Matteo Vincenzo Rocco

Curriculum Vitae – Scientific and Professional activities (last update: August 2019)

SUMMARY

In compliance with the Italian legislative Decree no. 196 dated 30/06/2003, I hereby authorize you to use and process my personal details contained in this document.

1. PERSONAL INFORMATION

Surname, Name:	Rocco, Matteo Vincenzo
Born:	03-08-1986, Legnano (MI), Italy
Home address:	Via Matteotti 121, Rescaldina (MI), Italy
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2. EDUCATION

2.1. ACADEMIC QUALIFICATIONS

March 2015 — **Doctoral Degree in Energy and Nuclear Science and Technology (STEN)**
Department of Energy, Politecnico di Milano
Thesis title: *Primary Exergy Cost of Goods and Services – An Input-Output approach*
Supervisor: Prof. Emanuela Colombo
Description: the thesis introduces and formalizes a methodology for the quantification of primary non-renewable resources consumption of goods and services production based on Exergy Analysis and Input-Output Analysis.

December 2011 — **Master of Science in Energy Engineering**
Politecnico di Milano, score 104/110
Thesis title: *L'exergia come strumento per l'analisi dei sistemi*
Supervisor: Prof. Emanuela Colombo
Description: the thesis reviews the most relevant advanced exergy-based methods for system analysis and provides a novel and comprehensive formalization of the Extended Exergy Accounting.

September 2008 — **Bachelor of Science in Energy Engineering**
Politecnico di Milano, score 99/110
Thesis title: *Riscaldamento Globale: la componente antropica*
Supervisor: Prof. Ernesto Pedrocchi

2.2. OTHER QUALIFICATIONS

October 2018 — **National Academic Qualification as Associate Professor**
Abilitazione Scientifica Nazionale (ASN) valida per funzioni di Professore di seconda fascia nel Settore Concorsuale 09/C2 (Fisica Tecnica e Ingegneria Nucleare)
Validity: from 08-10-2018 to 08-10-2024

March 2016 — **Qualification to practice Engineering profession**

2.3. COURSES AND CERTIFICATIONS

September 2016 — **Computable General Equilibrium (CGE) Models for Environmental Assessment**
Center for Research on Energy and Environmental Economics and Policy (IEFE)
Bocconi University, Milan (Italy), 26-29 September 2016
Topics: applications of Macroeconomic models for the evaluation of the primary energy requirements and environmental impact of new policies and products

Oct 2016 **GaBi Advanced Training**
Course organized by *Thinkstep* (www.thinkstep.com), Ravenna, 24-27 October 2016
Topics: Introduction to sustainability and LCA; GaBi software jump start, intermediate and advanced use

July 2012 **Scuola di Calcolo Scientifico con Matlab**
Università degli Studi di Palermo, 23 July – 7 August 2012
Topics: scientific programming, parallel computing and toolboxes

June 2011 **Summer School of Thermodynamics**
University of Roma "La Sapienza", Anzio, June 24 – July 26, 2011
Topics: Thermodynamics methodologies, Heat transfer and Thermoeconomics

3. Academic and Professional Career

3.1. Current position

Jan 2017 – Present **Assistant Professor** (*Ricercatore a Tempo Determinato tipologia "Junior", RTD-A*)
Department of Energy, Politecnico di Milano, Via Lambruschini 4 – 20156, Milano, Italy
Research title: "*Modelli di analisi exergetiche avanzate e Life Cycle nella valutazione dell'efficienza nell'uso delle risorse primarie per la produzione di beni e servizi*"
Activities: serving as Senior Researcher in a group composed by 3 PhD candidates and 2 research fellows, focusing on the development of multi-layer, integrated models for the assessment of impact of productive systems and energy policies

Oct 2018 – Present **Associate Researcher**
Fondazione Eni Enrico Mattei (FEEM), Corso Magenta 63 – 20123, Milan, Italy
Research program: "*Africa Research, Empowerment, Partnership (Africa-REP)*"
Activity: supporting as Senior Researcher the activity of a team composed by 2 PhD candidates and 1 project manager, focusing on the joint application of supply chain engineering, energy and Input-Output models for policy advising in Africa

3.2. Previous positions

Jan 2015 – Dec 2016 **Postdoctoral Fellow**
Department of Energy, Politecnico di Milano, Via Lambruschini 4 – 20156, Milano, Italy
Research program: "*Analisi exergetiche avanzate e analisi economiche per la valutazione del consumo primario di risorse naturali per la produzione di beni e servizi*"
Activities: development and applications of Thermodynamic-based Life Cycle Methods to account for primary energy-resources embodied in goods and services.

Jan – Apr 2013 **Visiting Researcher**
Centre for Energy Resources and Consumption (CIRCE)
University of Zaragoza, Campus Río Ebro. Mariano E. Gómez 15, Zaragoza (Spain)
Supervisor: Prof. Antonio Valero
Activities: development of an Exergy-based Input-Output methodology to quantify the resources embodied in human labor

Jan 2012 – Mar 2015	**PhD Candidate** Department of Energy, Politecnico di Milano, Via Lambruschini 4 – 20156, Milano, Italy Supervisor: Prof. Emanuela Colombo Research activities: development and application of advanced Exergy-based methods for energy system analysis
Mar – Nov 2011	**CFD analyst** Internship at Ansaldo Caldaie S.p.A., Largo Buffoni 3, Gallarate (VA) Supervisor: Eng. Giani Thomas (Ansaldo Caldaie S.p.A.) Activities: Computational Fluid Dynamics (CFD) analysis of an airfoil applied on a 660 MW steam generator operating in Abu Qir (Egypt)
Jun – Aug 2005	**Junior Energy system analyst** Internship at Thermoteam s.r.l., Corso G. Garibaldi 127, Legnano (MI) Supervisor: Eng. Giorgio Ferraro

3.3. AFFILIATION TO RESEARCH GROUPS / ASSOCIATIONS / COMMITTEES

Nov 2018 – Present	Member of the **"Osservatorio per l'economia circolare e la transizione energetica"** Assessorato Ambiente e Clima di Regione Lombardia
May 2018 – Present	Member of the **"OSeMOSYS Steering Committee"** KTH Royal Institute of Technology in Stockholm Brinellvägen 8, 114 28 Stockholm, Sweden Activity: development of the OSeMOSYS energy modelling framework
2017 – Present	Member of the **"Exergy-Economics network"** (www.exergyeconomics.wordpress.com)
2016 – Present	Member of the **"International Input-Output Association"** (IIOA, www.iioa.org)
2016 – Present	Member of the **"International Electrotechnical Committee"** (IEC, https://www.iec.ch/) Technical Committee 105 – Fuel Cell Technologies Working Group 14 (WG14) – Life Cycle Assessment Activities: • Development of Standards for assessing fuel cell environmental performances: - *IEC 62282-9-101* – Streamlined life cycle considered environmental performance characterization of stationary fuel cell power systems for residential applications - *IEC 62282-9-102* – Product category rules for environmental product declarations of stationary fuel cell power systems and alternative systems for residential applications • Organization of WG14 meeting in Milan, 5-8 August 2019
2013 – Present	Member of the **"Rete Italiana LCA"** (www.reteitalianalca.it) Involved in the research activities of the work group: *Development and Improvement of LCA methodology: Research and Exchange of experiences* (DIRE), Supervisors: Dr. Grazia Barberio (ENEA), Prof. Lucia Rigamonti (Politecnico di Milano).

4. HONORS AND AWARDS

June 2019 **Wassily W. Leontief Memorial Prize**
International Input-Output Association (IIOA)
Received for the best paper presented at the 27th International Input-Output Association (IIOA) Conference, 30th June to 5th July 2019, Glasgow, Scotland.
Selected paper: Rocco M V. *Integrating Energy and Economy models based on the Dynamic Input-Output framework.* In conference electronic proceedings
Prize: 1,000 $

October 2017 **Individual basic research activity funding**
Agenzia nazionale di valutazione del sistema universitario e della ricerca (ANVUR)
Prize: 3,000 €

June 2016 **Premio Giovani Ricercatori LCA 2016**
Rete Italiana LCA
Received for the best paper presented at the scientific congress: "V Convegno dell'Associazione Rete Italiana LCA", Jun 23-24, 2016, Ravenna
Selected paper: Rocco M V. *Accounting for human labour in LCA: a novel Input-Output approach*. In Atti del X Convegno dellla Rete Italiana LCA 2016 Life Cycle Thinking, sostenibilità ed economia circolare Ravenna - 23-24 giugno 2016. ISBN: 978-88-8286-333-3.
Ravenna (Italy), 23-24 June 2016.
Prize: 500 €, free participation to the "GaBi Advanced Training", Ravenna, 24-27 Oct 2016

5. ACADEMIC ACTIVITY

5.1. MSc, BSc COURSES

A.Y. 2018-2019 **Teaching Professor**
Course: "Fisica Tecnica", SSD: ING/IND-10
Lectures and Hands on sessions
Registered students: 189
BSc in Management engineering, Politecnico di Milano

A.Y. 2017-2018 **Teaching Professor**
Course: "Fisica Tecnica", SSD: ING/IND-10
Lectures and Hands on sessions
Registered students: 176; Course score: 3.1/4
BSc in Informatic engineering, Politecnico di Milano

A.Y. 2016-2017 **Teaching Assistant**
Course: "Fisica Tecnica", Prof. Fabio Inzoli, SSD: ING/IND-10
Hands on sessions
BSc in Energy engineering, Politecnico di Milano

A.Ys. 2015 – Present **Teaching Assistant (5 academic years)**
Course: "Advanced Thermodynamics and Thermoeconomics", Prof. Emanuela Colombo, SSD: ING/IND-10
Hands on sessions
MSc in Energy engineering, Politecnico di Milano

A.Y. 2014-2015 **Teaching Assistant**
Course: "Energetica Generale", Prof. Emanuela Colombo, SSD: ING/IND-10
Hands on sessions
MSc in Energy engineering, Politecnico di Milano

A.Ys. 2012 – 2014 **Tutor (2 academic years)**
Course: "Fondamenti di Energetica", Prof. Riccardo Mereu, SSD: ING/IND-10
BSc in Energy engineering, Politecnico di Milano
Course: "Ingegneria e Cooperazione per lo Sviluppo", Prof. Emanuela Colombo, SSD: ING/IND-10, MSc in Energy engineering, Politecnico di Milano

5.2. PHD COURSES

A.Ys. 2017-2019 **Member of the Teaching Staff (2 academic years)**
Course: "Resource Planning and Management within Sustainable Development", Prof. Emanuela Colombo, PhD in Energy and Nuclear Technology Science (STEN)
Lectures and Hands on sessions
Module: "The Global Energy Challenge and the Relevance of Energy Accounting"

5.3. MASTER COURSES

Jan 2019 **Scientific Coordinator of a Master module (Enel Green Power)**
Responsibility of the Master "Strategies and Innovative O&M Management - *Enel Green Power* and Global Thermal Generation", module 1: "Energy Outlook for Electricity production"
Department of Energy – Politecnico di Milano

Jan 15th, 2019 **Energy world: overview and trends (Enel Green Power)**
Lecture and hands on (2 days)
Master "Strategies and Innovative O&M Management - Enel Green Power and Global Thermal Generation", module 1: "Energy Outlook for Electricity production"
Department of Energy – Politecnico di Milano

Apr 30th, 2019 **Economic and Environmental Impact assessment: theory and methods**
Lecture (4 hours)
Master RIDEF 2.0 XV edizione - Modulo 2 Cambiamenti climatici, limiti fisici per il pianeta e sostenibilità forte
Department of Energy – Politecnico di Milano

Nov 30th - Dec 20th, 2018 **An LCA perspective on energy and productive sectors (Eni)**
Lecture and hands on (2 days)
Master "Energy Innovation – ENI and Politecnico di Milano"
Department of Energy – Politecnico di Milano

5.4. OTHER LECTURES, SEMINARS

Jun 26th, 2019	**Introduction to Economic and Environmental Impact Accounting (Enel Foundation))** Lecture (2 hours) Open Africa Power education venture – Enel Foundation, 2018 Department of Energy – Politecnico di Milano
Jan 28th - 29th, 2019	**Introduction to Environmental and Economic Impact Accounting (FEEM)** Lecture and hands on (2 days) Lecture and project work for the Joint workshop by Politecnico di Milano and FEEM in the Energy Modelling Platform for Africa (EMP-A) University of Cape Town, New Engineering Building, South Africa
Oct 10th - Nov 7th, 2018	**Energy resources and Environmental impact accounting methods for energy and productive system analysis (SAIPEM)** Lecture and hands on (4 days) Short Course, High Value Service Division, SAIPEM, San Donato Milanese (Milan)
Dec 18th, 2017	**Il settore energetico: fabbisogni, problemi emergenti e scenari di sviluppo (IKAROS)** Seminar (3 hours) IKAROS foundation – school of professional development, Largo Don Minzoni 8, Buccinasco, Milan
Nov 11th, 2015	**Strumenti per la valutazione di sistemi energetici complessi a grande scala** Seminar (3 hours) Invited lecturer from Prof. Mauro Reini (reini@units.it), Università degli Studi di Trieste, Piazzale Europa, 1, 34127 Trieste
Nov 5th, 2015	**Introduction to Industrial Ecology** Lecture (4 hours) TriNex European Project (ref.: 544397-TEMPUS-1-2013-1-IT-TEMPUS-JPHES). Department of Energy – Politecnico di Milano
May 2nd, 2015	**Energy, economy and policy (Innovative Teaching program, Politecnico di Milano)** Recorded lectures Massive On-line Course (MOOC): AspEnergy101 – The strange paradox of the world energy question (https://www.pok.polimi.it/courses/). Department of Energy – Politecnico di Milano

5.5. THESES SUPERVISION

Jan 2017 – Present	Permanent member of the Graduation Commission in Energy Engineering Advisor of 12 MSc theses in Energy Engineering Reviewer and Opponent of 3 MSc thesis in Energy Engineering
Jan 2017 – Present	Advisor of 3 PhD candidates: - *Roberto Vaccaro*, PhD Executive from EURAC research (Bozen, Südtirol) - *Roque Gustavo Stagnitta*, Joint PhD program with Rosario National University (Rosario, Santa Fe, Argentina) - *Lanuzza Luigi*, PhD Executive candidate from Enel X (Rome, Italy)
Dec 2011 – Dec 2016	Co-supervision of 15 MSc theses in Energy, Chemical and Environmental Engineering

6. RESEARCH ACTIVITY

6.1. RESEARCH FIELD DESCRIPTION

The Candidate serves as Senior Researcher and participate to the coordination of the research activities of the *Sustainable Energy System Analysis and Modelling group* (SESAM) at the Department of Energy, Politecnico di Milano, in the years 2012-2019. Between 2012 and 2014 as PhD candidate, between 2015 and 2016 as Post-Doctoral researcher, and between 2017 and 2019 as Assistant Professor (RTD-a).

The research is focused on the development of integrated and multi-scale models capable to define future development scenarios at the nation-wide scale and by assessing the related Life Cycle impacts by including all the industrial sectors of the analyzed country (or clusters of countries). More specifically, the research assumes the original Leontief's Input-Output meso-economic model as the preferred computational structure, extending and integrating it by means of simulation/optimization models of the national energy systems and detailed engineering models of other processes, to enable a detailed technological characterization. The ultimate purpose of the research is to support the definition of effective and scientifically-grounded energy and environmental policies, in line with the objectives of the Agenda 2030, translating the overall policy impact into a set of quantitative energy, environmental and economic indicators, such as: overall exergy destructions, primary energy requirements, pollutants and greenhouse gases emissions, resources use (e.g. virtual water, land footprint), and economic effects like the change in Gross Domestic Product.

The research activities of the Candidate stem from the MSc thesis, deepening the Advanced Exergy-based methods for system analysis and Life Cycle Assessment methods and models. The first research area concerns the development of Exergy Analysis, Exergy Cost Theory and Thermoeconomic analysis [J2,J6,J14]. Theoretical advances in this field, especially focused on Embodied Exergy methodologies (e.g. Cumulative Exergy Consumption, Thermo-Ecological Cost, Extended Exergy Analysis, etc.) [J2,J10] are accompanied by practical applications to different case studies, mainly energy conversion systems [J1,J12] and processes of the Oil&Gas industry [J8,J21]. Thermoeconomic analysis methods for cost accounting and malfunction diagnosis purposes have also been applied [J16], and theoretical developments proposed [J14].

Particular attention is then devoted to the analytical formalization of industrial supply chains models (e.g. Process-based and Input-Output techniques) and to their integration with thermodynamic models (Hybrid modelling) [B1,J12,J19]. Notably, the development of integrated models based on Input-Output analysis has been performed and extensively analyzed in a scientific monography [B1]. More specifically, models for the impact assessment of current and future light-duty transport vehicles have been developed and applied to different case studies in different countries [J7,J19]; methodology improvements of Life Cycle Assessment (LCA) have been proposed in the same field [J13]. Environmentally extended Input-Output models have been also developed and applied for the assessment of the thermodynamic metabolism of industrial systems [J17]. Finally, developments and applications of optimization models useful to perform operational and planning analyses of national energy system have been performed [J20], and these have been integrated into a multi-layer energy methodology able to support the assessment and the definition of scientifically-grounded energy and environmental policies [J22]

The research path drawn by the Candidate from 2012 to present benefits from durable and profitable cooperation with other research groups at both national and international level (see paragraph 6.2), from responsibility and participation to a number of national and international research projects (see paragraphs 6.3 and 6.4), from the activity of lecturer in MSc and BSc courses (all part of the scientific sector 09/C2, ING-IND11) and from the membership to one International Journal Editorial Board (see paragraph 7.2). The research carried out these years

has led to publications in International Journals, Proceedings of International and National Congresses, a scientific monography and other different contributions (see paragraph 7.1).

6.2. National / International Research Collaborations

2012 – Ongoing
Senior Researcher in the **Sustainable Energy Systems Analysis and Modelling (SESAM)** group, Department of Energy, Politecnico di Milano, Via Lambruschini 4, Milan (Italy)
Supervisor: Prof. Emanuela Colombo

2018 – Ongoing
Senior Researcher in **Fondazione Eni Enrico Mattei (FEEM)**
Contacts: Dr. Paolo Carnevale (Paolo.Carnevale@eni.com)
Role and Activities: enrolled as Associate Researcher in the program: "*Africa Research, Empowerment, Partnership (Africa-REP)*", coordinated by Prof. Emanuela Colombo, to support policy development in the African context by developing integrated modelling frameworks based on energy optimization models, supply chain engineering models, Input-Output models.

2018 – Ongoing
Collaboration with **Istitituto per le Technologie della Costruzione, Consiglio Nazionale delle Ricerche (ITC-CNR)**
Contacts: Dr. Ludovico Danza (danza@itc.cnr.it), Dr. Lorenzo Belussi (belussi@itc.cnr.it)
Research contribution: developing detailed thermodynamic models for the Italian building stock and their integration with national power systems models.

2018 – Ongoing
Collaboration with **Calvin College**, Grand Rapids, USA
Contact: Dr. Matthew K. Heun (mkh2@calvin.edu)
Research contribution: collaboration to the activities of the Exergy Economics group

2018 – Ongoing
Collaboration with **Instituto Tecnológico y de Estudios Superiores de Monterrey**, Nuevo León, Mexico
Contact: Dr. Zeus Guevara (zshrzmgv@gmail.com)
Research contribution: collaboration to the activities of the Exergy Economics group

2018 – Ongoing
Collaboration with **Copernicus Institute of Sustainable Development, Utrecht University**, Utrecht, Netherlands
Contact: Dr. Elena Fumagalli (e.m.fumagalli@uu.nl)
Research contribution: development of integrated energy-economy models for assessing rural electrification impact

2017 – Ongoing
Collaboration with **EURAC Research (Renewable Energy Institute)**, Bolzano, Italy
Contact: Dr. Roberto Vaccaro (roberto.vaccaro@eurac.edu)
Research contribution: starting of a joint Executive PhD, and preparation of joint H2020 Marie Curie call (H2020-MSCA-ITN-2018)

2016 – Ongoing
Collaboration with the **Joint Research Centre (JRC)**, Ispra, Italy
Contact: Dr. Alberto Moro (Alberto.MORO@ec.europa.eu)
Research contribution: methodology improvements of the European Commission Well to Wheels model

2016 – Ongoing	Collaboration with the **International Energy Agency (IEA)**, Paris, France Supervisors: Dr. Laura Cozzi (Laura.COZZI@iea.org) Research contribution: regularly published in World Energy Outlook reports
2015 – Ongoing	Collaboration with **Group on Advanced Separation Processes & GAS Processing (GASP)** Department of Chemistry, Politecnico di Milano Contact: Prof. Laura Pellegrini (laura.pellegrini@polimi.it) Research contribution: application of exergy-based methods to standard and innovative acidic gas removal systems in LNG production
May – Dec 2014	Collaboration with the **Center for Automotive Research (CAR)** The Ohio State University, 930 Kinnear Road, Columbus, Ohio Contact: Dr. Matteo Muratori (muratori.2@osu.edu) Research contribution: application of Well to Wheels methods for the analysis of different fuel pathways and powertrains in different World regions.
Jan – Apr 2014	Visiting Researcher at **Centre for Energy Resources and Consumption (CIRCE)** University of Zaragoza, Campus Río Ebro. Mariano E. Gómez 15, Zaragoza (Spain) Contact: Prof. Antonio Valero (valero@unizar.es) Research contribution: development of Hybrid Input-Output methodology to quantify the resources embodied in human labor

6.3. RESPONSIBILITY OF FUNDED RESEARCH PROJECTS

Jan 2019 – Ongoing	**Modello Integrato di Impatto per Strategie di Decarbonizzazione e di Economia Circolare (Eni)** Budget: 120,000 €; Duration: 24 months Partner: Eni S.p.A. Supervisor: Dr. Matteo V. Rocco (Politecnico di Milano) Activities: development and application of an Input-Output model for the assessment of the nation-wide economic and environmental impact of decarbonization and circular economy strategies of Eni.
Jan 2019 – Ongoing	**A Study for the integrated development of the region BOAne, MoAmba, NamaacHA, Mozambique (Polisocial Award 2018, Politecnico di Milano)** Budget: 30,000 €; Duration: 12 months Partners: consortium of Departments of Politecnico di Milano Supervisor: Dr. Matteo V. Rocco (Politecnico di Milano) Activities: development and application of a model for assessing future development scenarios for the energy sector and the economic system of Mozambique.
Mar – Jul 2018	**Application of Advanced Exergy Methods for the analysis of Energy Systems (Eni)** Budget: 19,000 €; Duration: 3 months Partner: Eni S.p.A. Activities: surveying of advanced exergy-based methods for assessing energy conversion systems performances.

6.4. PARTICIPATION IN FUNDED RESEARCH PROJECTS

Oct 2018 – Ongoing

PRE-LEAP-RE: PREparing for a Long-Term Joint EUAU Research and Innovation Partnership on Renewable Energy (HORIZON2020 - call LC-SC3-JA-3-2018)
Budget: 1.000.000,00 €;
Grant holder: Commissariat a l'Energie Atomique et aux energies alternatives
Partners : 16 international partners
Scientific coordinator: Prof. Emanuela Colombo (Politecnico di Milano)
Research contribution: support action in preparation of a Joint Programming. Proposal focused on designing technological and social innovation research pathways and a capacity building agenda in compliance with the Knowledge Triangle.

Oct2018 – Ongoing

Emerging African Innovation Leaders: G7 Exchange & Empowerment Program for enabling Innovation within the Next Production Revolution (Agenzia Italiana di Cooperazione e Sviluppo – AICS, AID 11346)
Budget: 999.142,00 €;
Grant holder: Politecnico di Milano
Partners : Politecnico di Torino
Scientific coordinator: Prof. Emanuela Colombo (Politecnico di Milano)
Target countries: Tunisia, Niger, Nigeria, Kenya
Research contribution: support action in providing lectures, seminars and advising to the project candidates.

Sep 2017 – Ongoing

Eni Impact Tool: Modello di valutazione dell'impatto per i progetti di investimento comunitario di ENI: applicazione ai progetti energetici (Eni)
Budget: 350,000 €; Duration: 24 months
Partner: Eni S.p.A.
Supervisor: Prof. Emanuela Colombo (Politecnico di Milano)
Research contribution: development and application of an impact assessment model for community project in developing countries and application to energy projects.

Feb 2017 – Jan 2018

Energy Efficiency Work stream (GIZ)
Budget: 1,000,000 €; Duration: 18 months;
Partners: Africa Europe Energy Partnership (AEEP), Deutsche Gesellschaft für Internationale Zusammenarbeit, GmbH (GIZ)
Scientific coordinator: Prof. Emanuela Colombo (Politecnico di Milano)
Research contribution: Establishment and management of an energy efficiency action group with the objective to contribute to the Africa-EU Energy Partnership 2020 energy efficiency target

May 2014 – Nov 2015

Green Entrepreneurship European Project (GIEP), 530611-TEMPUS-1-2012-IT-TEMPUS-JPCR
Budget: 953,000.00 €; Duration: 3 years; Partner countries: Germany, Austria, Egypt.
Scientific coordinator: Prof. Emanuela Colombo (Politecnico di Milano)
Research contribution: definition of scientific curricula for MSc courses in Energy engineering

May 2014 – Nov 2015 **Sustainable Energy Technologies for Food Utilization (Set4Food), ECHO/ERC/BUD/2014/91006 (EU DG ECHO)**
Budget: 1,647,372.00 €; Duration: 18 months; Partners: Cooperazione Internazionale, Fondazione Politecnico di Milano, Politecnico di Milano.
Scientific coordinator: Prof. Emanuela Colombo (Politecnico di Milano)
Research contribution: evaluation of efficiency and environmental impact of energy solutions for food cooking and preservation in camps and informal settlements for refugees and internally displaced persons (IDPs)

May 2014 – Nov 2015 **Knowledge triangle platform for Water Energy Food Nexus (TriNex), 544397-TEMPUS-1-2013-1-IT-TEMPUS-JPHES**
Budget: 978,019.59€; Duration: 36 months; Partner countries: Egypt, France, Germany, Austria.
Scientific coordinator: Prof. Emanuela Colombo (Politecnico di Milano)
Research contribution: member of the team lecturer; training of academic staff of Egypt in a variety of fields, including Thermodynamic analyses and Industrial Ecology

May – Dec 2012 **Analisi del ciclo di vita delle principali tecnologie di protezione dei versanti**
Partners: Eng. Claudio Zarotti, PratiArmati s.r.l., via del Cavaliere 18, Opera (MI)
Supervisor: Prof. Emanuela Colombo, Dr. Claudio Zarotti (PratiArmati)
Research contribution: the application of Thermodynamic-based LCA techniques to account for the primary exergy caused by the construction of standard and innovative of anti-erosion systems

May – Sep 2012 **Analisi exergetiche come strumenti a supporto delle decisioni nella selezione di alternative impiantistiche (Eni)**
Partner: Eni S.p.A., San Donato Milanese, Milan, Italy
Supervisor: Prof. Emanuela Colombo (Politecnico di Milano)
Research contribution: application of Exergy Analysis to a crude oil stream, evaluating its Thermodynamic potential and suggesting the best feasible ways to exploit it

7. PUBLICATION ACTIVITY

7.1. PUBLICATIONS

INTERNATIONAL JOURNAL (ISI)

J1. Cassetti G, **Rocco M V**, Colombo E
Exergy based methods for economic and risk design optimization of energy systems: application to a gas turbine
Energy, 2014;74:269–79, DOI: 10.1016/j.energy.2014.07.043

J2. **Rocco M V**, Colombo E, Sciubba E
Advances in Exergy Analysis: a novel assessment of the Extended Exergy Accounting method
Applied Energy, 2014;113:1405–20, DOI:10.1016/j.apenergy.2013.08.080.G

J3. Colombo E, **Rocco M V**, Toro C, Sciubba E
An Exergy-based approach to the joint economic and environmental impact assessment of possible photovoltaic scenarios: a case study at a regional level in Italy
Ecological Modelling, 2015:318:64-74, DOI:10.1016/j.ecolmodel.2014.11.006

J4. **Rocco M V**, Colombo E
Exergy Life Cycle Assessment of a Waste-to-Energy Plant
Energy Procedia, 2016:104:562-567, DOI: 10.1016/j.egypro.2016.12.095

J5. **Rocco M V**, Cassetti G, Gardumi F, Colombo E
Exergy Life Cycle Assessment of soil erosion remediation technologies: an Italian case study
Journal of Cleaner Production, 2016:4:3007-3017, DOI:10.1016/j.jclepro.2015.10.055

J6. Keshavarzian S, Gardumi F, **Rocco M V**, Colombo E
Off-design modeling of Natural Gas Combined Cycle Power Plants: an order reduction by means of Thermoeconomic Input–Output analysis
Entropy, 2016:18:71, DOI: 10.3390/e18030071

J7. Orsi F, Muratori M, **Rocco M V**, Colombo E, Rizzoni G
A multi-dimensional Well-To-Wheels analysis of passenger vehicles in different regions: primary energy consumption, CO2 emissions, and economic cost
Applied Energy, 2016:169:197–209, DOI:10.1016/j.apenergy.2016.02.039

J8. Baccanelli M, Langè S, **Rocco M V**, Pellegrini L, Colombo E
Low temperature techniques for natural gas purification and LNG production: an energy and exergy analysis
Applied Energy, 2016:180:546-559, DOI:10.1016/j.apenergy.2016.07.119

J9. Toro C, **Rocco M V**, Colombo E
Exergy and Thermoeconomic analyses of central receiver concentrated solar plants using air as heat transfer fluid
Energies, 2016:9(12),885, DOI: 10.3390/en9110885

J10. **Rocco M V**, Colombo E
Internalization of human labor in embodied energy analysis: definition and application of a novel approach based on Environmentally Extended Input-Output analysis
Applied Energy, 2016:182:590-601, DOI:10.1016/j.apenergy.2016.08.148

J11. **Rocco M V**, Colombo E
Evaluating Energy Embodied in national products through Input-Output Analysis: Theoretical definition and practical application of International Trades treatment methods
Journal of Cleaner Production, 2016:139:1449-1462, DOI:10.1016/j.jclepro.2016.09.026

J12. **Rocco M V**, Di Lucchio A, Colombo E
Exergy Life Cycle Assessment of electricity production from Waste-to-Energy technology: A Hybrid Input-Output approach
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J14. Keshavarzian S, **Rocco M V**, Gardumi F, Colombo E
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Energy Conversion and Management, 2017:150:532-544, DOI: 10.1016/j.enconman.2017.08.045

J15. Riva F, **Rocco M V**, Gardumi F, Bonamini G, Colombo E
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J16. Keshavarzian S, **Rocco M V**, Colombo E
Thermoeconomic diagnosis and malfunction decomposition: Methodology improvement of the Thermoeconomic Input-Output Analysis (TIOA)
Energy Conversion and Management, 2018:157:644-655, DOI: 10.1016/j.enconman.2017.12.021

J17. **Rocco M V**, Forcada Ferrer R J, Colombo E
Understanding the energy metabolism of World economies through the joint use of Production- and Consumption-based energy accountings
Applied Energy, 2018:211:590-603, DOI: 10.1016/j.apenergy.2017.10.090

J18. **Rocco M V**, Rady Y, Colombo E
Soft-linking bottom-up energy models with top-down input-output models to assess the environmental impact of future energy scenarios
Modelling, Measurement and Control C, 2018:79(3):103-110, DOI: 10.18280/mmc-c.790307

J19. **Rocco M V**, Casalegno A, Colombo E
Modelling road transport technologies in future scenarios: Theoretical comparison and application of Well-to-Wheels and Input-Output analyses
Applied Energy, 2018:232:583-597, DOI: 10.1016/j.apenergy.2018.09.222

J20. Rady Y Y, **Rocco M V**, Serag-Eldin M A, Colombo E
Modelling for power generation sector in Developing Countries: Case of Egypt
Energy, 2018:165:198-209, DOI: 10.1016/j.energy.2018.09.089

J21. **Rocco M V**, Langè S, Pigoli L, Colombo E, Pellegrini L A
Assessing the energy intensity of alternative chemical and cryogenic natural gas purification processes in LNG production
Journal of Cleaner Production, 2019:208:827-840, DOI: 10.1016/j.jclepro.2018.10.108

J22. Lombardi F, **Rocco M V**, Colombo E
A multi-layer energy modelling methodology to assess the impact of heat-electricity integration strategies: The case of the residential cooking sector in Italy
Energy, 2019:1249-1260, DOI: 10.1016/j.energy.2019.01.004

J23. Lombardi F, **Rocco M V**, Locatelli S, Magni C, Colombo E, Belussi L, Danza L
Bottom-up Lumped-parameters Thermodynamic Modelling of the Italian Residential Building Stock: Assessment of High-resolution Heat Demand Profiles
Tecnica Italiana – Italian Journal of Engineering Science, 2019:63:349-356, DOI: 10.18280/ti-ijes.632-434

NATIONAL/INTERNATIONAL CONFERENCE PROCEEDINGS

C1. Cassetti G, **Rocco M V**, Colombo E
Exergy based methods for economic and environmental design optimization of energy systems
In Proceedings of the 26th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2013). Guilin, China, Jul 16-19, 2013

C2. Colombo E, **Rocco M V**, Toro C, Sciubba E
An exergy-based approach to the joint economic and environmental impact assessment of possible photovoltaic scenarios: a case study at a regional level in Italy
In Proceedings of the 27th International conference on Efficiency, cost, optimization, simulation and environmental impact of energy systems (ECOS 2014). ISBN: 9781634391344. Turku, Finland, Jun 15-19, 2014

C3. Keshavarzian S, Gardumi F, **Rocco M V**, Colombo E
An off-design Thermoeconomic Input-Output analysis of a Natural Gas Combined Cycle Power Plant
In Proceedings the 28th international conference on efficiency, cost, optimization, simulation and environmental impact of energy systems (ECOS 2015). ISBN: 978-2-9555539-0-9. Pau, France, Jun 30 - Jul 3, 2015

C4. **Rocco M V**, Di Lucchio A, Colombo E
Thermoeconomic analysis and design evaluation of a Waste To Energy power plant: an Input-Output approach
In Proceedings of the 28th international conference on efficiency, cost, optimization, simulation and environmental impact of energy systems (ECOS 2015). ISBN: 978-2-9555539-0-9. Pau, France, Jun 30 - Jul 3, 2015

C5. **Rocco M V**, Pavarini C, Colombo E
Assessing direct and embodied energy trades among national economies through Input-Output analysis
In Proceedings of the 29th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2016). ISBN: 978-961-6980-15-9, University of Ljubljana, Portotoz, Slovenia, Jun 19-23, 2016

C6. Catalano A, **Rocco M V**, Toro C, Colombo E, Sciubba E
Simulation and comparative Thermoeconomic analysis of Central Receiver Concentrated Solar Plants using air as heat transfer fluid
In Proceedings of the 29th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2016). ISBN: 978-961-6980-15-9, University of Ljubljana, Portotoz, Slovenia, Jun 19-23, 2016

C7. **Rocco M V**, Toro C
Exergy based methods for economic and environmental analysis applied to a 320 mw Combined Cycle Power Plant

In Proceedings of the 12th Joint European Thermodynamics Conference, JETC 2013, Eds. M. Pilotelli and G.P. Beretta, ISBN 978-88-89252-22-2, Snoopy, Brescia, Italy, 2013

C8. **Rocco M V**, Taranto F, Colombo E
Energy and Exergy Life Cycle Assessment of different anti-erosion systems
In Proceedings of the VII Convegno Scientifico della Rete Italiana LCA: "Life Cycle Assessment e ottimizzazione ambientale: esempi applicativi e sviluppi metodologici", ISBN 978-88-8286-292-3, ENEA, Roma, Italy, 2013

C9. Colombo E, **Rocco M V**, Gardumi F, Cassetti G, Barbieri J
Exergy as a measure of oil well potential
In Proceedings of the 31st UIT National Heat Transfer Conference, Como (Italy), Eds. L. Vitali and P. Gramazio, ISBN 97888-6493-017-6, Poliprint - Politecnico di Milano, Milan, Italy, Jun 25-27, 2013

C10. **Rocco M V**
Accounting for human labour in LCA: a novel Input-Output approach
In Atti del X Convegno dellla Rete Italiana LCA 2016 Life Cycle Thinking, sostenibilità ed economia circolare, ISBN: 978-88-8286-333-3, Ravenna, Jun 23-24, 2016

C11. Keshavarzian S, **Rocco M V**, Gardumi F, Colombo E
Practical Approaches for the Application of Exergy Cost Theory to Energy Conversion Systems
Proceedings of the 4th International Conference on Contemporary Problems of Thermal Engineering (CPOTE 2016), ISBN: 978-83-61506-36-2, Gliwice – Katowice, Poland, Sep 14-16, 2016

C12. **Rocco M V**, Rady Y Y, Colombo E
Soft-linking Bottom-up energy models with Top-down Input-Output models to assess the environmental impact of future energy scenarios
In Proceedins of the 3rd AIGE/IIETA International Conference and 12th AIGE 2018 Conference on Energy Conversion, Management, Recovery, Saving, Storage and Renewable Systems (AIGE 2018), Reggio Calabria – Messina, Jun 14-16, 2018

C13. Lombardi F, **Rocco M V**, Locatelli S, Magni C, Colombo E, Belussi L, Danza L
Bottom-up Lumped-parameters Thermodynamic Modelling of the Italian Residential Building Stock: Assessment of High-resolution Heat Demand Profiles
In Proceedins of the 4rd AIGE/IIETA International Conference and 13th AIGE 2018 Conference on Energy Conversion, Management, Recovery, Saving, Storage and Renewable Systems (AIGE 2019), Matera, Italy, Jun 13-14, 2018, ISSN: 0040-1846, 2019:63(2-4)

C14. Sanvito F D, **Rocco M V**, Colombo E
Extended cost structure decomposition within exergoeconomics: a revised design evaluation approach
Proceedings of the 32th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2019), Wroclaw, Poland, Jun 23-28, 2019, ISBN 978-83-61506-51-5

C15. Golinucci N, **Rocco M V**, Colombo E
The effectiveness of LCA-based emissions policies against carbon leakage: theory and application
In Atti del X Convegno dellla Rete Italiana LCA 2016 Life Cycle Thinking, sostenibilità ed economia circolare Università degli Studi Roma Tre, Roma, Jun 13-14, 2016

BOOKS

B1. **Rocco M V.**
The Exergy Cost of goods and services – an Input-Output approach
Polimi Springer Brief Series. 2016. DOI: 10.1007/978-3-319-43656-2, eBook ISBN 978-3-319-43656-2, Softcover ISBN 978-3-319-43655-5, Series ISSN 2282-2577.

TECHNICAL REPORTS, OTHER PUBLICATIONS

O1. **Rocco M V.**
Who is responsible for pollution embedded in internationally traded goods?
Spotlight in Energy and Air Pollution - World Energy Outlook Special Report 2016, OECD/IEA Publication, Paris, France, 2016

O2. Causone F, **Rocco M V**
Sviluppo sostenibile e metabolismo urbano - Verso un modello di analisi inclusivo e quantitativo
In Milano Produttiva - 28° Rapporto della Camera di Commercio di Milano Monza Brianza Lodi, 2018

O3. Montedoro L, Rulli M C, **Rocco M V**, Castelletti A
Il Politecnico di Milano porta il Water, Energy and Food Nexus in Mozambico
In Africa e Affari, anno 7, numero 5, May 2019

O4. Colombo E, **Rocco M V**, Toelzer C, Otieno D
Africa-Eu Energy Partnership - Enhancing Energy Efficiency in Africa
AEEP Energy Efficiency Workstream (AEEP-EEWS) Final report, ISBN 9788894122657, Feb 2018

O5. Colombo E, **Rocco M V**, Riva F, Toelzer C, Otieno D, Forcada Ferrer R J
The "Energy Efficiency Matrix": An Africa-EU Energy Partnership tool to foster Energy Efficiency in Africa
In Proceedings of Renewable Energy Solutions for Africa Annual Conference (RES4AFRICA 2017), Addis Ababa, Ethiopia, Oct 3-4, 2017

O6. Golinucci N, **Rocco M V**, Inzoli F, Colombo E
La questione degli Indicatori
Equilibri - Economia circolare: aprire lo sguardo per chiudere il cerchio. Fondazione Eni Enrico Mattei (FEEM), Jan 2019

7.2. EDITORIAL ACTIVITIES

Jan 2018 – Present **Member of the Academic Editorial Board**
Journal of Cleaner Production (Elsevier)
https://www.journals.elsevier.com/journal-of-cleaner-production
ISSN: 0959-6526; Journal rank: Q1; Impact factor (2019): 6.395

2012 – Present **Reviewer** (120 manuscript reviewed per year on average)

Journal	*Editor*
Applied Energy	Elsevier
Journal of Cleaner Production	Elsevier
Energy, the International Journal	Elsevier
Energy Conversion and Management	Elsevier
Applied Thermal Engineering	Elsevier
Environmental Geotechnics	Elsevier
Energy Research & Social Science	Elsevier

Journal	*Editor*
Environmental Science and Pollution Research	Elsevier
Energy Strategy Reviews	Elsevier
Journal of Environmental Management	Elsevier
Resources, Conservation & Recycling	Elsevier
Waste Management	Elsevier
Energies	MDPI
Entropy	MDPI
International Journal of Green Energy	Taylor and Francis
Environmental Science and Technology	ACS

7.3. INTERNATIONAL/NATIONAL CONFERENCES

CONFERENCE BOARD MEMBER

Jul 2019 **Member of International Conference Scientific Board**
International Conference on Cleaner Production & Sustainability, Hong Kong, China, Oct 30 - Nov 2, 2019

Jul 2013 **Member of the International Conference Organization Board**
12th Joint European Thermodynamics Conference Brescia, Italy, July 1-5, 2013

CONFERENCE PARTICIPATION AS SPEAKER / PAPER AUTHOR

2019

- **27th International Input-Output Conference & 9th Edition of the International School of I-O Analysis** (IIOA 2019), Jun 30 – Jul 5 2019, Glasgow, Scotland
- **32nd International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems** (ECOS 2019), Jun 23-28 2019, Wrocław, Poland
- **13th International Conference of the European Society for Ecological Economics**, Jun 18-21 2019, Turku, Finland. Organization of the Special Session: "Advances in understanding the physical structures of economies: materials, energy, and the services they provide"
- **4rd AIGE/IIETA International Conference, 13th AIGE Conference 2018** (AIGE 2019), Jun 13-14 2019, Matera, Italy
- **XIII Convegno della Rete Italiana LCA, Il Life Cycle Thinking a supporto delle strategie di mitigazione e adattamento ai cambiamenti climatici**, Jun 13-14 2019, Università degli Studi Roma Tre, Roma, Italy
- **7th IAERE Annual Conference** (Italian Association of Environmental and Resources Economists), Feb 7-8 2019, Udine, Italy
- **Energy Modelling Platform for Africa 2019** (EMP-A 2019), Jan 30-31 2019, Cape Town, University of Cape Town, South Africa

2018

- **3rd AIEE Energy Symposium** (Associazione Italiana Economisti dell'Energia), Dec 10-12 2018, Bocconi University, Milan, Italy
- **Prima Conferenza Annuale ICESP** (Italian Circular Economy Stakeholder Platform), Dec 3 2018, Palazzo Madama, Senato della Repubblica, Italy
- **Energy Modelling Platform for Europe** (EMP-E 2018), Sep 25-26 2018, European Commission, DG RTD, Brussels

- 26th International Input-Output Conference & 8th Edition of the International School of I-O Analysis (IIOA 2018), Jun 25-29 2018, Juiz De Fora, Brazil
- 3rd AIGE/IIETA International Conference, 12th AIGE Conference 2018 (AIGE 2018), Jun 14-16 2018, Reggio Calabria – Messina, Italy
- 3rd International Exergy Economics Workshop, Instituto Superior Técnico, Universidade de Lisboa, 13-15 May 2018

2017

- 25th International Input-Output Conference & 7th Edition of the International School of I-O Analysis (IIOA 2017), Jun 19-23 2017, Atlantic City, New Jersey, USA
- Renewable Energy Solutions for Africa Annual Conference (RES4AFRICA 2017), Addis Ababa, Ethiopia, Oct 3-4 2017
- SETAC Europe 27th Annual Meeting (SETAC 2017), 7-11 May 2017, Brussels, Belgium
- REEEM Stakeholder Workshop Series: Energy Transition Pathways for the EU, Oct 5-6 2017, Brussels, Belgium

2016

- Contemporary Problems of Thermal Engineering (CPOTE 2016), 14-16 Sep 2016, Silesian University of Technology, Gliwice, Poland
- Convegno dell'Associazione Rete Italiana LCA 2016 - Life Cycle Thinking, sostenibilità ed economia circolare, 23-24 Jun 2016, Univeristà di Bologna, Italy
- 29th International Conference on Efficiency, Costs, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2016), 19-23 Jun 2016, Portoroz, Slovenia
- Applied Energy Symposium and Forum 2016: Low carbon cities & urban energy systems (CUE 2016), 13-15 Jun 2016, Jinan, Shandong, China

2015

- 28th International Conference on Efficiency, Costs, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2015), Jun 29 - July 3 2015, Pau, France

2014

- 27th International Conference on Efficiency, Costs, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2014), 15-19 Jun 2014, Åbo Akademi University, Turku, Finland

2013

12th Joint European Thermodynamics Conference (JETC 2013), 1-5 Jul 2013, Brescia, Italy

- 26th International Conference on Efficiency, Costs, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2013), Jul 15-19 2013, Guilin, China
- Convegno dell'Associazione Rete Italiana LCA 2016 - Life Cycle Thinking, sostenibilità ed economia circolare, 27-28 June 2013, Politecnico di Milano, Italy
- 31st UIT Heat Transfer Conference, Jun 25-27, 2013, Como, Italy