



At the service  
of sustainable  
progress

# Presentation scheme

Background

S.I.E. Services

Softwares

Experience

Opportunities



# Background

- Electrical engineer
- Master degree in grid analysis
- Consultant at S.I.E.
- Power Flow and Stability
- Electromagnetic transients
- Power quality
- International training: USA, China, Argentina



| Countries      | Type  |
|----------------|---|
| Uruguay        | Power Flow, Stability, Transients, management, Power Quality, Protections |
| Spain          | Power Flow, Stability   |
| Mexico         | Power Flow, Power Quality, Protections                                    |
| Panama         | Power Flow, Stability   |
| Brazil         | Stability, transients   |
| Australia      | Power Flow, insulation coordination                                       |
| Ethiopia       | Power losses analysis, losses course                                      |
| Dominican Rep. | Seminars on inertia in electrical grids                                   |
| Singapore      | Seminar on inertia estimation in electrical grids                         |
| Chile          | Connectivity  |

# Presentation scheme

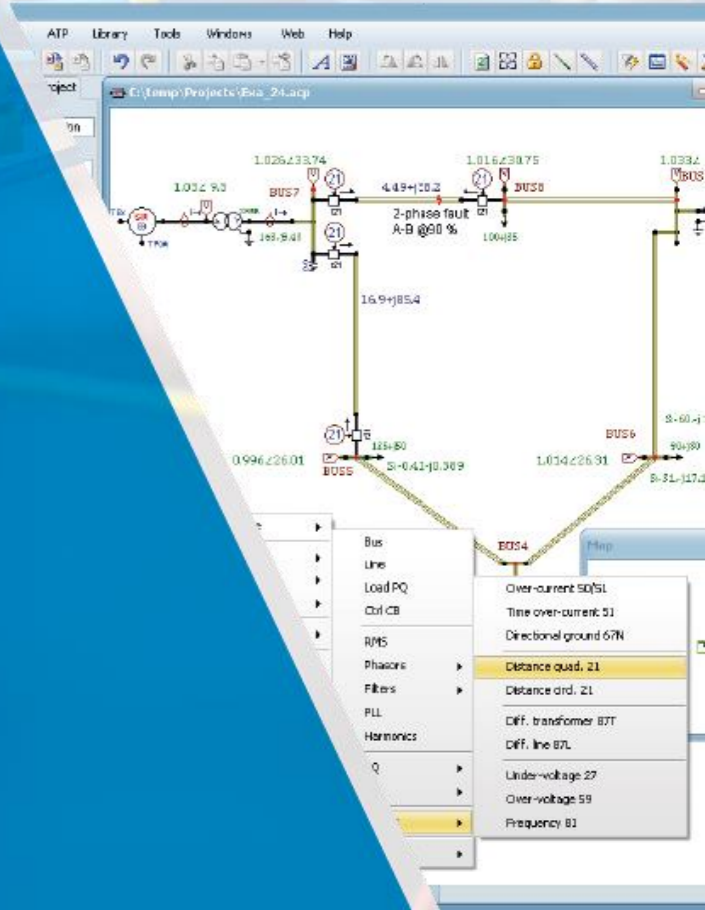
Background

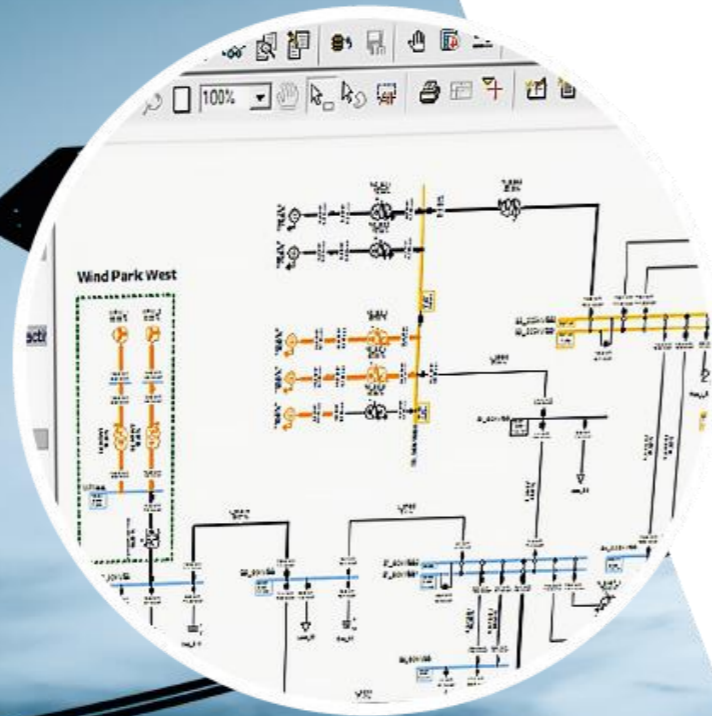
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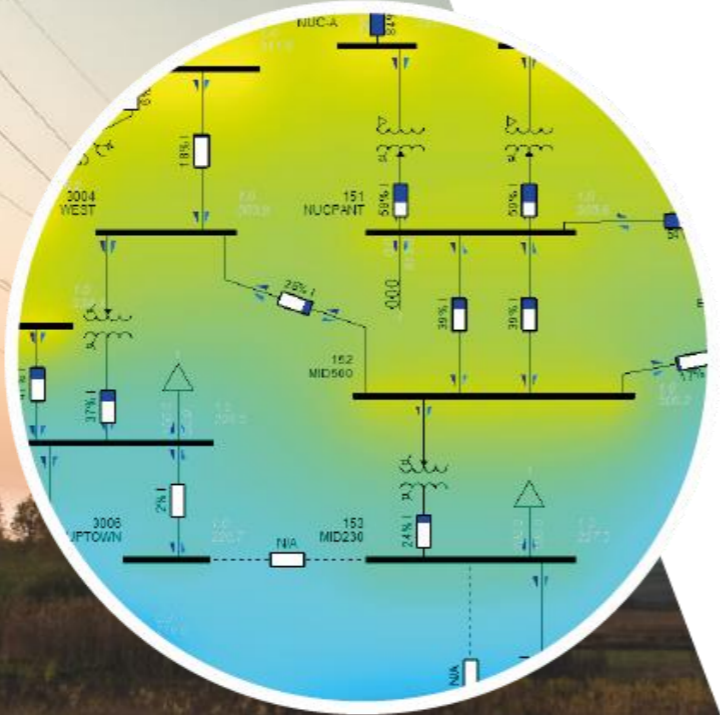
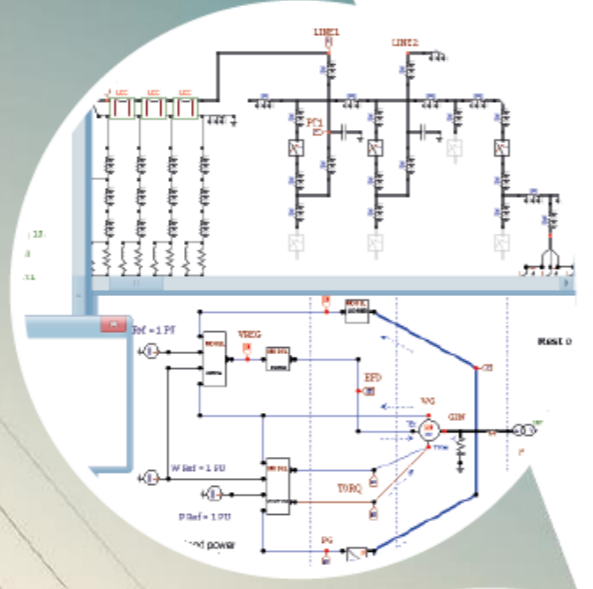


## Power flow studies:

- Models development
- Losses
- Capability curve
- Compensation
- Short circuit
- Interconnection studies

## Electromechanical transients studies:

- Dynamic models development
- User models, development and setting
- Frequency and voltage stability
- Temporary over voltages



## Electromagnetic transients studies:

- Dynamic models development
- Lightning over voltages
- Insulation coordination
- Circuit breakers TRV specification
- Line reactors dimensioning
- Lines and cables electrical parameters calculation

## Power quality studies:

- Current and voltage harmonics
- Flicker
- Voltage variations

# Short courses

- Models approval and validation for electromechanical and electromagnetic transients in non-conventional renewable generation



# Short courses

- Methodology for inertia estimation on electrical grids.
- Power losses study on electrical grids.





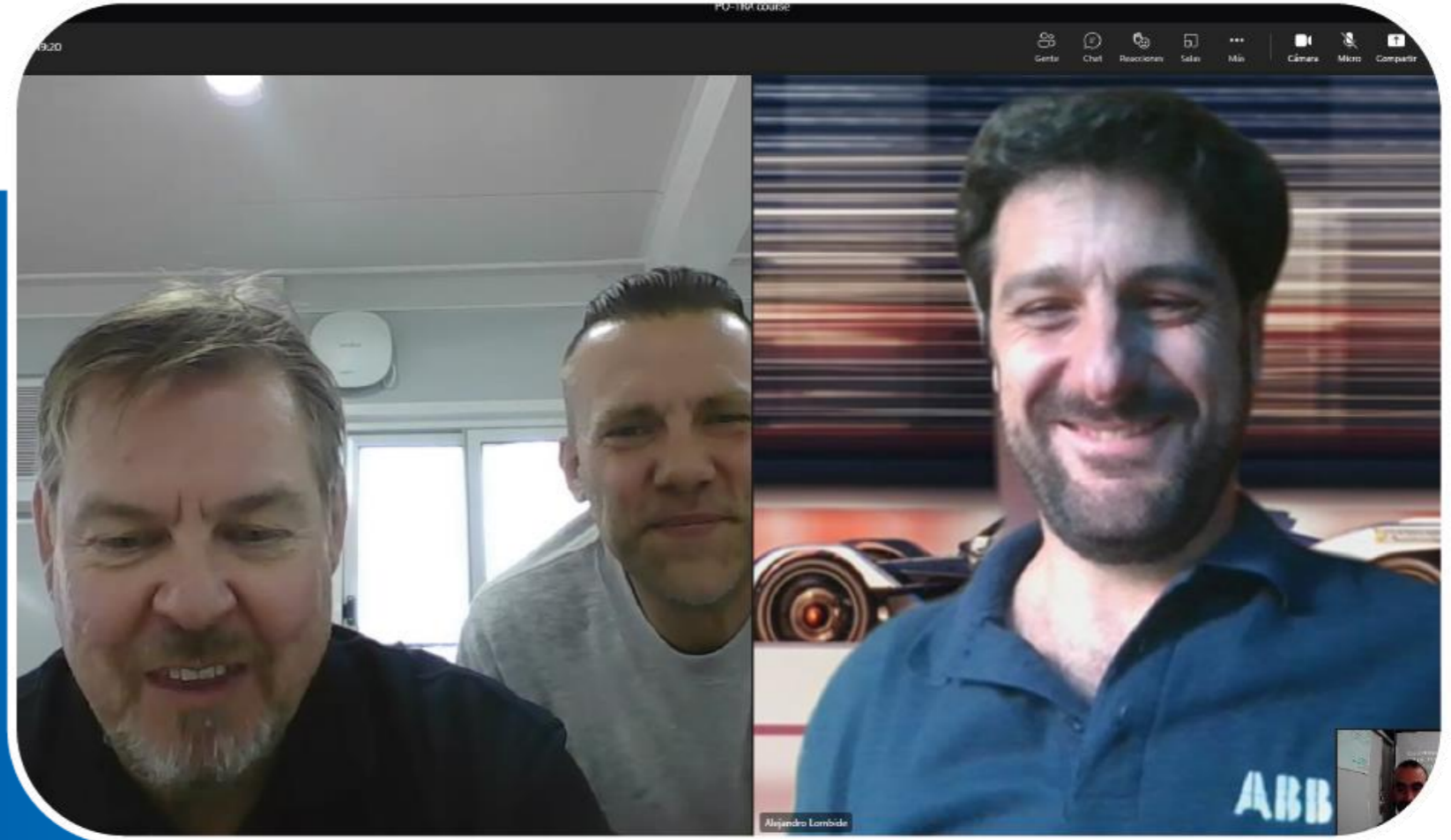
# Short courses

- Power quality
- Python programming for engineers



# Short courses

- PO-TRA-SL-0001/02



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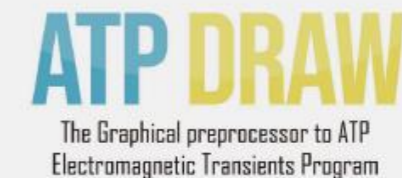
Opportunities

# Softwares

| Current  | Uses                                    |
|----------|---|
| PSS/E    | Power flow, Short circuit and stability |
| ETAP     | Power Flow, stability and harmonics     |
| ATP/Draw | Electromagnetics transients             |

| Future    | Uses                        |
|-----------|-----------------------------|
| ANAREDE   | Power flow                  |
| ANAFAS    | Short Circuit               |
| ANATEM    | Stability                   |
| PSCAD     | Electromagnetics transients |
| DigSilent | PF, SC and transients       |



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| Year | Location | Project        | Description   |
|------|----------|----------------|---|
| 2023 | Uruguay  | E-FUEL         | Connectivity study for an e-fuel plant and its associated renewable energy generation. Study carried out with 1200 MW of generation and 750 MW of consumption.          |
| 2023 | Uruguay  | VENCODESA BESS | BESS modeling for San Gregorio de Polanco (10MVA) y Sarandí del Yí (8MVA) sites. Viability, power flow, short circuit, harmonics, stability and black start studies.    |
| 2022 | Uruguay  | UPM2           | Electromagnetics transients modeling of Biomass plant: 240 MW in loads and biomass generators for 426 MVA. Passive grid, loads, generators and control system modeling. |

| Year      | Location | Project                  | Description  |
|-----------|----------|--------------------------|--|
| 2022      | Uruguay  | SEG BESS                 | BESS modeling for San Gregorio de Polanco (10MVA) y Sarandí del Yí (8MVA) sites. Viability studies.  |
| 2022      | Uruguay  | AKUO BESS                | BESS modeling for San Gregorio de Polanco (10MVA) y Sarandí del Yí (8MVA) sites. Viability, power flow, short circuit, stability and black start studies.                  |
| 2022      | Uruguay  | STILER BESS              | BESS modeling for San Gregorio de Polanco (10MVA) y Sarandí del Yí (8MVA) sites. Viability, power flow, short circuit, stability and black start studies.                  |
| 2022      | Uruguay  | UPM 2                    | Training on PO-TRA-SL-0001/02 regulation for foreign and national engineers in charge of on-site building at UPM 2 (Transmission client and biomass generator) facilities. |
| 2022      | Uruguay  | Albisu                   | Modeling of photovoltaic farm, installed power 10 MW. Modeled for power flow, short circuit and stability studies.   |
| 2022      | Uruguay  | Tubacero                 | Modeling of photovoltaic farm, installed power 0.3 MW. Modeled for power flow and short circuit studies.   |
| 2022      | Uruguay  | Pamer                    | Modeling of photovoltaic farm, installed power 3.5 MW. Modeled for power flow and short circuit studies.   |
| 2022      | Uruguay  | Cristalpet               | Modeling of photovoltaic farm, installed power 1.3 MW. Modeled for power flow and short circuit studies.   |
| 2022      | Uruguay  | Giacote Menafra          | Modeling of photovoltaic farm, installed power 20 MW. Modeled for electromagnetics transients studies.   |
| 2021-2022 | Uruguay  | Punta del Tigre          | Photovoltaic farm, installed power 30MW. Power flow and stability model creation.  |
| 2021      | Uruguay  | Zonamerica: private town | Grid and load modeling for private town, free commerce zone. Voltage studies. Installed power: 8MW.  |

| Year      | Location           | Project                    | Description   |
|-----------|--------------------|----------------------------|---|
| 2021      | Ethiopia           | National Transmission grid | Creation of a power losses guide manual.  |
| 2021      | Uruguay            | Statcom insertion studies  | Studies determination for the installation of a 180 MVA Statcom in a transmission Substation.   |
| 2020      | Ethiopia           | National Transmission grid | International training in power losses, study philosophy and results oriented methodology.  |
| 2020      | Ethiopia           | National Transmission grid | Power losses study for the complete transmission grid.  |
| 2020      | Dominican Republic | Training course            | Seminar dedicated to frequency stability in electrical grids with lack of inertia Participants of the Coordinated Organization for the National Interconnected Electric System. |
| 2020      | Argentina Uruguay  | CTM                        | Calculation of neutral reactors in expansion project of CTM (Mixed Technical Commission) Salto Grande - Uruguay.  |
| 2019-2020 | México             | Sol de Sonora              | Photovoltaic farm, installed power 10MW. Power flow, harmonics and protections studies.   |
| 2019      | Uruguay            | Salto Grande               | Reclosing study in transmission substation Salto Grande - 500 kV.   |
| 2019      | Uruguay            | Anillo 500 kV              | Study for the insertion of damping reactors in the context of grid transmission planning.   |
| 2019      | Uruguay            | Anillo 500 kV              | Energization study for 2 transmission lines, taking into account lines transpositions. Comparison against established limits.   |
| 2018-2020 | Panama             | Ikakos 0, 1, 2 & 3         | Photovoltaic farm, installed power 40MW. Power flow and stability model creation. Power flow and stability studies. Contract management.  |
| 2018      | Uruguay            | Anillo 500 kV              | Modeling of electrical line parameters from physical topology, conductor type, tower type and geographical disposition. Reactive compensation study.                            |



| Year | Location          | Project                             | Description  |
|------|-------------------|-------------------------------------|--|
| 2018 | Uruguay           | Anillo 500 kV                       | Calculation of neutral reactors for grid transmission planning. In total, 800 kms in transmission lines to be fully compensated.   |
| 2018 | Uruguay           | Punta del Tigre                     | Energization study for connecting lines of Punta del Tigre substation - 500 kV.  |
| 2018 | México            | Bluemex                             | Photovoltaic farm, installed power 90MW. Power flow and reactive compensation studies.   |
| 2018 | México            | Camargo                             | Photovoltaic farm, installed power 25 MW. Power flow and reactive compensation studies.  |
| 2018 | Australia         | Lilyvale                            | Photovoltaic farm, installed power 118MW. Power flow and insulation coordination studies.  |
| 2018 | Uruguay           | Uruguayan grid modeling in ATP/Draw | The whole Uruguayan electrical transmission grid, modeled for electromagnetic transients studies. Almost 5000 MW installed in generation, 300 transmission lines, 250 transformers and their respective loads, capacitors and inductors bank, etc. |
| 2016 | Uruguay           | Wind power plant Pampa              | Ferroresonance study in the context of the insertion of a wind power plant.  |
| 2016 | Uruguay<br>Brazil | Conversion station HVDC             | Modeling of frequency conversion station HVDC - 50 Hz/60 Hz - 500 kV – 500 MVA boundary between Uruguayan and Brazilian grid.  |
| 2015 | Uruguay           | Montes del Plata                    | Connectivity study, installed power 160MW. Impact analysis and grid planning in transmission grid.   |
| 2015 | Uruguay           | Ombues generator                    | Connectivity study, installed power 10MW. Impact analysis in Distribution and Transmission grid.   |
| 2014 | Uruguay           | Multiple studies                    | 26 connectivity studies. Loads and generators with authorized/installed power between 2.5MW and 20MW. Loads and generators to be installed on Distribution grid. Impact analysis in Distribution and Transmission grid.                            |

# Experience (5)

supervision and approval

| Year                    | Location | Project             | Description   |
|-------------------------|----------|---------------------|---|
| 2015-2016 and 2020-2021 | Uruguay  | Estrellada Melowind | Wind farm, installed power 50MW. Power flow, stability and electromagnetics transients model approval. Power quality study and field test approval.         |
| 2015 and 2020-2021      | Uruguay  | Alto Cielo          | Photovoltaic farm, installed power 20MW. Power flow, stability and electromagnetics transients model approval. Power quality study and field test approval. |
| 2017-2018 and 2020-2021 | Uruguay  | Pampa               | Wind farm, installed power 140MW. Power flow, stability and electromagnetics transients model approval. Power quality study and field test approval.        |
| 2017 and 2019-2020      | Uruguay  | Astidey             | Wind farm, installed power 50MW. Power flow, stability and electromagnetics transients model approval. Power quality study and field test approval.         |
| 2017 and 2019-2020      | Uruguay  | Cadonal             | Wind farm, installed power 50MW. Power flow, stability and electromagnetics transients model approval. Power quality study and field test approval.         |
| 2017 and 2019-2020      | Uruguay  | Colonia Arias       | Wind farm, installed power 70MW. Power flow, stability and electromagnetics transients model approval. Power quality study and field test approval.         |
| 2017 and 2019-2020      | Uruguay  | R. del Este         | Wind farm, installed power 50MW. Power flow, stability and electromagnetics transients model approval. Power quality study and field test approval.         |
| 2017 and 2019-2020      | Uruguay  | R. del Sur          | Wind farm, installed power 50MW. Power flow, stability and electromagnetics transients model approval. Power quality study and field test approval.         |
| 2015-2016 and 2019-2020 | Uruguay  | Valentines          | Wind farm, installed power 70MW. Power flow, stability and electromagnetics transients model approval. Power quality study and field test approval.         |
| 2014 and 2019           | Uruguay  | Agua leguas 1       | Wind farm, installed power 50MW. Power flow, stability and electromagnetics transients model approval. Power quality study and field test approval.         |
| 2014 and 2019           | Uruguay  | Agua leguas 2       | Wind farm, installed power 50MW. Power flow, stability and electromagnetics transients model approval. Power quality study and field test approval.         |
| 2017-2018               | Uruguay  | Jolipark            | Wind farm, installed power 20MW. Power flow, stability model approval. Power quality study and field test approval.   |

# Experience (6)

supervision and approval

| Year        | Location | Project               | Description   |
|-------------|----------|-----------------------|---|
| 2017 - 2018 | Uruguay  | Ladaner               | Wind farm, installed power 50MW. Power flow, stability and electromagnetics transients model approval. Power quality study and field test approval. |
| 2017 - 2018 | Uruguay  | Palomas               | Wind farm, installed power 50MW. Power flow, stability model approval. Power quality study and field test approval.                                 |
| 2017        | Uruguay  | Juan Pablo Terra      | Wind farm, installed power 140MW. Power flow, stability model approval. Power quality study and field test approval.                                |
| 2017        | Uruguay  | Colidim (El naranjal) | Photovoltaic farm, installed power 50MW. Power flow, stability model approval. Power quality study and field test approval.                         |
| 2016 - 2017 | Uruguay  | Montes del plata      | Biomass generator, installed power 160MW. Power flow model approval. Power quality study and field test approval.                                   |
| 2015 - 2016 | Uruguay  | Fingano               | Wind farm, installed power 50MW. Power flow, stability model approval. Power quality study and field test approval.                                 |
| 2015 - 2016 | Uruguay  | Polesine II           | Wind farm, installed power 50MW. Power flow, stability model approval. Power quality study and field test approval.                                 |
| 2015 - 2016 | Uruguay  | Vengano               | Wind farm, installed power 50MW. Power flow, stability model approval. Power quality study and field test approval.                                 |
| 2015 - 2016 | Uruguay  | Vientos de Pastorage  | Wind farm, installed power 50MW. Power flow, stability model approval. Power quality study and field test approval.                                 |
| 2015 - 2016 | Uruguay  | Cobra (Kiyu)          | Wind farm, installed power 50MW. Power flow, stability model approval. Power quality study and field test approval.                                 |
| 2014 - 2015 | Uruguay  | Gemsa Polesine I      | Wind farm, installed power 50MW. Power flow, stability model approval. Power quality study and field test approval.                                 |
| 2014 - 2015 | Uruguay  | La Jacinta            | Photovoltaic farm, installed power 50MW. Power flow, stability model approval. Power quality study and field test approval.                         |

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# Co-working opportunities



Technical representation (regional and worldwide)

Power system engineer at your disposal

Software consultancy licences purchased

Short course trainer or seminars representation

A team member you can count on



ELECTRICAL  
ENGINEERING  
SOLUTIONS

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