Preface

The **EVF Conference Series "Energy and City of the Future" (EVF)** was initiated through the collaboration between ECAM EPMI Engineering School (Cergy-Pontoise, France), the University of Lorraine (France), and Queen's University (Canada). Since its creation, the EVF conference has aimed to provide an international forum bringing together academic researchers, engineers, industrial actors, policymakers, and urban stakeholders to exchange ideas, experiences, and research results concerning all aspects related to energy systems and the city of the future.

The EVF conferences address a broad spectrum of themes including historical, societal, environmental, conceptual, methodological, and technological perspectives associated with the transformation of cities and infrastructures in response to global challenges. The objective is to encourage interdisciplinary dialogue and promote innovative solutions for sustainable urban development.

Previous editions of the EVF conference series have been successfully organized in several countries: **Cergy-Pontoise, France (2014); Tetouan, Morocco (2015); Kingston, Canada (2016); Longwy, France (2017); Fès, Morocco (2018); Pune, India (2019); Remote edition (2020); Cergy-Pontoise, France (2021); El Jadida, Morocco (2022); and Nouakchott, Mauritania (2023).** Through these international editions, the EVF community has progressively built a strong scientific network connecting researchers and practitioners from Europe, Africa, North America, and Asia.

The **11th International Conference on Energy and City of the Future (EVF'2024)** was held on **21–22 November 2024** at the **CHIMM – Centre Hospitalier Intercommunal Meulan-Les Mureaux**, located in **Les Mureaux, France**. This edition continues the tradition of fostering international collaboration while addressing contemporary challenges facing modern cities.

It is difficult today to think about the city of tomorrow without considering the exceptional global circumstances that humanity has recently experienced. Scientific assessments published by the Intergovernmental Panel on Climate Change continue to provide increasingly detailed evidence regarding the urgency of the climate crisis. Climate change is no longer perceived only through scientific instruments and long-term observations; its effects are now visible within a human lifetime. Natural systems and biodiversity have often acted as early indicators of environmental changes, but today human societies themselves are directly experiencing the consequences of global warming, extreme weather events, and environmental transformations.

Another defining event of recent years has been the global pandemic, which profoundly affected societies worldwide. This crisis forced citizens, researchers, and policymakers to rethink fundamental questions about the future of life ("Vie") and the city ("Ville"). In many countries, repeated lockdowns triggered new social dynamics, including temporary migrations

from urban centers to rural areas and renewed reflections on urban resilience, public health, and sustainable living environments.

In this context, the theme of the **City of the Future** has gained renewed importance. Decision-makers, urban planners, engineers, and scholars increasingly recognize the necessity of rethinking urban systems, energy infrastructures, water management, health systems, and industrial processes. Previous EVF editions have contributed to building a strong scientific foundation for these discussions, both in French-speaking regions (France and Morocco editions) and in English-speaking contexts (Canada and India editions).

The **EVF'2024 conference** addresses these challenges through several thematic tracks:

- **TH1 – City and Buildings of the Future**
- **TH2 – Energy and Management**
- **TH3 – Water Management**
- **TH4 – Physics, Materials and Factories of the Future**
- **TH5 – E-Health, Professions of the Future and Related Training Courses**

The conference program includes several distinguished invited lectures. The plenary invited lecture was delivered by Geoffrey Levermore, Emeritus Professor at the University of Manchester and EVF Series Godfather, entitled *"Climate Change and the Urban Heat Island."* This keynote highlights the growing importance of understanding interactions between global climate change and urban environments, particularly the urban heat island phenomenon affecting major cities.

In addition, **two invited speakers contributed to the scientific program of EVF'2024**. Pierre-Olivier Logerais presented an invited lecture within the **Energy and Management (TH2)** track, focusing on the sustainability of photovoltaic power plants in desert environments, addressing design challenges and maintenance strategies.

Another invited contribution was delivered by Moncef Benkherrat and an international team including Carlos Alario Hoyos, Doru Cantemir, Carlos Delgado Kloos, Adriana Tofanescu, Valerio Alessandroni, Pablo J. Alhama Blanco, and Rafik Absi. Their invited paper addressed **Health 4.0 training and digital transformation in healthcare systems**, within the **E-Health track (TH5)**.

The contributions presented in these proceedings illustrate the diversity of research topics addressed by the EVF community. They include studies on **building thermal performance using phase change materials, IoT-based smart agriculture systems, photovoltaic energy systems, electric vehicle integration, energy storage, water resource management, coastal monitoring, machine learning applications for environmental monitoring, advanced materials, and digital transformation in health systems**.

These works demonstrate the increasing importance of **interdisciplinary approaches** combining engineering, environmental science, data science, urban planning, and public policy. They also highlight the role of emerging technologies—such as artificial intelligence, smart sensing networks, renewable energy systems, and advanced materials—in shaping more sustainable and resilient cities.

The editors would like to express their sincere gratitude to all **authors, reviewers, members of the scientific and organizing committees, and partner institutions** who contributed to the success of EVF'2024. Special thanks are also extended to the host institution **CHIMM – Centre Hospitalier Intercommunal Meulan-Les Mureaux**, whose support made this event possible.

We hope that the contributions presented in these proceedings will stimulate further research, encourage international collaboration, and contribute to the development of innovative solutions for **sustainable energy systems and resilient cities of the future**.

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Geoffrey Levermore (University of Manchester, UK).

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