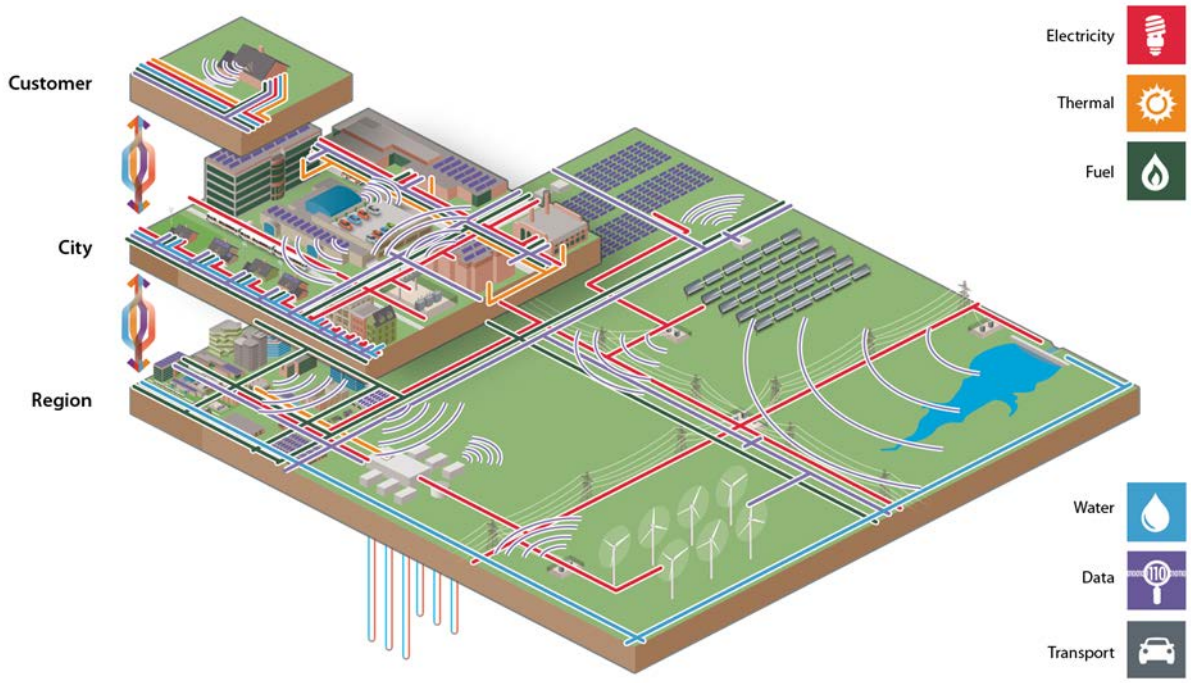
Energy Systems Integration in smart buildings, communities and microgrids

University of Melbourne & International Institute for Energy Systems Integration

Melbourne Australia, March 21 – 22, 2017

Energy Systems Integration



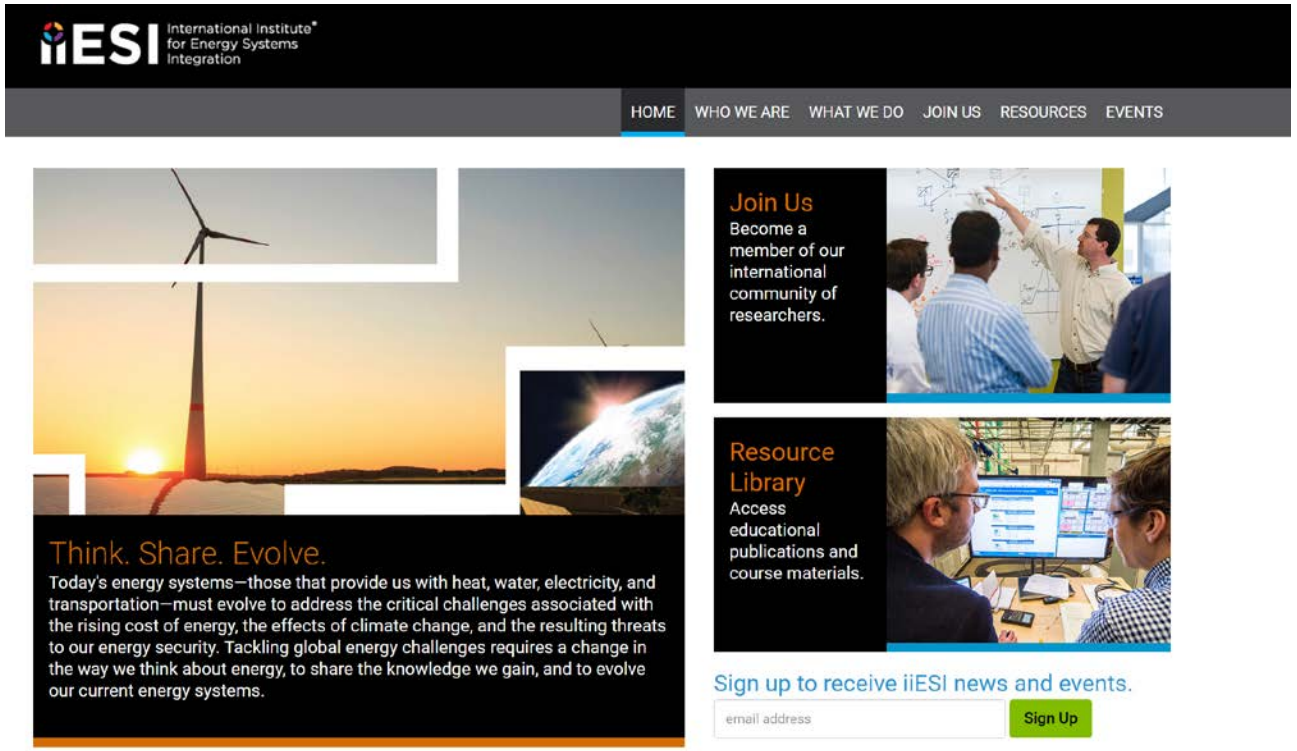
- **optimization** of energy systems across multiple pathways and scales
- increase reliability and performance, and minimise **cost and environmental impacts**
- most valuable at **the interfaces where the coupling** and interactions are strong and represent a challenge and an opportunity
- control variables are **technical economic and regulatory**

iiESI.org

Imperial College London

NREL NATIONAL RENEWABLE ENERGY LABORATORY

EPRI ELECTRIC POWER RESEARCH INSTITUTE



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KIT Karlsruhe Institute of Technology

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What We Do

The International Institute of Energy Systems Integration (iiESI) is engaging in a variety of activities to chart the course for energy systems integration (ESI) research around the world.

ESI practitioners take a holistic view of the energy systems we use today—focusing on the combined strength of our electricity, heat, and fuels systems. Tapping into the combined strength of energy systems maximizes the value of every unit of energy we use in our water, power, and transportation infrastructures. Through collaboration and coordination, iiESI addresses the technical challenges associated with integrating multiple energy systems to enable clean, reliable, affordable energy systems worldwide.

iiESI resources and events are globally sourced from the world's leading ESI institutions, so all of our activities include the latest findings in ESI research.

This year, iiESI will:

- Establish the first global ESI-focused conference
- Create member-developed massive open online courses (MOOCs) and course content—taught by the world's top professors on ESI subjects
- Create joint member publications on ESI topics
- Hold regional workshops to address regional ESI challenges
- Facilitate student/staff exchanges between member organizations.

Become a Member

Members Create ESI Resources for the Global Community

Regional Workshops

Past Workshops

Bi-Annual Global ESI Conference

ESI Global Conference
December 5-6, 2017
More information to come

Educational Courses

Fall 2017: Online ESI course taught by the world's top professors on ESI subjects

Past Educational Courses

ESI Articles and Papers

Energy Systems Integration: Defining and Describing the Value Proposition, iiESI White Paper (June 2016)

Coming Soon:
Strategic Energy Technologies Information System (SETIS) Magazine (October 2017)

Past Articles and Papers

Student and Staff Exchanges

Contact iiesi@nrel.gov for more information

Subscribe to our email list to receive updates about our plans for this year and beyond.

email address Subscribe

Events

Learn about past and upcoming workshops and courses on energy systems integration from the International Institute for Energy Systems Integration (iiESI).

Past Events

- Consumers, Economics and Energy Systems Workshop
  Dublin, Ireland (October 17-18, 2016)
- Energy Systems Integration Course
  Dublin, Ireland (May 16 and 19, 2016)
- ICT Enabling Thermal Energy Flexibility in Integrated Energy Systems
  Daejeon, Korea (October 21-22, 2015)
- Energy Systems Integration 102
  Golden, Colorado (August 3-7, 2015)
- Energy Systems Integration 101
  Leuven, Belgium (May 18-22, 2015)
- Key Research Challenges of Energy Systems Integration
  London, United Kingdom (March 30-31, 2015)
- iiESI Asian Workshop
  Kyoto, Japan (November 17, 2014)
- Renewables and Energy Systems Integration Workshop
  Golden, Colorado (September 8-9, 2014)
- Energy Systems Integration 101
  Golden, Colorado (July 21-25, 2014)
- International Energy Systems Integration European Workshop
  Copenhagen, Denmark (May 27-28, 2014)
- International Energy Systems Integration Workshop
  Arlington, Virginia (February 18-19, 2014)

Planned Events

Energy Systems Integration in Smart Buildings, Communities, and Microgrids
The University of Melbourne, Melbourne, Australia
March 21-22, 2017
Download Agenda

EPRI Power Delivery & Utilization (PDU) 2017 European Advisors Meeting
May 17-18, 2017
London
More Information »

Bi-Annual Global ESI Conference
December 5-6, 2017
More information to come

Agenda

Day 1

The first day will involve presentations and discussions on technical (morning) and socio-economic (afternoon) aspects of smart buildings, districts, communities and microgrids.

8.30 – 9.00 Registration, Tea & Coffee

9.00 – 9.15 Welcome and opening – Pierluigi Mancarella, The University of Melbourne

9.15 – 9.30 Workshop objectives - Mark O'Malley, University College Dublin, Ireland

AM Session: Technical aspects
Chair: Mark O'Malley, University College Dublin, Ireland
The first morning session will cover technical aspects associated to energy systems integration at the level of smart buildings, districts, communities and microgrids.

9.30 – 10.00 "Probabilistic energy forecasting for smart grids and buildings" - Rob Hyndman, Monash University, Melbourne, Australia

10.00 – 10.30 "Technical, financial and environmental analysis of a small scale, grid connected, hybrid power plant" - Michael Brear, The University of Melbourne

10.30 – 11.00 "Integrating PV and storage in communities: distribution network challenges and smart grid solutions" – Nando Ochoa, The University of Melbourne

11.00 – 11.30 Coffee Break

11.30 – 12.30 *Discussion*: "What are the technical gaps and challenges in understanding and modelling for ESI in districts, communities and microgrids? What are the key technologies to be considered? What are the potential benefits? What's the role of data (for instance from smart meters)?"

12.30 – 13.30 Lunch Break

PM Session: Socio-economic aspects
Chair: William D'haesleer, KU Leuven, Belgium
The afternoon session will cover techno-economic and social aspects associated to energy systems integration at the level of smart buildings, districts, communities and microgrids.

13.30 – 14.00 "Integrating community energy into the Australian National Electricity Market"– Iain Macgill, University of New South Wales, Australia

14.00 - 14.30 "Socio-economic aspects of community energy systems" – Reihanna Mohideen, The University of Melbourne

14.30 - 15.00 "Integrating minigrids into communities: socioeconomic and technical considerations from real-world case studies"– Justin Harding, Ausnet Services, Australia

15.00 - 15.15 – Coffee break

15.15 – 16.00 *Discussion*: "What are the socio-economic, commercial and regulatory barriers to develop ESI-based districts, communities and microgrids? What is the role of consumers? What is the role of energy policy and regulation?"

16.00 – 16.15 *Summary and lessons learned from day 1* – Pierluigi Mancarella, The University of Melbourne

Day 2

The second day will provide further insights into energy systems integration in distributed energy systems but from the perspective of the whole system (AM). Then, general discussions will be carried out before summarizing the workshop achievements and next steps.

Whole System-level aspects
Chair: Pierluigi Mancarella, The University of Melbourne
The morning session will cover whole system-level aspects associated with energy systems integration at the level of smart buildings, districts, communities and microgrids.

9.00 – 9.30 "Integrated modeling of active demand response with electro-thermal systems" – William D'haeseleer, KU Leuven, Belgium

9.30 – 10.00 "Planning and operating integrated energy systems" - Mark O'Malley, University College Dublin, Ireland

10.00 – 10.30 "Flexibility and system services from distributed multi-energy systems: a techno-economic assessment" – Pierluigi Mancarella, The University of Melbourne

10.30 – 11.00 Coffee break

11.00 – 12.00 *Discussion*: "What are the whole system level benefits from integrating distributed and centralised energy systems? How about integrating different energy vectors? What are the challenges? Are they technical, economic or what?"

12.00 – 13.00 Lunch

PM session: Final discussions and workshop closing

13.00 – 14.00 *Final discussion with relevance to Australia, and next steps* - Chair: Mark O'Malley, UCD, Ireland
The final group discussion will be centred on consolidating and summarizing the learning from the workshop, with focus on the Australian situation and recent economic and security events. The discussion will also bridge towards next steps.

14.00 – 14.15 *Workshop closing remarks* – Pierluigi Mancarella, The University of Melbourne