

Rémy Rigo-Mariani

Research Scientist in Power & Energy Systems

PhD. in Electrical Engineering

Power Systems Management and Planning, Smart Grid,
Renewable Energy Integration, Optimization



Details

DOB – October 17th, 1985
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Executive Summary

- More than 10 years of experience in power systems operation and planning.
- Modeling and optimization at the end-users, utility and wholesale market levels.
- Over 35 related publications and strong communication experience with institutional and industrial stakeholders.
- Hardworking, self-starter and ability to work on multi-disciplinary projects.
- Adaptability to new environments with several international experiences.

Expertise

- **Modelling** - distribution & transmission networks, energy markets, generation cost and emissions, demand side management, technico-economical analysis, solar panel, gas turbine, Li-Ion battery.
- **Solving** - linear programming, mixed-integer linear programming, quadratic programming, dynamic programming, genetic algorithm, particle swarm optimization, hybrid algorithms, game theory, stochastic optimization.

Languages

French : Native speaker
 English: Fluent (NZ, USA, Singapore)
 Spanish : Intermediate

Experience

2020 - now

Research Scientist in Power & Energy Systems

Centre National de la Recherche Scientifique, CNRS
Grenoble Electrical Engineering Laboratory, G2Elab – Grenoble, France

- ▶ Investigation of optimal strategies for the management, design and planning of distributed energy resources in the context of power system analysis, multi energy systems and emerging energy markets – applications at the building, district/community and national scales.
- ▶ Grant applications and participation in national and international projects (nine ongoing projects from 100 k€ to 10 M€), collaborations with academic and industrial partners in the field of power systems applications.
- ▶ Project coordination, funding and recruitment. Mentoring and supervision of PhD students, interns and engineers (> 10 resources).
- ▶ Teaching and training to students in engineering schools (INP Grenoble) and professionals.
- ▶ Scientific dissemination: workshops, working groups, seminars, conference chair, publications in international journals, software development.

2018 - 2020

Lead Scientist in Energy Systems Operation

Energy Research Institute @ Nanyang Technological University - Singapore

- ▶ Audit and improvement of a solution for energy management at a building scale, with local generation and electrical/thermal storages – targeting 10 % energy savings and 20 % cost savings. Leading for the modules development, implementation and integration tests in with 100 kW range assets.
- ▶ Responsible for the documentation and the external communication with both institutional and industrial stakeholders.
- ▶ Securing the funds for a future project - technical expert support along the proposal writing, defense and revisions.

Technical Skills: Modeling & optimization (Rstudio), database management (SQL).

2017 - 2018

Research Fellow in Power Systems Planning

Cambridge Research Centre - Singapore

- ▶ Analytical modeling of the centralized power plants in Singapore – 97% accuracy in terms of CO₂ emissions of combined cycle gas turbines.
- ▶ Distributed generation planning, optimal resources allocation in a 200 buses system (Jurong Island in Singapore) for CO₂ reduction.
- ▶ Energy market analysis and simulations. Distributed optimization for the investigation of new policies on renewable energy integration and carbon tax.

Technical Skills: Modeling & optimization (YALMIP/CPLEX), power flow analysis (MATPOWER).

2015 - 2016

Research Associate in Microgrid Operation

University of Washington – Seattle, United-States 

- ▶ Multi-agent deployment for the energy management strategy and voltage regulation in a campus scale microgrid.
- ▶ Building modeling using neural network and machine learning techniques for demand response purposes.

Technical Skills: Optimization (GAMS), machine learning, multi-agent system (Volttron)

2011 - 2014

Research Engineer / PhD Candidate in Microgrid Design

INP Toulouse/ENGIE-SCLE/CIRTEM/SEVIL – Toulouse, France 

- ▶ Cost driven management and design of a microgrid with renewable energy sources and storage unit (inertial and electrochemical) – SMART ZAE project.
- ▶ Real time control strategy based on the mitigation of the day ahead forecast errors.

Technical Skills: Modeling (MATLAB), linear and non linear optimization (CPLEX/GLPK)

2009 - 2011

Research Engineer in Electrical Engineering

LAPLACE Laboratory/AIRBUS/SAFT Batteries – Toulouse, France 

- ▶ Study of an emergency network with a battery for more electrical aircraft, sizing of power electronics systems in terms of mass and efficiency.
- ▶ Experimental tests on a HVDC bus (270 V) with a hybrid power source including and a 28 V Li-ion battery.

Technical Skills: Modeling (Excel/VBA), Real-Time Control (dSpace/ControlDesk)

2008 - 2009

Internships in Electrical Engineering

RTE (Réseau de Transport Electrique) – Toulouse, France 

Integration of the medium voltage renewables in transmission grid analysis.









EDF (Electricité de France) – Ajaccio, France 

Tuning of a controller for the primary frequency regulation in hydro power plants.

Massey University – Wellington, New Zealand 

Analysis of power quality disturbances due to compact fluorescent lamps.

Software Skills

- **MATLAB :** 
- **R-Studio :** 
- **GAMS :** 
- **Python/C :** 
- **Excel/VBA :** 
- **MS Office :** 
- **CPLEX/GLPK :** 
- **Matpower :** 

Teaching & Training

- Optimization for energy management strategies and design of microgrids.
- Power flow analysis, operation of distribution and transmission networks.
- Prospective study for long term planning of the French national energy mix.

Publications

Over 35 publications in journals and conferences



H. Radet, X. Roboam, B. Sareni, R. Rigo-Mariani, "Dynamic aware aging design of a simple distributed energy system: A comparative approach with single stage design strategies", *Renewable and Sustainable Energy Reviews*, vol. 147, 2021.

R. Rigo-Mariani, S.O. Chea Wae, S. Mazzoni, A. Romagnoli, "Comparison of optimization frameworks for the design of a multi-energy microgrid", *Applied Energy*, Vol. 257, 2020.

R. Rigo-Mariani, C. Zhang, A. Romagnoli, M. Kraft, K.V. Ling, J. Maciejowski, "A Combined Cycle Gas Turbine Model for Heat and Power Dispatch Subject to Grid Constraints", *IEEE Transactions on Sustainable Energy*, 2019.

Rigo-Mariani, K. V. Ling, J. Maciejowski, "A clusterized energy management with linearized losses in the presence of multiple types of distributed generation", *International Journal of Electrical Power & Energy Systems*, Vol. 113, pp 9-22, 2019.

Hobbies

 guitar ,  cooking ,  water sports

Education

2011 - 2014

PhD. In Electrical Engineering

Optimal design coupled with management strategy for a microgrid with storage

Awards: Best Thesis in Electrical Engineering - Doctoral School GEET 2015

Jean Nougaro award, Science Academy of Toulouse, 2016

INP (Institut Nationale Polytechnique) – Toulouse, France

2006 - 2009

MSc Electrical Engineering and Automation

ENSEEIH (Ecole Nationale Supérieure d'Electrotechnique, d'Electronique, d'Informatique, d'Hydraulique et des Télécommunications), Toulouse, France