

EE Hub Digitalisation Working Group Alison Delgado, Pacific Northwest National Laboratory Team: Vikas Chandan, Kathryn Otte, and Tanner Stelmach Joint Meeting of the APEC EGEEC & APEC EGNRET 6 October 2022



# Agenda

- 1. Overview of EE Hub Digitalisation Working Group (DWG)
- 2. Launch of recent report on Digitalisation for Energy Efficiency of Buildings Operations: Lessons Learned from the EE Hub Digitalisation Working Group
- 3. Current activities and next steps



# **Digitalisation Working Group (What)**

- Established to increase multilateral cooperation in the field of energy efficiency and demand flexibility, specifically to:
  - 1. Identify shared priorities and challenges so that collaborative research can be conducted to address the most pressing issues
  - 2. Share lessons learned so that successes can be replicated
  - 3. Enhance the development of instruments that enable effective implementation of energy efficiency, demand response and other demand flexibility policy measures
- At its kickoff meeting in December 2021, the Working Group decided to focus its first activities on buildings.



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# **Digitalisation Working Group (Why)**

- Digitalisation is creating new opportunities to optimize energy systems and decrease GHG emissions
- Among these sectors, buildings are critical to address because they comprise 36% of global energy demand and 37% of global energy-related CO2 emissions.<sup>1</sup>
- The IEA estimates that digitalization could cut 10% of total building energy consumption by 2040.<sup>2</sup>



Sources: (1) 2021 UNEP Global Status Report for Buildings and Construction (2) 2017 IEA Digitalization & Energy Report



# **Digitalisation Working Group (Who)**

- To date, eight member countries and the European Commission have joined.
  - U.S. (lead)
  - Australia
  - Brazil
  - Canada
  - Denmark
  - France
  - Germany
  - Japan



**Chair:** Rob Sandoli, U.S. Department of Energy **Operating Agent:** Pacific Northwest National Laboratory **Other team members:** Brian Walker, U.S. Department of Energy, Jack Mayernik, National Renewable Energy Laboratory



# **Recent Working Group Report**

- Report launched in September 2022
- Report highlights:
  - Identifies technological and policy/regulatory gaps
  - Characterizes impactful digitalisation tools for buildings
  - Incorporates country policy/program examples based on member country interviews and presentations



In an increasingly interconnected world, digital technologies have great potential to improve the efficiency of human systems, particularly energy. Digitalisation is creating new opportunities to optimize energy systems and decrease greenhouse gas emissions in power grids, buildings, transportation, manufacturing, oil and gas, and agriculture. Buildings are critical since they account for 36% of total energy use and 37% of direct CO<sub>2</sub> emissions.

Buildings represent

· 37% of global energy-related emissions<sup>1</sup>

Many digital technologies that actively raise energy efficiency and reduce carbon emissions in buildings are less expensive and lead to faster returns on investment than physical renovations. Compared to passive solutions, digitalisation can typically recoup costs three times as fast, and can renovate 10 times the space for the same budget. Digitalisation provides an opportunity to extract more energy efficiency benefits than physical renovations and can be used where physical renovations are not feasible.

However, the wide-scale deployment of digital technologies faces regulatory and technological obstacles. A combination of policy and technology solutions are required to address five key barriers.



The Digitalisation Working Group is preparing a roadmap on near-term, mid-term, and long-term strategies for elevating the role of digitalisation in accelerating improvement in building energy efficiency. Download the report: www.energyefficiencyhub.org/DWGReport

<sup>1</sup> Source: 2021 UNEP Global Status Report for Buildings and Construction <sup>2</sup> Source: 2017 IEA Digitalization & Energy Report

Download the report: www.energyefficiencyhub.org/DWGReport

# Energy Efficiency Hub

### **Accelerating Energy Efficiency Through** Digitalisation

### A report by the Digitalisation Working Group

### · 36% of global energy consumption

Digitalisation could cut 10% of total building energy consumption by 2040<sup>2</sup>



# **Identified Barriers**

- Interoperability, data concerns, privacy, cybersecurity, and device energy consumption and decentralization constitute major barriers
- As digitalisation becomes more prevalent in buildings, owners, managers, and occupants will want access to information from across a range of manufacturers and product types.





## **Interoperability Case Study**



Innovation Hub for Affordable Heating and Cooling (i-Hub): Leveraging digital innovation, i-Hub supports the delivery of flexible demand services from buildings. As part of this effort, the i-Hub developed a real-time data management platform.

### Impact

- More than 60 buildings and 9 software ulletapplications use the platform
- Led to significant interview & focus group • research on adoption barriers

### **Lessons Learned**

- Lower digital connectivity costs for by making • it a part of normal equipment investment lifecycle
- Coordination with industry stakeholders • plays a key role in project success

Challenges: The large-scale program delivery required significant time and coordination effort.



## **Privacy & Cybersecurity Case Study**

Smart Meter Gateway in Germany: A highly secure and interoperable communication module for sharing data between smart meters and service providers.

### Impact

- Led to robust cybersecurity and privacy • policy in smart meters
- Prevents manipulation of smart meter ulletdata
- Protects buildings against cyber attacks •

### **Lessons Learned**

- Robust technology development can enhance ٠ cybersecurity and privacy solutions
- Increase customer acceptance via attractive ulletofferings and noticeable benefits
- Complex product certification schemes can • delay technology rollouts

Challenges: Some of the notable barriers included consumer acceptance and complexity of the certification process.



## **Data Availability & Analysis Case Study**



**Green Button Initiative:** Industry-led effort to provide utility customers with easy and secure access to their energy usage information in a consumer-friendly, digitized format

### Impact

- 60 million homes and businesses securely accessing standardized energy information
- More than 50 participating utilities ٠
- More than 35 companies developed apps • leveraging Green Button Data

### Lessons Learned

- Leverage existing standards •
- Launch marketing campaign with the • support from the government
- Set up non-profit alliances for testing and • compliance

Challenges: Some of the challenges included lack of data standards, initial difficulty of recruiting early adopters, and testing and compliance.



- DWG website launch in October
- Developing roadmap on near-term, mid-term, and long-term strategies for elevating the role of digitalisation in accelerating improvement in building energy efficiency
- Launch event of report and roadmap in November





# Thank you!

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