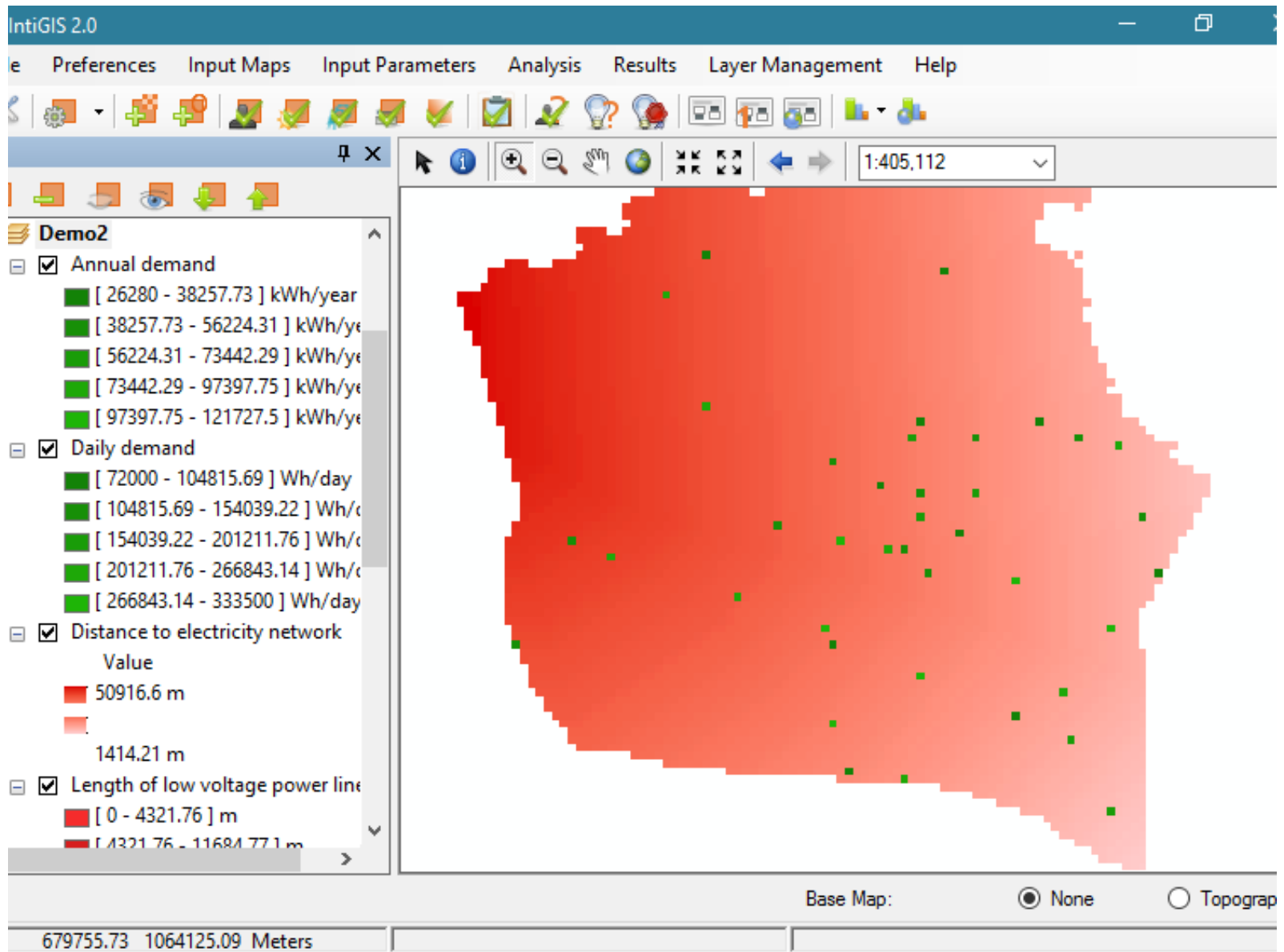
## PARAMETERS

- Electricity demand per household
- Economic Parameters
  - Electricity Tariff
  - Diesel cost
- Parameters of subcomponents

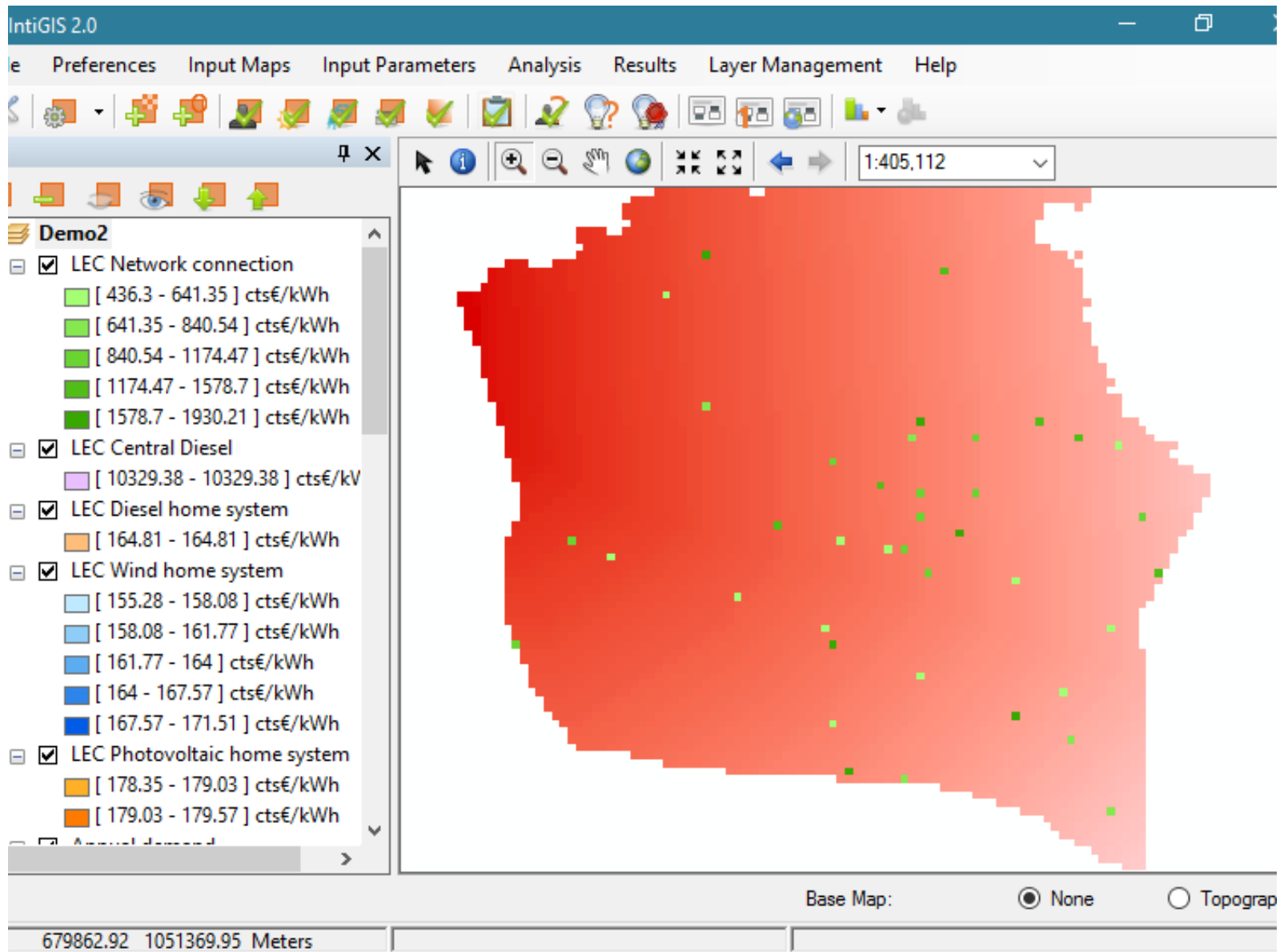
# Outputs

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- Graphic Outputs (maps)
- What-if analysis with graphs
- Numeric Results

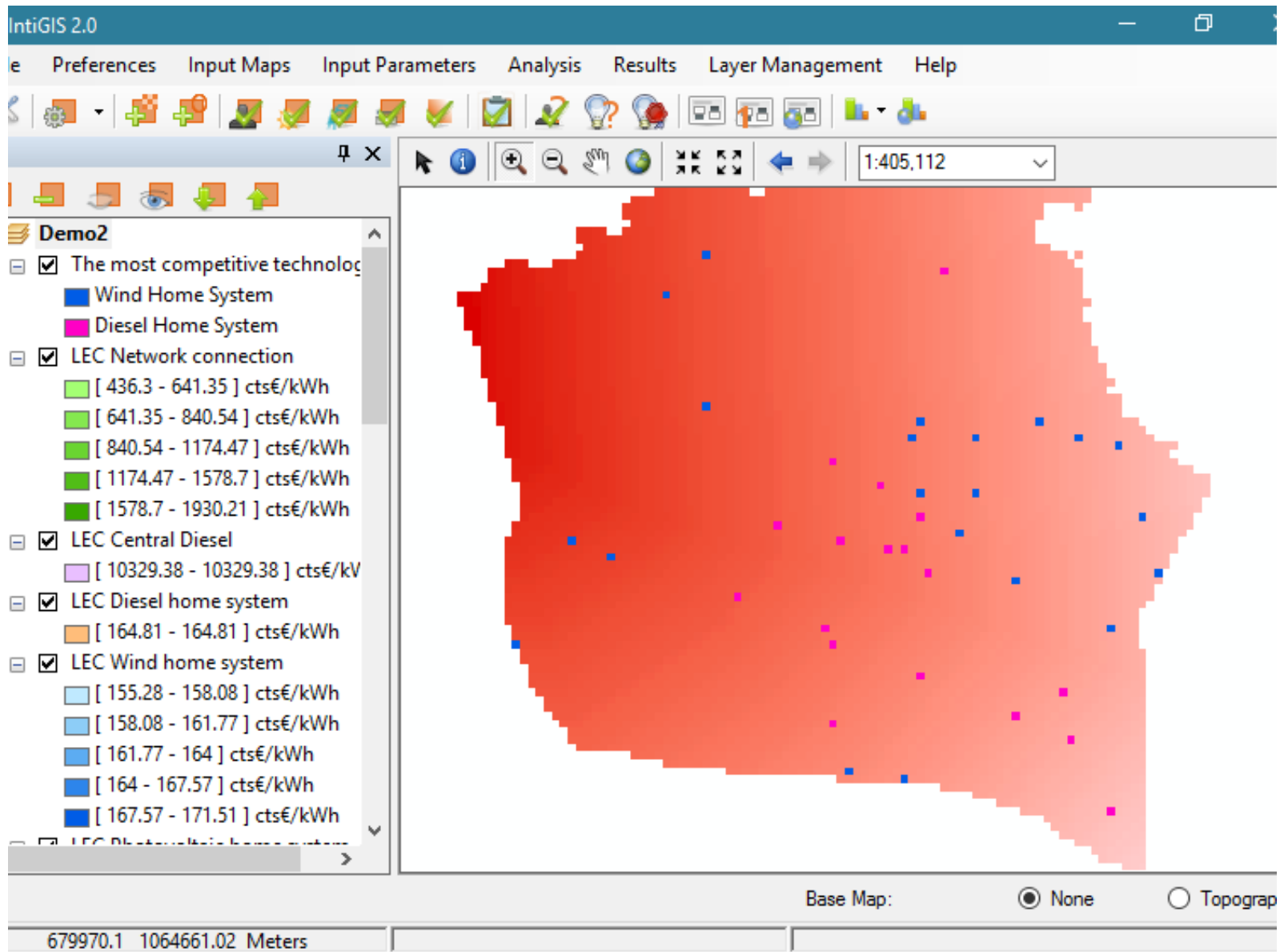


Calculated Annual Demand Values



LEC for each technology





## Most Competitive Technology

## SSA for a technology

### Variable

Choose the technology

Photovoltaic

Choose the variable

Radiation

### Study range

Reference value 5.35 kWh/m<sup>2</sup> yearMinimum value 2.675 kWh/m<sup>2</sup> yearMaximum value 8.025 kWh/m<sup>2</sup> year

### Results

Radiation, Photovoltaic

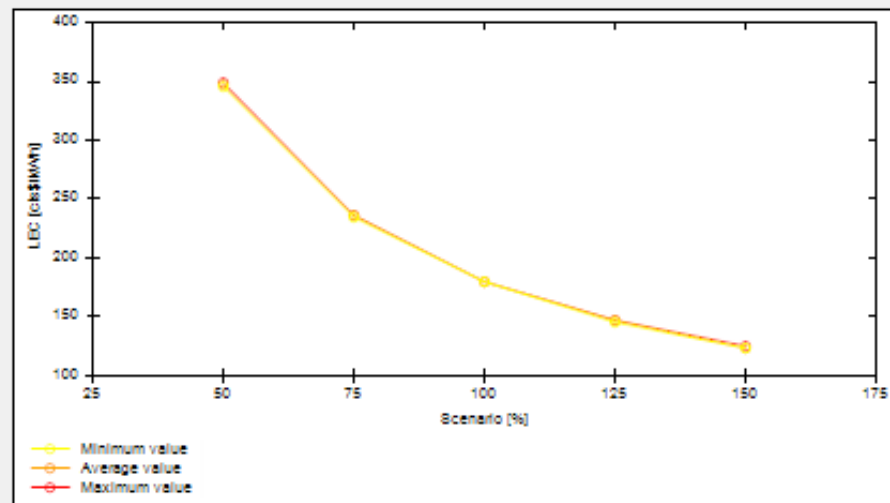


#### Numerical results

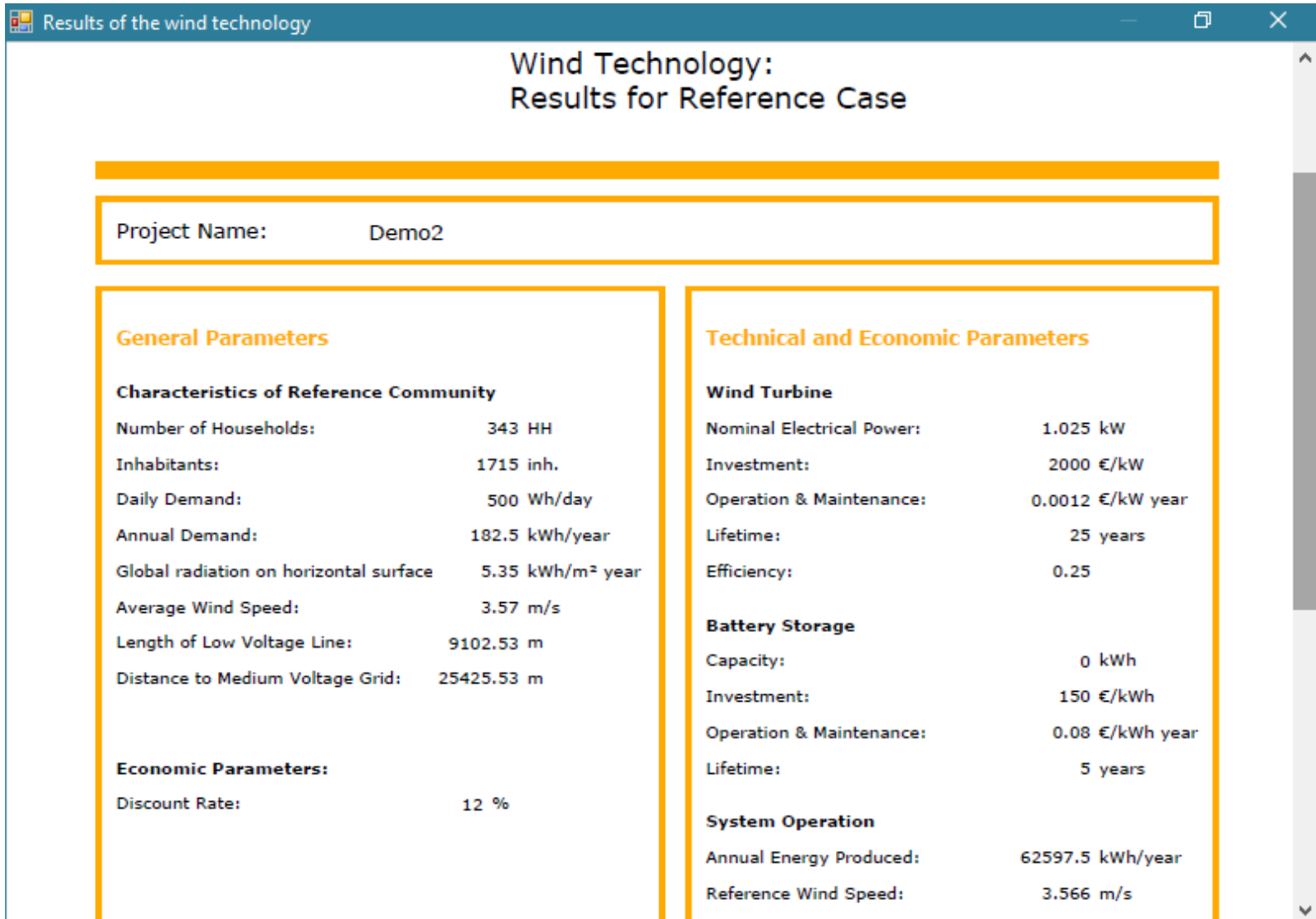


|   | scenario      | Minimum value | Average value | Maximum value | Standard deviation |
|---|---------------|---------------|---------------|---------------|--------------------|
| ▶ | Scenario 50%  | 344.94        | 346.33        | 347.38        | 0.61               |
|   | Scenario 75%  | 233.88        | 234.81        | 235.5         | 0.41               |
|   | Scenario 100% | 178.35        | 179.05        | 179.57        | 0.3                |
|   | Scenario 125% | 145.03        | 145.59        | 146.01        | 0.24               |
|   | Scenario 150% | 122.82        | 123.28        | 123.63        | 0.2                |

#### Graphical representation



# Sensitivity Analysis (What-if)



## Numeric Results

# Final Notes

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## Requirements

- Microsoft Windows 7, 8, 8.1, 10
- ArcGIS v10.3 or newer
- .NET Framework 4.0
- A preferred PDF viewer

## Gotchas

- English locale only
- Errors generally mean you have entered wrong/invalid data

# Merci pour votre attention

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THANKS FOR YOUR ATTENTION