

Consultants & Engineers Building the Future.



Vision

We want to pass on to our children a world where sustainable and affordable resources are available to everyone for an efficient use.

Mission

Support worldwide our clients to define their strategy and achieve their goals in the energy and water sector through by means of excellent and state-of-the-art hands-on support, technical and economic advisory services, modern capacity building and solutions.

At a glance...



- ✓ International Consulting and Engineering
- Experts in Energy, Water and Environment
- ✓ 25 years of experience
- Know-how and ownership of more than <u>4,500</u>
 references in relevant Projects
- ✓ More than 145 countries in 5 Continents
- ✓ More than **250** highly skilled **professionals**
- ✓ Average Annual Revenue 20m\$
- ✓ Certified **ISO 9001**, 14001 and 45001
- ✓ Sustainability & Climate Change Oriented

Our History



MAI Values Experience Humanity State-of-the art Solutions Independence 30 0 Sustainability Code of Conduct Optimism Socially Committed Empathy ...





Areas

Management Consulting

Energy

Water

Environment



Management Consulting

MAI is a recognised global leader in Energy and Water management consulting. We provide governments, private clients and donors with strategies and solutions that can successfully guide them towards energy transition and resilient development, employing new technologies for a low-carbon future.



Economic Consulting: Policy, Regulation and Markets analysis.



Transaction Advisory: technical and financial support for energy and water operations including among others Due Diligence, index forecasting, yield assessment, project finance structuring, etc

Utilities Operations: analysis and operation of utilities in regulated business



Energy

MAI is a recognised global leader in energy consulting and engineering. Our 20+ years of experience in the industry allow us to leverage our knowledge and resources to provide governments, private clients and donors with technical solutions that can successfully help them in their projects towards energy transition and resilient development.



Renewables: Services for Solar and Wind Power Plants development (LTAs, yield assessments, feasibility studies, optimization, tendering support – EPC, FIDIC or similar-, Project Management and Supervision, etc)



Storage & Hydrogen: analysis of solutions, optimization, feasibility studies, tendering support, Project Management and Supervision, etc. to support the decarbonization of the grid.

T&D: Power system analysis, feasibilities studies, project implementation support (FIDIC or similar), <u>detailed</u> engineering (up to 750kV) and Smart Grids



Water

MAI currently offer consulting and engineering services in the whole water cycle including feasibility studies, technical advisory, tendering support and Project Management (Fidic or similar) as water is an important sector for a country's development and sustainable future.



Treatment & Supply: Technical and economic services for Water Treatment Plants and water distribution, Loss Reduction Plans, Assets Management, project implementation.

Desalination: Technical Analysis, detailed design, economic analysis, project implementation.

Wastewater: Technical and economic analysis, assets management and valuation, project implementation, tertiary use.



Environment

MAI is a company with 20 years in the Environment and Social sector, in particular supporting studies for energy, industry and infrastructure development. MAI evaluates aspects related with the impact of the organizations and infrastructures on the environment and deals with how the activities of companies and new developments affect the health, safety and wellbeing of the people affected directly or indirectly by them



Consulting: energy efficiency and environmental management; innovation and consulting, plans and programs. Regional planning, corporate social responsibility and sustainable development.



Permitting: project feasibility analysis, Administrative and Legal Support, Studies and technical reports, environmental engineering



Monitoring: environmental site assessment, environmental monitoring plans, modelling and measurements, nature and species studies.



What Makes MAI Different?



Global Proximity

- Worldwide international network
- Presence in four continents
- In-depth local knowledge



Strong Team

- Hands-on experience and intergenerational vision
- We empathize with Client's targets.
- Provide Feasible Solutions to difficult problems



Leading Technologies Experts

- Floating and Bifacial PV
- Desalination
- Stochastic Models
- Smart Grids
- Storage & Green Hydrogen



Wide Range of Services

- One-Stop-Shop
- Economic and technical know-how
- Synergies between Sectors



Wide Range of Services

Strategy

- Regulation development
- Tariffs
- Financial Analysis
- Transaction support
- Permitting

• LTA

• ESIA

Project

Preparation

• Due Diligence

• Technical Analysis

- Feasibility Studies
- Project Loan
 Preparation

Project Implementation

- Tendering Support
- Implementation Management
- Independent Engineer
- Owners Engineer
- Detailed Engineering
- ESIA Follow up

Project Commissioning

- FAT/SAT
- Commissioning Support
- Deviations Management

Project Monitoring

- Project Outputs follow up
- Environmental Monitoring
- Compliance Reporting

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MAI Clients

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Excerpt of Relevant References





Building the Future

More info at: <u>www.mai.group</u> contact@mai.group

Annex A Services Details



Management Consulting: Economics



- Economic Analysis & Regulation
- Tariff Calculation & Design
- \circ Subsidy optimization
- Demand Studies
- Master Planning
- \circ CBAs
- Litigation Support

• Business Strategy

- Ordena[®] and Plexos Modelling
- Power Market Price Forecasting
- \circ Dispatch Optimization
- \circ Investment Assessment

We use Energy Exemplar's Plexos[®] for our modelling both in Energy and Water sectors.

- Regulatory Consulting
- Restructuring and Unbundling
- Legislation Development
- \circ Renewable Auctions
- $\,\circ\,$ RE & EE promotion
- National & Regional Power Markets design
- Energy Strategy
- Capacity Building Programs
 - Study Tours
 - $\,\circ\,$ Ad-hoc Training
 - Institutional Development



EU: CESEC's region potential for renewable and low-carbon gas deployment.



Tunisia: Reform of the Power, Gas & Oil Sector



Saudi Arabia: Review and Evaluation of the Water Price Reform



Kenya-Tanzania: Interconnection Tariff Study



Management Consulting: Transaction Advisory

- Comprehensive Due Diligence
 - $\,\circ\,$ Financial and Economic
 - \circ Market
 - Regulatory
 - \circ Technical
 - \circ Environment
- PPP Support
 - \circ Concession schemes
 - PPP Contracts

- Key Parameters Forecasting
 - $\,\circ\,$ CAPEX & OPEX Assessment
 - $\,\circ\,$ Long Term Prices Forecasting
 - Yield Assessment
 - $\,\circ\,$ Incomes Forecasting
- Equity & Project Finance Structuring



Sweden: Distribution Assets Due Diligence services for a buyer



Pakistan: Technical services for the GEPCO Privatization

Our Due Diligences use the sophisticated proprietary tool<u>Ordena®</u> for Power Sector Development,

And $\underline{\text{MERUM}^{\$}}$ in the case of Network Utilities



Support for the implementation of Solar/Wind Auctions in Mongolia



Armenia: Full Transaction Advisory for PV Tender



Management Consulting: Utilities Operations



• Technical Analysis

- Assets Sustainability Assessment
- KPI development and monitoring
- Resilience Analysis
- $\,\circ\,$ Loss Reduction Plans
- Quality of Service Improvement Plans
- Utility Business Operations
 - Business Optimization
 - \circ Business Operation
 - Management of Utilities

MAI may deploy managers and key experts with hands-on experience to effectively operate utilities

- Capacity Building Programs
- $\circ\,$ Study Tours
- Ad-hoc Training
- Institutional Development



Tajikistan: Power Distribution Utility Management Contract



Ethiopia: Consultancy Services for Cost Minimization and Revenue Maximization for EEP



Gambia: Design and Implementation of a monitoring framework for NAWEC's performance contract



India: Capacity Development of the Assam Power Sector Utilities



Energy: Renewables

• Development

- Technical Analysis
- Feasibility Studies
- Solar & Wind Resource Assessment and Monitoring Campaign
- Energy Mix Optimization
- Lender Technical Advisor (LTA)
- Implementation
 - Tendering and Contracting Support
 - Full Engineering Design Review

We are experts in the following technologies:

| • | PV (Conventional, Bi-facial and | • | Wind |
|---|---------------------------------|---|----------------|
| | Floating) | • | Hybrid Systems |
| • | CSP (Concentrated Solar Power) | • | Mini-Hydro |

*Our services are supported with our Data Intelligence and Modelling solutions (WindPro, WAsP, PVSys, etc.)

| | Owner's Engineer (OE) |
|---|--|
| | EPC Management |
| | FIDIC Engineer |
| | Construction and Commissioning Supervision |
| | Witnessing Factory Acceptance Tests |
| • | Other Services |
| | Capacity Building |

○ Independent Engineer (IE)

Litigation Support







Uzbekistan: Independent Engineer for 100 MW Wind Power Project





Energy: Storage & Hydrogen



• Development

- Technical Analysis
- Feasibility Studies
- \circ Energy Mix Optimization
- Lender Technical Advisor (LTA)
- Implementation
 - Tendering and Contracting Support
 - Full Engineering Design Review
 - Independent Engineer (IE)

- $\,\circ\,$ Owner's Engineer (OE)
- EPC Management
- FIDIC Engineer
- Construction and Commissioning Supervision
- Witnessing Factory Acceptance Tests
- Other Services
 - Capacity Building
 - Litigation Support

We are experts in the following technologies:

- \circ Lithium-Cadmio BESS
- Green Hydrogen systems

* Our services are supported with our Data Intelligence and Modelling solutions (like WindPro, PVSys, CORVUS, etc.)





The Gambia: Owner's Engineer and Capacity Building for 8 MWh BESS.



BESS, including Power Transmission

Uzbekistan: Lender's Technical Advisory Services for 3x100 MWh





Energy: Transmission & Distribution

• Full Engineering Design Review

Independent and Owner's

• Owner's Engineer (OE)

• EPC Management

FIDIC Engineer

Capacity Building

Litigation Support

Tariffs Technical Studies

Support

Engineer

- Power System Analysis
- Integration Studies
- Feasibility Studies
- Lender Technical Advisor (LTA)
- Grid Codes Development
- Detailed Engineering
 - Other Services • Engineering for Networks (up to 765kV)
 - Interconnection Studies
- Project Management
 - Tendering and Contracting

We are experts in the following technologies:

- HVAC & HVDC ٠ Smart Grids ٠
- ٠
- Distribution ٠
- **Rural Electrification**

* Our services are supported with our Data Intelligence and Modelling solutions (like DigSilent, PLSSCAD, arcGis, etc.)

Bangladesh: Feasibility Study to establish an Underground Distribution Network in Dhaka



Tajikistan: Project implementation for AMI project for over 1M customers.



India: Feasibility study and detailed Tanzania: Project implementation for engineering of Transmission line 765 rural electrification at the country level kV and 400KV S/S Mainpuri Bara in Uttar Pradesh (170 km)





Water: Treatment & Supply



• Technical Studies

- Power System Analysis
- Integration Studies
- Feasibility Studies
- Lender Technical Advisor (LTA)
- Grid Codes Development
- Detailed Designs

• Project Management

- Tendering and Contracting Support
- Development of Bidding Documents (RFP, Contracts)

- $\circ\,$ Full Engineering Design Review
- Independent and Owner's Engineer
- Owner's Engineer (OE)
- \circ EPC Management
- \circ FIDIC Engineer
- Construction and Commissioning Supervision
- Other Services
 - $\circ\,$ Capacity Building
 - $\,\circ\,$ Tariffs Technical Studies



Argentina: General Belgrano Plant New raw water lifting station 1st Stage



Angola: Water collection, DWTP, and distribution network for Uige (Angola).



Spain: Expansion and improvement of the Monforte de Lemos drinking water treatment system" (Orense)



Republic of Congo: Technical assistance for the "Drinking water treatment for the city of Kinshasa-Ozone (Republic of Congo)



Water: Desalination



- Power System Analysis
- Integration Studies
- Feasibility Studies
- Lender Technical Advisor (LTA)
- Grid Codes Development
- Detailed Designs

• Project Management

- Tendering and Contracting Support
- Development of Bidding Documents (RFP, Contracts)

- Full Engineering Design Review
- Independent and Owner's Engineer
- Owner's Engineer (OE)
- o EPC Management
- FIDIC Engineer
- Construction and Commissioning Supervision
- Other Services
 - $\circ\,$ Capacity Building
 - $\,\circ\,$ Tariffs Technical Studies

Mexico: Technical assistance for economic analysis, tabulation and assessment of mechanical equipment for desalination project



Iran: Seawater treatment plant project to feed a Combined Cycle Plant.



Spain: Granadilla Desalination Plant Project (Tenerife)



Peru: Economic assessment for a brackish water treatment plant for Compañía Minera Antamina (Peru).





Water: Waste-Water Treatment Plants

- Technical Studies
 - Power System Analysis
 - Integration Studies
 - Feasibility Studies
 - Lender Technical Advisor (LTA)
 - Grid Codes Development
 - Detailed Designs
 - Tertiary Use
 - Air pollution
 - Energy Optimization and Efficiency
- Project Management
 - Tendering and Contracting Support
 - $\,\circ\,$ Development of Bidding

- Documents (RFP, Contracts)
- Full Engineering Design Review
- Independent and Owner's Engineer
- Owner's Engineer (OE)
- o EPC Management
- FIDIC Engineer
- Construction and Commissioning Supervision
- Project Verification
- Other Services
 - $\circ\,$ Capacity Building
 - Tariffs Technical Studies



Spain: Construction Project for the Reuse Treatment Plants of Aranjuez, El endrinal, Los Escoriales and Miraflores



Abu Dhabi: Economic analysis and measurements for EPC Trakker refinery waste treatment plant



Spain: Biogas plant for the production of biomethane and compost, located in the municipality of Noez (Toledo)



Senegal: Detail design for tendering the WWTP of Camberene





Environment: Consulting



• Environmental and Social

- E&S Impact Assessment (ESIA)
- E&S Action Plan (ESAP)
- Mitigation Measures Support
- E&S Due Diligence
- Health & Safety

MAI follows and is familiar with the IFC Standards and the Equator Principles as well as local regulations.

• Governance

- Company leadership and management.
- $\circ\,$ Corporate social responsibility and Compliance
- Financial transparency and business integrity.
- Regulatory compliance and risk management initiatives.
- Ethical business practices.





Oman: Lender's Technical, Environmental and Social Advisor of the Ibri II PV power plant



Morocco: ESIA of >10GW Combined Power Generation Project (PV, Wind, Battery, Line)



Tajikistan: Management contract for an unbundled Power Distribution Utility



Environment: Permitting



MAI provides, among others, the following services:

- Project feasibility analysis
- Administrative and legal support
- Studies and technical reports
- Environmental engineering
- Due diligence
- Negotiation and conflict resolution con Authorities
- Corrective and compensatory measures implementation



Uzbekistan: Consultancy Services for PPA review and advisory for Kungrad Wind Farm



Tajikistan: IEE for Loan preparation for Transmission Line.





Spain: Environmental supervision of projects, works, and start-up of the sanitation network of Vigo and New water supply to Pontevedra



Spain: Permitting for 235MW Solar Power Plant



Environment: Monitoring



MAI provides, among others, the following services:

- Environmental site management
- Environmental monitoring plans
- Modelling and measurements
- Nature and species studies
- Analysis of critical species
- Measurement and modelling of pollutants: air, water, soil, noise and light pollution





Annex B MAI DIM Solutions

Data Intelligence & Modelling

For 15 years, **Mercados - Aries International** has been developing stand-alone Business Intelligence solutions whose value is recognized by our Clients:

<u>ORDENA®</u> is the MAI in-house developed tool to determine the optimal schedule of generation, transmission, and fuel infrastructure investments in the given area.

<u>MERUM</u> is a software solution for the **optimization of OPEX** and **CAPEX** in utilities. It is a multi-parameter software with algorithms and models to reach the **optimum**.

SUNCASTER® is a MAI in-house web solution that offers solar radiation and other weather variables data estimated from satellite images and reanalysis data set.

<u>CORVUS</u> is a MAI in-house developed tool to optimize the Energy Mix with Battery Energy Storage System

<u>SCADA</u> design, implementation, and operation of SCADA systems related to renewable energy monitorization.

Besides the above MAI has the following Data Intelligence & Modelling:

• PVSyst, WAsP, windPRO, iAuditor, Calcutta, DigSilent and Spatial Load Forecasting (SLF).







ORDENA ®

Optimal power system simulation and planning

- Long term Optimal power joint generation and transmission expansion planning
- **Power market price simulation.** Short term **unit commitment** with hydro and thermal. State-of-art simulation of intermittent RES, hydrogen and storage
- **Extended version simulates** the expansion of energy systems including electricity + Fuels + Gas + Water
- Database storage and advanced analytics
- Probabilistic scenario modelling
- **Proven** in many projects all over the world. Both at regional markets and country level. 20Y+ in use.





ORDENA® is the MAI in-house developed

tool to determine the optimal schedule of generation, transmission and fuel infrastructure investments required to supply the forecasted load in an individual country or a multi-region system.



MERUM



Overview

Merum is a software regulatory solution developed by Mercados – Aries International for the **optimization of investments and tariffs** in utilities.

It is based on a multi-parameter structure, which, considering utility parameters and boundary conditions, develops a series of algorithms and models to reach the **optimum OPEX** and **CAPEX** for best regulatory design.

Optimization is based on:

- Assets' characteristics (Grid age, Topology, level of automation, feeders' length, etc.)
- Historical information and investment patterns analysis
- OPEX based on staff calculations (benchmark, network conditions, number of customers, meters' reading, Call Centre, etc.)
- Boundary conditions: targets service level, losses, demand growth, etc.

Considering the above, the program analyses the optimal tariff:

$$Min(Tariff(\$/kWh)) = Min\left(\frac{Revenue = f(CAPEX, OPEX)}{Demand(kWh)}\right)$$

Reaching the theoretical results for tariff optimization.





SUNCASTER



Overview

SUNCASTER is a MAI in-house developed web solution that offers solar radiation and other weather variables data estimated from satellite images and reanalysis data set.

It takes into account temporal and spatial distribution, availability of representative time series, to estimate solar resource at locations where no previous ground historic radiometric records are available.

- Tested, being bankable for yield estimation
- Can generate time series for historic years
- Valid for PV (GHI) and CSP (DNI)
- Will be implemented in an online interactive platform to be used at low cost by the clients



CORVUS

Corvus is a data intelligence solution developed by Mercados-Aries International for the **optimization of renewable energy mix that comprises batteries storage systems.**

- The tool simulates hybrid solutions, capturing new opportunities along energy resources and BESS, and then optimizes the energy mix
- The software optimizes: 1. PV Power, 2. Wind Power, 3. BESS Capacity and 4. BESS Power.
- The Hybrid Facility Optimization tool is based on different KPIs such as LCoE and firmess. Besides, It generates heatmaps that depict the trend of the optimum solutions.
- Flexible to adapt to the client's needs by including additional constraints such as energy price profiles, PPA requirements, land requirements.
- It offers a clear understanding and outlook for different solutions, optimizing the energy mix and therefore maximising profits.



MAI has developed a software in Python/Jupyter to simulate Hybrid solutions and optimizing the Energy Mixes. It allows to capture new business opportunities as well as maximising profits.



SCADA Solutions



Overview

Mercados – Aries International has a long experience in the design, implementation and operation of **SCADA systems** related to renewable energy monitorization.

They allow the organization of on-site data into different nested screens for remote monitoring and control of plants.

SCADA Systems present a detailed set of information that involves from general values to monitored values of single items, in a fully customizable and secure way.

Some successful implementations are:

- **GUATEMALA**: Repowering of *Horus I-II* 50+30 MW Solar Photovoltaic Plant, located in Chiquimulilla
- TANZANIA: Kigoma 5MW Solar Photovoltaic Plant
- URUGUAY: El Naranjal 50MW Solar Photovoltaic Plant, located in El Salto
- BRAZIL: Agropoulo 3MW Solar Photovoltaic Plant, located in Pindoretama

Relevant experience has also been acquired in **battery storage** SCADA control, with Projects like 20MW Solar PV Plant With Batteries Storage in Hawaii, involving the integration of Power Plant Controller (PPC) and BESS Controller in SCADA.





Annex C Some More Clients

MAI Clients: Spain







Investors & Other Private Clients







MAI Clients: CIS

Governments & Regulators Image: Construction of the second seco





Investors & Other Private Clients



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MAI Clients: Africa

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Utilities & Associations



International Donor Community



Investors & Other Private Clients







Masdar 🏐 مصدر Marubeni



MAI Clients: MENA

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MAI Clients: Asia

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Annex D Some More References

We know about Management Consulting





We know about Energy





We know about Water





We know about Environment



