

## Annex81: Data Driven Smart Buildings

# Data Driven Smart Buildings

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IEA Technology Collaboration Programme on Energy in Buildings and Communities Webinar  
“Building Energy Efficiency and Indoor Air Quality”

9th November 2021, 12:00-15:00 UTC / GMT

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## Data-Driven Smart Buildings

### Why are we interested?

- Poorly maintained and improperly controlled HVAC equipment wastes up to 30% energy
- HVAC offers a large untapped resource of flexible load that can support increased use of variable renewable electricity sources
  - … and other bundled comfort and productivity services

**Can ‘digitalization’ unlock energy savings and flexible demand?**

FDD savings and costs snapshot

	Year 1	Year 2
Median savings	6%	9%
Median savings (\$/sf/yr)	\$0.17	\$0.24

Costs	Per point	Per building	Per sq ft
Base software and installation (one-time cost)	\$8	\$12,500	\$0.05
Annual software + MBCx service provider (\$ per year)	\$5	\$3,503	\$0.02

Many additional results on measures IDd, enablers, barriers, payback ...

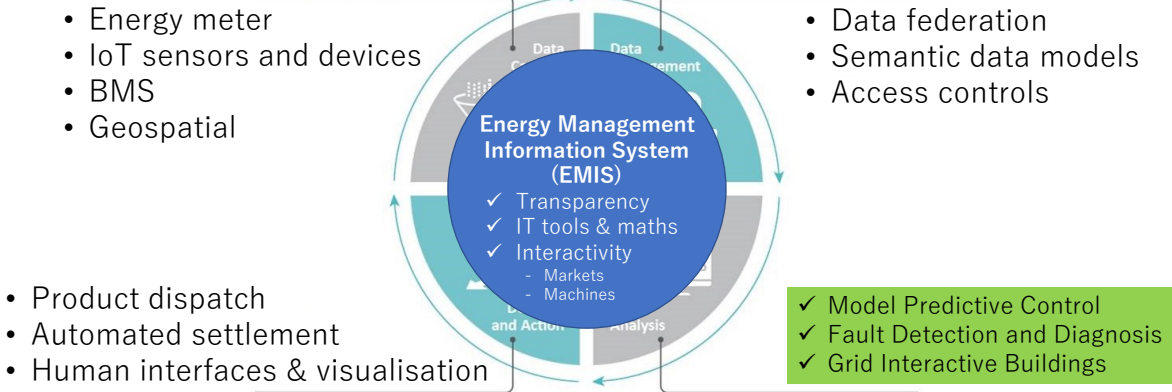


US DoE Smart Energy Analytics Campaign

- 104 organizations, 6500+ buildings
- ~2 year payback time

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# What is Digitalization/ Industry 4.0/ Smart-Building?



## “Platform” for multi-stakeholder participation

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# Barriers to realising savings from digitalization

## Data/System Integration Barriers

- Poor hardware/software interoperability
- Lack of standards for managing data
- Cyber security, privacy and data-leakage fears
- IT dept. engagement and conservative industry structure

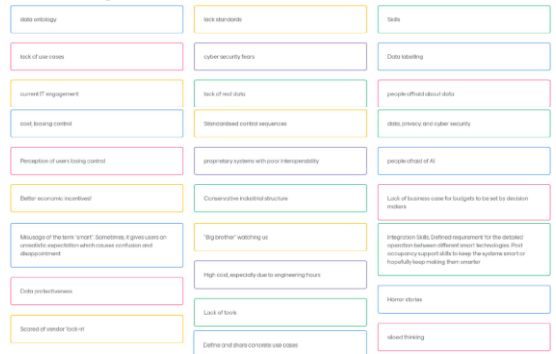
## Skills Barriers

- Lack of system-integration skills
- Diverse hardware/software implementation practices

## Commercial Barriers

- Commercial lock-in/ purchasing fears
- Siloed product offerings
- Lack of innovation/ narrow range of services
- Lack of clarity regarding the value for stakeholders

## What are the barriers to smart-building technologies?

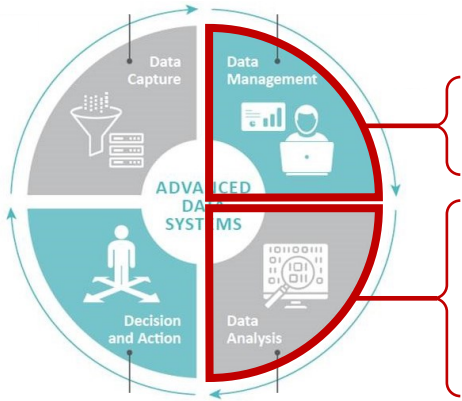


Poorly understood concept of a “digital-ready” building  
Not packaged up as a clear “product” that anyone can buy or train for

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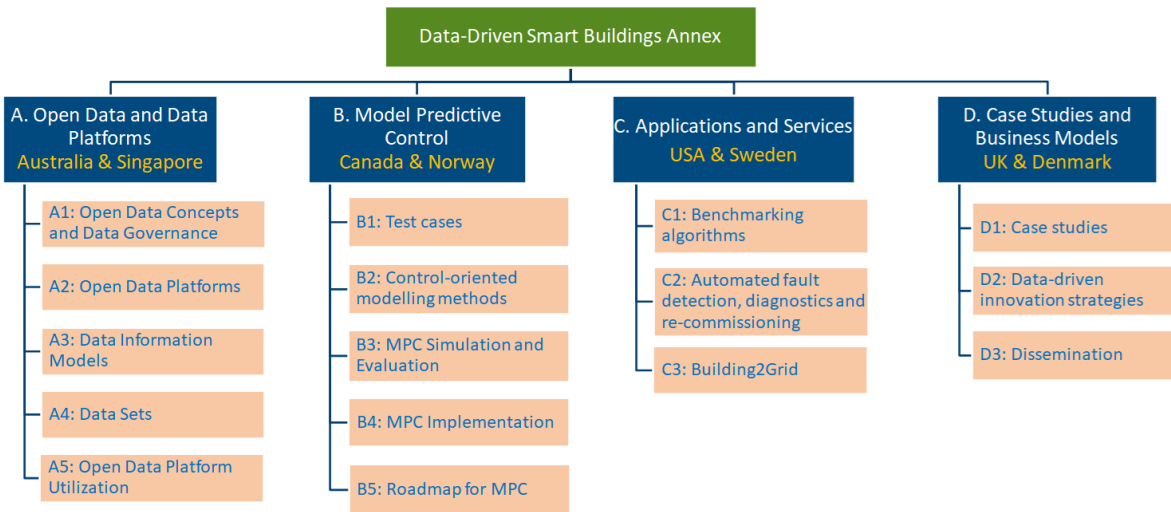
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# Our role



- ✓ Community of practice: networking and knowledge sharing
- ✓ Support the development of data management standards & platforms
- ✓ Transparent software “Application” benchmarking
- ✓ Drive innovation and value in data-driven services
  - Data sandpits
  - Competitions

# The Annex



# Competitions

Global AI Challenge  
For Building EM Facilities

Highlights

- Data Query: To extract building data from a building
- Workshop: To provide hands-on data analysis and quarterly applications
- Cooling Demand Prediction: To energy prediction models for cooling demand
- Innovation Ideas Pitching: To provide an innovative proposal that enhances cooling demand prediction
- Resources provided for participants: About 2 years of building data, workshop, mentorship

Total more than US\$150,000 prizes for winners!!

Global Conference | AI Competition | Workshop | Awards Ceremony

Oct 2021 | Sep 2021 - Mar 2022

Smart Energy Systems ERA-Net

MICall20

MISSION INNOVATION

Smart Energy ERA-Net

THE CITYLEARN CHALLENGE  
MULTI-AGENT REINFORCEMENT LEARNING FOR INTELLIGENT ENERGY MANAGEMENT

Sign up | CityLearn GitHub

The CityLearn Challenge 2021 has now concluded! The winners and the leaderboard will be announced at the RLEM workshop:  
<https://rlem-workshop.net/>

Note: Non-author registration is free for the online workshop and BuildSys

Onboard | The University of Texas at Austin Machine Learning Laboratory | The University of Texas at Austin Energy Institute | RASEI | INREL

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# What does success look like?



- Imagine if you could download energy efficiency tools like you download an “App”?
- Who would like to go first?

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# **Annex81: Data Driven Smart Buildings**

## **Japan's Activities and Challenges**

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