Xiaojin ZHANG

PROFILE

specialist in sustainability, with 10 years of experience in consulting and research, focused on assessing conventional and renewable energy production and storage technologies, sustainable buildings and districts through life cycle assessment, techno-economic analysis, potential analysis, multi-criteria decision-making analysis.

LANGUAGES

Chinese: native speaker

English: C1

German: B2 (Telc certified)

EXPERIENCE

Paul Scherrer Institute, Switzerland

PhD candidate (ETH Zurich, Chair of Sustainable Construction) Sep 2020 - Present

Scientist, energy technology assessment Jan 2014 - Present

Scope:

Technology assessment of energy generation and storage technologies using life cycle assessment, techno-economic and potential analysis, investigating technology performance such as life cycle greenhouse gas emissions, levelized cost of electricity, current and future cost developments, technology potentials, etc. Funding acquisition, project management and coordination. Student supervision and lecturing (courses: "CCS and the industry of carbon-based resources", "renewable energy technologies" and "nuclear energy system") at ETH Zurich.

Projects:

• Amsterdam Bilbao Citizen Driven Smart Cities (ATELIER) Link (2019 - 2024)
• IEA EBC Annex 72: Assessing Life Cycle Related Environmental Impacts Caused by Buildings (2019-2021) Link
• IEA EBC Annex 83: Positive Energy Districts (2020 – 2024) Link
• IMPort of Electricity-based GAs (IMPEGA), Nordur Power SNG (2019 - 2020) Link
• Swiss Competence Center for Energy Research, Electricity and Heat Storage (Hae), Commission for Technology and Innovation (2014 – 2020) Link Phase I, Link Phase II
• Swiss Competence Center for Energy Research, Supply of Electricity (SoE), Commission for Technology and Innovation (2014 - 2020) Link Phase I, Link Phase II
• Energy System Integration (ESI) Platform, Paul Scherrer Institute (2016 - present) Link
• Enabling a Low-carbon Economy via Hydrogen and CO_2 Capture & Storage (ELEGANCY) (2017-2020) Link
• Update on cost and potential of Solar Photovoltaics in Switzerland, Swiss Federal Office of Energy (2018-2019)
• Cost, Environmental and Technology Potential Assessment of Swiss Electricity Supply Technologies until 2050- Solar Photovoltaics, Swiss Federal Office of Energy (2015-2017) Link
• Life Cycle Assessment of Swiss Nuclear Power, Swissnuclear (2015-2017) Link

Accomplishments:

• Assessment of stationary heat and electricity storage technologies including pumped hydro storage, li-ion batteries, lead-acid battery, vanadium redox flow battery, advanced compressed air energy storage, power-to-gas, sensible and latent heat storage considering various applications and systems scales
• Technology monitoring of current and future development of solar photovoltaics in Switzerland, exploring its technology potential, economic performance, and environmental impacts
• Evaluation of the role of Power-to-Gas in mobility, as an alternative gas production technology, and as energy storage technology considering its different system variations
• Update of the environmental impacts of nuclear power production in Switzerland considering latest and future fuel supply chain, waste management and plant decommissioning

SOFTWARE

- MS Office (Excel, PPT, Word, Access, Visio, Onenote)
- System Dynamics Modeling (PowerSim)
- Decision Making Analysis (Criterium Decision Plus)
- Life Cycle Assessment (SimaPro, Brightway)
- Building Simulation (eQuest)

Python

Autocad, ArcGIS

TRAININGS & SEMINARS

- Energy Data Hackdays (Brugg, 2019) Link

- Mentoring program for women with leadership ambition at PSI (2018-2019) Link

- CDM Smith Project Management Training (2013, Singapore)

- Singapore BCA Green Mark Manager course, for green building and low energy design (2010, Singapore) Link

INTERESTS

- Swimming
- Hiking
- Music
- Art

VONLUNTEER

Visiting Service, Regionales Pflegezentrum Baden (2017- 2020)

CDM Smith, Singapore May 2010 – Dec 2013

Consultant, urban systems analysis

CDM Smith is a global consulting firm specialized in water, energy, transportation and infrastructures. Singapore office is an innovation hub that provides integrated solutions for sustainable urban planning by applying advanced urban systems modelling.

Scope:

Analytical model development and application by applying database- and GIS-based simulation tool that compares different combinations of technologies in urban planning, specialized in: Energy Supply and Demand Management, Smart Grid and Renewable Energy, Building Energy Simulation, Greenhouse Gas Accounting and Mitigation, Planning Level Financial Analysis of Technologies (capital/O&M cost estimate, savings in utility cost, investment prioritization, net present value, benefit cost ratio, internal rate of return, payback analysis, scenario analysis, etc.)

Projects:

- Punggol Eco-town Masterplan, Housing Development Board of Singapore (2010-2013) Link
- Bukit Timah/Geylang/Kallang Drainage Masterplan, Public Utility Board of Singapore (2012-2013)
- Macquarie University Campus Energy System Planning (2012-2013)

Accomplishments:

- Led the model development team consisting of engineers, GIS specialists, software user interface developers on the development of the urban system model including energy- and transportation- sector, financial analytical layer and greenhouse gas accounting layer from framework conceptualization to full implementation Link to Model Demo
- Coordinated with government agencies and institutions in Singapore and Australia on model application in eco- developments
- Advised clients on technology decision making through quantitative analysis on key performance indicators (KPI) in different alternatives that efficiently improves the sustainability performance of the master plan
- Recognized for excellence in data collection, management, documentation and advanced in data analysis
- Delivered the progress status report to clients, funding organizations, and executive management team within the firm

Sichuan Environmental Protection Agency, China Mar 2009 – May 2009

Intern, environmental impact assessment

Provincial government department in charge of the environmental regulations

Environmental impact assessor that analyzes data from sites, conducting inspections, identifying potentially adverse effects and recommending preventative measures to conform to environmental regulation

Sichuan Jincheng Construction Machinery, China Dec 2007 – Feb 2008

Intern, business and interpreting

Subsidiary of China Huashi Corporation that focussing on tower crane manufacturing with a world market coverage.

English interpreter that helps the interpretation and document translation of company's business in Dubai; contract negotiation, and facilitated trade up to 1.8 million USD

EDUCATION

Msc., Environmental Science and Engineering Jun 2009 – Jul 2010

Nanyang Technological University & Stanford University, Singapore & USA

Full scholarship, Singapore Stanford Partnership

Special Merit Award in Green Wave Environmental Care Project, Tertiary Level, Singapore, 2010

Beng., Environmental Engineering Sep 2005 – May 2009
Sichuan University, China
Graduate from Wu Yuzhang Honors College
UNEP/SETAC Life Cycle Award for Non-OECD countries on LCA Study on Generation and Transmission of Electricity in China, 2008

PUBLICATIONS

Zhang, X., Bauer, C. (2021) Life Cycle Assessment of Synthetic Natural Gas produced with CO2 from geothermal energy generation in Iceland and used in Switzerland. https://www.psi.ch/en/ta/impega

Zhang, X., Witte, J., Schildhauer, T., Bauer, C. (2020) Life cycle assessment of Power-to-Gas with biogas as carbon source, Sustainable Energy & Fuels,4, 1427-1436 http://doi.org/10.1039/C9SE00986H

Zhang, X., Bauer, C. (2019) Potentials, costs and environmental assessment of electricity generation technologies, An update of electricity generation costs and potentials – Solar photovoltaics, Swiss Federal Office of Energy, https://www.bfe.admin.ch/bfe/de/home/news-und-medien/publikationen.exturl.html/aHR0cHM6Ly9wdWJkYi5iZmUuYWRtaW4uY2gvZGUvcHVibGljYX/Rpb24vZG93bmxvYWQvOTgyNg==.html

Schmidt, T.S., Beuse, M., Zhang, X. Steffen, B., Schneider, S., Pena-Bello, A., Bauer, C., Parra, D. (2019) Additional Emissions and Cost from Storing Electricity in Stationary Battery Systems, Environmental Science & Technology, 53(7), 3379-3390, https://doi.org/10.1021/acs.est.8b05313

Terlouw, T., Bauer, C., Zhang, X., Alskaif, T. (2019) Towards the determination of metal criticality in home-based battery systems using a life cycle assessment approach, Journal of Cleaner Production, Vol. 221, pp. 667-677, https://doi.org/10.1016/j.jclepro.2019.02.250 (corresponding author)

Zhang, X., Bauer, C. (2017). Potentials, costs and environmental assessment of electricity generation technologies – Solar photovoltaics, Swiss Federal Office of Energy, http://www.bfe.admin.ch/themen/00526/index.html?lang=de&dossier_id=05238

Zhang, X., Wang, H., Treyer, K., Chapter 3: Development of unit process datasets, LCA Compendium – The Complete World of Life Cycle Assessment - Life cycle inventory analysis (LCI), Ciroth, A. & Arvidsson, R. (edt.), Springer https://www.springer.com/series/11776 (in print, to be published)

Zhang, X., Bauer, C. (2017). Life Cycle Assessment of Nuclear Power in Switzerland, https://www.psi.ch/sites/default/files/2019-05/PSI_LCA-Nuclear_CH_Final-Formatted.pdf

Abdon, A., Zhang, X., Parra, D., Patel, K., Bauer, C., Worlitschek, J. (2017). Techno-economic and environmental assessment of stationary electricity storage technologies for different time scales, Energy, Vol. 139, pp. 1173-1187, https://doi.org/10.1016/j.energy.2017.07.097 (first co-author)

Parra, D., Zhang, X., Bauer, C. and Patel, M. K. (2017). An integrated techno-economic and life cycle environmental assessment of power-to-gas systems, Applied Energy, Vol. 193, pp. 440-454, https://doi.org/10.1016/j.apenergy.2017.02.063 (first co-author)

Parra, D., Swierczynski, M., Stroe, D. I., Norman, S. A., Abdon, A., Worlitschek, J., O'Doherty, T., Rodrigues, L., Gillot, M., Zhang, X., Bauer, C. and Patel, M.K. (2017). An interdisciplinary review of energy storage for communities: Challenges and perspectives, Renewable and Sustainable Energy Reviews, Vol. 79, pp. 730-749, https://doi.org/10.1016/j.rser.2017.05.003

Zhang, X., Bauer, C., Mutel, C. and Volkart, K. (2017). Life Cycle Assessment of Power-to-Gas: Approaches, system variations and their environmental implications, Applied Energy, Vol. 190, pp. 326-338, https://doi.org/10.1016/j.apenergy.2016.12.098

Zhang, X., Cannan, A., Lemaster, K. (2012). Estimating Greenhouse Gas Emissions in Urban Planning Using a Multi-Urban Sector Tool, IWA World Congress on Water, Climate and Energy Proceedings, Dublin

Myers, D., Grace, P., LopezCalva, E., Zhang, X., (2012). District-Scale Water Management Impacts on Infrastructure, Energy, Pollution, and Greenhouse Gas Emissions, Singapore International Water Week 2012 Proceedings, Singapore

Liu, G., Zhang, X., Wang, H., (2008). Research on Energy Depletion Potential in China, China Life Cycle Management Conference Proceedings