Leveraging ICT for Energy Systems: Building a National Research Community

Description/teaser:

This project has facilitated researchers from energy systems and ICT joining forces to strengthen national collaboration on digital technologies for future energy systems. Through workshops, conferences, and lectures, the initiative helped align a growing community and contributed to the successful launch of the large-scale UTOPYS research programme.

Applicants:

Energy: Prof. Peter Palensky (TU Delft), Dr. Jose Rueda-Torres (TU Delft), Dr. Jochen Cremer (TU Delft), Dr. Sergio Grammatico (TU Deflt), Prof. Koen Kok (TU/e), Dr. Phuong Nguyen (TU/e), Dr. Gerwin Hoogsteen (UTwente), Dr. Michele Cucuzzella (RUG).

NIRICT: Dr. Aaron Ding (TU Delft), Prof. Kees Vuik (TU Delft), Dr. Alex Stefanov (TU Delft), Dr. Neil Yorke-Smith (TU Delft), Prof. Han la Poutré (TU Delft), Prof. Bert Zwart (TU/e), Prof. Valentin Robu (TU/e), Prof. Johann Hurink (UTwente), Prof. Nima Monshizadeh Naini (RUG).

Report for publication:

How digital technologies can support the future energy system was the central question of this project, jointly funded by 4TU.Energy and 4TU.NIRICT. This initiative successfully brought together researchers from energy systems and ICT to strengthen collaboration, exchange knowledge, and connect academia with industry and public stakeholders.

Connecting Energy and ICT Communities
Between June 2024 and December 2025, the project delivered a strong programme of community-building and knowledge exchange, coordinated through the PowerWeb Institute. The funding enabled the organisation of recurring, high-quality events that aligned researchers across Dutch universities and research organisations, while also engaging grid operators, industry partners, and policymakers.

Key Activities and Outcomes
The programme included:
- Nine thematic workshops focused on digital twins and ICT technologies for power systems, bringing together researchers from TU Delft, TU/e, University of Twente, University of Groningen, Radboud University, Erasmus University, Utrecht University, CWI, and SURF.
- Two national conferences serving as major meeting points for the community:
  - AI & Quantum Computing for Energy Systems (October 2024), with over 65 participants.

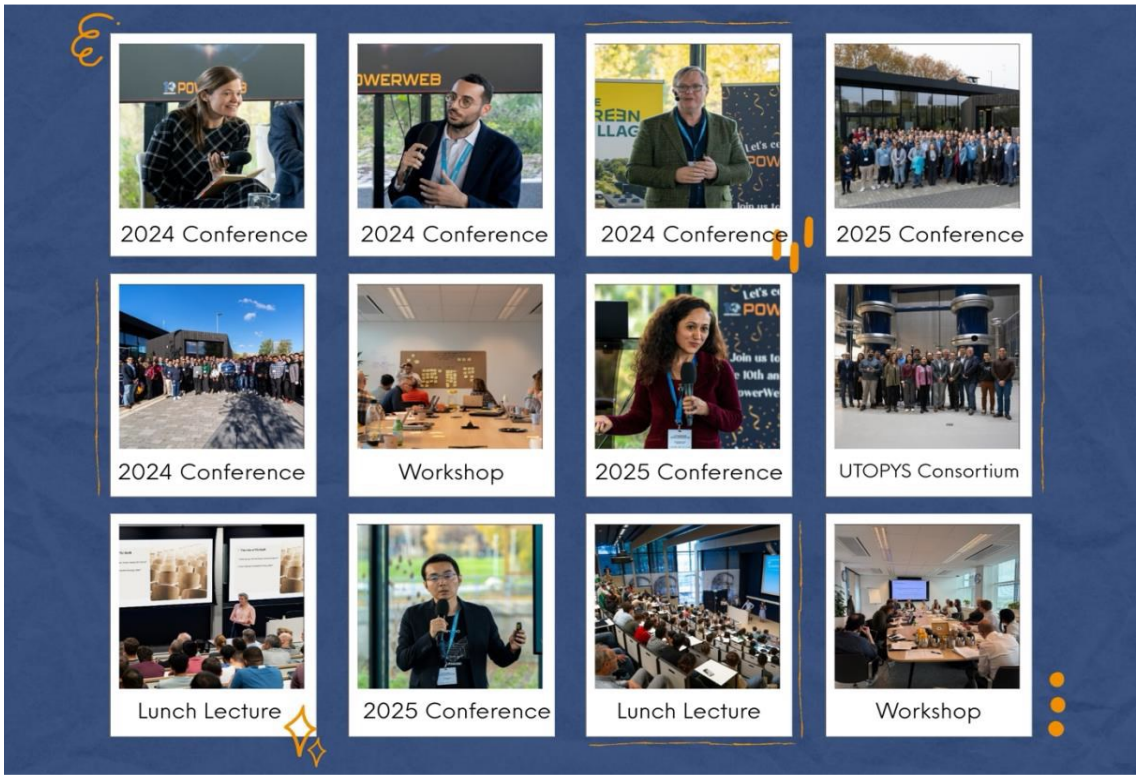
• Power Grid Cyber Resilience & Sustainable AI (November 2025), attracting more than 80 participants.
- Fourteen lunch lectures held almost monthly, drawing 40–60 participants per session on average, with a special edition exceeding 100 participants.

In addition, the funding supported improved recording and dissemination of event materials, extending the reach and long-term value of the activities.

Impact: From Community Building to Large-Scale Research
A major impact of this initiative was its contribution to strengthening and aligning a national research community. The sustained interaction fostered through the workshops and events supported the formation and maturation of a national research consortium. This alignment provided an important foundation for the UTOPYS project (Understanding Large and cOmplex Power sYstems), which was awarded €16.5 million under the NWO Large Scale Research Infrastructure programme. The project aims to develop new theories and methods for understanding and operating future energy systems using digital twins of large-scale electricity grids.

Reflection and Lessons Learned
The activities met and exceeded the original goals of the proposal. More events and formats were delivered than initially planned, and the interaction between ICT and energy communities was stronger and more sustained than anticipated. A key lesson for future editions is to further increase the visible role of consortium partners, for example by rotating hosting responsibilities and shared session leadership.

Looking Ahead
Building on this success, the community will continue its activities through the PowerWeb Institute, with an annual flagship symposium, smaller thematic events throughout the year, and continued integration with long-term initiatives such as the UTOPYS project. Future editions will also place additional emphasis on diversity among speakers, shared ownership across institutions, and recognition of the essential role of professional support staff in enabling high-quality, cross-domain collaboration.


2024 Conference
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2025 Conference
2024 Conference
Workshop
2025 Conference
UTOPYS Consortium
Lunch Lecture
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Workshop