



# MAEP User's manual v.0

Universidad de los Andes  
Electrical analysis and planning  
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## Electrical analysis and planning - MAEP

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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

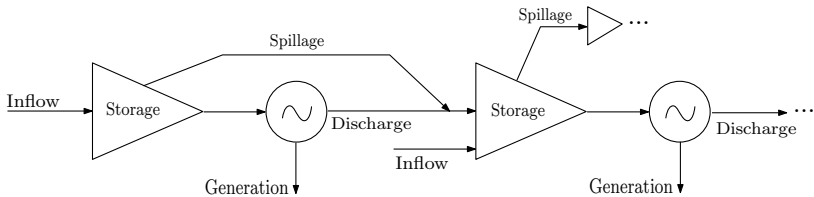


Fig. 4

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**

