You Li, D.Eng.

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Research Interests

- Solar Energy & Solar Radiation
- Peer-to-peer Energy Sharing
- Building Energy System
- Energy Transition Analysis

Research & Education Experiences

- **Senior Researcher** 2023/4-present, **Ritsumeikan University**
  (Host researcher: Prof. Weisheng Zhou)
- **D.Eng. in Environmental Engineering** 2020/10-2023/4, **The University of Kitakyushu**
  (Supervisor: Prof. Hiroatsu Fukuda & Weijun Gao)
- **M.Eng. in Environmental Engineering** 2018/10-2020/9, **The University of Kitakyushu**
  (Supervisor: Prof. Hiroatsu Fukuda)
- **B.Eng. in Architecture** 2013/9-2018/6, **Zhejiang A&F University**

Honors & Awards

- **Best Paper Award** The 16th International Conference on Computer Science and its Applications (2024)
- **Highly Skilled Foreign Professionals (Academic)** Ministry of Justice, Japan (2023)
- **Best Paper Award** The 3rd International Conference of iSMART (2022)
- **Best Presenter Award** The 3rd International Conference of iSMART (2022)
- **Monbukagakusho Honors Scholarship** Japan Student Services Organization (2019 & 2018)
- **Excellence Award** Japan Institute of Architects, Japan-Korea joint workshop (2018)
- **FAW-Volkswagen My Land, My Hometown Charity Scholarship** FAW-Volkswagen Charity funding (2018)
- **Third Prize** The 3rd Zhejiang College Students' Rural Planning Creative Design Competition (2017)
- **Academic Scholarship** Zhejiang A&F University (2017 & 2015)

Funded projects (PI)

1. **Research on a knowledge-based solar radiation prediction and resource spatiotemporal distribution.** Ritsumeikan University, 2024/4-2025/3, JPY 1,000,000.
2. **Program to Support the Submission to High-Impact Journals.** Ritsumeikan University, 2024/4-2025/3, JPY 1,625,000.
3. **Multi-scale carbon footprint analysis of zero-carbon campus and research on optimal decarbonization evolution path.** Hangzhou City University, 2023/8-2024/7, CNY 30,000.
4. **Comparative study on urban development and happiness evaluation indexes in China and Japan.** Ritsumeikan University, 2023/4-2024/3, JPY 580,000.

5. **Diffuse radiation-based thermal assessment and component optimization for university campuses considering weather stochasticity.** Ritsumeikan University, 2023/4-2024/3, JPY 198,000.

Selected Fundings (Participant)

1. **Research on Green Recovery and the Realization of Carbon Neutrality in East Asia.** Ritsumeikan University, 2022/4-2025/3, JPY 20,000,000. (Host by: Prof. Weisheng Zhou)
2. **A comparative study of ecological design and implementation of zero-carbon campus in China and Japan.** Ritsumeikan University, 2022/4-2024/3, JPY 4,000,000. (Host by: Prof. Weisheng Zhou)

First/ Corresponding Author Publications

*: Corresponding Author +: Co-corresponding Author.

1. Li, Y., Zhou, W., Wang, Y., Miao, S. *, Yao, W., & Gao, W. (2025). Interpretable Deep Learning Framework for Hourly Solar Radiation Forecasting Based on Decomposing Multi-Scale Variations. **Applied Energy,** 377, 124409.
2. Li, Y., Wang, Y.*, Zhou, R., Qian, H., Gao, W., & Zhou, W. (2024). Energy transition roadmap towards net-zero communities: A case study in Japan. **Sustainable Cities and Society**, 100, 105045.
3. Li, Y., Wang, Y.*, Yao, W., Gao, W., Fukuda, H., & Zhou, W. (2023). Graphical decomposition model to estimate hourly global solar radiation considering weather stochasticity. **Energy Conversion and Management**, 286, 116719.
4. Li, Y., Qian, F.*, Gao, W., Fukuda, H., & Wang, Y. (2022). Techno-economic performance of battery energy storage system in an energy sharing community. **Journal of Energy Storage**, 50, 104247.
5. Li, Y., Wang, Y.*, Qian, H., Gao, W., Fukuda, H., & Zhou, W. (2023). Hourly global solar radiation prediction based on seasonal and stochastic feature. **Heliyon**, 9(9).
6. Li, Y., Wang, Y.*, Fukuda, H., Gao, W., & Qian, F. (2022). Analysis of energy sharing impacts in a commercial community: A case of battery energy storage system deployment for load leveling. **Frontiers in Energy Research**, 10, 929693.
7. Wang, Y., Li, Y.*, Zheng, Y., Gao, W. (2025), Solar Radiation Forecasting with Hybrid Deep Learning Framework integrating Feature Factorization. **Human-centric Computing and Information Sciences.** 15 (10).
8. Cao, L., Toyohara, A., Li, Y.*, Zhou, W*. (2024). Willingness to pay for carbon tax in Japan. **Sustainable Production and Consumption**, 52: 427-444.
9. Longfor, N. R., Hu, J., Li, Y.*, Qian, X., & Zhou, W. (2023). Scientometric Trends and Knowledge Gaps of Zero-Emission Campuses. **Sustainability**, 15(23), 16384.
10. Wang, Y., Gao, W.*, Li, Y.+, Qian, F., & Yao, W. (2023). Techno-economic analysis of the transition toward the energy self-sufficiency community based on virtual power plant. **Frontiers in Energy Research**, 11, 1010846.
11. Li, Y., Wang, Y.*, Zheng, Y., Qian, H., & Zhou, W. (2024). Numerical Feature Preprocessing Method for Daily Solar Radiation Pattern Classification. **Lecture Notes in Electrical Engineering**, 1190, pp. 1-7.
12. Li, Y., Wang, Y.*, & Zhou, W. (2024). Spatial Distribution of Kyushu's Solar Energy Resources. **Lecture Notes in Electrical Engineering.** In Publication.
13. Li, Y., Zhou, W.*, Wang, Y., (2024). Scenario analysis for Energy Transition integrating Global and Local Perspectives. **Energy Proceedings**. In Publication.
14. Wang, Y., Li, Y.*, & Gao, W. (2024). Load Leveling Potential Evaluation of Virtual Power Plant based on Genetic Algorithm Optimization. **Lecture Notes in Electrical Engineering,** 1190, pp. 1-6.
15. Li, Y.*, Fukuda, H., & Wang, Y., (2022). Optimum Sizing of Commercial Photovoltaic Battery System for Load Leveling,

Journal of Asian Urban Environment, pp. 381-384.

16. Li, Y.*, Fukuda, H., Gao, W., & Wang, Y., (2022). The Sharing Potential of Battery Energy Storage System in a Community: A Review. **Journal of iSMART**, pp. 242-247.
17. Li, Y.*, Fukuda, H., & Wang, Y., (2021). The Benefit of Aggregated Control of Distributed Battery Energy Storage System, **Journal of Asian Urban Environment**, pp. 242-247.

Collaborative Publications

18. Tian, L., Liu, Z. A., Li, Y., Hou, J., Xiao, Y., Fei, F., ... & Fukuda, H. (2025). Influence and optimization of building opening configurations on the performance of enhanced roof ventilation units (ERU): a numerical and orthogonal study. **Case Studies in Thermal Engineering**, 105753.
19. Shi, C., Li, Y., Li, H., Qiu, H., Xu, T., (2024) Towards sustainable urban water management: An ecological compensation framework for sponge cities. **Environmental Research Letters**. 19(12), 123002
20. Shi, C., Xia, Y., Wang, X., Zhou, Y., Li, Y., Liu, G., Gao. W., Xu, T., (2024) Exploring public attitudes toward implementing green infrastructure for sponge city stormwater management. **Scientific Reports**. 14(1), p.24252.
21. Yang, H., Gao, W., Xu, S., Li, Y., Wei, X., Wang, Y. (2024). Urban-scale power decarbonization using a modified power purchase agreements framework based on Markowitz mean-variance theory. **Sustainable Cities and Society**, 116, 105903.
22. Wang, Y., Gao, W.*, Qian, F., & Li, Y. (2021). Evaluation of economic benefits of virtual power plant between demand and plant sides based on cooperative game theory. **Energy Conversion and Management**, 238, 114180.
23. Xu, T., Fan, Y., Wang, P., Zhou, Y., Li, Y., Xie, J., Wang, X., Hu, J., Lin, Y., Wei, X., & Yao, W. (2025). Carbon emission reduction model for sewage heat recovery and utilization in a northern Chinese city. **Sustainable Cities and Society**, 115, 105825.
24. Yang, H., Xu, S., Gao, W., Wang, Y., Li, Y., & Wei, X.*. (2024). Mitigating long-term financial risk for large customers via a hybrid procurement strategy considering power purchase agreements. **Energy**, 131038.
25. Yang, H., Gao, W., Wei, X.*, Wang, Y., & Li, Y. (2024). Techno-economic comparative analysis of PV third–party ownership between customer and developer sides in Japan. **Journal of Energy Storage**, 80, 110062.
26. Xu, T., Wang, X., Wang, Y., Li, Y., Xie, H., Yang, H., ... & Shi, C.* (2023). Integration of sewage source heat pump and micro-cogeneration system based on domestic hot water demand characteristics: A feasibility study and economic analysis. **Process Safety and Environmental Protection**, 179, 796-811.
27. Zhou, R., Fukuda, H., Li, Y., & Wang, Y. (2023). Comparison of Willingness to Pay for Quality Air and Renewable Energy Considering Urban Living Experience. **Energies**, 16(2), 992.

Oral Presentations

1. Spatial Distribution of Kyushu's Solar Energy Resources. **The 16th International Conference on Computer Science and its Applications**, 2024/12, Pattaya, Thailand. **(Best Paper Award)**
2. Scenario analysis for Energy Transition integrating Global and Local Perspectives. **The16th International Conference on Applied Energy**, 2024/09, Niigata, Japan. **(Paper Recommended to Applied Energy (IF:10.1))**
3. Energy transition roadmap towards net-zero communities. **The 25th International Conference on World Peace and the Creation of Regional Economic and Social Systems**, 2024/05, Kagoshima, Japan.
4. Kyoto City Low Carbon Construction Level Index Evaluation Report (Keynote Speech). **The 2nd Japan-China Decarbonized City Forum**, 2023/12, Hangzhou, China.

5. Numerical Feature Preprocessing Method for Daily Solar Radiation Pattern Classification. **The 15th International Conference on Computer Science and its Applications**, 2023/12, Nha Trang, Vietnam. **(Paper Recommended to Human-centric Computing and Information Sciences (IF:3.9))**
6. Energy transition roadmap towards net-zero communities. **Sino-Japanese Academic Symposium on Sustainable Development**, 2023/12, Huzhou, China.
7. Graphical decomposition model to estimate hourly global solar radiation considering weather stochasticity. **The 12th Congress of Asian Association of Environmental and Resource Economics**, 2023/08, Tokyo, Japan.
8. Development of prediction models and research on regional energy sharing based on solar energy. **2023 Hangzhou Sustainability Workshop**, 2023/09, Hangzhou, China.
9. A multi-disciplinary collaborative framework towards a zero-carbon campus. **Ritsumeikan university-Hangzhou City University Zero Carbon Campus Workshop**, 2023/05, Hangzhou, China.
10. Optimum Sizing of Commercial Photovoltaic Battery System for Load Leveling. **The 19th International symposium and conference of Asia Institute of Urban Environment**, 2022/12, Yokohama, Japan.
11. The Sharing Potential of Battery Energy Storage System in a Community: A Review. **The 3rd International Conference of iSMART**, 2022/03, Qingdao, China. **(Best Paper Award)**
12. The Benefit of Aggregated Control of Distributed Battery Energy Storage System. **The 18th International symposium and conference of Asia Institute of Urban Environment**, 2021/12, Kitakyushu, Japan.
13. The Sustainable Protection Mode of Historical Block: A Study of Historical Renewal in Hangzhou. **The 3rd International Conference on Green Urbanism**, 2019/12, Roma, Italy.

Volunteering

- **Committee Member** 2025/1-, **Applied Energy Innovation Institute (AEii)**
- **Visiting Researcher** 2023/12-2026/11, **Hangzhou Dual-carbon Research Center**
- **Member** 2023/04- present, **Japan Society of Energy and Resources**
- **Member** 2024/04- present, **Architectural Institute of Japan**

Technical Strength

- **Languages**: Mandarin (Fluent), Japanese (Fluent), English (Fluent).
- **Programming Languages**: MATLAB, R, Python.
- **Other Skills**: Sketchup, Photoshop, Illustrator.

Referrers

- **Professor Weisheng Zhou**
  Host researcher
  Tenured Professor, College of Policy Science, **Ritsumeikan University**
  Foreign Fellow, **Engineering Academy of Japan**
  Email: zhou@sps.ritsumei.ac.jp
- **Professor Hiroatsu Fukuda**
  Ph.D. Supervisor
  Tenured Professor, Faculty of Environmental Engineering, **The University of Kitakyushu**
  Email: fukuda@kitakyu-u.ac.jp
- **Professor Weijun Gao**

Ph.D. Supervisor
Tenured Professor, Faculty of Environmental Engineering, **The University of Kitakyushu**
Foreign Fellow, **Engineering Academy of Japan**
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Research Spotlight

1. **High-performance solar radiation forecasting (Deep learning method)**

High-precision solar radiation forecasting is crucial for the economic and reliable operation of building energy systems and contributes to achieving sustainable development goals. Due to the multi-scale variability and instability of solar radiation, most forecasting methods face a zero-sum trade-off between simplicity, reliability, and interpretability. We propose that the multi-scale variability of solar radiation is the primary reason for the challenges in its identification and prediction. Because of the seasonal scale variations, extracting features from solar radiation has long been considered a difficult task. We propose a feature transformation method based on a transformation matrix, which achieves feature extraction with a simple mathematical description and categorizes Tokyo's solar radiation characteristics into 16 types. Additionally, we have developed a reliable, high-precision, and partially interpretable forecasting model by integrating a robust feature extraction method with deep learning. The following represents some of the key findings:

1. Li, Y., Zhou, W, Wang, Y., Miao, S. *, Yao, W., & Gao, W. (2025). Interpretable Deep Learning Framework for Hourly Solar Radiation Forecasting Based on Decomposing Multi-Scale Variations. ***Applied Energy***, 377, 124409.
3. Li, Y., Wang, Y.*, Yao, W., Gao, W., Fukuda, H., & Zhou, W. (2023). Graphical decomposition model to estimate hourly global solar radiation considering weather stochasticity. ***Energy Conversion and Management***, 286, 116719.
5. Li, Y., Wang, Y.*, Qian, H., Gao, W., Fukuda, H., & Zhou, W. (2023). Hourly global solar radiation prediction based on seasonal and stochastic feature. ***Heliyon***, 9(9).
7. Wang, Y., Li, Y.*, Zheng, Y., Gao, W. (2024), Solar Radiation Forecasting with Hybrid Deep Learning Framework integrating Feature Factorization. ***Human-centric Computing and Information Sciences***. In Publication.

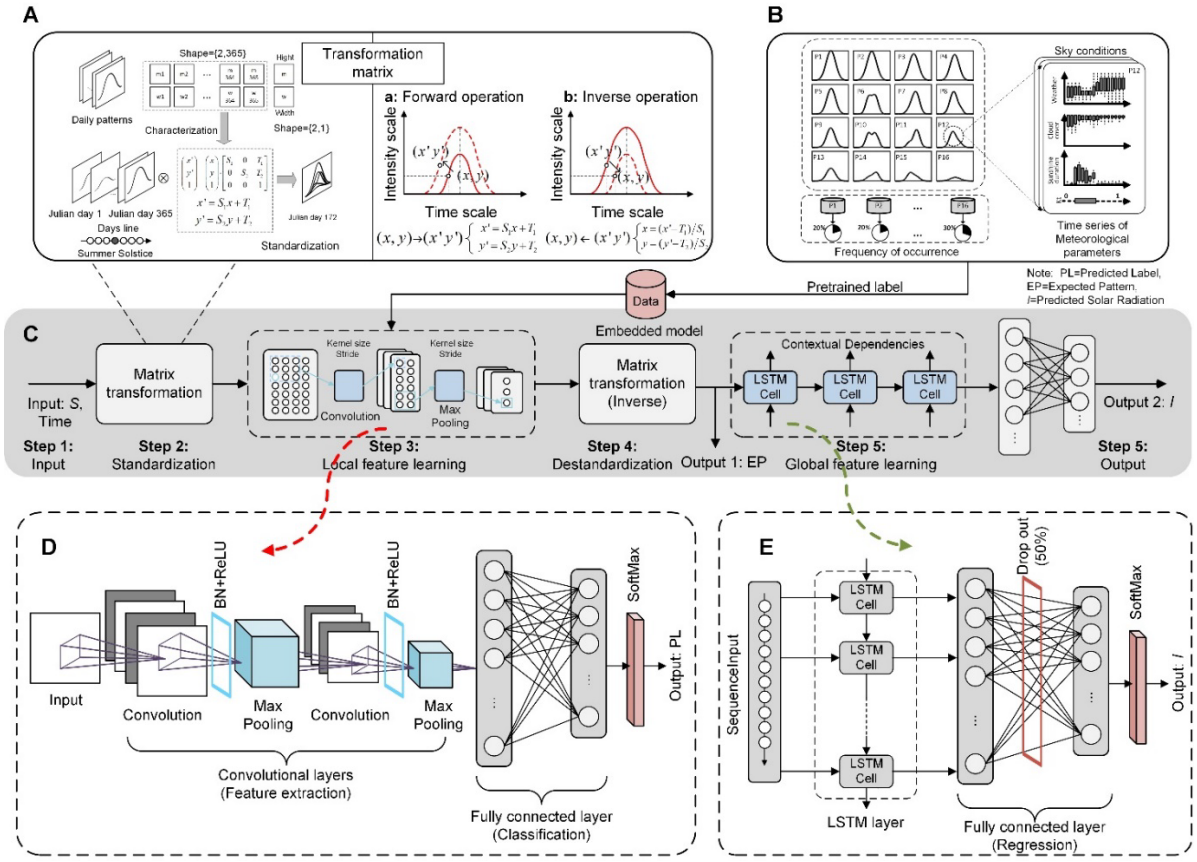

Fig.1 The proposed two-step hybrid deep learning forecasting model

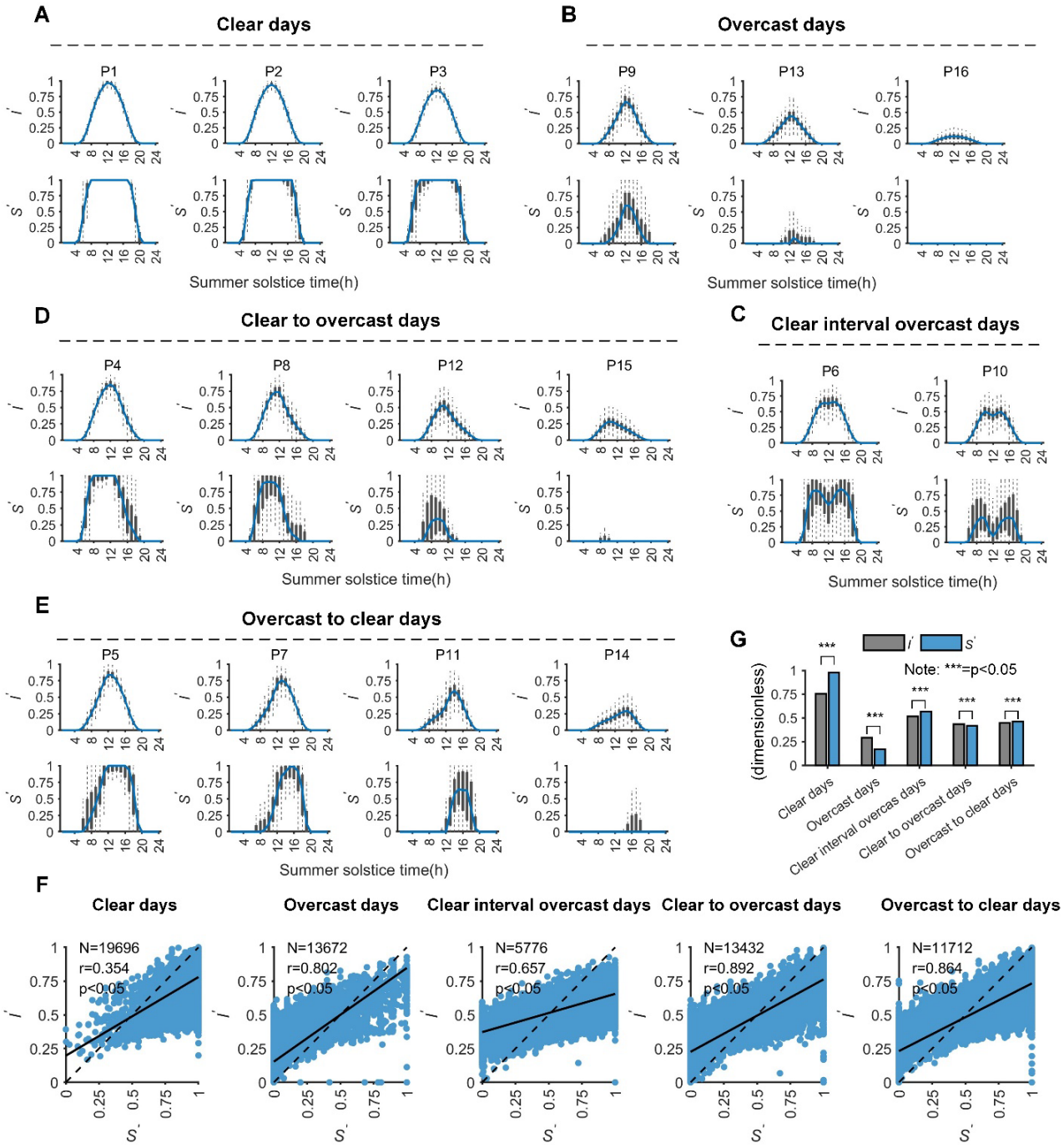

Fig.2 Sixteen types of solar radiation day patterns and their correlations with characteristic parameter. Time series of the feature values of diurnal variations on (A) clear days, (B) overcast days, (C) clear interval overcast days, (D) clear to overcast days, and (E) overcast to clear days. (F) Scatter plots between the feature values and their corresponding values. (G) Bar chart and significance between the feature values and their corresponding values.

2. **Dynamic aggregation and response strategies for community energy systems**

Optimizing distributed energy systems (such as photovoltaics and energy storage systems) can significantly enhance the efficiency of renewable energy utilization and accelerate the transition of communities toward zero carbon. We collected fundamental data on the energy usage behavior of residents in smart community buildings, as well as the application performance of distributed energy systems (such as photovoltaics and energy storage systems), based on real-world operational projects. Using historical monitoring data, we developed a multi-objective constraint model based on a genetic algorithm to determine the installed capacity and quantity of energy storage systems, which enhanced the proportion of local renewable energy utilization. We then explored the flexibility of energy storage systems in participating in grid demand response and examined the potential for energy sharing among building clusters, further clarifying the pathway for transitioning to zero-carbon communities. The following are some of the key representative research outcomes:

4. Li, Y., Qian, F.*, Gao, W., Fukuda, H., & Wang, Y. (2022). Techno-economic performance of battery energy storage system in an energy sharing community. ***Journal of Energy Storage***, 50, 104247.
6. Li, Y., Wang, Y.*, Fukuda, H., Gao, W., & Qian, F. (2022). Analysis of energy sharing impacts in a commercial community: A case of battery energy storage system deployment for load leveling. ***Frontiers in Energy Research***, 10, 929693.
9. Wang, Y., Gao, W.*, Li, Y.+, Qian, F., & Yao, W. (2023). Techno-economic analysis of the transition toward the energy self-sufficiency community based on virtual power plant. ***Frontiers in Energy Research***, 11, 1010846.

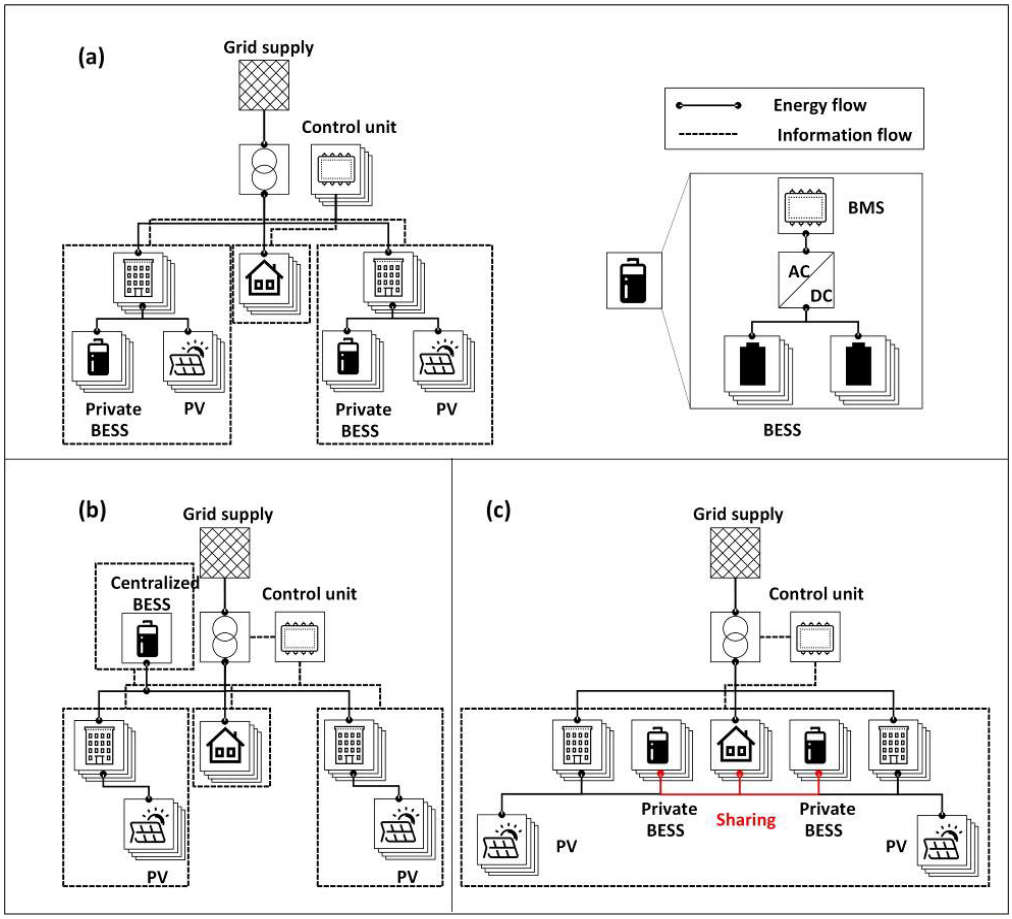

Fig.3 Peer-to-Peer (P2P) Energy Sharing Design: Different storage-sharing architectures and operational strategies.

3. **Energy transition roadmap for community to carbon neutrality**

Mitigation pathways are crucial for achieving carbon neutrality. While renewable energy will play an essential role in decarbonization, most analyses of carbon neutrality scenarios focus on resolving macroeconomic costs and proposing optimal energy shares, leaving unclear the contribution, interaction, and temporal dynamics of various technologies in reducing carbon emissions. Moreover, for a more detailed understanding of the measures and emission reduction effects in resource-constrained areas (such as communities) when addressing the grand goal of carbon neutrality, this study developed an improved "Global-Regional" Century Energy-Environment Planning (G-CEEP) model. The advantage of this model lies in its embedded energy technology modules, which allow for the evaluation of different mitigation pathways and emission reduction potentials specific to actual communities. The following are some of the key representative research outcomes:

2. Li, Y., Wang, Y.*, Zhou, R., Qian, H., Gao, W., & Zhou, W. (2024). Energy transition roadmap towards net-zero communities: A case study in Japan. ***Sustainable Cities and Society***, 100, 105045.

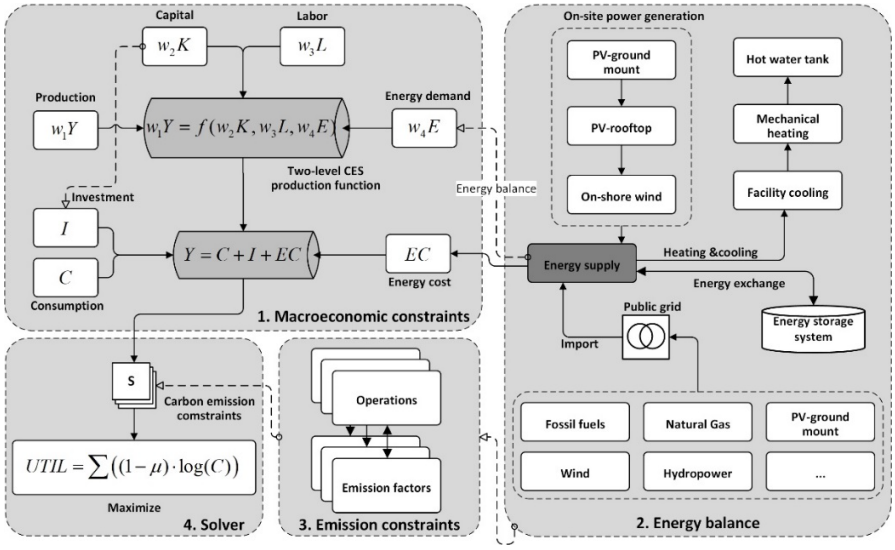

Fig.4 Overview of the proposed G-CEEP model framework.

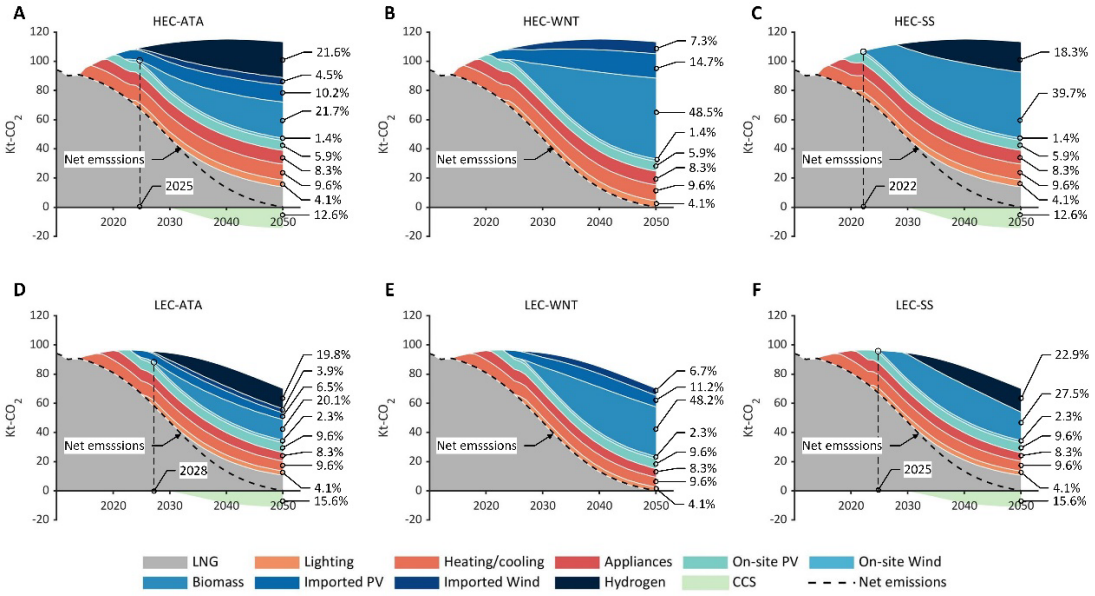

Fig.5 Energy-related CO2 emissions and carbon neutrality target realization pathways from 2010 to 2050.