

# Stefano Moret | full CV

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## In a nutshell

PhD in Energy with a solid interdisciplinary background, my main area of expertise is **modeling and optimization of energy and Engineering systems**. I am currently a Swiss National Science Foundation Research Fellow at Imperial College London. Before that, I was a postdoc at EPFL (Switzerland), where I also lectured the *Energy conversion and renewable energy* Master course. To date, I have authored 20+ scientific publications (cited 600+ times 📄), and I am fluent in Italian, English, French and Spanish; intermediate in German and Chinese. My goal is to contribute to the energy transition, through research, teaching and consulting.

## Education

<b>École Polytechnique Fédérale de Lausanne (EPFL)</b> <i>PhD Energy</i> Dissertation title: <i>Strategic energy planning under uncertainty</i> (October 20, 2017) Supervisors: Prof. F. Maréchal, Prof. M. Bierlaire	<b>Switzerland</b> 2013–2017
<b>University of Padova</b> <i>MSc Mechanical Engineering, 110/110 with honors</i> GPA: 29.5/30	<b>Italy</b> 2009–2012
<b>University of California, Berkeley</b> <i>Academic exchange for MSc Thesis, BEST lab</i> Dissertation title: <i>Energy efficiency in lighting: daylight harvesting optimization and Wireless Sensor Networks</i>	<b>USA</b> Aug 2011 - Jan 2012
<b>NTNU</b> <i>Academic exchange, Erasmus program</i>	<b>Norway</b> 2010
<b>University of Padova</b> <i>BSc Industrial Engineering, 110/110 with honors</i> GPA 29.3/30	<b>Italy</b> 2006–2009
<b>High School</b> <i>Scientific High School diploma, 100/100</i>	<b>Italy</b> 2001–2006

## Professional experience

<b>Imperial College London</b> <i>Swiss National Science Foundation (SNSF) Visiting Research Fellow</i> ○ Models and algorithms for decision-making under uncertainty (W. Wiesemann group, Business School) ○ Integrated Development of Low-Carbon Energy Systems (IDLES) project: integrated modeling and optimization for the future UK energy system	<b>UK</b> 2019–present
<b>j4</b> <i>Founder &amp; CTO</i> j4energy 🚀 develops advanced simulation and optimization models for large-scale energy systems	<b>Italy</b> 2018–present
<b>École Polytechnique Fédérale de Lausanne (EPFL)</b> <i>Postdoc and lecturer - Industrial Process and Energy Systems Engineering (IPESE) group</i> ○ Lecturer: <i>Energy conversion and renewable energy</i> Master course (watch 📺) ○ Research: modeling and optimization of national energy systems. Active in multiple projects, mainly funded by the Swiss Competence Center for Energy Research (SCCER) and the Swiss National Science Foundation (SNSF)	<b>Switzerland</b> 2017–2019
<b>École Polytechnique Fédérale de Lausanne (EPFL)</b> <i>Research and teaching assistant - Industrial Process and Energy Systems Engineering (IPESE) group</i>	<b>Switzerland</b> 2013–2017

Research: modeling and optimization under uncertainty of urban and national energy systems. Main projects:

- Swiss-energyscope.ch - decision support for the Swiss energy strategy
- Geotherm II - integration of deep geothermal energy in cities

Teaching:

- Assistant to Master and PhD energy courses: lectures and exercises
- 20+ supervised students (10 Master theses)

**University of Padova – Industrial Engineering Department**

**Italy**

*Temporary research fellow*

**2013**

6-month research project funded by ENEL Foundation

**California Lighting Technology Center – University of California, Davis**

**USA**

*Junior Specialist*

**2012**

Building energy simulation, experimental tests for fenestration devices

**JESt - Junior Enterprise, University of Padova**

**Italy**

*Associate, President (year 2011)*

**2009-2011**

Non-profit student association. Consultancy and event organization. Highlights:

- Start Cup Giovani, project manager: university course and start-up competition in 3 universities (250+ students). Obtained and managed 240 k€ funding from the Italian Prime Minister's Office, Department of Youth.
- Becoming Manager 2009, project manager: job meeting and recruitment event. Generated 30 k€ revenue.
- President: management of 35 associates

**FIAMM Spa**

**Italy**

*Summer intern*

**2009**

Energy storage. BSc thesis: LabVIEW application for Statistical Process Control

**Aluminium Rheinfelden GmbH**

**Germany**

*Intern*

**2008**

Aluminium foundry. One-month research on innovative aluminum alloys (collaboration with University of Padova)

**ACC compressors Spa**

**China**

*Summer intern*

**2006–2008**

Compressor manufacturer. Quality engineer, chemical and acoustic laboratory work

**DSG Srl**

**Italy**

*Summer intern*

**2005**

Stainless steel processing. Direct labor experience.

## Grants & Awards

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**Grants:** Contributor, total of **3.25 Million CHF** research grants awarded to IPESE group (EPFL)

**Swiss National Science Foundation:** Awardee of Early Postdoc Mobility fellowship, fully financing 1.5 year research visit at Imperial College London (UK). Fellowship amount: **79'900 CHF**

**EDEY Outstanding PhD Thesis Award 8%:** shortlisted

**ABB award for best EPFL PhD thesis in energy:** nominated by the jury

**University of California Education Abroad Program scholarship:** Reciprocity student at UC Berkeley, 2011

**Erasmus scholarship:** NTNU (Norway), 2010


**Energy efficiency contest "Think Green, Be Efficient":** honorable mention for MSc thesis. Italian Senate, 2012.

**JADE Excellence Awards:** 1<sup>st</sup> most innovative and creative project for *Start Cup Giovani*. EU Parliament, 2012.

**JADE Excellence Awards:** 2<sup>nd</sup> most innovative and creative project for *Becoming Manager*. EU Parliament, 2011.

## Teaching activities

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**Lecturer:** *Energy Conversion and Renewable Energy*, EPFL Master course, Fall 2018. Positive/very positive feedback by **95%** of students. Videos of the course publicly available online 

**Supervision of students:** co-supervised 10 Master theses, 10+ semester projects

**Teaching assistant:** Lectures, exercises and management for Master level and PhD level courses at EPFL (years 2013-2019) on the topics of energy systems, thermodynamics, energy technologies, modelling, optimization.

## Doctoral Theses (co-supervision).....

1. X. Rixhon. *Optimized and robust energy transition pathway for Belgium through uncertainty quantification*. Université Catholique de Louvain (Belgium), ongoing. Member of the supervisory panel.
2. M. Yliruka. Imperial College London (UK), ongoing.


## Master Theses (co-supervision).....

1. M. Borasio. *Italy Energyscope: energy system modeling and scenarios for the Italian energy transition*. Politecnico di Torino (Italy), 2019.
2. N. Cobo-Losey Rodriguez. *Cruise-ship energy system design and optimization under uncertainty*. Universidad Pontificia Comilla (Spain), 2018.
3. S. Breton. *A GIS-integrated methodology for the optimal design of a district heating network - A case study of the city of Sion*. EPFL (Switzerland), 2017.
4. P. Campos. *Assessment of energy generation technologies at an urban scale. Case study: Concepción, Chile*. Northwestern University (USA), 2016.
5. M. Nasato. *Biomass energy pathways in Switzerland*. University of Padova (Italy), 2016.
6. A. Boss. *Integration of Geothermal Energy from Medium-Depth Aquifers in New Urban Districts - The Case Study of Malley (Lausanne, Switzerland)*. EPFL (Switzerland), 2016.
7. J. Unternährer. *Combining Geographical Information Systems and Optimization for Geothermal Energy Integration in Urban Systems - The case study of the City of Lausanne*. EPFL (Switzerland), 2016.
8. F. Fogari. *Aquifer thermal energy storage modelling and integration in district heating system applied to the Lausanne city case*. University of Genova (Italy), 2015.
9. F. Amblard. *Geothermal energy integration in urban systems. The case study of the city of Lausanne*. EPFL (Switzerland), 2015.
10. M. Pernet. *Smart heat design – urban energy system design under uncertainty*. EPFL (Switzerland), 2014.


## Publications

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### PhD thesis.....

S. Moret, *Strategic energy planning under uncertainty*. EPFL, Lausanne, 2017. Advisors: F. Maréchal, M. Bierlaire. DOI: 10.5075/epfl-thesis-7961. 

### Journal articles.....

1. M. Borasio and S. Moret. *Deep decarbonisation of European energy systems: a methodological review of recent studies and a novel modelling approach*. In preparation.
2. F. Contino, S. Moret, G. Limpens, H. Jeanmart. *Whole-energy system models: the advisors for the energy transition*. Progress in Energy and Combustion Science, 2020. Vol. 81, p. 100872. DOI: 10.1016/j.pecs.2020.100872.
3. E. Guevara, F. Babonneau, T. Homem-de-Mello and S. Moret. *A combined machine learning and distributionally robust approach to deal with uncertainty in strategic energy planning*. Applied Energy, 2020. Vol. 271, p. 115005. DOI: 10.1016/j.apenergy.2020.115005.
4. F. Baldi, S. Moret, K. Tammi and F. Maréchal. *The role of solid oxide fuel cells in future ship energy systems*. Energy, 2020. Vol. 194, p. 116811. DOI: 10.1016/j.energy.2019.116811.
5. S. Moret, F. Babonneau, M. Bierlaire and F. Maréchal. *Overcapacity in European power systems: analysis and robust optimization approach*. Applied Energy, 2020. Vol. 259, p. 113970. DOI: 10.1016/j.apenergy.2019.113970.
6. S. Moret, F. Babonneau, M. Bierlaire and F. Maréchal. *Decision support for strategic energy planning: a robust optimization framework*. European Journal of Operational Research, 2020. Vol. 280 (2), p. 539-554. DOI: 10.1016/j.ejor.2019.06.015 
7. G. Limpens, S. Moret, H. Jeanmart and F. Maréchal. *EnergyScope TD: a novel open-source model for regional energy systems*. Applied Energy, 2019. Vol. 255, p. 113729. DOI: 10.1016/j.apenergy.2019.113729
8. S. Moret, V. Codina Gironès, M. Bierlaire and F. Maréchal. *Characterization of input uncertainties in strategic energy planning models*. Applied energy, 2017. Vol. 202, p. 597-617. DOI: 10.1016/j.apenergy.2017.05.106





9. V. Codina Gironès, S. Moret, E. Peduzzi, M. Nasato and F. Maréchal. *Optimal use of biomass in large-scale energy systems: insights for energy policy*. Energy, 2017. Vol. 137, p. 789-797. DOI: 10.1016/j.energy.2017.05.027
10. J. Unternährer, S. Moret, S. Joost and F. Maréchal. *Spatial clustering for district heating integration in urban energy systems: application to geothermal energy*. Applied Energy, 2017. Vol. 15, p. 749-763. DOI: 10.1016/j.apenergy.2016.12.136
11. S. Moret, E. Peduzzi, L. Gerber and F. Maréchal. *Integration of deep geothermal energy and woody biomass conversion pathways in urban systems*. Energy Conversion and Management, 2016. Vol. 129, p. 305-318. DOI: 10.1016/j.enconman.2016.09.079
12. S. Moret, M. Bierlaire and F. Maréchal. *Robust optimization for strategic energy planning*. Informatica, 2016. Vol. 27, num. 3, p. 625-648. DOI: 10.15388/Informatica.2016.103
13. V. Codina Gironès, S. Moret, F. Maréchal and D. Favrat. *Strategic energy planning for large-scale energy systems: a modelling framework to aid decision-making*. Energy, 2015. Vol. 90, p. 173-186. DOI: 10.1016/j.energy.2015.06.008

### Conference papers.....

1. E. Guevara, F. Babonneau, T. Homem-de-Mello and S. Moret. *Planificación energética bajo incertidumbre: importancia de los enfoques e hipótesis estocásticas en las soluciones robustas*. XIII Chilean conference on Operations Research (OPTIMA), Chile, 2019. Link to full text
2. G. Limpens, S. Moret, G. Guidati, X. Li, F. Maréchal and H. Jeanmart. *The role of storage in the Swiss energy transition*. In Proceedings of the 32nd International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems, Poland, 2019. Link to full text
3. X. Li, S. Moret, F. Baldi and F. Maréchal. *Are renewables really that expensive? The impact of uncertainty on the cost of the energy transition*. In Proceedings of 29th European Symposium on Computer Aided Process Engineering, p 1753-1758, The Netherlands, 2019. DOI: 10.1016/B978-0-12-818634-3.50293-9
4. M. L. Della Vedova, E. Tacchini, S. Moret, G. Ballarin, L. de Alfaro and M. Di Pierro. *Automatic online fake news detection combining content and social signals*. In Proceedings of the FRUCT22 conference, Finland, 2018. DOI: 110.23919/FRUCT.2018.8468301
5. E. Tacchini, G. Ballarin, M. L. Della Vedova, S. Moret, and L. de Alfaro. *Some like it hoax: automated fake news detection in social networks*. In Proceedings of the Second Workshop on Data Science for Social Good, Macedonia, 2017. Vol. 1960. CEUR-WS. Link to full text
6. S. Moret, M. Bierlaire and F. Maréchal. *Strategic energy planning under uncertainty: a mixed-integer linear programming modeling framework for large-scale energy systems*. In Proceedings of the 26th European Symposium on Computer Aided Process Engineering, p. 1899-1904, Slovenia, 2016. DOI: 10.1016/B978-0-444-63428-3.50321-0
7. J. Rager, S. Moret, M. Pernet and F. Maréchal. *Integrating uncertainty into urban energy system design*. In Proceedings of the 26th European Symposium on Computer Aided Process Engineering, p. 1641-1646, Slovenia, 2016. DOI: 10.1016/B978-0-444-63428-3.50278-2
8. V. Codina Gironès, S. Moret, E. Peduzzi, M. Nasato and F. Maréchal. *Optimal use of biomass in large-scale energy systems: insights for energy policy*. In Proceedings of the 29th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems, Slovenia, 2016.
9. S. Moret, L. Gerber, F. Amblard, E. Peduzzi and F. Maréchal. *Geothermal energy and biomass integration in urban systems: a case study*. 40th Workshop on Geothermal Reservoir Engineering, USA, 2015. Link to full text
10. S. Moret, V. Codina Gironès, F. Maréchal and D. Favrat. *Swiss-energyscope.ch: a platform to widely spread energy literacy and aid decision-making*. In Proceedings of the 17th Conference on Process Integration, Modelling and Optimisation for Energy Saving and Pollution Reduction, p. 877-882, Czech Republic, 2014. DOI: 10.3303/Cet1439147
11. S. Moret, M. Noro and K. Papamichael. *Daylight harvesting: a multivariate regression linear model for predicting the impact on lighting, cooling and heating*. Building Simulation Applications, Italy, 2013. Link to full text


## Invited talks and presentations

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1. S. Moret and G. Limpens. *EnergyScope: a novel open-source model for regional energy systems*. Presentation, Energy Modelling Platform for Europe (EMP-E 2020), October 2020. 
2. S. Moret. *Whole-energy systems modelling and planning under uncertainty*. Invited talk, Center for Energy, Austrian Institute of Technology, July 2020.
3. S. Moret and M. Borasio. *Italy EnergyScope: un Nuovo Modello Energetico per l'Italia e la sua Applicazione per la Decarbonizzazione al 2050*. Invited keynote talk, 37th AICARR National Congress, Italy, July 2020. 
4. S. Moret and G. Limpens. *EnergyScope: a novel open-source model for regional energy systems*. Presentation, 2nd Online Lightning Talk Mini-workshop, Open Energy Modelling Initiative, April 2020. 
5. S. Moret. *Long-term energy planning under uncertainty*. Invited talk, Energy Futures lab, Imperial College London, UK, December 2018. Link to associated blog post: 
6. S. Moret and F. Maréchal. *Energyscope: modeling a national energy system to support decision-making*. Invited talk, International Conference on the Management of Energy, Climate and Air for a Sustainable Society, Cuba, July 2018.
7. S. Moret. *University and Sustainability: il ruolo dell'università nella transizione energetica*. Invited talk, JADE Italia meeting, Italy, May 2018.
8. S. Moret. *Uncertainty: Sensitivity analysis and robust optimization*. Invited talk, Modeling and optimization of ship energy systems workshop, Switzerland, October 2017.
9. S. Moret, V. Codina Gironès, M. Bierlaire and F. Maréchal. *The impact of uncertainty in national energy planning*. Poster presentation, Energy Systems Conference, UK, June 2016.
10. S. Moret, M. Bierlaire and F. Maréchal. *Uncertainty classification for strategic energy planning*. Poster presentation, SIAM Conference on Uncertainty Quantification, Switzerland, April 2016.
11. S. Moret, M. Bierlaire and F. Maréchal. *Robust optimization for strategic energy planning*. Conference presentation, 1st European Conference on Stochastic Programming and Energy Applications, France, September 2014.
12. S. Wiemer and S. Moret. *Geothermal reservoir processes: towards the implementation of research into the creation and sustainable use of enhanced geothermal systems (GEOTHERM-2)*. Invited talk, Competence Center Environment and Sustainability conference, Switzerland, February 2014.
13. S. Moret and A. Lorenzoni. *Energia elettrica, vettore efficiente negli usi finali*. Invited talk, University of Padova, December 2013.

## Current projects

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**energyscope**: contributed to the development of the online platform [energyscope.ch](http://energyscope.ch). Development, full documentation and maintenance of the open-source energy modeling framework: see it on [github](https://github.com) . The framework has found application in 10+ projects at urban, regional and national levels, and it is used for teaching at EPFL.

**askPinocchio**: machine learning tool for automatic online fake news detection ([askpinocchio.com](http://askpinocchio.com))

## Personal skills

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Languages.....

**Italian**: Mother tongue

**English**: Fluent

TOEFL iBT 106/120, year 2010

**French**: Fluent

**Spanish**: Fluent

**Mandarin Chinese**: Intermediate

HSK Basic level A 211/300, year 2008



**German**: Intermediate

## Other skills.....

**IT:** scripting (Matlab, python, Lua, VBA), mathematical programming (AMPL, GLPK),  $\LaTeX$ , web development, git, MacOS, Linux

**Technical:** optimization, energy modeling, data science, machine learning, deep learning, research, environmental impact assessment (LCA)

**Organizational:** solid experience in project management, problem solving

**Relational:** teaching (watch ) , presentations and public speaking, communication (watch )

## Licences & Certifications

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**Convolutional Neural Networks:** Coursera (Certificate ID: SB5FHD8JW29B, 2020)

**Structuring Machine Learning Projects:** Coursera (Certificate ID: K4DN9N37HX6L, 2020)

**Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization:** Coursera (Certificate ID: WNZXVNKERR6S, 2020)

**Neural Networks and Deep Learning:** Coursera (Certificate ID: LMWBURY2ZMEE, 2020)

**Python for Data Science and AI:** Coursera (Certificate ID: LJK2ZEL29KL, 2020)

**Discrete Optimization:** Coursera (Certificate ID: WX4RQ9JEMSAA, 2020)

**Machine Learning:** Coursera (Certificate ID: 8J67X3U8PRKF, 2019)

**Licensed Industrial Engineer:** Italian Order of Engineers professional examination (2013)

## Individual reviewer activities

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**Reviewer for:** *Sustainable Cities and Society*, *Energy Conversion and Management*, *European Journal of Operational Research*, *Operations Research Letters* journals

## Other interests

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Music: guitar player

Traveling & photography

Sports: running, climbing, mountaineering

Writing, literature & philosophy

## References

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Available upon request from Imperial College London, EPFL, University of Padova, University of California Davis, FIAMM Spa, ACC Compressors Spa

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