NIQS (November 23, 2022)

NIGERIAN INSTITUTE OF QUANTITY SURVEYORS
The professional construction cost managers

RICS

Cost Management—Role of International Standards, Data, and Digital Tools

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Global Construction and Infrastructure Sector Lead

Agenda

1

About RICS

2

Vision for the Built Environment

3

International Standards, Data and Digital Tools

Agenda

1

About RICS

Everything we do is designed to effect positive change in the built and natural environments

Our global presence

134k

RICS-qualified and trainee professionals globally

...and we operate in the main areas of

land

construction & infrastructure

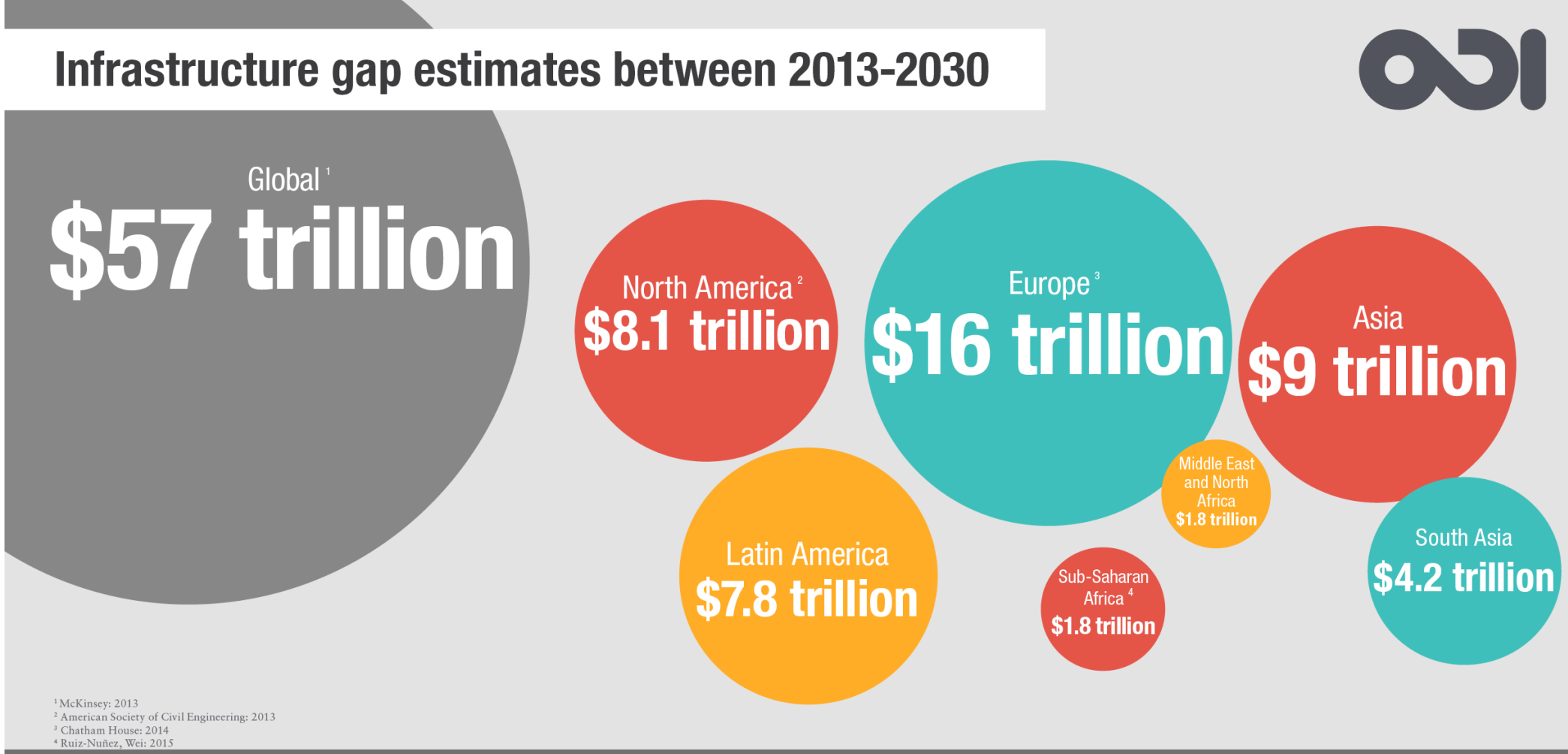
property

Agenda

2

Vision for the Built Environment

Infrastructure gap estimates between 2013-2030



[1] McKinsey: 2013
[2] American Society of Civil Engineering: 2013
[3] Chatham House: 2014
[4] Ruiz-Nuñez, Wei: 2015

Source: https://www.odi.org/sites/odi.org.uk/files/paragraph-images/cape_infographic_v5.png

The Vision

Source: Construction Innovation Hub https://constructioninnovationhub.org.uk/news/vision-for-the-built-environment/

WORLD GREEN BUILDING COUNCIL

#BuildingforEveryone accelerate the Sustainable Development Goals and sustainable built environments for everyone, everywhere

#Building for the planet urgently addressing climate, health and food crisis

#Building for communities urgent action to address social outcomes such as affordability and equity

#Building for economies accelerating a more circular and regenerative economy

How can our sector achieve this vision and what is the role of the QS?

Source: https://worldgbc.org/world-green-building-week-2022

Implications for our sector

Successful Projects

Useful Community-Serving Built Assets

Whole-of-Life					
Design	Construct	Operate	Maintain	Renew	End-of-Life

Time

Quality

Cost

Safety

Others

Data about environment

Data about people

Data about organizations

Data about objects and products

Social Outcomes

Economic Outcomes

Environmental Outcomes

Image Source: https://www.vecteezy.com/free-vector/cement

Adapted from bennettinstitute.cam.ac.uk/valuingdata

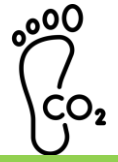
Changing role of a QS

Advisor

Technician

Advisory role of QS

Sustainability studies



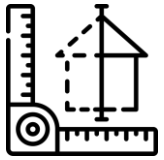
Carbon calculations

Life cycle costing

Benchmarking

Supply chain management

Procurement



Quantification and costing

Commercial management

Project controls

Value engineering

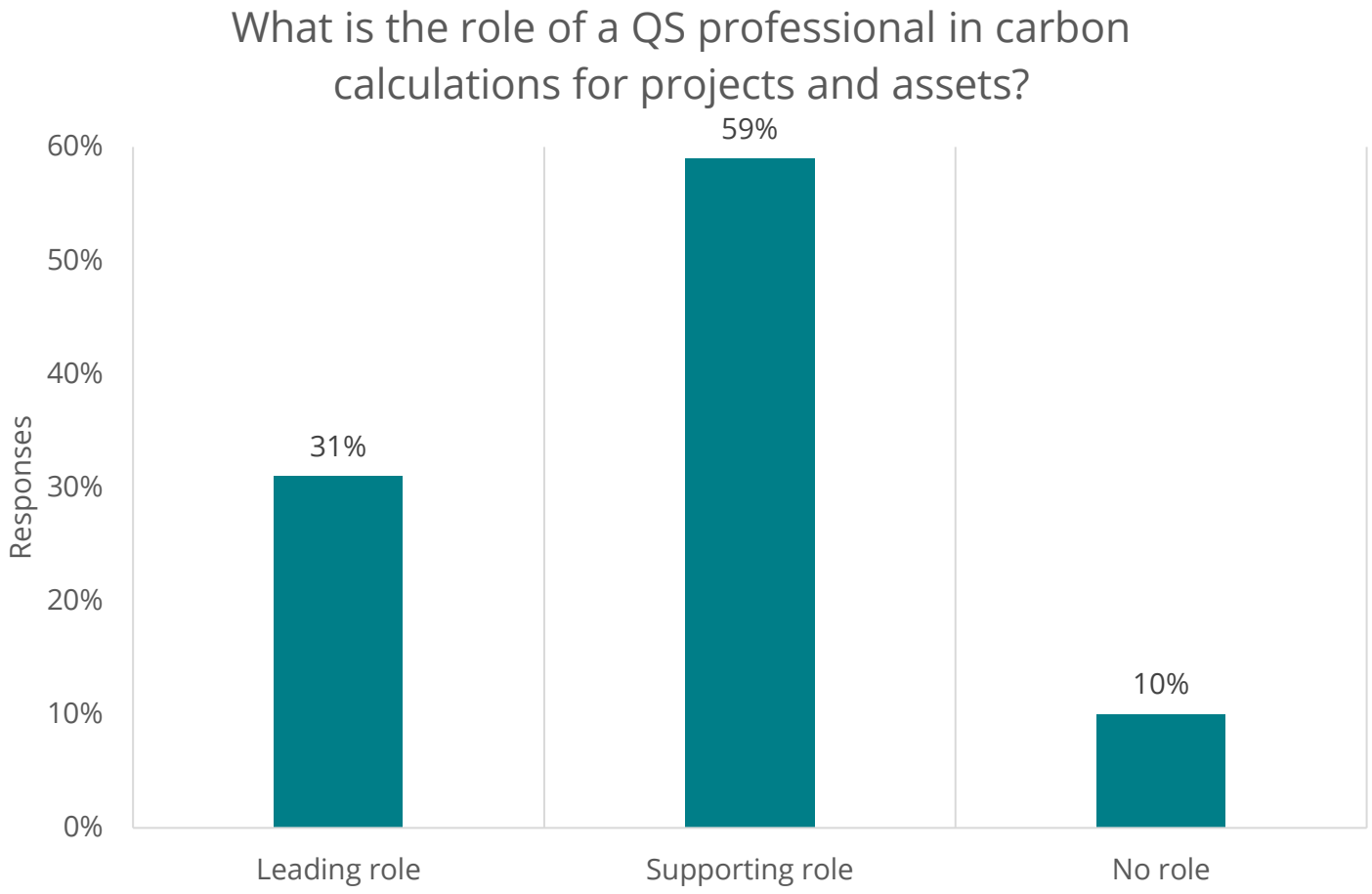
Risk management

Lender services

Dispute advisory

Feasibility studies

Role of Quantity Surveyors



Source: RICS

Agenda

3

International Standards, Data and Digital Tools

Three enabler

1

International standards

2

Data

3

Digital tools

How much data are we talking about (~2019)?

Large infrastructure projects — requiring an average of **130 million emails, 55 million documents, and 12 million workflows**

95.5 percent of all data captured goes **unused**

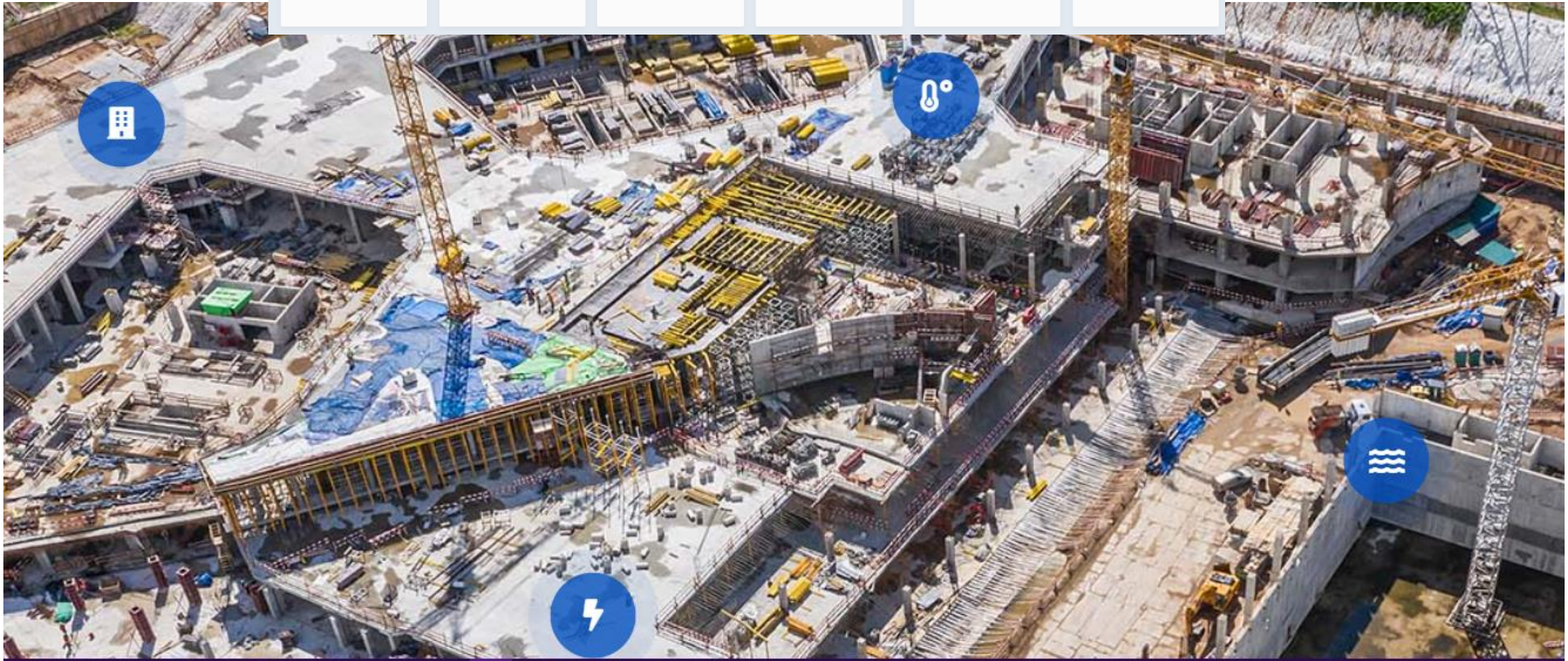
13 percent of construction teams' working hours are **spent looking for project data and information**

30 percent of engineering and construction companies are using **applications that don't integrate with one another**

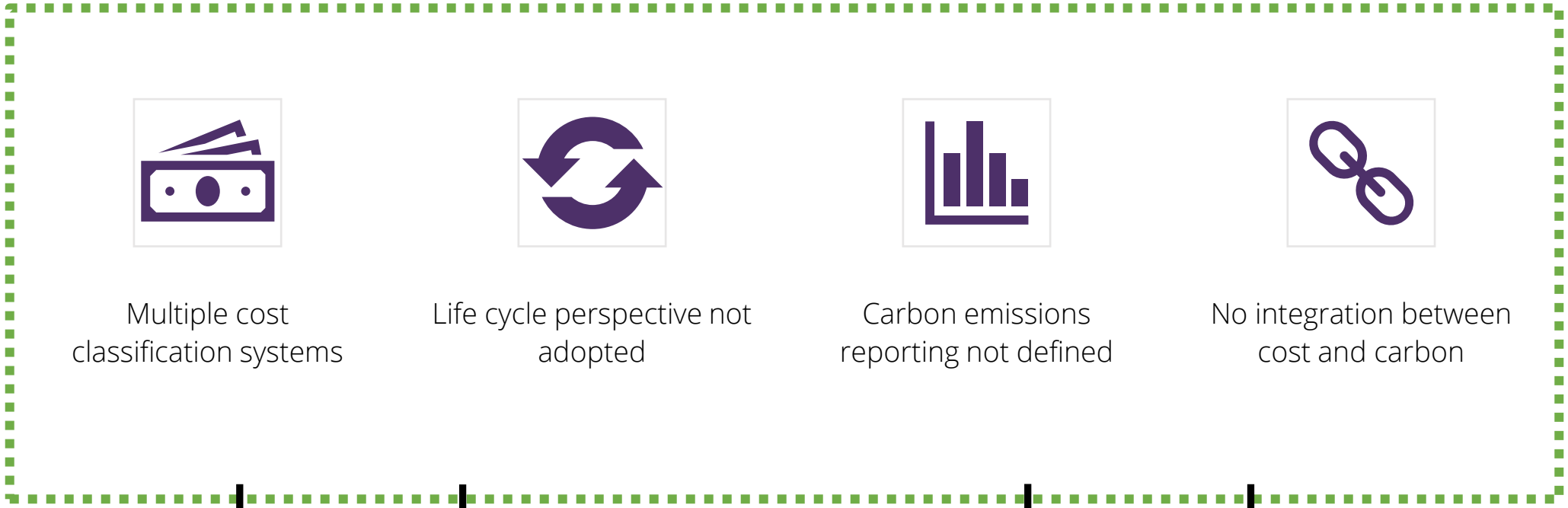
Source: https://www.constructormagazine.com/dealing-with-data-in-the-construction-industry/

Edge data during construction

Source Latium Technologies https://latiumtech.com/job-site-insights/

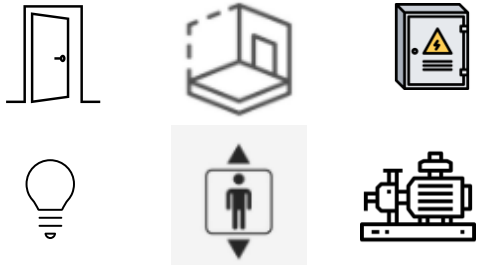


Issues addressed



Data Standards

Construction Objects

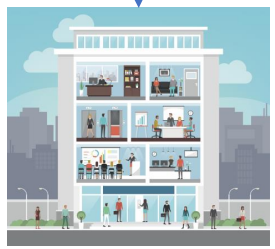


Object Data

- Manufacturer data
- Environmental product declarations
- Specifications
- Physical Properties
- Thermal Properties
- Other data

- Content
- Structure
- Process

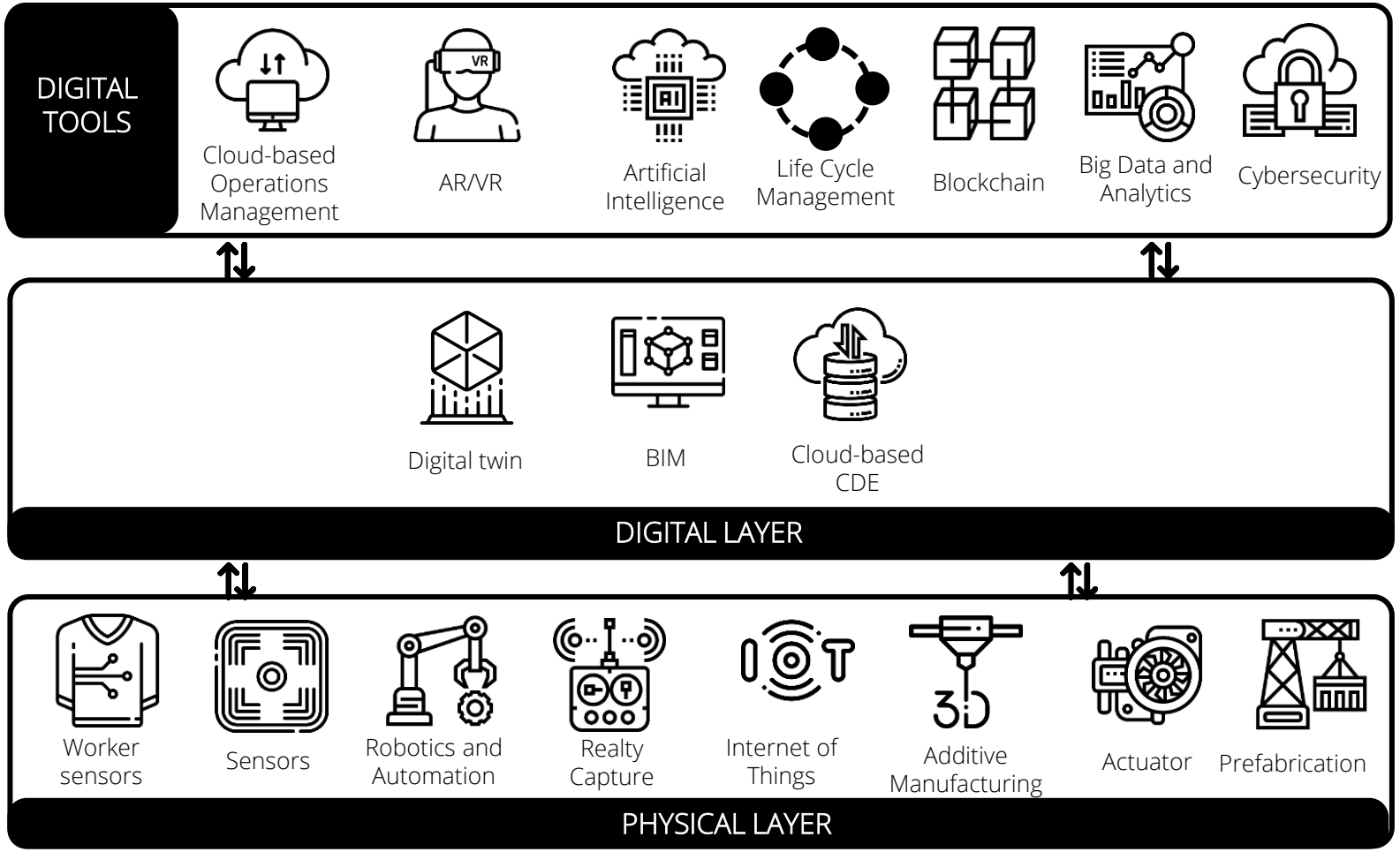
Digital twin



- EN ISO 23386 BIM and interconnected dictionaries;
- EN ISO 23387 BIM and Data templates for construction objects

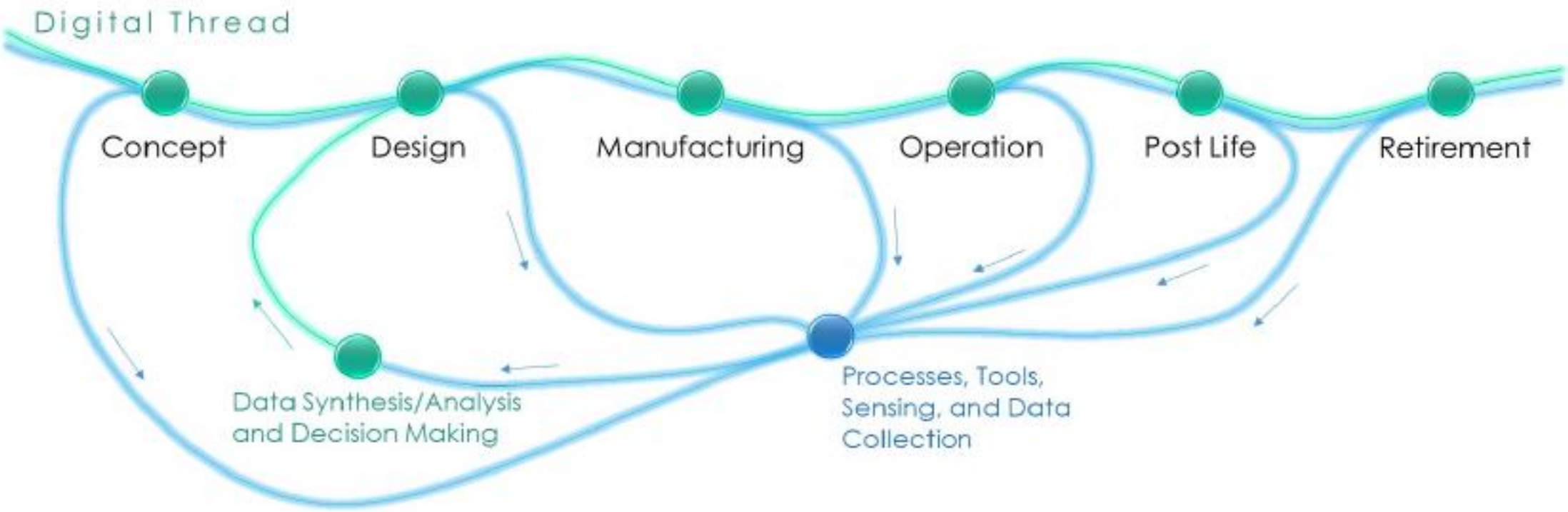
Image Source: https://www.flaticon.com/

Digital Tools in the Construction 4.0 Framework



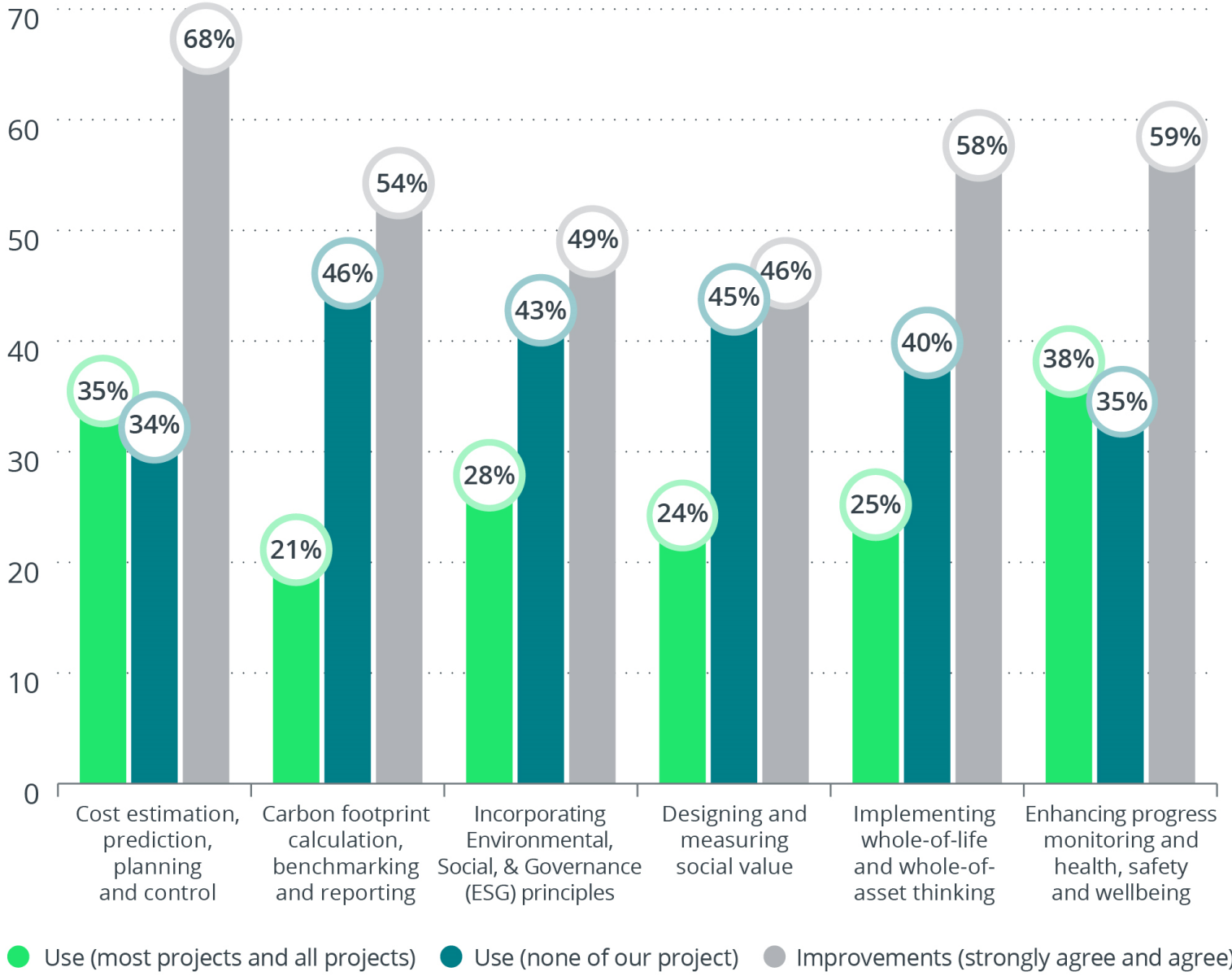
Concept of the digital thread

"Digital Thread can be viewed as containing all the information necessary to generate and provide updates to a Digital Twin."



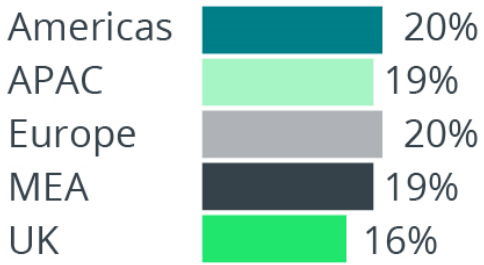
Source: Victor Singh and Karen E. Willcox. "Engineering Design with Digital Thread," AIAA 2018-0569. 2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference. January 2018.

Consistent use of processes and practices driven by digitalisation versus improvements resulting from digitalisation

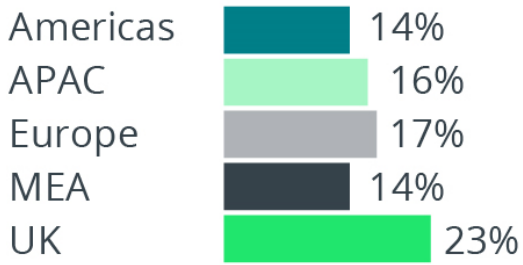


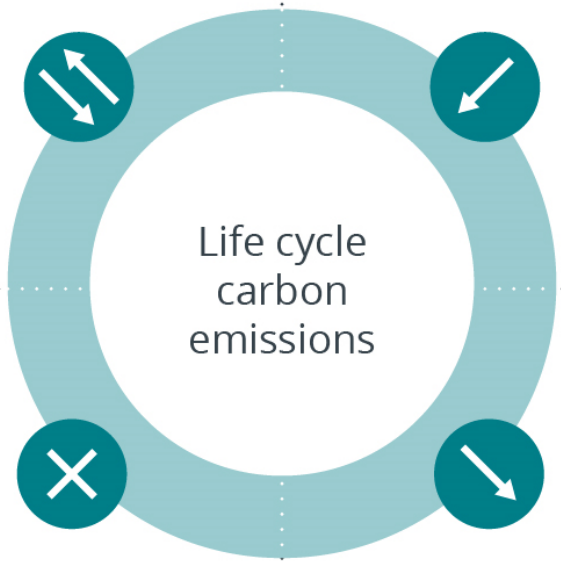
Your organisation in terms of sharing data and information with other project team members about materials, products and systems via digital models on your current projects:

Provide and receive



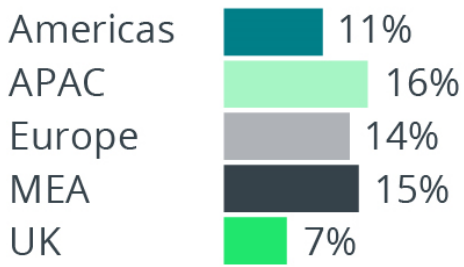
Receive only





No data and information sharing

Provide only



ICMS INTERNATIONAL COST MANAGEMENT STANDARD

High-level taxonomy and format for classifying, defining, measuring, recording, analysing and presenting life cycle costs and carbon emissions associated with built assets

A-CROME
[Acquisition, Construction, Renewal, Operation, Maintenance, and End-of-life]

Project and asset (cost and schedule defining) attributes and values

Integrated life cycle costs and carbon emissions

An inflection point—cost and carbon

Construction (capital) costs

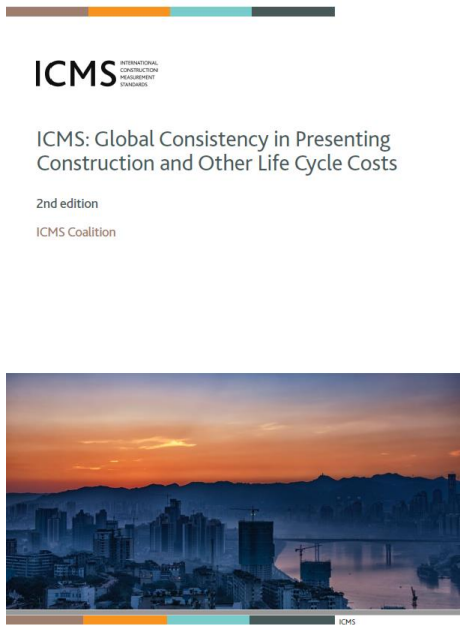
Life cycle costs

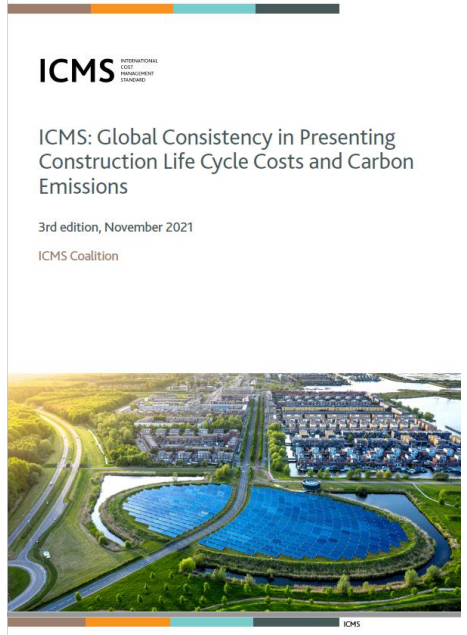
+ other outcomes such as sustainability, circularity, etc.

Life cycle costs

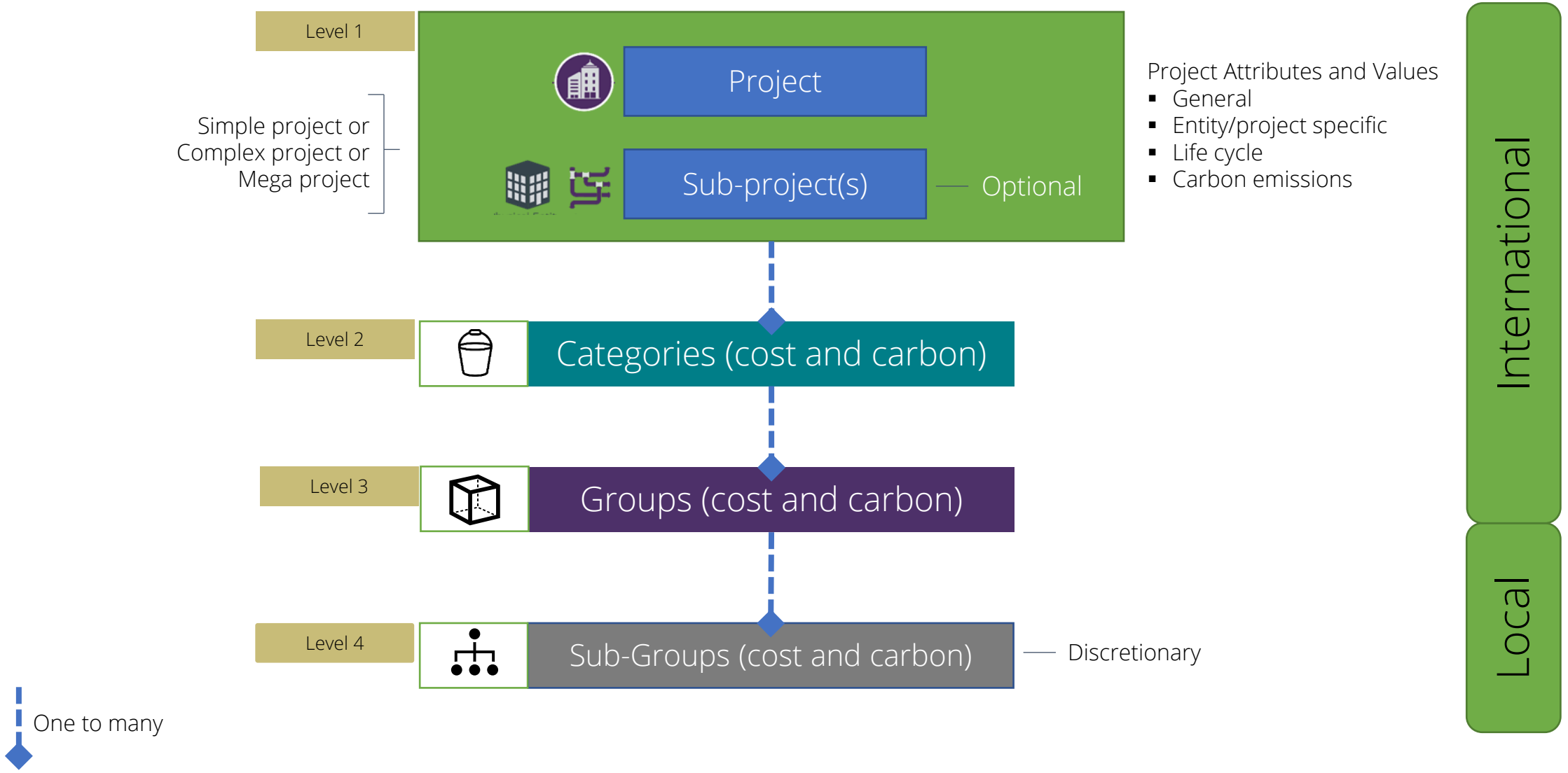
+

Life cycle carbon emissions





Core classification in ICMS



Sample ICMS report

Names of carbon assessment standard(s) adopted for the project	Greater London Authority, Whole Life-Cycle Carbon Assessments guidance Pre-consultation draft (2020); RICS Professional Statement: Whole Life Carbon Assessment for the Built Environment (2017); EN 15978:2011, Sustainability of Construction Works.
Names of carbon assessment tool(s) adopted for the project	One Click LCA
Source(s) of conversion factors (emission factors)	One Click LCA; Environmental Product Declarations; SAP 10

Code	Category	Buildings	
		Emissions (tCO_2e)	tCO_2e/Qty
	Project Quantity		29,127
	Quantity's Units of Measurement		m^2
	Total		
1.	Acquisition Carbon Emissions (AE) (where significant)	Not significant	Not significant
2.	Construction Carbon Emissions (CE)	15,678	0.538
3.	Renewal Carbon Emissions (RE)	7,180	0.246
4.	Operation Carbon Emissions (OE)	8,005	0.275
5.	Maintenance Carbon Emissions (ME)	9,100	0.312
6.	End of Life Carbon Emissions (EE)	759	0.026
7.	Benefits and loads beyond the system boundary	-2,106	-0.072

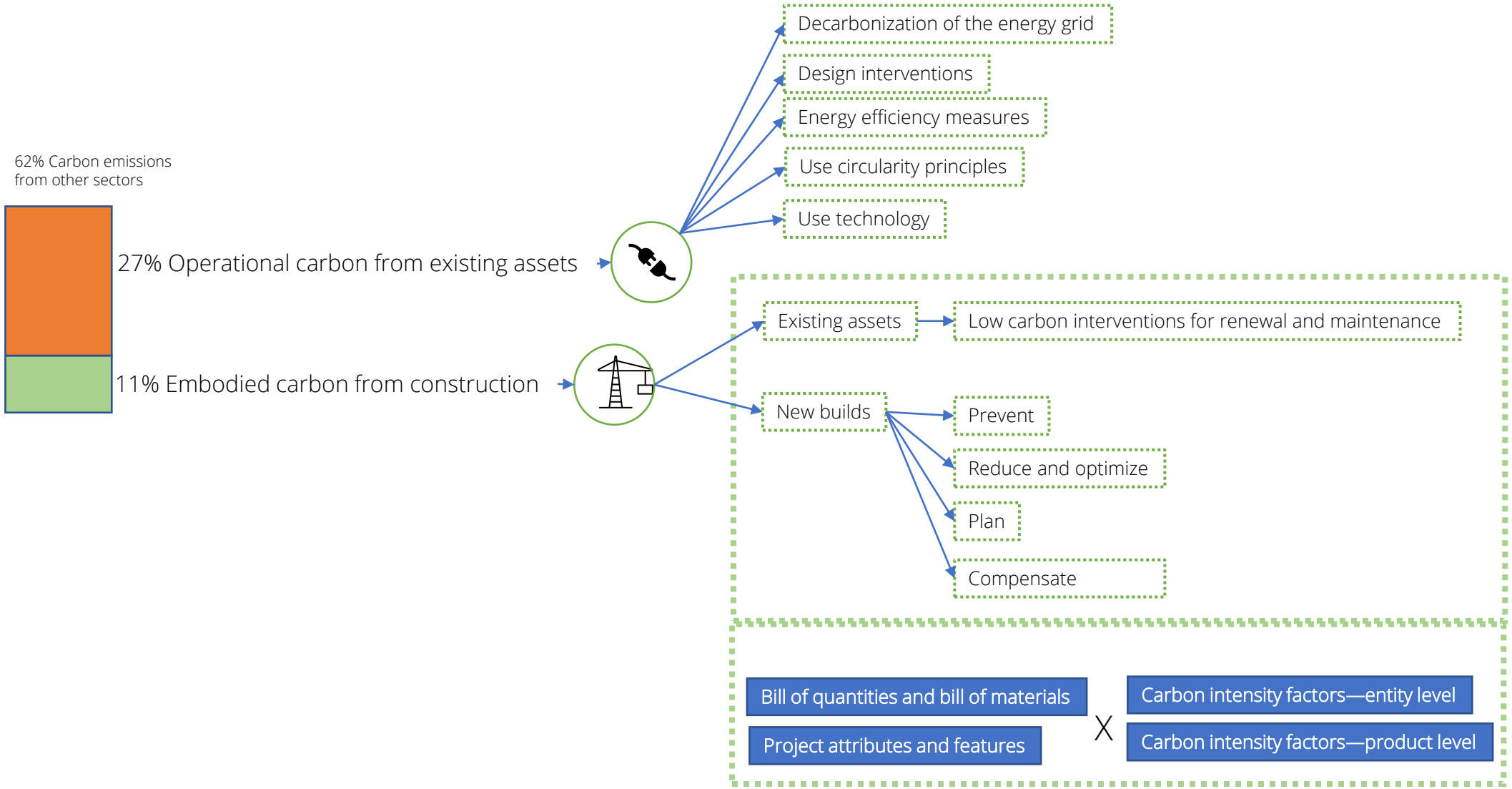
ACROE

Table 3: Carbon breakdown by category for a proposed development (i.e. using Table H–1 of ICMS 3)

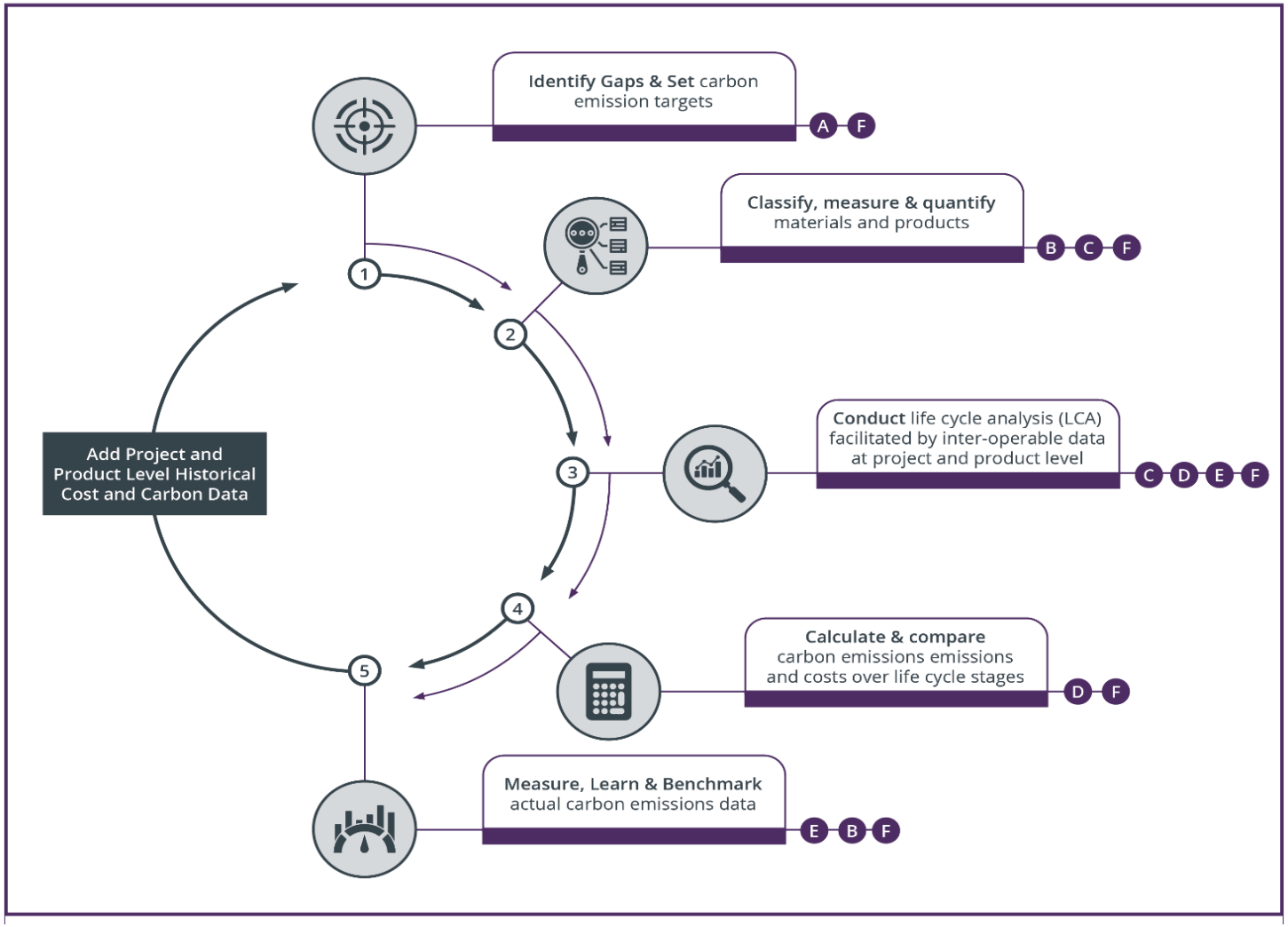
Source: Adapted from a Whole Life Carbon Assessment Report for a proposed development of residential and commercial buildings (published in 2020 to support a UK planning application).

$$\rightarrow \sum ICMS\ Groups \rightarrow \sum ICMS\ Subgroups$$

Decarbonization—simplified view



RICS Carbon Toolkit



RICS Resources to Achieve Net-Zero Carbon for the Built Environment

A RICS 2021 Sustainability Report

D Built Environment Carbon Database (BECD)

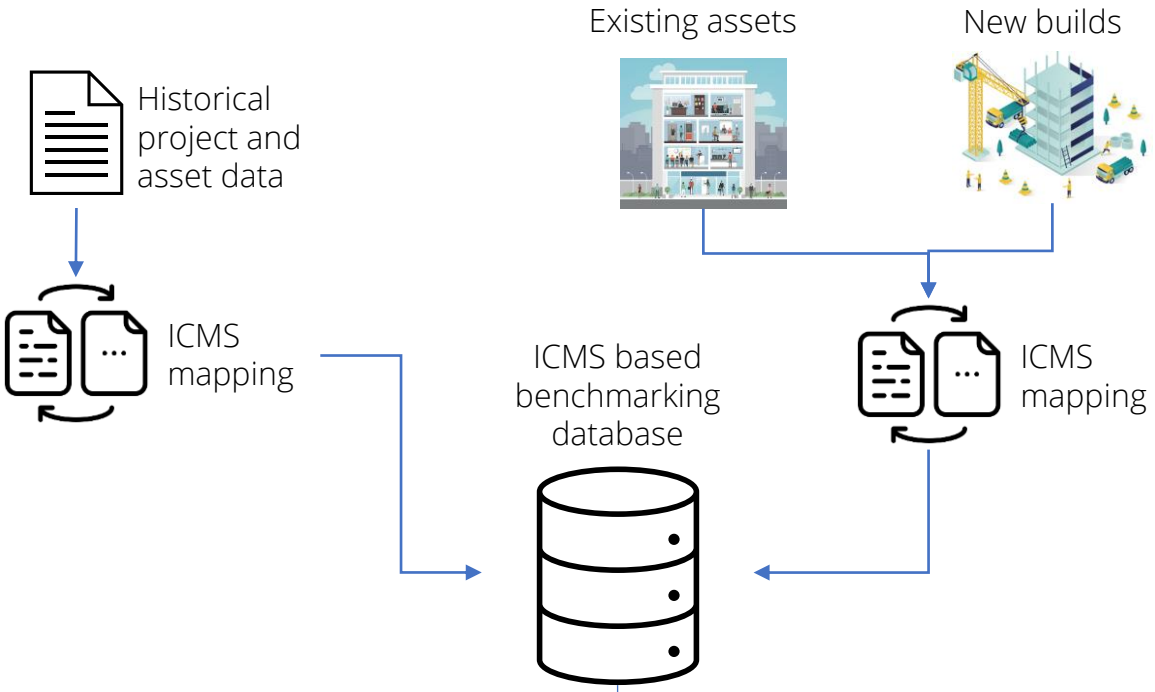
B ICMS Life Cycle Costs & Carbon Emissions Standards

E RICS Data Standards

C RICS Whole Life Carbon Assessment in the Built Environment Professional Statement

F RICS Life Cycle Cost and Carbon Learning Modules

ICMS at the organization or sector level



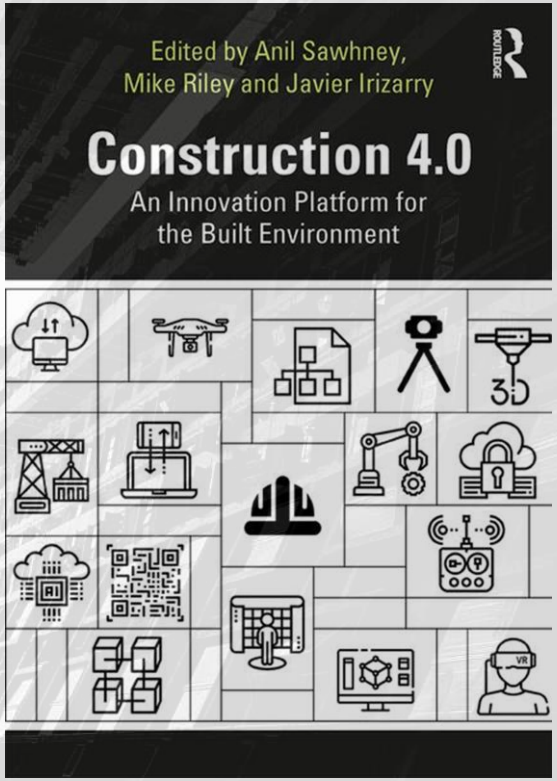
1. Early cost and carbon advice
2. Make investment decisions
3. Streamline project selection and initiation
4. Select options with a whole life perspective
5. Measure performance
6. Show progress against targets
7. Benchmark life cycle costs and carbon emissions
8. Enhance cost certainty

Things We Need to Address

- Data & technology central to digitalization of our sector
- Common principles and standards are crucial
- Value data and demand data-enriched processes, practices, and assets
- Convert data into information, knowledge, and understanding
- Focus on performance and outcomes (reduce emissions, reduce waste, etc.)
- Sort out contractual, technological, and cultural issues


RICS
WORLD BUILT ENVIRONMENT FORUM
Digital twins from design to handover of constructed assets
March 2022
In partnership with
Glodon
rics.org/wbef


RICS
Digitalisation in construction report 2022
RESEARCH


Edited by Anil Sawhney, Mike Riley and Javier Irizarry
Construction 4.0
An Innovation Platform for the Built Environment

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Further information and questions