



Doing business in the Italian power market

Strategic advisory, financial modelling & price forecast services

A short profile



Summary

1. Financial modeling and investments evaluation
2. Business strategy and market advisory
3. Market trends and price forecast
4. Storage evaluation model
 - a) PV coupled with BESS
 - b) Stand-alone BESS
5. Knowledge of the Italian plants fleet to evaluate investments
6. Power Purchase Agreements (PPA)

An overview

Althesys assists energy players and investors in analyzing power markets and their future trends in order to define strategies for value creation

In a complex and rapidly evolving framework, Althesys provides an in-depth view of the power markets, offering:

- Markets insights of offer-demand evolution
- Electric system trends & scenarios
- Investment evaluation and financial modeling
- Monitor and forecast of market prices
- Analysis of the power industry structure and evolution.

1. Financial modeling and investments' evaluation

Provide the customer with a financial model to evaluate investments in renewable technologies and operate in the Italian electricity market

Althesys developed and applied a comprehensive financial model to analyze the financial viability of projects and investments in renewable energy plants, providing its clients with:

- An easy but accurate tool running with MS Excel[®] including:
 - Plant technical production data, default or customized
 - Capex and opex, both based of default/standard values and client's data
 - Financial prospects, according to different Client's choices
 - A dashboard summarizing all the key information to evaluate the investment.
- Long-term scenarios about revenues, considering prices & volumes coming from different sources: market, tariffs, PPA, etc.. Althesys' NET price curves, as well as data from other providers can be adopted.
- Sensitivity analysis about the main key parameters and different technical solutions.
- A tool to design business plans, evaluate investments in generation plants, analyze energy purchase and sale contracts, examine the convenience of storage systems, etc.

The model structure and how it works

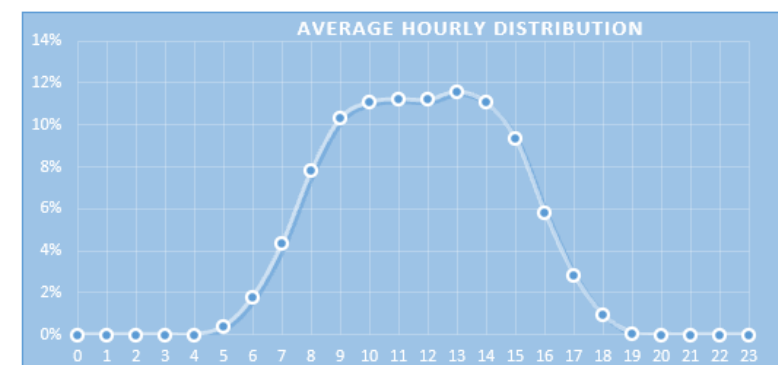
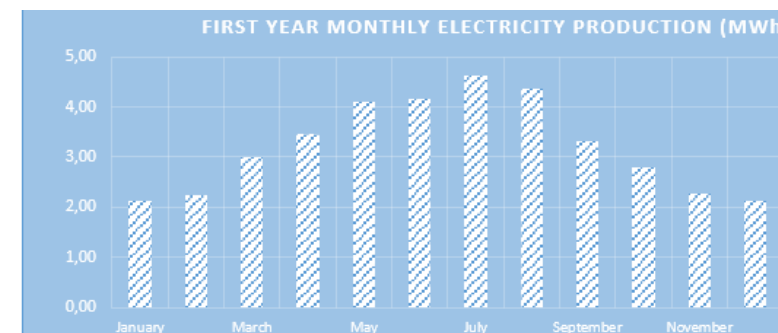
The model lets the user fill **technical data inputs** for the selected *Renewable Energy Source* (RES) plant:

- Location
- Capacity
- Lifetime
- Main features
- ...

*An example, the sheet:
"Plant technical-production data"*

| PART 1 - PHOTOVOLTAIC SYSTEM | | | |
|------------------------------|---|------------------------|----------|
| SITE AND CHARACTERISTICS | | | |
| ↓ | Plant location | Foggia | |
| ↓ | Plant type | Single-Axis PV Tracker | |
| ↓ | Module placement | Ground | |
| ↓ | Module type | Bifacial | |
| ← | Plant nominal electric power (MW _p) | 20,00 | |
| ↓ | Land type | Agro-PV | |
| ← | Land/Rooftop/Other size (ha) | 30,0 | |
| ↓ | Type of grid connection | High Voltage (AT) | |
| ← | Inverter type | Central | |
| ← | Grid and system losses | Default | 13,5% |
| → | Performance Ratio (PR) | 91,0% | |
| ← | Plant availability | 99,0% | |
| ← | Term (years) | 35 | |
| ↓ | Annual degradation | Default | 0,4% |
| → | Annual irradiation (MWh/m ²) | Calculated | 2.455,92 |
| → | Annual output (MWh/MW _p)* | Calculated | 1.907,64 |

- ↓ List of values or default
- ← Insert value
- Output



*Assuming optimal slope and azimuth for the modules

The financial outputs

The output is condensed in the **dashboard** and includes sensitivities:

- Profitability indexes (NPV, IRR, ROE, ROI)
- Sensitivity on Capex, Opex, Development fee, Discount rate, ...

*An example, the sheet:
«Dashboard»*

| KEY PROJECT ASSUMPTIONS | |
|-------------------------|------------|
| Plant Start Date | 2024 |
| Operational Life | 35 |
| Currency | € |
| Capacity (MW) | 20 |
| Degradation | 0,4% |
| Inflation Rate | 2,00% |
| Miscellaneous CAPEX | 0 |
| Total CAPEX w/o VAT | 13.804.584 |
| O&M First Year | 264.554 |
| Other OPEX First Year | 269.474 |
| Total OPEX First Year | 534.028 |

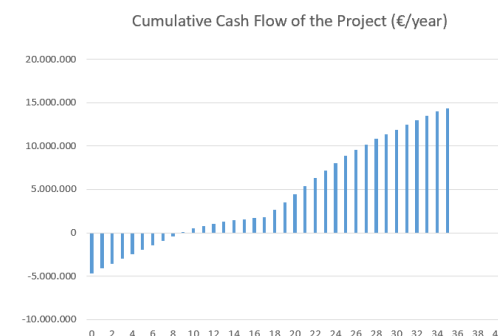
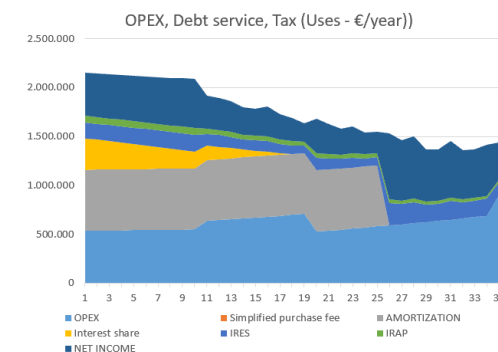
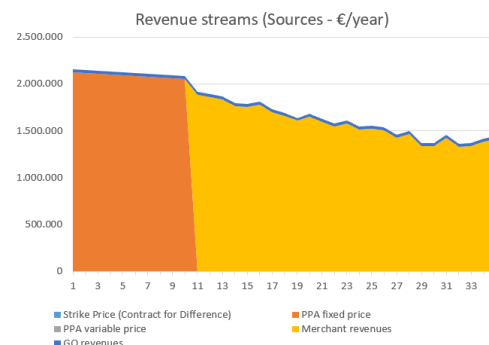
| GROSS INVESTORS RETURNS | |
|-------------------------|--------|
| Levered IRR | 10,44% |
| Unlevered/Project IRR | 5,96% |

| KEY FINANCIAL INDICATORS | |
|--------------------------|-----------|
| Debt Ratio | 70% |
| Equity Ratio | 30% |
| Leverage | 2,33 |
| WACC | 4,2% |
| ROE | 14,7% |
| ROI | 8,8% |
| NPV | 4.578.429 |

| PPA SUMMARY | |
|-----------------------------------|--------------|
| PPA Years | 10 |
| PPA Price (€/MWh) | 55,00 |
| % of electricity sold through PPA | 100% |
| Type of PPA Price | Fixed |
| Indexing Parameter | Zonal Prices |
| Variation range type | % |
| % of upside sharing | - |

| | SENSITIVITIES | |
|---------------------|---------------|---------------|
| | Levered IRR | Unlevered IRR |
| Base case | 10,44% | 5,96% |
| CAPEX + 5% | 9,36% | 5,53% |
| CAPEX - 5% | 11,65% | 6,43% |
| OPEX + 1% | 10,34% | 5,92% |
| OPEX - 1% | 10,53% | 6,00% |
| PPA price + 1% | 10,66% | 6,03% |
| PPA price - 1% | 10,22% | 5,89% |
| Merchant Prices +1% | 10,45% | 5,93% |
| Merchant Prices -1% | 10,36% | 5,87% |

| SOURCES AND USES | |
|-----------------------------------|-------------------|
| USES | |
| CAPEX | 15.624.049 |
| TOTAL USES (excl. VAT) | 15.624.049 |
| VAT on CAPEX | 3.437.291 |
| TOTAL USES | 19.061.340 |
| SOURCES | |
| Total amount of financing | 10.936.834 |
| Total amount of shareholders loan | 0 |
| Total amount of other equity | 4.687.215 |
| TOTAL SOURCES (excl VAT) | 15.624.049 |
| Shareholder loan for VAT | 3.412.497 |
| VAT facility | 0 |
| TOTAL SOURCES | 19.036.546 |



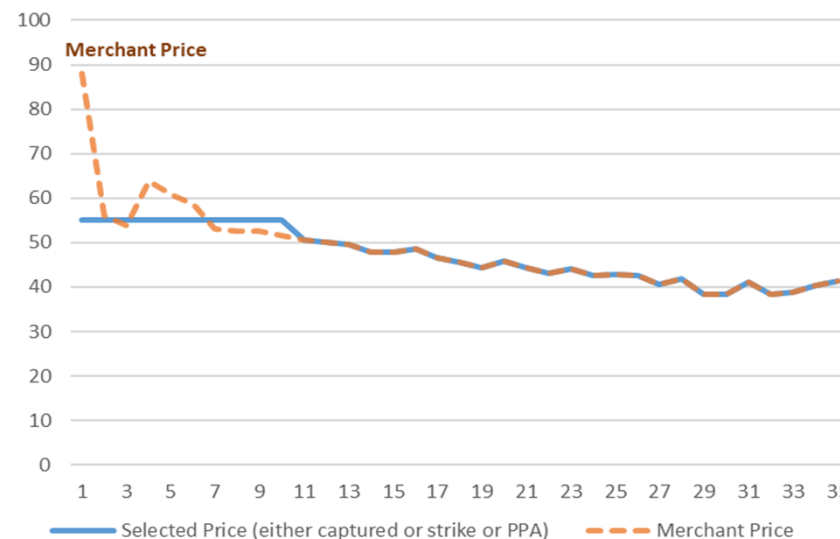
| DEVELOPMENT FEES | | SENSITIVITIES DEVELOPMENT FEES | | | |
|------------------------------|-----------|--------------------------------|-----------|-----------|-----------|
| Development fee base | 7,24% | 10,20% | 10,20% | 10,20% | 10,20% |
| Custom development fee - % ↓ | Yes | | | | |
| Development fee - total | 1.000.000 | 1.408.068 | 1.408.068 | 1.408.068 | 1.408.068 |
| Development fee - € per MW | 50.000 | 70.403 | 70.403 | 70.403 | 70.403 |
| Levered IRR | 10,44% | 13,01% | 13,01% | 13,01% | 13,01% |
| Unlevered IRR | 5,96% | 6,94% | 6,94% | 6,94% | 6,94% |

| UNLEVERED NPV | | | | | | | |
|--------------------------|---------|---------|-----------|-----------|-----------|-----------|-----------|
| Discount rate (%) | 5,75% | 5,50% | 5,25% | 5,00% | 4,75% | 4,50% | 4,25% |
| Unlevered NPV - total | 311.306 | 695.825 | 1.098.919 | 1.521.671 | 1.965.239 | 2.430.860 | 2.919.858 |
| Unlevered NPV - € per MW | 15.565 | 34.791 | 54.946 | 76.084 | 98.262 | 121.543 | 145.993 |

The revenues flows and the market price curves

*An example, the sheet:
«Custom prices»*

Selling Price Curve (€/MWh)



The user can choose between:

- **System captured prices** (long term forecast by NET)
- Yearly/monthly **custom captured prices**
- **Contract for Difference strike price**
- **PPA price** (fixed, variable, upside sharing)

CUSTOM PRICES YEARLY CURVES

← Cells activate when "Yes" is selected in cell C3 and "Annual" in cell C4 of "Financial Prospect" Worksheet. Enter custom current prices

| € | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 203 |
|------------------------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|------|
| Captured price (€/MWh) | 302,00 | 250,00 | 170,00 | 120,00 | 105,00 | 100,00 | 95,00 | 90,00 | 85,00 | 80,00 | 75,00 | 70,00 | 65,0 |

CUSTOM PRICES MONTHLY CURVES

← Cells activate when "Yes" is selected in cell C3 and "Monthly" in cell C4 of "Financial Prospect" Worksheet. Enter custom current prices

| Captured price (€/MWh) | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 2022 | 302,00 | 302,00 | 302,00 | 302,00 | 302,00 | 302,00 | 302,00 | 302,00 | 302,00 | 302,00 | 302,00 | 302,00 |
| 2023 | 250,00 | 250,00 | 250,00 | 250,00 | 250,00 | 250,00 | 250,00 | 250,00 | 250,00 | 250,00 | 250,00 | 250,00 |

2. Business strategy and market advisory

Althesys supports energy companies, technology providers and investors offering market insights, regulation counseling, advisory in scouting, evaluating, developing and acquiring energy facilities and projects.

Our professionals assist clients with a wide range of services in designing and implementing growth strategies in renewable and storage plants and projects:

- Scouting for plants and projects opportunities
- Regulation and permitting assistance
- Business and financial planning
- Advisory in deals for plants projects sale/acquisition
- Assistance in looking for partnership & alliances and related agreements

▶ *Deliver high quality and reliable support to create value in the energy markets*

3. Market trends and price forecast

Althesys developed a specific know-how for the analysis and forecast of the Italian electric market, considering its peculiar features and segments

Through the tool NET, energy players and investors are supported in their business, thanks to its powerful architecture that grants a vision on the evolution of the Italian power market in the short, medium and long term.

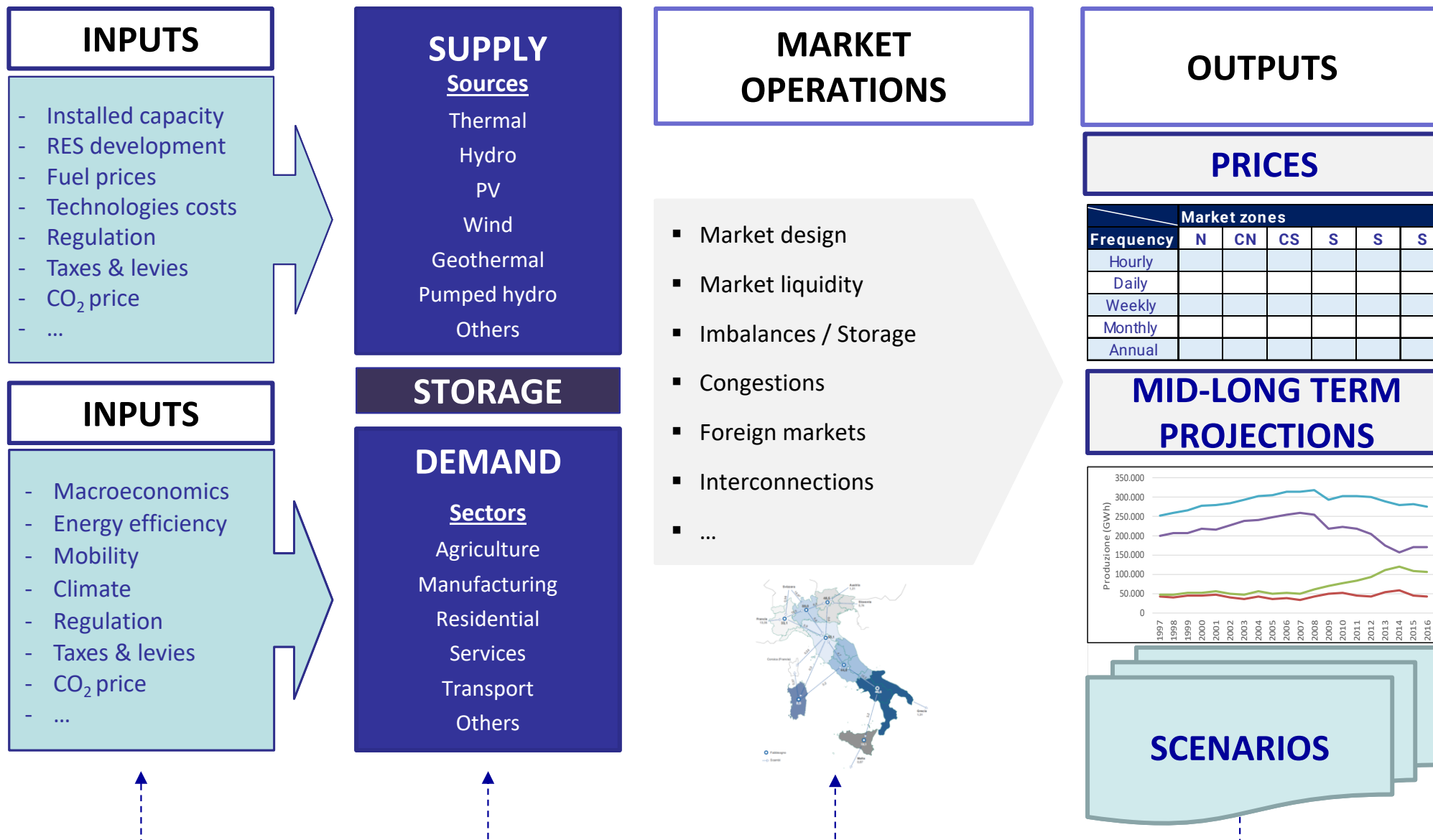
NET model was developed by Althesys in cooperation with the University of Pisa and the University of Naples.



Why?

- Today, the complexity of electricity markets requires a wide view on the entire energy system and the economic framework, as well as a deep knowledge of new technologies development
- A sound model, based both on a strong scientific approach and on operational testing, is needed to ensure a reliable future view and forecast
- NET answers these issues by considering a large set of factors: impact of RES, market and grid design, fuel mix, storage systems, EVs and digital revolution for today and the years to come

NET model: macro-variables used



Applications

- Business strategy analysis for entering the market
- Financial and business planning of investments in new capacity, revamping and repowering plants
- Evaluations of assets/companies' acquisition
- Energy management operations
- PPA design and evaluation
- Assessments of technologies, costs and profitability
- Tailored-made analysis, models and forecasts.

The model key features

- NET forecasts are based on an internally developed powerful model of the Italian Power market designed with an advanced methodology
- The model is «peer-reviewed» and appears in one of the TOP 12 energy journals
- Energy markets forecasting fundamentals such as demand/offer and prices
- The model replicates the functioning of the market using a large set of variables, high precision algorithms and feedback effects
- The simulations could match several needs of market players, supporting in taking decisions for deals and investments.

Key features

Outputs & deliverables

- All results are split by market zone (i.e. North, North-Central, etc.)
 - Spot prices and captured prices (also split by source)
 - Supply (also split by source)
 - Demand (also split by sector)
- Short-mid term forecasts
- Long term projections continuously updated
- Tailored-made deliverables according to the needs of the client.

Flexibility gives more value

- The model is conceived to consider the present market key drivers as well as the future possible changes, both in the market design, the regulatory framework and the technological solutions
- The tool is so helpful to build scenarios and to assess the impact of several factors: financials, economic, technological and regulatory
- Flexibility of NET allows it to adapt to the complex and fast-changing framework, thus, delivering more value to users across different applications.

4. Storage evaluation model a) PV coupled with BESS

A tool to evaluate the financial feasibility of storage investments in the Italian electricity system, simulating different plant's features and revenues streams

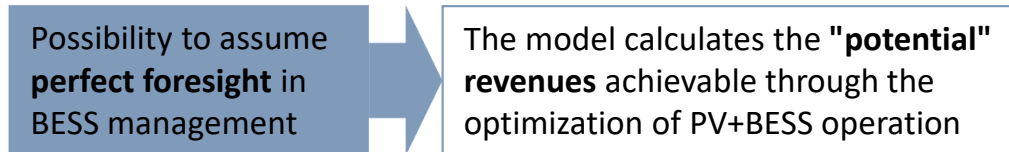
The financial model is featured with the possibility of **coupling** RES plants with **energy storage** facilities.

The model can provide different elements:

1. RES plant imbalance reduction
2. Operations in the:
 - Energy markets (MGP, MI)
 - Ancillary Services Market (MSD ex-ante, MB)
3. Possibility to participate to:
 - Capacity market auctions (when scheduled)
 - Pilot projects by TSO (when scheduled)

| PART S1 - STORAGE SYSTEM CONTROLS CENTER | | | |
|---|--|-------------|------------------------|
| ↓← | Photovoltaic generation forecast accuracy (%) | Default | 11,0% |
| → | Production unit (UP) | Relevant | |
| → | Macro-zone | South | |
| Ancillary Services Market (ASM) PRICES FORECAST | | | |
| ↓← | MSD ex-ante - upward (α) | Default | 66,3280 |
| ↓← | MSD ex-ante - upward (β) | Default | 1,0898 |
| ↓← | MSD ex-ante - downward (α) | Default | -17,8570 |
| ↓← | MSD ex-ante - downward (β) | Default | 0,7164 |
| ↓← | MB - upward (α) | Default | 59,2750 |
| ↓← | MB - upward (β) | Default | 1,1375 |
| ↓← | MB - downward (α) | Default | 8,3637 |
| ↓← | MB - downward (β) | Default | 0,4010 |
| Balancing Energy Market (BEM) and PV plant imbalances | | | |
| ↓ | ASM Prices | MSD ex ante | |
| ↓← | Probability of positive imbalance of PV plant | Default | 50% |
| ↓← | Probability of macro-zone imbalance sign concordance | Default | 60% |
| → | FIRST YEAR IMBALANCE REVENUE(+)/COST(-) (€/Year) | -49.360 | |
| → | FIRST YEAR IMBALANCE REVENUE(+)/COST(-) (€/MW _p) | -2.468 | Benchmark (-2800;-600) |
| → | FIRST YEAR IMBALANCE REVENUE(+)/COST(-) (€/MWh) | -1,3 | |

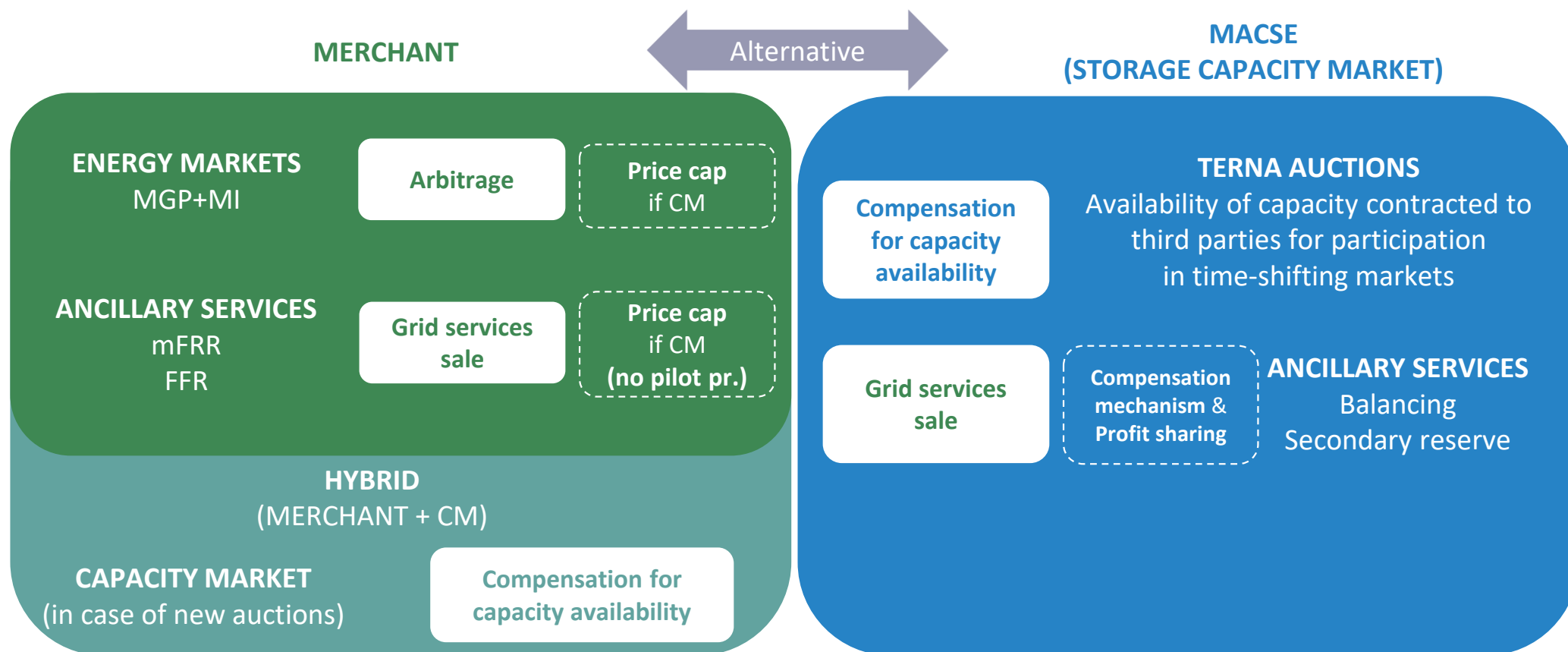
| PART S2 - FIRST YEAR HOURLY AND MONTHLY VALUES OF IMBALANCES (MWh) | | | |
|--|---------|----------|-------|
| HOURLY AND MONTHLY VALUES FROM PART 6 INPUTS | | | |
| h/Months | January | February | March |
| 0 | | | |
| 1 | | | |



4. Storage evaluation model b) stand alone BESS

Market strategy

The operator can optimize Stand-alone BESS value by delivering various services within a designated timeframe and effectively combining the resulting revenue streams.



5. Knowledge of the Italian plants fleet to evaluate investments

The knowledge of the real “competitive arena” of a plant in the power market is the key to properly understand the financial sustainability of an investment

Althesys developed a mapping of the current Italian generation plants fleet joint to a large collection of data from all existing plants, whatever the fueling and the operating state. For each plant is available:

- Bid prices and quantities on the Day-Ahead Market
- Detail of bidding energy source
- Total Revenues
- Revenues per MWh
- Estimated infra-marginal rent.

Analysing the current and future offer-demand game in the power market with sound and exhaustive data is now possible thanks to the database developed by Althesys. It can also help in analysing:

- prices and volatility
- locational risks (‘zonal risk’)
- cannibalisation effect
- impacts of storage.



6. Power Purchase Agreements (PPA)

Mission: assist companies, both sale and buy side, in designing, evaluating, and negotiating PPA to optimize their terms and to carry on the bankability.

Althesys can support investors, sellers or buyers in the PPA design process:

- Advisory in designing PPA structure and terms
- Financial and energy modelling to define PPA key elements;
- Potential off-takers / providers identification and selection;
- Expected revenues estimation through Italian electricity market price forecasting, in M-LT;
- Assistance in negotiations within the framework of different players and consultants involved.

Contract structure

Duration, volumes and obligations, technical parameters, transport and risk sharing, termination, etc.

Risk management-mitigation

Volumes, volatility of market prices, non-programmability, dispatching risk, regulatory changes, etc.

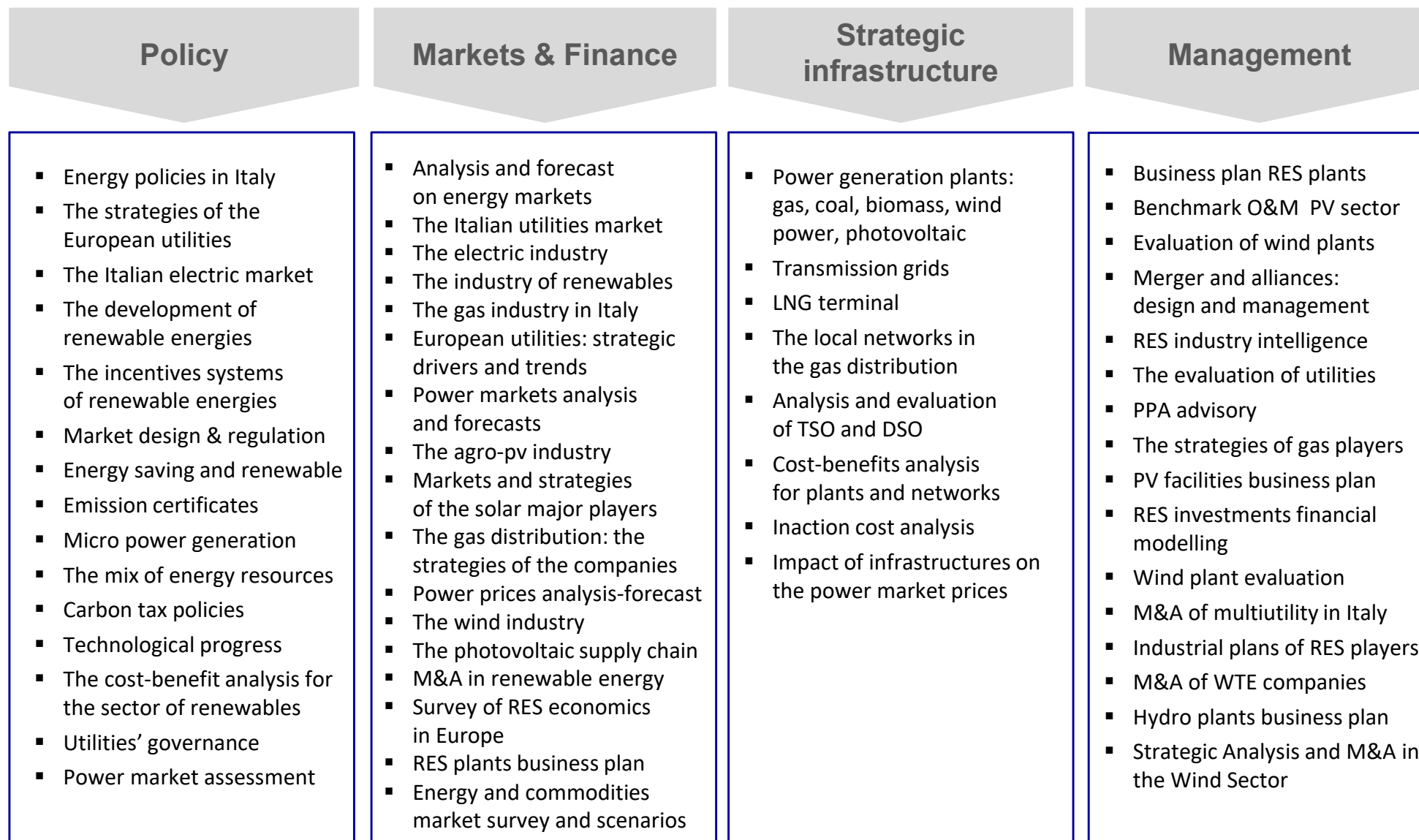
Pricing schemes

Fixed price, variable price with floor, with cap&floor, with cap, with upside, profit sharing, mixed schemes, etc.

Collaterals

Credit assessment, warranties & representations, performance bonds, other collaterals, etc.

Beyond power markets, Althesys develops projects and competences in many areas of the energy industry



Clients in the energy industry



Disclaimer

The aim of this document is to present a general overview of the several services offered by Althesys to assist investors and energy players (hereafter the Clients) in operating in the Italian electric market with data and sound information to evaluate the potential of investment in renewable plants and infrastructures (the Project).

This note is a short summary of the services and knowledge Althesys could in general provide the Clients. It is not neither exhaustive nor tailor made for specific needs.

The services and deliveries to a specific Client have to be discussed and defined with him, in order to focus its objectives and needs and design the detailed contents of the advisory services and decide together the implementation steps.

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