Energy Systems Integration Group

A new name for the next level of service and education

Mark Ahlstrom, President, Board of Directors

ESIG

ENERGY SYSTEMS INTEGRATION GROUP

How it started

- ESIG started as UWIG in 1989 by a group of six utilities interested in learning about wind energy
- Group grew slowly during the 1990's as wind development became more than a CA phenomenon
- UWIG had grown to 50 members by 2003, and has 180 member organizations today
- Primary focus during the large growth time was wind integration challenges and solutions

Maturing of the wind industry in early 2000's

- Industry recognition of common challenges and solutions occurred with increasing levels of wind
- Wind integration literature grew dramatically, increasingly documenting the ability to manage more wind on the system
- Consolidation of balancing areas and growth of ISO/RTOs and fast markets also changed things

And then came solar

- By 2010, solar PV began to be installed in very significant ways
- UWIG was asked to include PV solar, with the issues of solar variability and uncertainty having similarities with wind
- UWIG incorporated solar concerns and in 2011 became UVIG, the Utility Variable-Generation Integration Group

Strategic planning activities by the board

- Important to stay true to our mission
  - Non-profit educational and discussion-convening group
  - Forward-leaning, but without advocacy or selling
  - Emphasis on integration and engineering with systems view
  - Casual, approachable, collaborative meetings and style
- Vital to stay relevant and remain at the leading edge
  - Broader definition of energy companies and the evolving utility industry
  - Broader topics (e.g., storage, DERs, market design, EVs)
  - Broader scope beyond “just renewables” integration

Strategic planning results

- Staying current and relevant
  - Energy companies are utilities and also much more
  - Variable generation integration challenges are changing
    - It is already “all resources” integration and engineering today
    - It is becoming “integration of all energy systems” as electrification grows
    - Our systems view must extend across multiple energy vectors
- Future-proofing our governance, advisors and skill sets
  - New name
  - Cleaner structure for memberships, board, collaboration and education

Changes unanimously approved in March 2018

- New name: **Energy Systems Integration Group** (www.ESIG.energy)
- Simplified membership structure - a single class of Regular Members
- Working Groups
  - International Institute for Energy Systems Integration (iiESI) anchors our new Research & Education Working Group
  - Other Working Groups continue:
    - Reliability, System Operations & Market Design, Distributed Energy Resources, and System Planning
    - O&M Users Group continues as our largest and most successful Users Group
- Board
  - Governance-oriented board for sustaining the organization and representing our membership
- Advisory Council
  - Growing the collaborative and educational mission of our organization

International Institute for Energy Systems Integration iiesi.org

iiESI International Institute for Energy Systems Integration

Vision

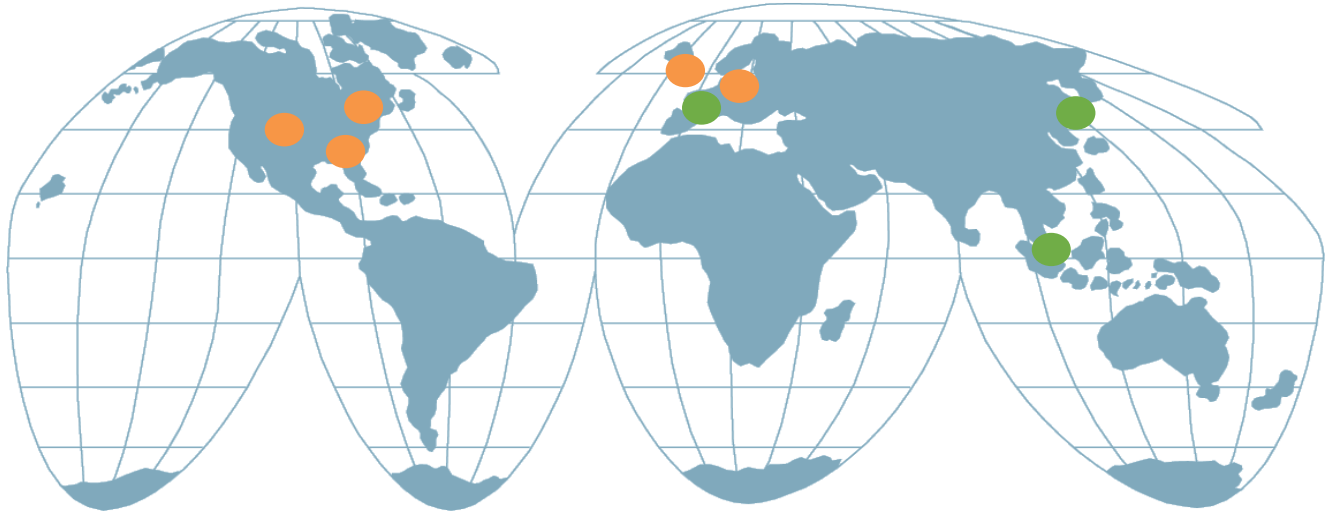
A global community of scholars and practitioners from leading institutions coordinating efforts in ESI R&D and education to enable highly integrated, flexible, clean, and efficient energy systems.

Dates

- Founded Feb 2014
- Formally established July 2016

Objectives

- Share Knowledge and Experience
- Education and Training Resources
- Enable the coordination of R&D



NREL NATIONAL RENEWABLE ENERGY LABORATORY

KU LEUVEN

UCD DUBLIN

EPRI ELECTRIC POWER RESEARCH INSTITUTE

Imperial College London

KIT Karlsruhe Institute of Technology

DTU

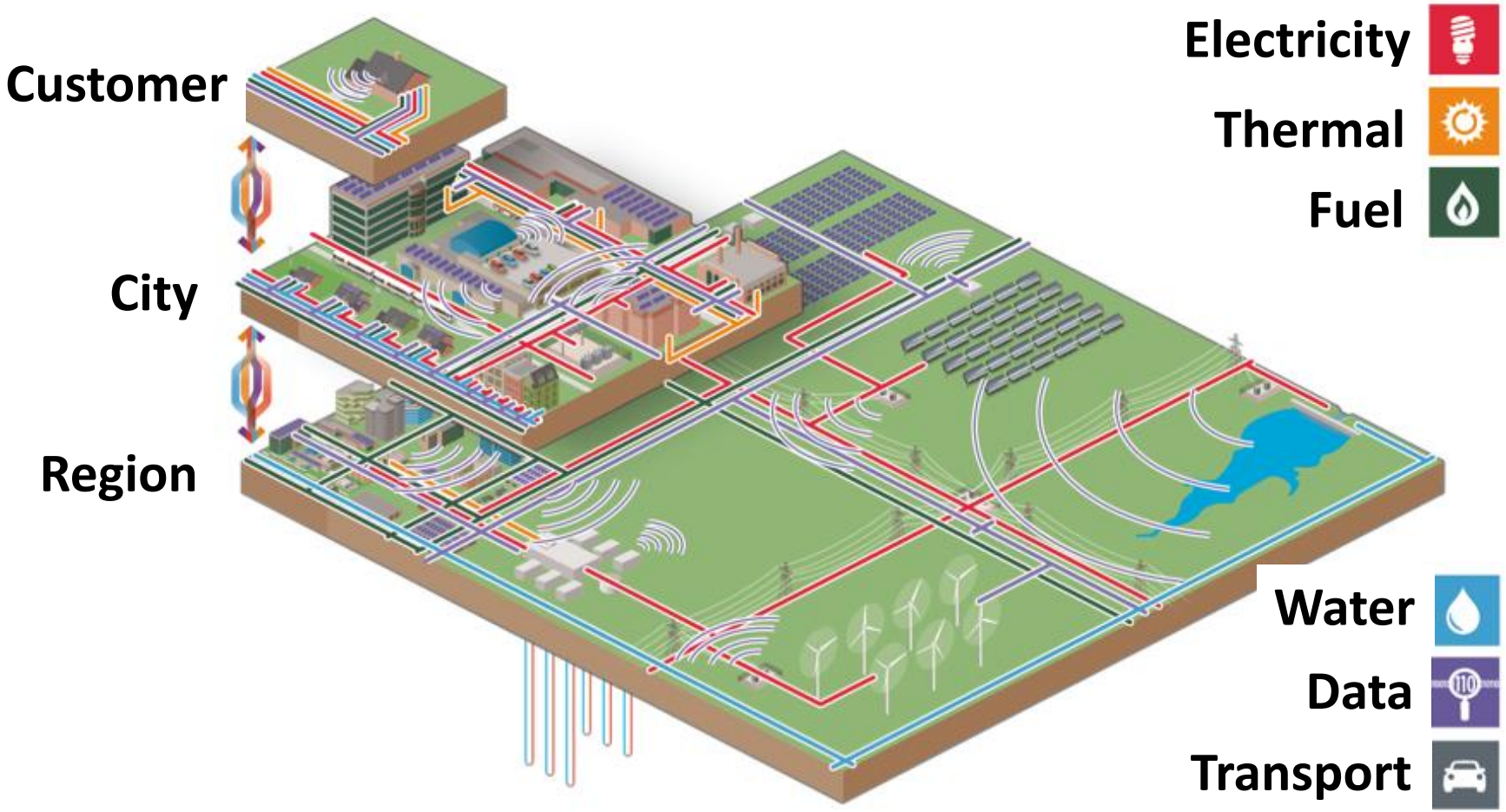
KIER

NANYANG TECHNOLOGICAL UNIVERSITY

What is Energy Systems Integration (ESI)?

Energy systems integration (ESI) is the process of coordinating the operation and planning of energy systems across multiple pathways and/or geographical scales to deliver reliable, cost-effective energy services with minimal impact on the environment.

Energy Systems Integration (ESI)



- **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**

ESIG

Global engagement

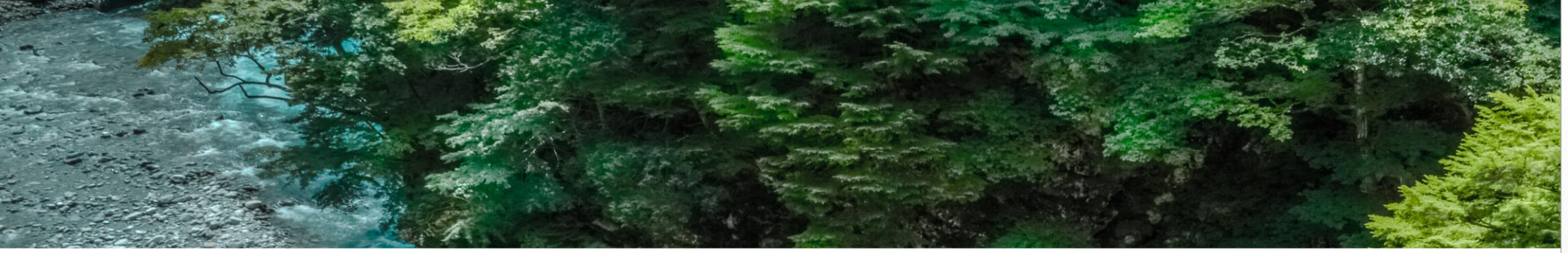
- Engaged in the latest ongoing work
  - Continental scale transmission planning
  - Essential reliability services and market design/operation
  - Wind and solar forecasting
- Engaged with other ESI groups
  - EU, European Energy Research Alliance, Joint Programme in ESI, CEM, EERA, DOE, IEA
- Engaged with the energy industry, research and standards activities
  - NERC, FERC, DOE/Labs, EPRI, IEEE, IEC, CIGRE, IEA, World Energy and Meteorology Council, Energy Foundation China
- Expanding on our long history as a convener of vital workshops
  - Annual Energy Systems Integration Conference – Imperial College London, March 2019

Concluding thoughts

- ESIG is a bridge for creating and sharing knowledge
- If your organization is a member, all of your staff are members
  - Encourage everyone to take advantage of our free webinars, members-only resources and working groups, the O&M Users Group, and other benefits
- Upcoming workshops
  - Fall Technical Workshop, October 1-3 2018, Denver, Colorado
  - Spring Technical Workshop, March 19-21 2018, Albuquerque, New Mexico
  - Annual ESI Conference, March 2019, Imperial College, London
  - **Forecasting Workshop, June 4-6 2019, Denver Colorado**

Energy Systems Integration Group is a non-profit educational association that provides workshops, resources and education on the evolving electricity and energy systems.

ESIG supports engineers, researchers, technologists, policymakers and the public with the transformation of energy systems in a way that is economic, reliable, sustainable, thoughtful and collaborative.



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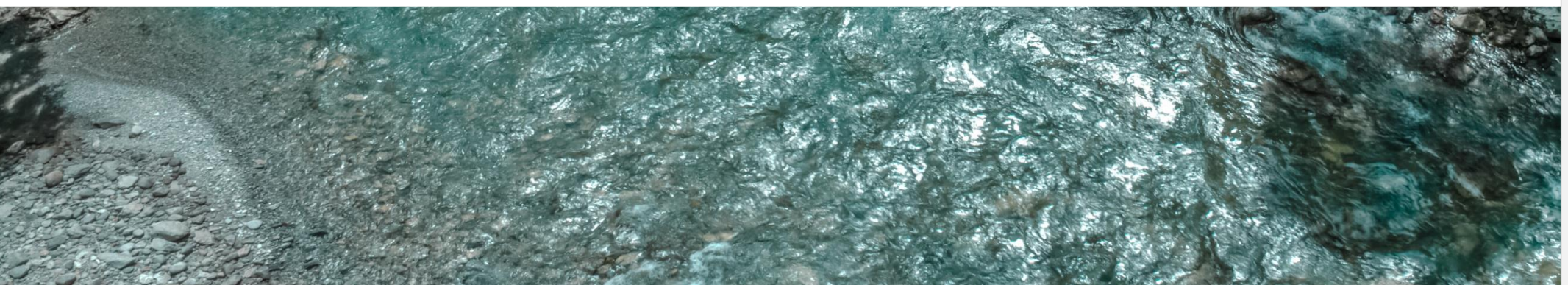

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