



Fabio RIVA, PhD

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- 🎂 21 October 1990
- 🇮🇹 Italian

*I am committed to addressing **energy challenges** for sustainable development. I seek **sustainable use of natural resources** in my profession and in my life. I adopt a multidisciplinary approach to solve energy problems, by integrating **engineering** and **system-thinking** expertise. I think that education and cooperation represent the basis of all development. Let's build a **more sustainable world together!***

PROFESSIONAL CAREER

POLITECNICO DI MILANO/ UNESCO CHAIR/ ENERGY SYSTEM ANALYSIS AND MODELLING (SESAM) GROUP Energy and Development researcher

Milan, Dec 2014 – Now

My research area concerns mainly the analysis and modelling of best practices in the field of rural electrification for sustainable development in developing countries, with a special focus on the integration of System-Dynamics and Energy Optimisation based methodologies. The main achievements are:

- Analysed and modelled best-practices for **sustainable electrification** in developing countries
- Applied **system-dynamics** for formulating the **electricity-development nexus** in rural areas of developing countries
- Developed **electricity load forecasting** and **energy optimisation** tools for off-grid systems
- Developed decision support systems and guidelines for sustainable use of energy in humanitarian contexts
- Investigated new standards for testing cook-stoves and prototyped together with **eni** for developing countries
- Collaborating with **Falck Renewables** for the realisation of the MOOC “Sustainable Business in the Renewable Energy”
- **Tutored** 11 master theses in Energy Engineering and 1 PhD candidate on impact evaluation for energy access projects
- **Organised** the 5th Workshop of the Open Energy Modelling Initiative
- **Reviewer for International ISI Journal:** Energy, Journal of Cleaner Production, Energy for Sustainable Development, Biomass and Bioenergy, Sustainability (MDPI)

CHALMERS UNIVERSITY OF TECHNOLOGY

Göteborg, Mar 2017 – Jun 2017

Visiting Researcher

- Developed a **system-dynamics** model for long-term rural electricity demand projections
- Authored **1 scientific article** in collaboration with the International Institute for Applied Systems Analysis (IIASA)
- Co-authored **1 poster** presentation at the Elkraft 2017 conference

VISPE NGO

Badile di Zibido San Giacomo, Jul 2013 – Oct 2013

Intern as energy auditor

- Energy assessment of the Mutoyi mission, in Burundi (2 weeks of staying)
- Proposed a technological solution for exploiting the electricity surplus for thermal uses
- Analysed the hydroelectric potential for two locations in Burundi (Burasira and Masabo)

TEACHING ACTIVITIES

Curricular teaching activities

- **Adjunct Professor of Sustainable Development** (SSD: ING-IND 10, 5 ECTS) for the degree programme in Chemical, Electrical, Nuclear, and Physics Engineering, Master of Science, Politecnico di Milano.
Academic years:
 - 2018/2019
- **Teaching assistant** of the thermodynamic course **Fisica Tecnica** (C.INS: 083795, SSD: ING/IND-10, 10 CFU) for the degree programme in Energy Engineering, Bachelor of Science, Politecnico di Milano.
Academic years:
 - 2014/2015
 - 2015/2016
 - 2017/2018
 - 2018/2019
- **Tutor** of the thermodynamic course **Fisica Tecnica** (C.INS: 083795, ING/IND-10, 10 CFU) for the degree programme in Energy Engineering, Bachelor of Science, Politecnico di Milano.
Academic years:
 - 2016/2017

- **Tutor** of the thermodynamic course **Fisica Tecnica** (C.INS: 083795, ING/IND-10, 10CFU) for the degree programme in Aerospace Engineering, Bachelor of Science, Politecnico di Milano.

Academic years:

- 2016/2017
- 2017/2018
- 2018/2019

- **Lecturer** on modelling load curves and electricity demand scenarios for the course **Engineering and Cooperation for Development** (C.INS: 097381, ING/IND-10, 8 CFU), degree programme in Energy Engineering, Master of Science, Energy for Development track, Politecnico di Milano.

Academic years:

- 2017/2018
- 2018/2019

Other teaching activities

- **19 November 2018 @ Politecnico di Milano, ATC2018 - RES4MED Deployment of renewable energy solutions: challenges and opportunities** – Lecture on the global and local dimension of the energy access challenge.
- **February 2016 @ Politecnico di Milano - Post graduate programme COOPERA(C)TION** - Lesson on the Project Cycle Management for the post graduate programme COOPERA(C)TION at DASTU.
- **4-5 June 2015 @ Università di Pavia - Master in Cooperation and Development** – Trainings attended by Master students and NGO's staff. It aimed at presenting the energy technologies identified and tested during the SET4food project and providing attendants with practical info on their installation / management and on the main SET4food outputs.
- **2 October 2015 @ Università di Genova - University course in International Cooperation and Development** – Lesson attended by master and PhD students focused on the Project Cycle Management.
- **8-9 October 2015 @ Bethlehem University - Master in Cooperation and Development** – Lesson on the state-of-the-art of the access to energy and its implication in food utilization in humanitarian contexts. Workshop attended by relevant officers from public authorities, international organizations, academia, NGOs, local associations and organizations, and private companies.

Massive Online Open Courses (MOOC)

- **Sustainable energy technologies for cooking and Decision Support System** – Set4food project: Politecnico di Milano, COOPI, Fondazione Politecnico
- **Energy Efficiency and Renewable Energy Generation** – *Emerging African Innovation Leaders* project: Politecnico di Milano, Politecnico di Torino
- **The Agenda 2030 and the role of energy** – *Sustainable Business in the Renewable Energy* course: Politecnico di Milano and Falck Renewables spa

EDUCATION

POLITECNICO DI MILANO – DEPARTMENT OF ENERGY

Milano, Nov 2015 – Oct 2018

PhD in Energy and Nuclear Science and Technology

System dynamics modelling, Sustainable Development, Energy modelling, Forecasting models, Energy optimisation, Scientific writing, Monte-Carlo Markov-Chain, Impact assessment

- **Thesis title:** *Modelling endogenous complexities in rural electrification: on the local dynamics of growth and the planning of off-grid systems*

POLITECNICO DI MILANO

Milano, Sep 2012 – Oct 2014

MSc in Energy Engineering (Energy for Development track)

110 summa cum laude

Electric engines and systems, Renewable Energy Systems, Project Cycle Management, Economic Development, Engineering for Sustainable Development, Design of solar thermal plants, Analysis of thermal transfer problems

POLITECNICO DI MILANO

Milano, Sep 2009 – Jul 2012

BSc in Energy Engineering

110 summa cum laude

Physics, advanced math, mechanics, fluids, technical design, C++, Energy production, Thermodynamics, Statistics

OTHER COURSES

- **RES4MED / Enel Foundation.** *Advance Training Course 2015: Integration of renewable energy solutions in the Mediterranean electricity markets*
- **MIT Sloan School of Management.** *4th System Dynamics Summer School 2017 - Advance track*

PARTICIPATION IN RESEARCH PROJECTS

Financed projects

- **December 2014 – November 2015**
Title: **Sustainable Energy Technologies for Food Utilization (Set4Food)**, ref: ECHO/ERC/BUD/2014/91006.

Duration: 18 months;

Partners: Cooperazione Internazionale, Fondazione Politecnico di Milano, Politecnico di Milano.

Supervisor: Prof. Emanuela Colombo (Politecnico di Milano)

Research contribution: Co-Author of the "SET4food guidelines on sustainable energy technologies for food utilization in humanitarian contexts and informal settlements" and main developer of the Decision Support System for supporting humanitarian actors in identifying the most appropriate technologies for food utilisation.

- December 2014 – November 2015

Title: **Access to modern energy services and community empowerment: improved cookstoves and entrepreneurship development in CONGO** by ENI spa.

Duration: 8 months;

Supervisor: Prof. Emanuela Colombo (Politecnico di Milano)

Research contribution: development of a comprehensive report of national and local development plans and a descriptive report of current strategies for supporting modern energy services in Congo; design, laboratory testing and development of a new model of improved cooking stove.

- June 2017 – ongoing

Title: **Mozambique.Nature.Growth.University.Education. (Mo.N.G.U.E)**

Partners: Politecnico di Milano, Universidade Pedagógica Delegação de Maxixe-UniSa, Congregazione Sacra Famiglia

Supervisor: Prof. Michele Ugolini (Politecnico di Milano)

Research contribution: Main advisor in the WP related to the energy assessment and planning in the project area of Mongue – Mozambique.

- January 2019 – ongoing

Title: **Piano per il Monitoraggio dell'iniziativa ILUMINA: accesso all'energia per lo sviluppo locale e l'empowerment delle donne AID 11387**

Partners: Agenzia Italiana per la Cooperazione allo Sviluppo Maputo (AICS-Maputo), Politecnico di Milano.

Supervisor: Prof. Emanuela Colombo (Politecnico di Milano)

Research contribution: Contribution in the preparation of the proposal

Submitted projects (contract pending)

- January 2019 – ongoing

Title: **The Matembwe-Ikondo mini-grid: learning from the past, preparing for the future**

Partners: MOTT Foundation, CEFA NGO, Politecnico di Milano

Supervisor: Prof. Emanuela Colombo (Politecnico di Milano)

Research contribution: Contribution in the preparation of the proposal. Expected Role: Project Manager.

PUBLICATIONS

On peer-reviewed Journals

- Lombardi, F., Riva, F., Sacchi, M., & Colombo, E. (2019). Enabling combined access to electricity and clean cooking with PV-microgrids: new evidences from a high-resolution model of cooking loads. *Energy for Sustainable Development*, 49, 78-88.
- Riva F, Gardumi F, Tognollo A, Colombo E. (2019) Soft-linking energy demand and optimisation models for local long-term electricity planning: An application to rural India. *Energy*, 166, 32-46. doi: 10.1016/j.energy.2018.10.067.
- Riva, F., Tognollo, A., Gardumi, F., Colombo, E. (2018). Long-term energy planning and demand forecast in remote areas of developing countries: Classification of case studies and insights from a modelling perspective. *Energy strategy reviews*, 20, 71-89.
- Riva, F., Ahlborg, H., Hartvigsson, E., Pachauri, S., & Colombo, E. (2018). Electricity access and rural development: Review of complex socio-economic dynamics and casual diagrams for more appropriate energy modelling. *Energy for Sustainable Development*, 43, 203-223.
- F. Riva, L. Berti, S. Mandelli, J. Pendezza, E. Colombo, On-field assessment of reliable electricity access scenarios through a bottom-up approach: The case of Ninga SHPP, Tanzania, in: 2017 6th Int. Conf. Clean Electr. Power, Santa Margherita Ligure, Italy, 2017: pp. 340-346. doi:10.1109/ICCEP.2017.8004837.
- Lombardi F, Riva F, Bonamini G, Barbieri J, Colombo E. Laboratory protocols for testing of Improved Cooking Stoves (ICSs): A review of state-of-the-art and further developments. *Biomass and Bioenergy* 2017;98. doi:10.1016/j.biombioe.2017.02.005.
- S. Mandelli, C. Brivio, M. Moncecchi, F. Riva, G. Bonamini, M. Merlo, Novel LoadProGen procedure for micro-grid design in emerging country scenarios: Application to energy storage sizing, in: *Energy Procedia*, Elsevier, Düsseldorf, Germany, 2017: pp. 367-378. doi:10.1016/j.egypro.2017.09.528.
- Lombardi, F., Riva, F., & Colombo, E. (2018). Dealing with small sets of laboratory test replicates for Improved Cooking Stoves (ICSs): insights for a robust statistical analysis of results. *Biomass and Bioenergy*, 115, 27-34.
- Barbieri J, Parigi F, Riva F, Colombo E. Laboratory Testing of the Innovative Low-Cost Mewar Angithi Insert for Improving Energy Efficiency of Cooking Tasks on Three-Stone Fires in Critical Contexts. *Energies*; 11(12), 3463: doi: 10.3390/en1123463.
- Riva F, Rocco MV, Gardumi F, Bonamini G, Colombo E. Design and performance evaluation of solar cookers for developing countries: The case of Mutoyi, Burundi. *Int J Energy Res* 2017. doi:10.1002/er.3783.
- Barbieri J, Riva F, Colombo E. Cooking in refugee camps and informal settlements: A review of available technologies and impacts on the socio-economic and environmental perspective. *Sustain Energy Technol Assessments* 2016. doi:10.1016/j.seta.2017.02.007.
- Aste N, Barbieri J, Berizzi A, Colombo E, del Pero C, Leonforte F, et al. Innovative energy solutions for improving food preservation in humanitarian contexts: A case study from informal refugees settlements in Lebanon. *Sustain Energy Technol Assessments* 2017.

doi:10.1016/j.seta.2017.02.009.

Riva F, Lombardi F, Pavarini C, Colombo E. Fuzzy interval propagation of uncertainties in experimental analysis for improved and traditional three – Stone fire cookstoves. *Sustain Energy Technol Assessments* 2016;18:59–68. doi:10.1016/j.seta.2016.09.007.

Conference proceedings

Hartvigsson E, Riva F, Colombo E, Ehnberg J, The merry-go-round of electrification programmes: potential pitfalls when only using electricity access as indicator for electrification. Poster at 36th Int. Conf. Syst. Dyn. Soc., Reykjavík, Iceland: System Dynamics Society; 2018.

Riva F, Investigating and modelling endogenous socio-economic dynamics in long-term electricity demand forecasts for rural contexts of developing countries. Int. Conf. Syst. Dyn. Soc., Reykjavík, Iceland: System Dynamics Society; 2018.

Riva F, Colombo E, Piccardi C. Modelling social networks in innovation diffusion processes: the case of electricity access in rural areas. Proc. 35th Int. Conf. Syst. Dyn. Soc., Cambridge, USA: System Dynamics Society; 2017.

Balderrama Subieta SL, Tarantino A, Sabatini S, Riva F, Bonamini G, Quoilin S. Feasibility Study of PV & Li-Ion Battery Based Micro-Grids for Bolivian Off-Grid Communities. Proc. IRES 2017 - 11th Int. Renew. Energy Storage Conf., Düsseldorf, Germany: 2017.

Bonomini G, Riva F, Colombo E. Cost Allocation strategy for off grid system in rural area: a case study on irrigation for rural agricultural lands in India. Ecos 2016 - 29th ECOS Conf., Portorose: 20

Caniato M, Barbieri J, Riva F, Colombo E. Energy Technologies for Food Utilization for Displaced People: from identification to evaluation. Tech4Dev 2016 Conference, Lausanne: 2016

SOFTWARE

- Proficiency of: Excel, Microsoft Office suite
- Engineering: HOMER Energy, Trnsys Simulation Studio, SolidWorks, SolidEdge, Inventor, R – Statistical Analysis
- Programming: Matlab - Simulink, Vensim DSS, C++, Python

CERTIFICATIONS

Language

- ITALIAN: *mother tongue*
- ENGLISH: *FIRST Certificate – B2 Level / TOEIC Certificate – C1 Level (score 885)*

Other

- *Chartered Industrial Engineer* (Esame di Stato per la Professione di Ingegnere)

I authorise the use of my personal data in compliance with the Legislative Decree 196/2003 and with GDPR 2016/679