



MAEP User's manual v.0

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Electrical analysis and planning - MAEP

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5. **ISAGEN:** Specific agreement No. 2. Interinstitutional framework agreement No. 47/353.

6. **CEIBA:** Center for Interdisciplinary Studies in Basic and Applied Studies in Complexity.

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1. First steps

1.1. Online execution

1.1.1. Platform

1.1.2. Type of users

- Administrator:
- Standard:
- Limited:

1.1.3. Input data

Table 1

Library	Description

1.2. Local execution

```

dir
├── docs
│   ├── docs_readme.txt
│   ├── manual_usuario_esp
│   └── user_manual_eng
├── web_interface
└── MAEP
    ├── ConsoleMAEP.py
    ├── datasystem
    ├── gurobi.log
    ├── __pycache__
    ├── pyomo_model.txt
    ├── reports_utils
    ├── results
    ├── savedata
    ├── scripts
    ├── temp
    ├── templates
    └── utils
  
```

Fig. 1

1.2.1. Source code

Table 2

Library	Description

1.2.2. Development

1.3. Repository

```

dir
├── docs
├── web_interface
├── MAEP
│   ├── scripts
│   │   ├── backward.py
│   │   ├── forward.py
│   │   ├── __init__.py
│   │   ├── main_model.py
│   │   ├── optimality.py
│   │   ├── __pycache__
│   │   ├── readData.py
│   │   └── run_model.py
│   └── utils
│       ├── classes.py
│       ├── efunction.py
│       ├── file_results.py
│       ├── __init__.py
│       ├── input_data.py
│       ├── input_hydro.py
│       ├── input_others.py
│       ├── input_wind.py
│       ├── objcalculation.py
│       ├── opf_data.py
│       ├── parameters.py
│       ├── paramvalidation.py
│       ├── pll_simulation.py
│       ├── __pycache__
│       ├── readWind.py
│       ├── readxls.py
│       ├── saveresults.py
│       ├── solvermodule.py
│       └── solver.py

```

Fig. 2

2. Data library



2.1. New projects

Web interface:

Input file:

2.2. Data base

```

dir
├── docs
├── web_interface
├── MAEP
│   └── datasystem
│       ├── colombia_areas.xlsx
│       ├── colombia_nodal.xlsx
│       ├── colombia_uninodal.xlsx
│       ├── ejercicio_areas.xlsx
│       ├── ejercicio_storage.xlsx
│       └── winddata

```

Fig. 3

2.2.1. Test files

2.2.2. Shared information



3. Forecasting resources

3.1. Hydro inflows

Table 3

Parameters	Units	Description	Status
------------	-------	-------------	--------

3.2. Wind speed

Table 4

Parameters	Units	Description	Status
------------	-------	-------------	--------

Note:

Note:



4. Generation units

4.1. Thermal plants

4.1.1. Configuration

Table 5

Parameters	Units	Description	Status
------------	-------	-------------	--------

4.1.2. Expansion capabilities

Note:

4.1.3. Fuel

Note:

4.2. Hydro plants

4.2.1. Configuration

4.2.2. Expansion capabilities

Note:

4.2.3. Hydro chains

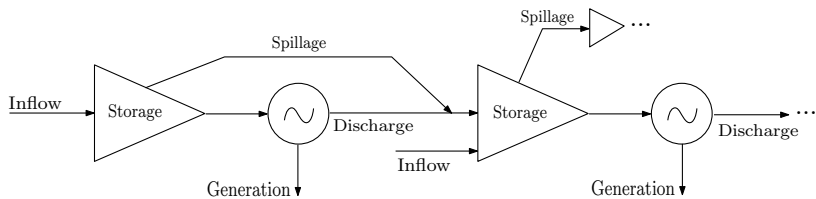


Fig. 4

Table 6

Parameters	Units	Description	Status
------------	-------	-------------	--------

Table 7

Parameters	Units	Description	Status
------------	-------	-------------	--------

Table 8

Parameters	Units	Description	Status
------------	-------	-------------	--------

4.3. Small plants

4.3.1. Configuration

4.3.2. Expansion capabilities

Note:

4.4. Wind power plants

4.4.1. Configuration

4.4.2. Expansion capabilities

Note:

4.4.3. Wind speed intensities

Note:

■ *Experimental module:*

4.4.4. Practical models

Wind power model M2

Note:

4.5. Storage units

4.5.1. Configuration

4.5.2. Expansion capabilities

Note:

Table 9

Parameters	Units	Description	Status
------------	-------	-------------	--------

Table 10

Parameters	Units	Description	Status
------------	-------	-------------	--------

Table 11

Parameters	Units	Description	Status
------------	-------	-------------	--------

Table 12

Parameters	Units	Description	Status
------------	-------	-------------	--------

Table 13

Parameters	Units	Description	Status
------------	-------	-------------	--------

Table 14

Parameters	Units	Description	Status
------------	-------	-------------	--------

Table 15

Parameters	Units	Description	Status
------------	-------	-------------	--------

Table 16

Parameters	Units	Description	Status
------------	-------	-------------	--------

Table 17

Parameters	Units	Description	Status
------------	-------	-------------	--------

Table 18

Parameters	Units	Description	Status
------------	-------	-------------	--------

5. Power system model



5.1. Electrical areas/nodes

Table 19

Parameters	Units	Description	Status
------------	-------	-------------	--------

Note:

5.2. Interconnection

Table 20

Parameters	Units	Description	Status
------------	-------	-------------	--------

5.2.1. Expansion of transmission network

Table 21

Parameters	Units	Description	Status
------------	-------	-------------	--------

Note:

5.2.2. Optimal power flow

5.2.3. Security constraints

Table 22

Parameters	Units	Description	Status
------------	-------	-------------	--------

Note:

5.3. Demand

Table 23

Parameters	Units	Description	Status
------------	-------	-------------	--------

Note:

5.4. Rationing

Table 24

Parameters	Units	Description	Status
------------	-------	-------------	--------

Note:

Table 25

Parameters	Units	Description	Status
------------	-------	-------------	--------

Table 26

Parameters	Units	Description	Status
------------	-------	-------------	--------

5.5. Blocks

5.5.1. Load curve

5.5.2. Storage systems restrictions

Table 27

Parameters	Units	Description	Status
------------	-------	-------------	--------

Note:



6. Parameters

6.1. Type of parameters

Table 28

Parameters	Units	Description	Status
------------	-------	-------------	--------

6.2. Basic parameters

Table 29

Parameters	Units	Description	Status
------------	-------	-------------	--------

6.3. Deterministic/Stochastic

6.4. Risk aversion

Table 30

Parameters	Units	Description	Status
------------	-------	-------------	--------

6.5. Short-term variability

Table 31

Parameters	Units	Description	Status
------------	-------	-------------	--------



7. Output files

7.1. Results

```
dir
├── docs
├── web_interface
└── MAEP
    ├── results
    │   ├── areadispatch_report.html
    │   ├── csv_variables
    │   │   ├── HydroGeneration.csv
    │   │   ├── LevelReservoirs.csv
    │   │   └── spillHydro.csv
    │   ├── General_results.xlsx
    │   └── report_variables
    └── utils
        ├── file_results.py
        ├── __init__.py
        ├── __pycache__
        └── saveresults.py
```

Fig. 5

7.2. Graph module

```
dir
├── docs
├── web_interface
└── MAEP
    └── reports_utils
        ├── curves_report.py
        ├── dispatch.py
        ├── __init__.py
        ├── __pycache__
        ├── reports_1.py
        ├── reports_2.py
        ├── reports_3.py
        └── reports_etc.py
```

Fig. 6

