Plenary stakeholder meeting on
the Horizon Europe R&I Partnership :
People-centric Sustainable Built Environment

European Commission

« Buildings renovation wave » in the Green Deal
under the priority: *Building and renovating in an energy and resource efficient way*

➢ *The flagship initiative of the new Commission to join forces towards **buildings decarbonisation and sustainability**,*

➢ ***« Renovation platforms »** (gathering buildings and construction sector, architects, engineers, local authorities) to address barriers to renovation,*

➢ *Strong link to **financing**- InvestEU & Green Finance,*

➢ *Focus on **affordability and social housing***

European Commission

Directorate-General for Energy

Energy transition in the built environment

SMART AND CLEAN ENERGY FOR ALL

THE ENERGY SYSTEM OF TOMORROW WILL LOOK DIFFERENTLY

2030

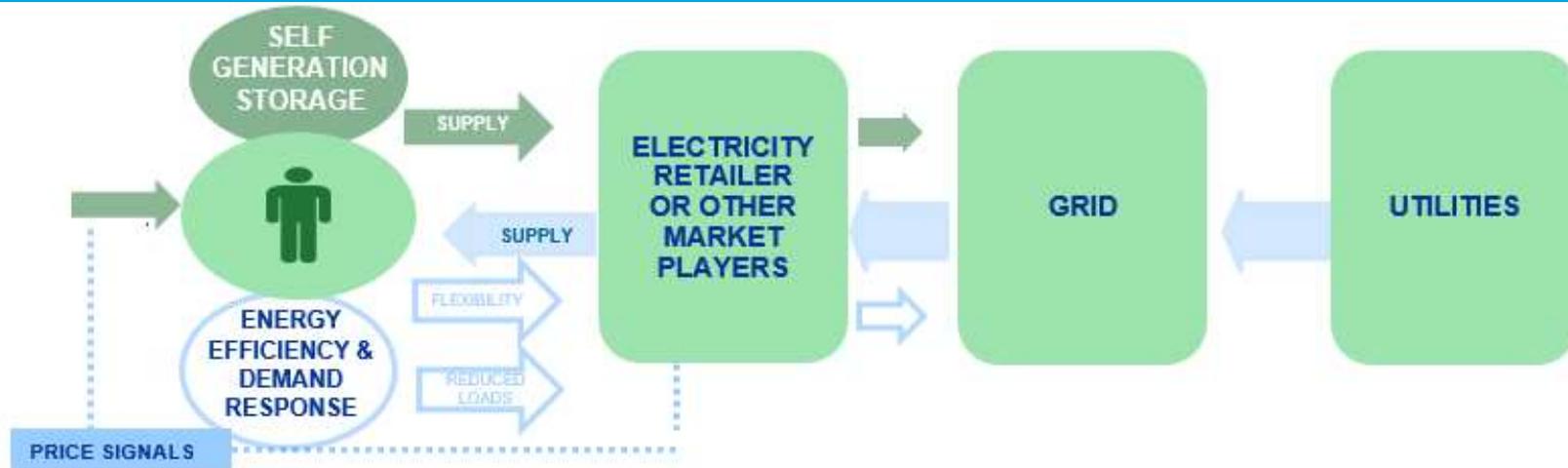**Over 50%** of electricity to come from **renewables**

2050

Electricity completely carbon free

WHY DO WE NEED THE ACTIVE DEMAND SIDE?

➢ **Renewable energy-based system** requires **adjustments on the demand-side** to reduce peak electricity prices and system costs

➢ **Energy efficiency and flexible energy demand** generate savings from the reduced back-up generation capacities and network investments.

ACTIVE CONSUMERS ARE KEY TO CREAT A MORE FLEXIBLE ENERGY SYSTEM…

SELF GENERATION STORAGE

SUPPLY

ELECTRICITY RETAILER OR OTHER MARKET PLAYERS

SUPPLY

FLEXIBILITY

REDUCED LOADS

ENERGY EFFICIENCY & DEMAND RESPONSE

GRID

UTILITIES

PRICE SIGNALS

SMART AND CLEAN ENERGY FOR ALL

The **built environment** of tomorrow will play **an active role in the energy system** by:

- **reducing system capacity** needs (generation & transition) through **energy efficiency**

- providing **flexibility** through **load shifting** (demand-response)

- providing **renewable energy** generation on-site

- providing **storage** of thermal or electric energy (e.g. through smart EV charging)

European Commission
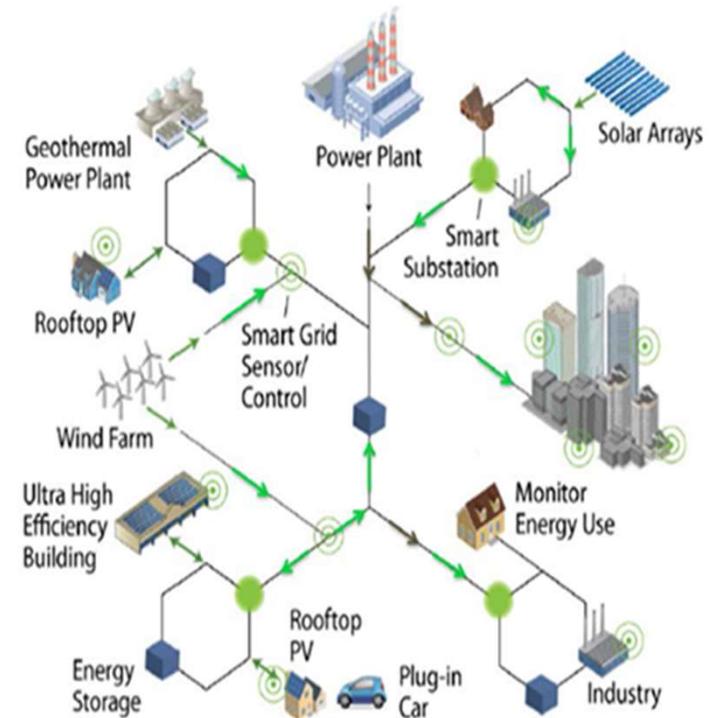
The Clean Energy Package

At least a **32%** share of renewables in final energy consumption

At least **32,5%** energy savings compared with the business-as-usual scenario

Vision for 2050: achieving **net-zero GHG emissions,** including highly energy efficient and **decarbonized EU building stocks**

➢ Improve **energy performance of buildings**, increase **renovation** rates,
➢ Generate needed **socio-economic and technology breakthroughs**,
➢ Ensure consistency of **policy, enabling actions, and R&I**

European Commission

Energy Efficiency in Buildings

A key sector for decarbonisation by 2050: 40% of energy consumption, 75% of existing buildings are energy inefficient

2016 — **2030** — **2050**

Implementing the strengthened Energy Performance of Buildings Directive (2010/31/EU)

- Renovation: speeding up current low rates, mobilising investments at higher scale

- Modernisation: smart technologies, e-charging infrastructure

Financing and mobilising investments:

- Stronger **long term renovation strategies** for member States **with a solid financial component**

- **Smart Finance for Smart Buildings** initiative

Consolidating the basic EU framework

- Energy Performance Certificates, labels informing citizens and businesses, creating a market

- Nearly Zero-Energy Buildings, low consumption & high on-building renewables in new construction

Engaging citizens

Focus on financing

Alleviation energy poverty

Sustainability

Circular economy

Links to city

Industrialisation and digitalisation of construction

Competitiveness

European Commission

Relevant energy legislation – some highlights

Active role of buildings in the future energy system :

➢ Smart metering (Energy Efficiency Directive, Electricity Directive)
➢ Renewable energy self-generation, self-consumption, renewable energy communities (Renewable Energy Directive, Electricity Directive)
➢ Energy smart appliances and building automation and control systems (Ecodesign and Energy Labelling Regulations, Energy Performance of Buildings Directive)
➢ Smart readiness indicator for buildings, requirements on automation and control (Energy Performance of Buildings Directive)

Enabling active consumers :

➢ Enabling demand response services, flexibility markets and ensuring competitive retail markets (Electricity Directive & Regulation)
➢ Enabling self-generation, self-consumption storage or re-selling (Electricity Directive, Renewable Energy Directive)

Sustainable mobility:

➢ Integration of EV charging infrastructure into distribution networks, measures for smart charging, framework for the development of storage services (Electricity Directive)
➢ Provisions on deployment of recharging infrastructure in buildings (Energy Performance of Buildings Directive)
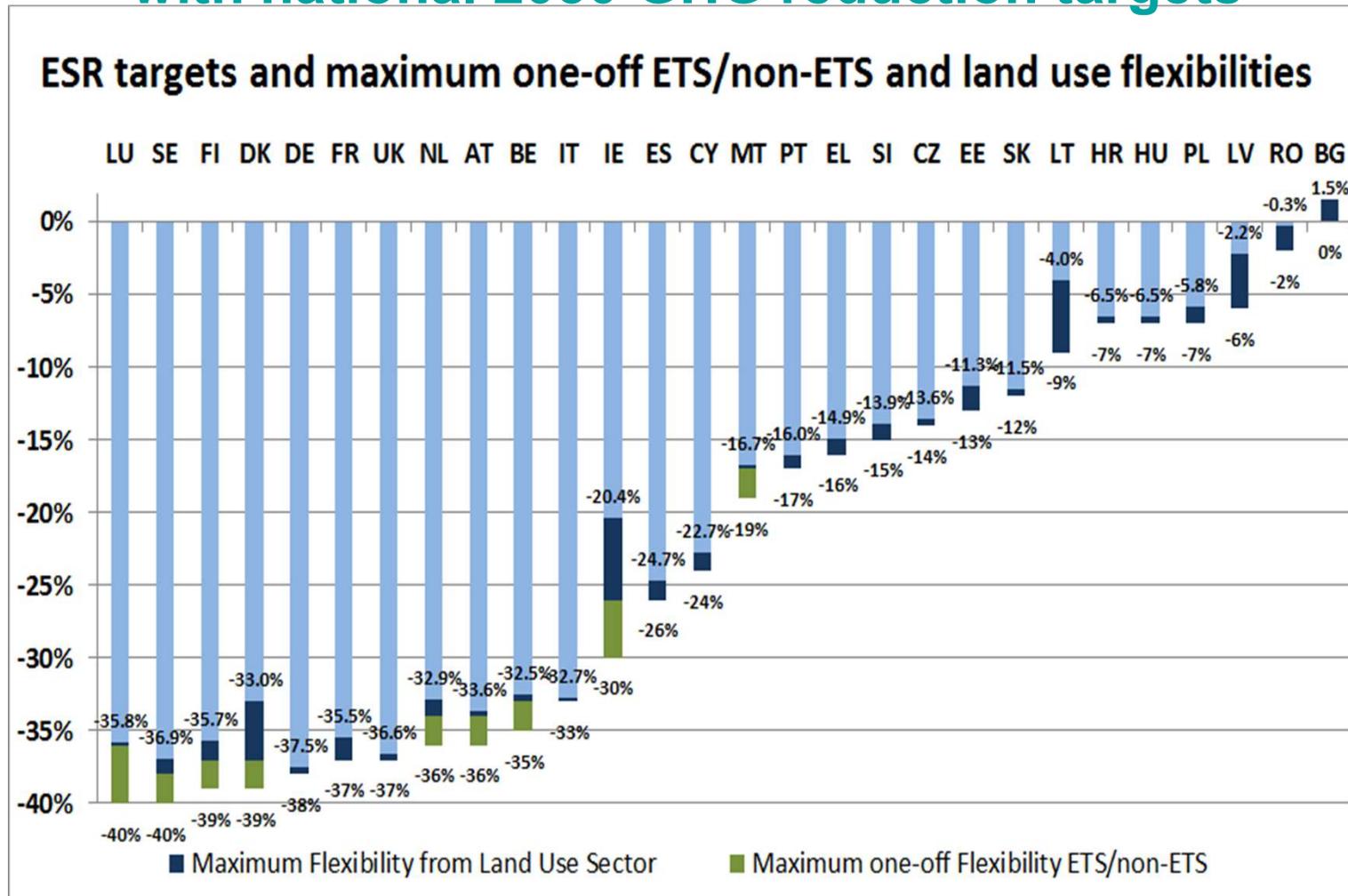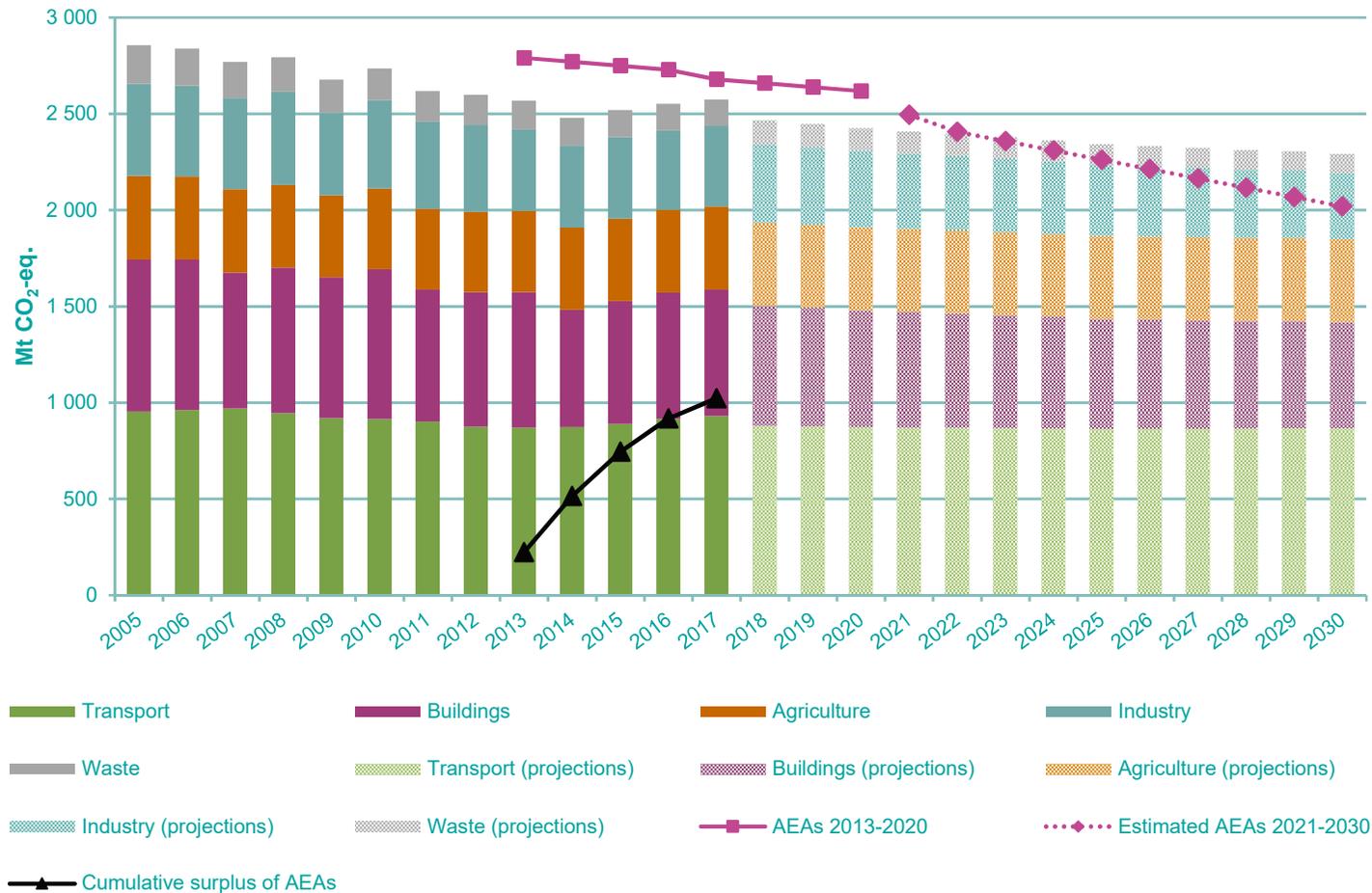
European Commission

Directorate-General for Climate Action

DG CLIMA: Effort sharing Regulation
Buildings is a key sector in the non-ETS sectors with national 2030 GHG reduction targets

ESR targets and maximum one-off ETS/non-ETS and land use flexibilities

DG CLIMA: Effort sharing regulation
Annual progress in non-ETS sectors since 2005

Legend:
- Transport
- Buildings
- Agriculture
- Industry
- Waste
- Transport (projections)
- Buildings (projections)
- Agriculture (projections)
- Industry (projections)
- Waste (projections)
- AEAs 2013-2020
- Estimated AEAs 2021-2030
- Cumulative surplus of AEAs

EC, Progress report 2018

European Commission

DG CLIMA: Effort sharing regulation

Estimated distance to target in 2030 with existing and with planned additional measures, National Energy- and Climate Plans
(drafts of early 2019)
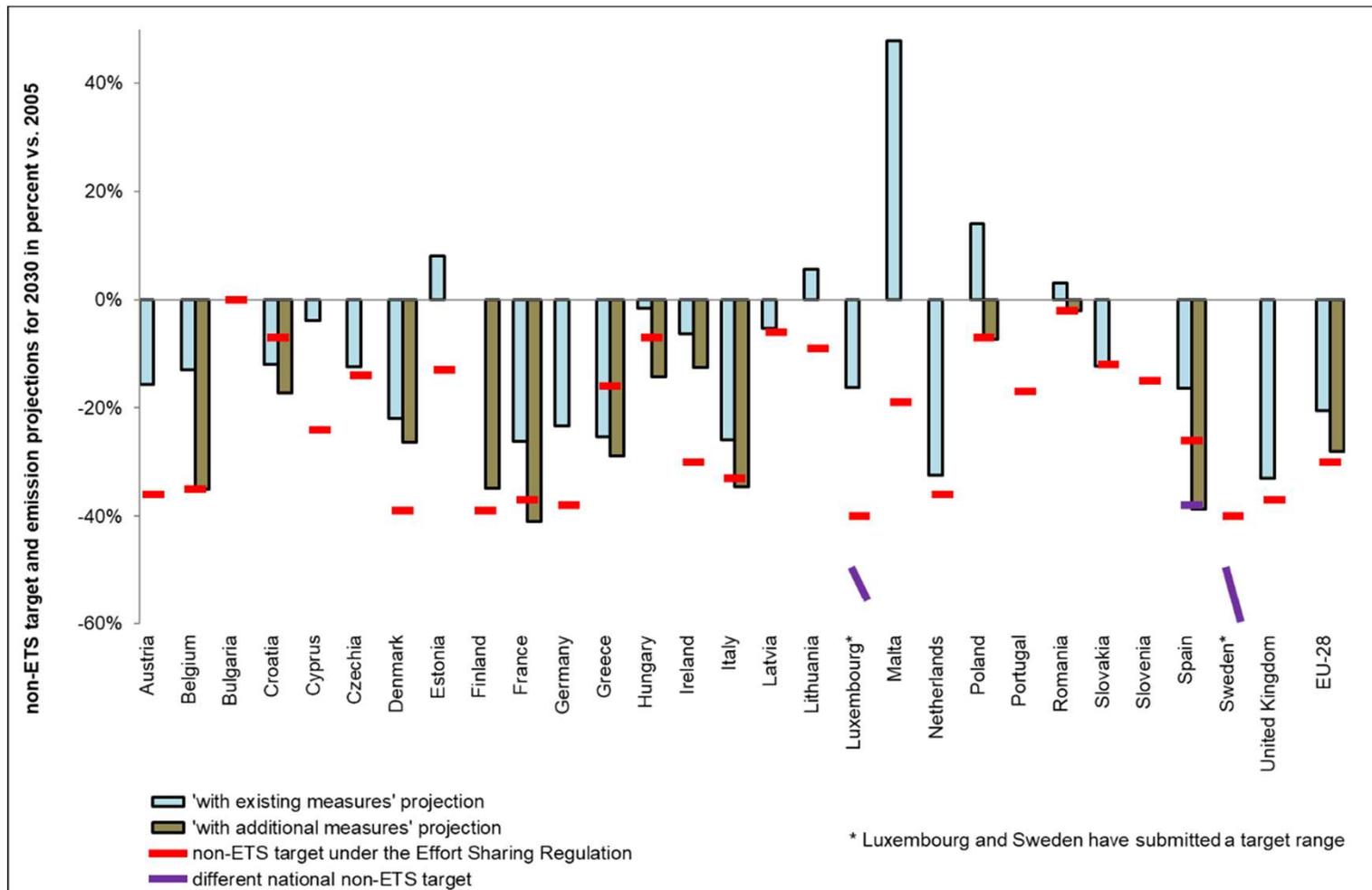
DG CLIMA: EU Emission trading system

- Essential to price pollution and to harness market forces, **carbon price incentive today of €25/tonne CO₂**. Largest environmental market in the world.

- ETS caps total greenhouse gas emissions from >11,000 installations **including power, steel, cement,** chemicals, paper, refineries and intra-EEA aviation: 31 countries, around 40% of EU's emissions.

- Important revenue for Member States from auctioning of allowances: around €42 bn since 2012

- Member States using >80% of this revenue to tackle climate change, reporting on this to the Commission

- Free allocations for industries has addressed risk of 'carbon leakage'

European Commission
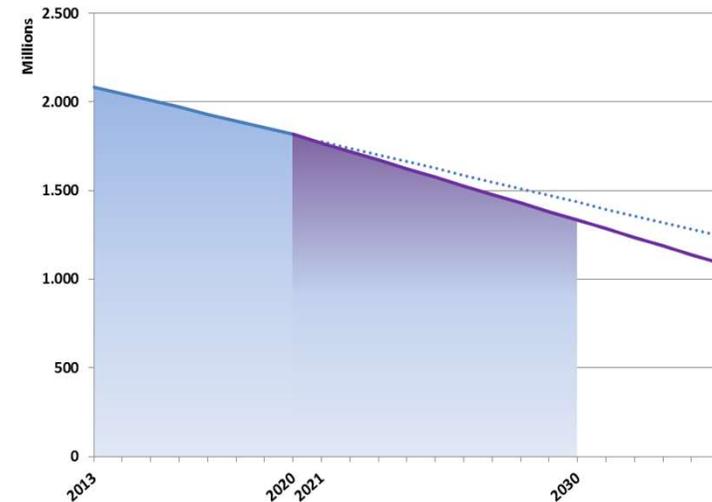
From Competitiveness of Construction to a Strategy for Sustainable Built Environment

**Directorate General for
Internal Market, Industry, Entrepreneurship and SMEs (DG GROW)**

European Commission

Construction 2020

Strategy for the sustainable competitiveness of the construction sector and its enterprises (2012)

Construction 2020 Action Plan (2013)

Thematic Objectives

1. Innovation
2. Skills
3. Resource efficiency
4. Regulatory framework
5. International competition

BIM Task Group, EU industrial platform for construction, Digitalisation of construction SMEs, Buildings Digital Logbook

Blueprint for sectoral cooperation as part of the Skills Alliance, Build Up Skills, Apprenticeship pledges for construction, Health and Safety at work.

Level(s), Energy efficiency standards and labelling, Eco design, BAMB, EU construction and demolition protocol Construction identified as key topic in the Circular Economy Package (2018), Build up portal, Energy Performance of Buildings Directive (EPBD), Energy Efficiency Directive (EED), and monitoring of energy performance by the EU building stock observatory.
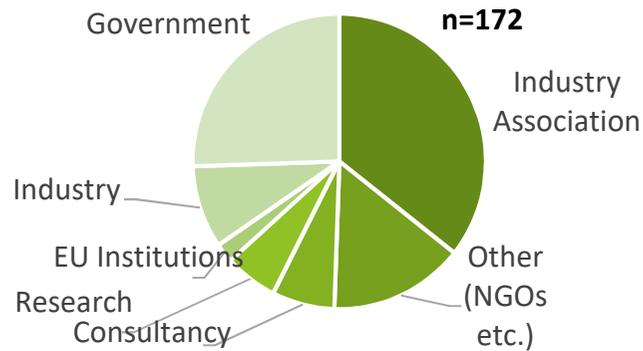
Construction Products Regulation (CPR) and the CPR implementation roadmap. On safety aspects, study on the toxicity of smoke and the Fire Information Exchange Platform (FIEP).

International competition: encouraging the uptake of Eurocodes and promoting the spread of new financial tools and contractual arrangements in non-EU countries. Assessment of Cross-border trade of Construction Products as well as analysis of production and trade data.

Each thematic objective is supported by a stakeholder thematic group and the High Level Forum.

The European Construction Sector Observatory measures the progress towards Construction 2020 targets.
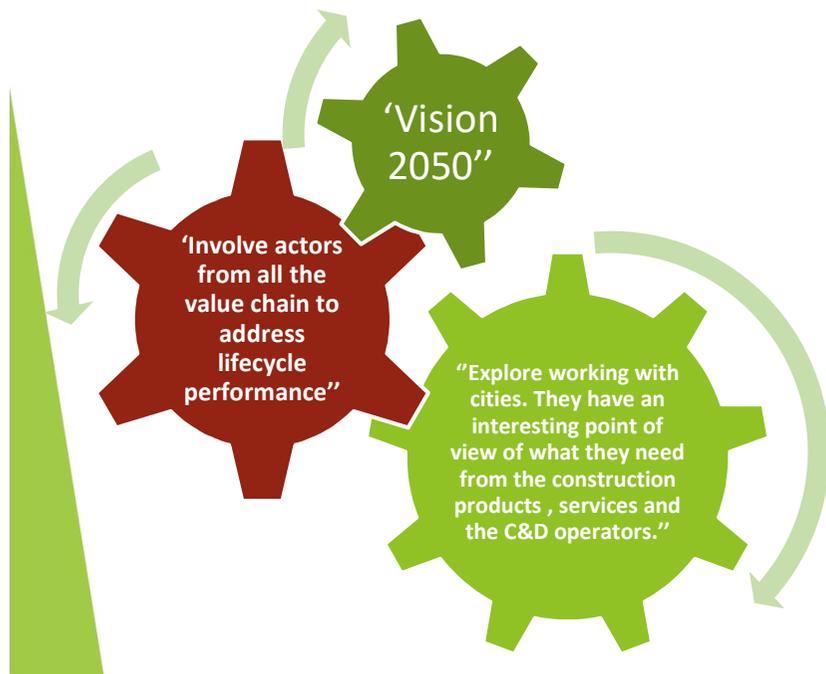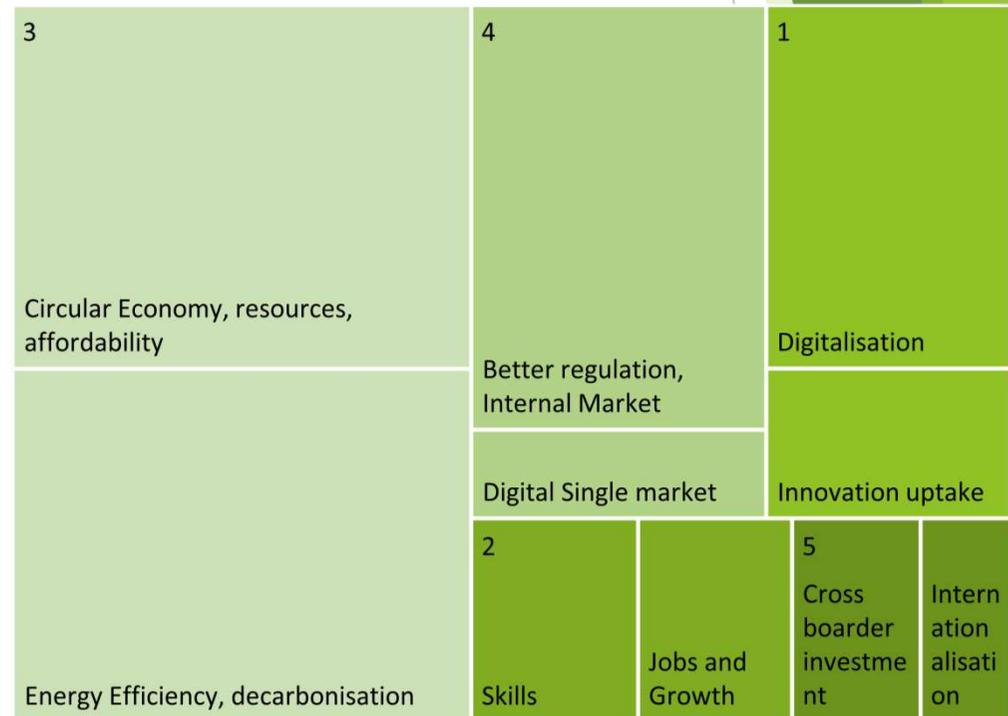
Stakeholder views on the future of Construction 2020

n=172

Government
Industry Association
Industry
EU Institutions
Research
Consultancy
Other (NGOs etc.)

Industry & Technology

National Policy

Other International Organisations

Lifecycle approach, broader scope, interconnected social, environmental and economic aspects of the built environment

'Vision 2050''

'Involve actors from all the value chain to address lifecycle performance''

"Explore working with cities. They have an interesting point of view of what they need from the construction products, services and the C&D operators.''

Interest on thematic priorities

3 — Circular Economy, resources, affordability

Energy Efficiency, decarbonisation

4 — Better regulation, Internal Market

Digital Single market

2 — Skills

Jobs and Growth

1 — Digitalisation

Innovation uptake

5 — Cross boarder investment

Internationalisation

2021 -

Political drivers

EU Green Deal, Circular Economy Action Plan

Jobs and Growth

Economy that works for people

EU fit for the digital age

SDGs, Paris Agreement

Critical elements

Complex and ''old'' EU built environment

Quality of life, Housing, affordability Gentrification, accessibility

Digitalization and digital economy Privacy, ethics, cyberattacks

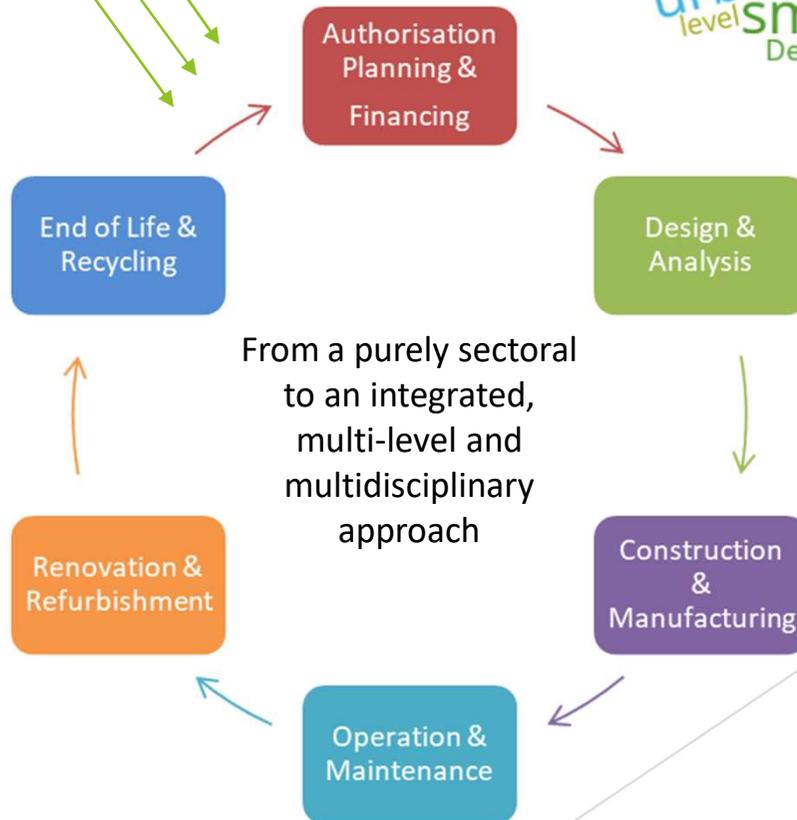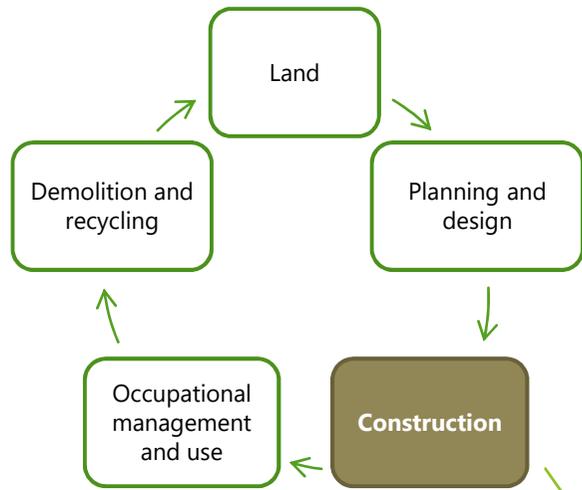Climate crisis, resilience, agility

Built Environment as lead market
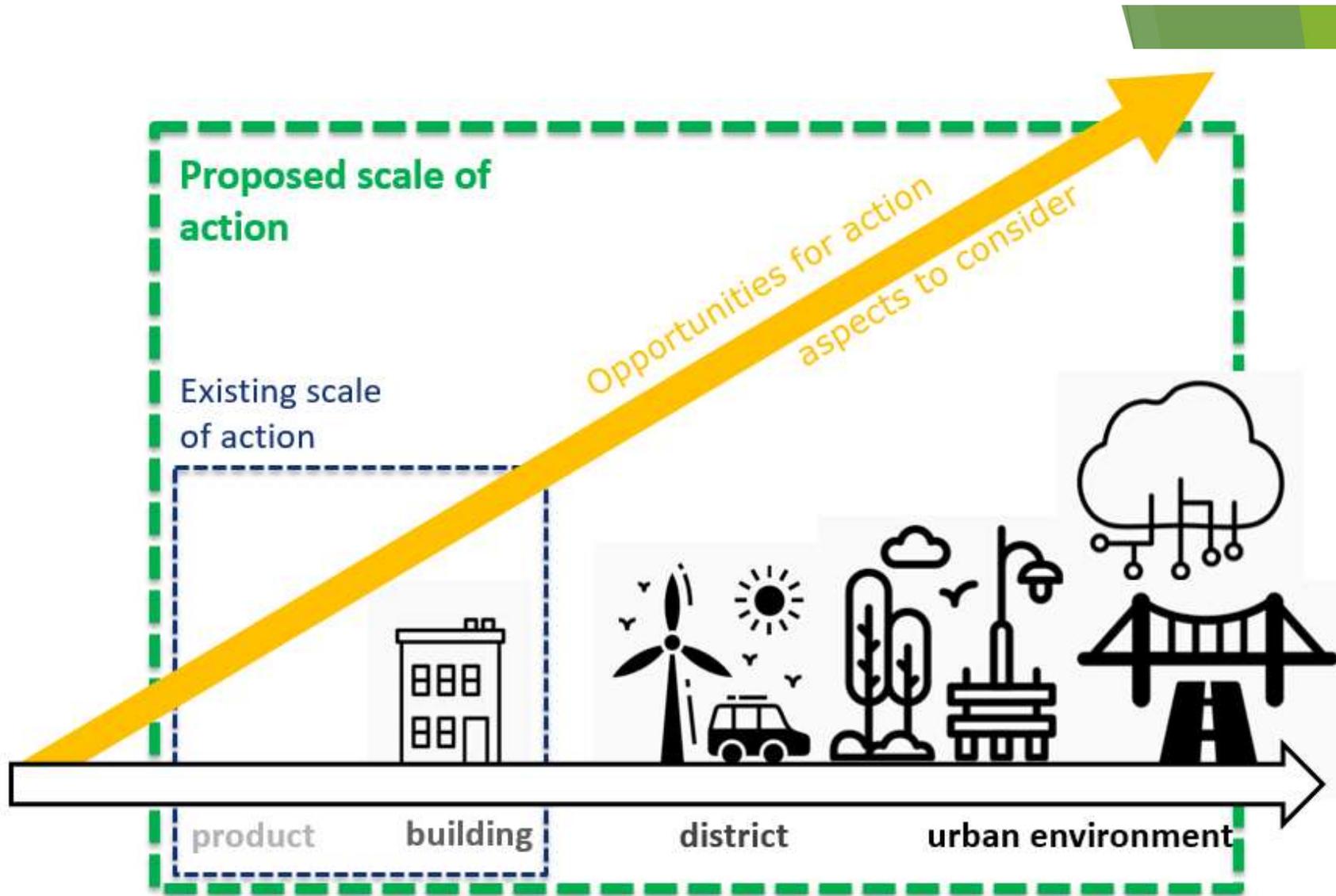
Most of EU buildings serve for 70 years in average

The average expectancy of life in Hong Kong can vary for up to 10 years depending on the district of residence.

The built environment consumes 50% of all extracted materials.

Land

Demolition and recycling

Planning and design

Occupational management and use

Construction

Platform Apprenticeships approach
Strategy Europe Innovation climate
renovation Accessibility
GreenBuildings Mobility
follow
digitalisation trade
Task projects Coordination Analysis Products regions
efficiency Energy analysis
territorial
Culture Resilience crisis
Sustainable Heritage Circular
SMEs air
Group BIMcities policy sector
Safety
planning Construction Internationalisation
systems
Economy urbandevelopment Skills
level smart quality Partnership
Declaration award Financing
support

Authorisation Planning & Financing

End of Life & Recycling

Design & Analysis

From a purely sectoral to an integrated, multi-level and multidisciplinary approach

Renovation & Refurbishment

Construction & Manufacturing

Operation & Maintenance

European Commission

Proposed scale of action

Existing scale of action

Opportunities for action

aspects to consider

product | building | district | urban environment

A new Strategy should define its scales of intervention starting from the material, product and building, till the urban environment/area, including all the intermediary scales: the infrastructures, districts, villages, towns, cities, including of course suburban, periurban and rural settlements.
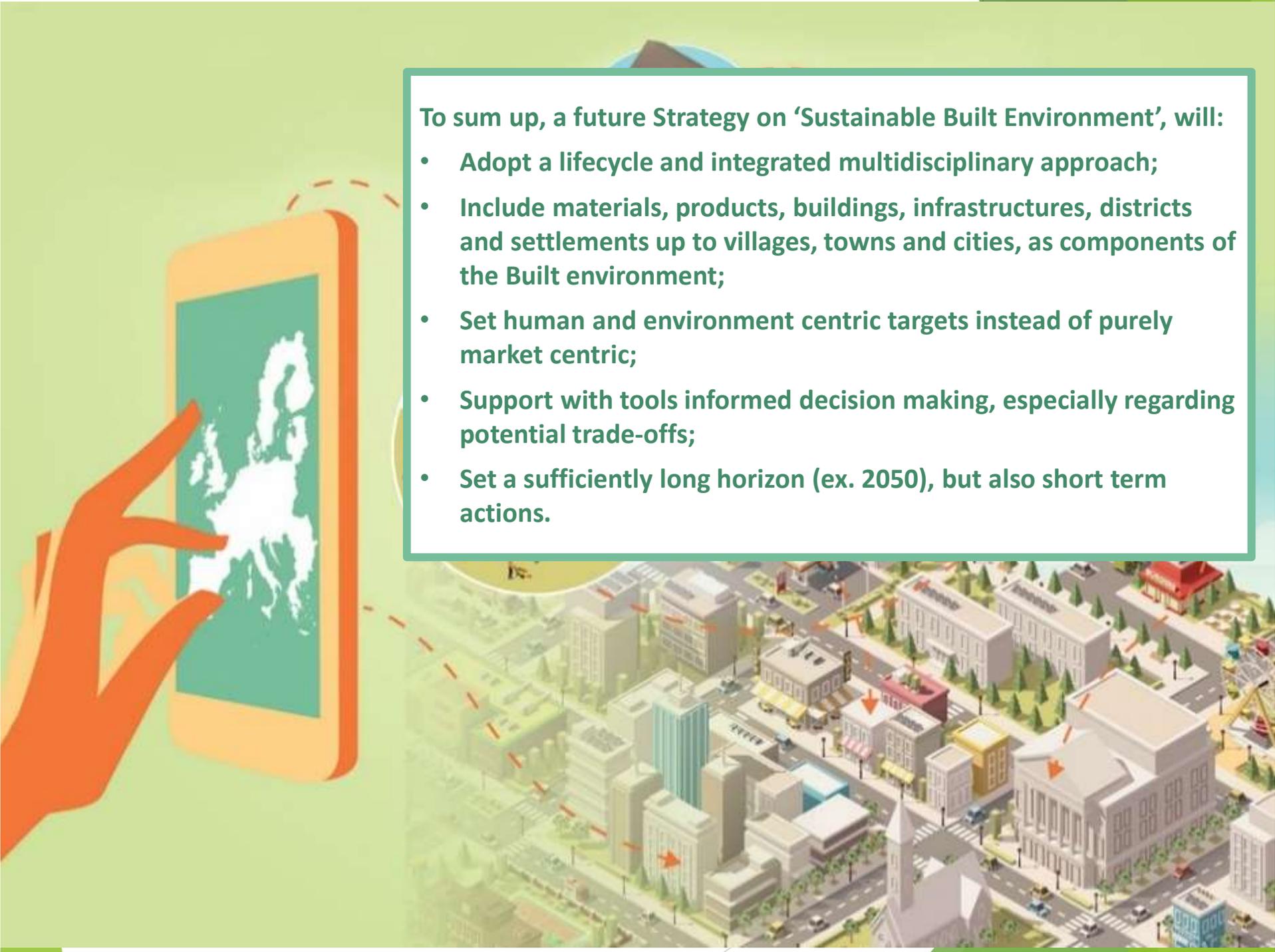
To sum up, a future Strategy on 'Sustainable Built Environment', will:

- Adopt a lifecycle and integrated multidisciplinary approach;

- Include materials, products, buildings, infrastructures, districts and settlements up to villages, towns and cities, as components of the Built environment;

- Set human and environment centric targets instead of purely market centric;

- Support with tools informed decision making, especially regarding potential trade-offs;

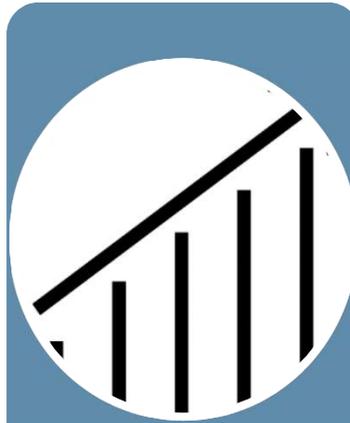- Set a sufficiently long horizon (ex. 2050), but also short term actions.

5 Thematic clusters for interdisciplinary actions

1.
Circular Economy and Climate Neutrality

2.
Skills and People

3.
Jobs, Growth, Investment
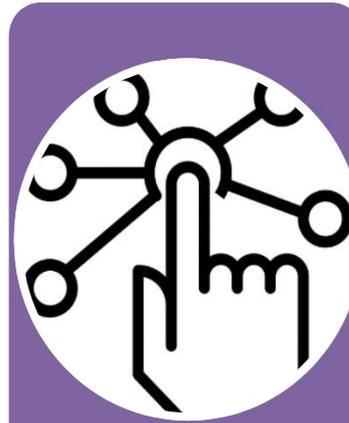
4.
Innovation uptake and Agility

5. Interoperable tools, indicators, logbooks for the whole BE, Sustainability and Digitalization Criteria

European Commission

Thank you!

Useful links

Construction and Built Environment

https://ec.europa.eu/growth/sectors/construction/competitiveness_en

European Construction Sector Observatory

https://ec.europa.eu/growth/sectors/construction/observatory_en

EU BIM Task Group www.eubim.eu
Supporting Digitalization of construction and its SMEs
https://ec.europa.eu/growth/content/report-supporting-digitalisation-construction-sector-and-smes_en
DigiPlace (EU Digital Platform for Construction)
https://cordis.europa.eu/project/rcn/224179/en
Blueprint for sectoral cooperation on skills in Construction https://ec.europa.eu/programmes/erasmus-plus/projects/eplus-project-details/#project/600885-EPP-1-2018-1-ES-EPPKA2-SSA-B
Construction and Demolition waste Protocol, and pre-demolition audit
https://ec.europa.eu/environment/waste/construction_demolition.htm
https://ec.europa.eu/growth/content/eu-construction-and-demolition-waste-protocol-0_en
Eurocodes
https://eurocodes.jrc.ec.europa.eu/showpage.php?id=13
Operational Health and Safety in Construction
https://ec.europa.eu/easme/en/tender/10379/development-eu-framework-assess-overall-impacts-occupational-health-and-safety-osh
Infrastructure maintenance
https://ec.europa.eu/growth/content/ec-discussion-paper-published-maintenance-road-and-rail-infrastructures_en

European Commission

Directorate-General for Environment

Sustainable buildings

Emissions Gap Report 2019

Final use 0.8

Services 0.6

Other products 1.0

Electronics 0.3

Transport equipment 0.9

Metal products 0.9

Machinery 2.0

Construction 5.0

11.5 GtCO$_2$e

European Commission
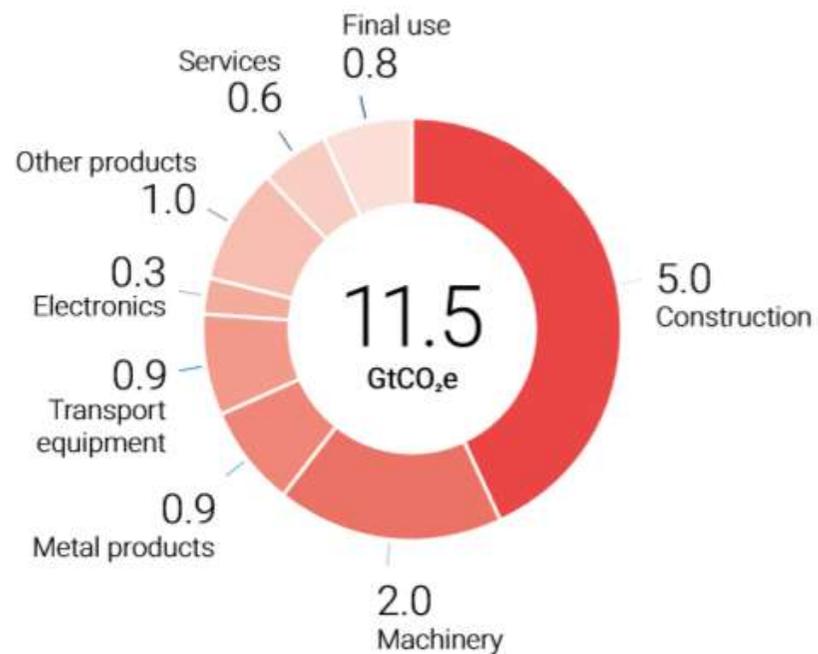
Bringing Embodied Carbon Upfront

By 2030, all new buildings, infrastructure and renovations will have at least 40% less embodied carbon with significant upfront carbon reduction, and all new buildings are net zero operational carbon.

By 2050, all buildings and infrastructure, new and existing, must be net zero carbon across the lifecycle.

CONSTRUCTION 2050

Building tomorrow's Europe today

JUNE 2019

Putting circular thinking at the heart of the construction sector will boost the market uptake of recycled materials and reused products…. support greater use of innovative materials and the life cycle design of buildings, making them suitable for deconstruction, to allow reuse of products and better recyclability of materials.

European Commission

Masterplan for a Competitive
Transformation of
EU Energy-intensive Industries
Enabling a Climate-neutral,
Circular Economy by 2050

Report by the High-Level Group on Energy-intensive Industries

…previous attempts for an industry-wide accepted LCA methodology have not been successful, there is now clearly a sense of <u>urgency with policymakers and industry alike</u> that spurs initiatives such as "Level(s)" which assesses CO2 performance over the life-cycle and across different materials as part of the built environment.

European
Commission

VISION

…the transformative potential that the European Commission's framework for sustainable buildings, Level(s), can play in delivering on key European environmental, economic and social goals.

Life cycle and circularity

1. Assess, measure, report, compare, learn, collaborate, improve, share, innovate, optimise

Level(s)

Images courtesy of Judit Kimpian, ACE

Level(s)

- Link circular economy and carbon neutral Europe

- Integrate life cycle thinking into building codes and procurement

- Comparable life cycle data, enabling learning and benchmarking

- Support normal building projects to consider life cycle

- European sustainability "yardstick" for investors, valuers and companies

- Certification schemes assuring their work reflects European policy

European Commission

Life cycle and circularity

2. Reap the full potential of Construction and Demolition Waste to contribute to a circular economy

Waste Framework Directive

European Commission

Waste Framework Directive

- Selective demolition

- Selective sorting

- Backfilling guidance

- By the end of 2024, Commission shall assess whether a preparation for reuse + recycling target shall be set (overall and/or for specific materials)

European Commission

…and more polices….

- Public Procurement
- Sustainable Finance
- Soil Thematic Strategy
- Green Infrastructure Strategy
- Green Cities and Green Capital Award

European Commission

Directorate-General for Education, Youth, Culture and Sport (DG EAC)

Cultural Policy Framework on the Built Environment

European Commission

EU Policy Framework on Cultural Heritage and Architecture

Council Resolution on **architectural quality** in urban and rural environments (2001)

Council conclusions on architecture: culture's contribution to **sustainable development** (2008)

EC Communication "Towards an **integrated approach to cultural heritage** for Europe" (2014)

European Commission

Davos Declaration "Towards a High-Quality Baukultur for Europe" (2018)

- Adopted by European Ministers of Culture and stakeholders
- Baukultur embraces **every human activity that shapes the built environment**: "existing buildings, including monuments and other elements of cultural heritage, as well as the design and construction of contemporary buildings, infrastructure, public spaces and landscapes".
- Integrated and participatory approach for the well-being of citizens
- Baukultur as a **common good** and as a **shared respon-sibility** of public authorities, civil society organisations and the private sector

European Commission

2018
EUROPEAN YEAR
OF CULTURAL
HERITAGE
#EuropeForCulture

THE EUROPEAN YEAR OF CULTURAL HERITAGE

European Framework for Action on Cultural Heritage

4 key principles - 5 areas - 65 actions

15 DGs in the European Commission

Holistic approach

Mainstreaming / integration

Evidence-based policy making

Multi-stakeholder approach

Cultural heritage for an inclusive Europe:
Participation and access for all

Cultural heritage for a sustainable Europe:
Smart solutions for a cohesive and sustainable future

Cultural heritage for a resilient Europe:
Safeguarding endangered heritage

Cultural heritage for an innovative Europe:
Mobilising knowledge and research

Cultural heritage for a stronger global partnership:
Reinforcing international cooperation

Quality - From impacts to value generation
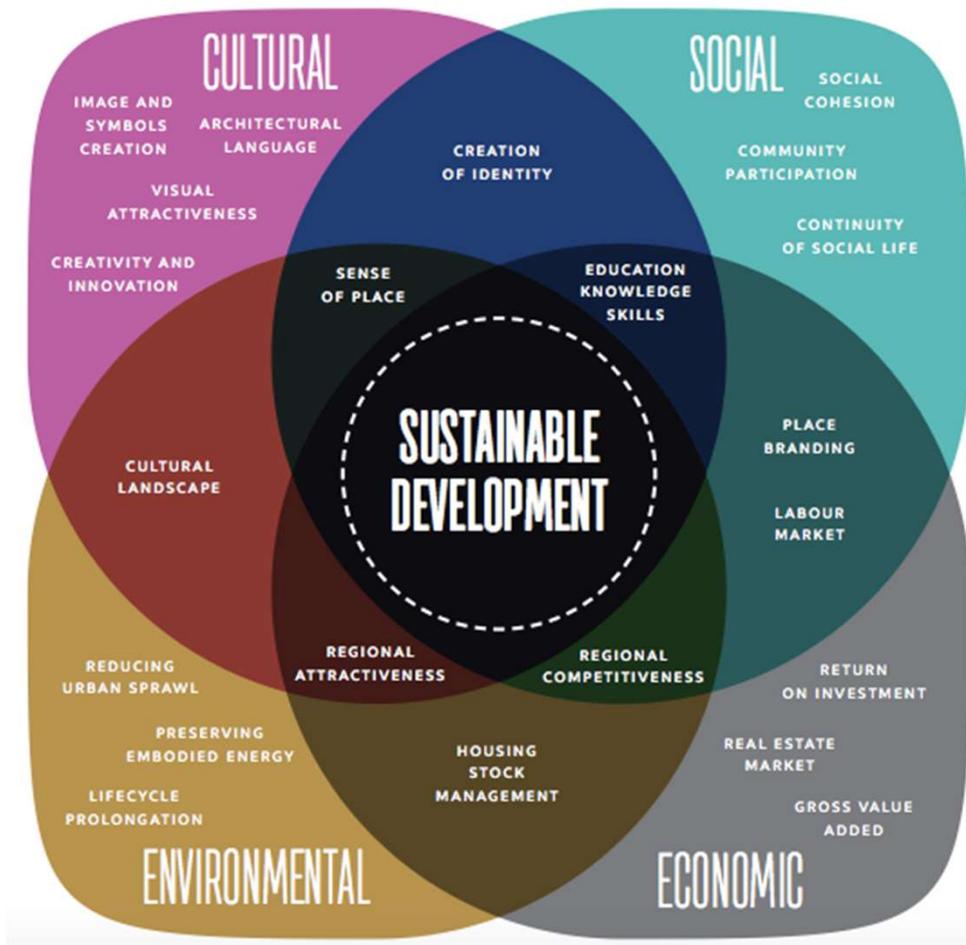
Quality & **Expertise**
Quality & **Process**
Quality & **Regenerative**
development

Is a **shared responsibility**

Benefits **people and communities**

Relies on **cooperation** and **participation**

Cultural Heritage Counts for Europe report (2015)
http://blogs.encatc.org/culturalheritagecountsforeurope/outcomes/

European Quality Principles for EU-funded Interventions with Potential Impact upon Cultural Heritage (ICOMOS)

1. *KNOWLEDGE-BASED Conduct research and surveys first of all*

2. *PUBLIC BENEFIT Keep in mind your responsibility towards future generations*

3. *COMPATIBILITY Keep the "spirit of the place"*

4. *PROPORTIONALITY Do as much as necessary, but as little as possible*

5. *DISCERNMENT Call upon skills and experience*

6. *SUSTAINABILITY Make it last*

7. *GOOD GOVERNANCE The process is part of the possible success*

European Commission

Authors
Anne Lacaton
Jean-Philippe Vassal
Frédéric Druot
Christophe Hutin

Client
AQUITANIS

EU
mies
award
19

WINNER

Transformation of 530 dwellings - Grand Parc Bordeaux

EU Prize for Contemporary Architecture aka Mies van der Rohe Award 2019

CITE DU GRAND PARC, BORDEAUX
3 BLOCKS, 530 DWELLINGS TRANSFORMED

100 %   **EXISTING CONSERVED**
             20% heavy renovation (hallways, elevators, bathrooms, elect.)
             80 % light renovation

+ 53%   **SURFACE ADDED**
             + 50 m2/dwg usable surface on average
                 incl. Dwellings + winter gardens + balconies + interior cellars

- 60%   **PRIMARY ENERGY CONSUMPTION**
             48,8 kWhep/m2.year after transformation

100%   **BUILDING OCCUPIED DURING THE WORKS**
             NO MOVE OF THE INHABITANTS

0%   **RENT INCREASE**

50.000 €   **NET / DWELLING**
             cost of works for transformation

European Commission

EU Work Plan for Culture: OMC group on "High-quality architecture and built environment for everyone"

Focus on architecture as a discipline that encompasses the **right balance** between cultural, social, economic, environmental and technical aspects for the **common good**

Identify **best practice** and innovative actions to deliver/preserve quality architecture; analyse multi-disciplinary and participatory **governance models** contributing to sustainable development

Output: Policy handbook with recommendations (2021), possibly Council Conclusions (2022)

European Commission

Research and Innovation

Directorate-General for Research and Innovation
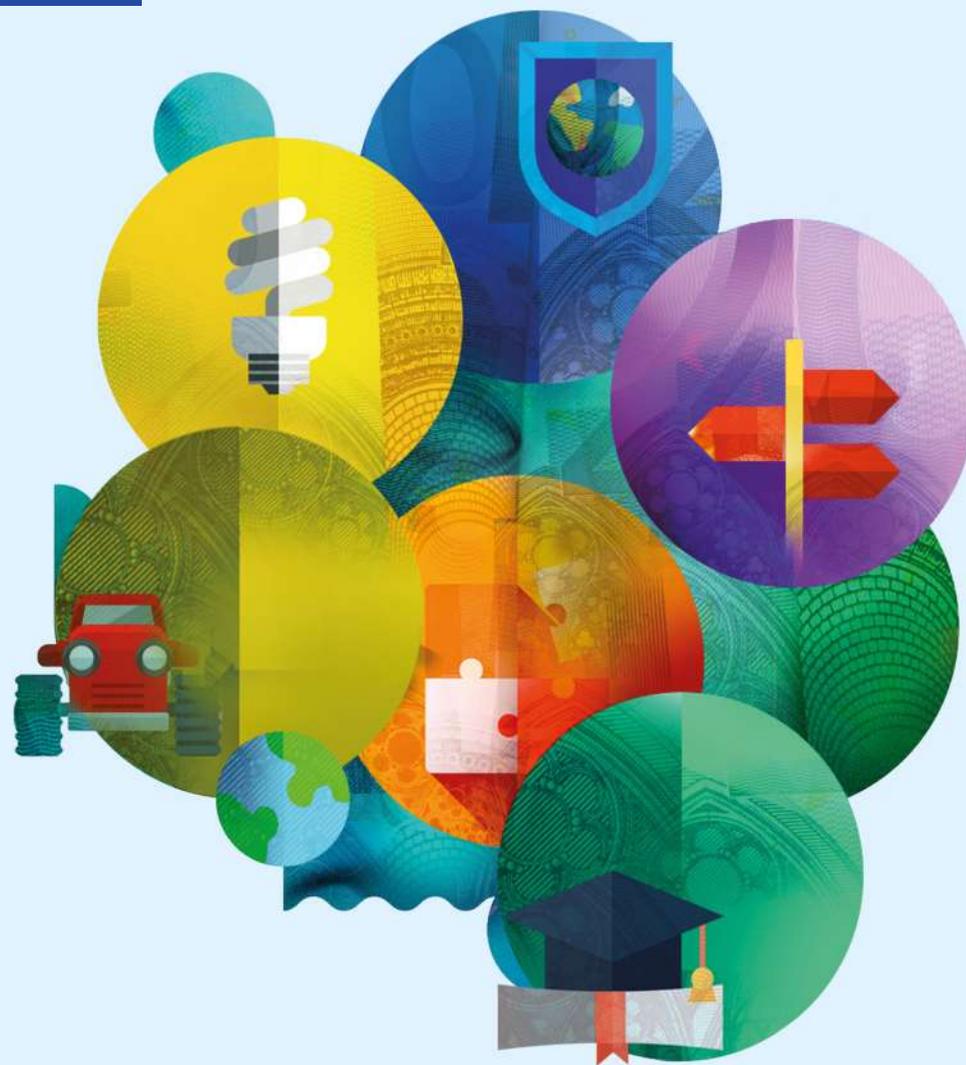
DG R&I – Unit D.1 'Clean Energy Transition'

Key aspects of our work relevant for this partnership:

- *Circularity approach to the energy system*

- *Materials for energy*

- *Energy embodied in the built environment*

- *Renewable energy technologies to fulfil electricity, heat and cooling consumption, according to local and specific needs of the built environment*

- *Hydrogen as energy carrier and energy source*

European Commission

DG R&I – Unit D.1 'Clean Energy Transition'

Important to consider:

- Synergies of this partnership with other proposed Horizon Europe European Partnerships that include relevant sectors of intervention

- Scope of the built environment

Also to note:

- Horizon 2020 topic on pre-commercial procurement for a 100% renewable energy supply (LC-SC3-RES-10-2020, expected deadline 26 March 2020)

European Commission

Directorate-General for Communications Networks, Content and Technology

➢ Digitalisation of buildings and construction

Interoperability and Standardisation
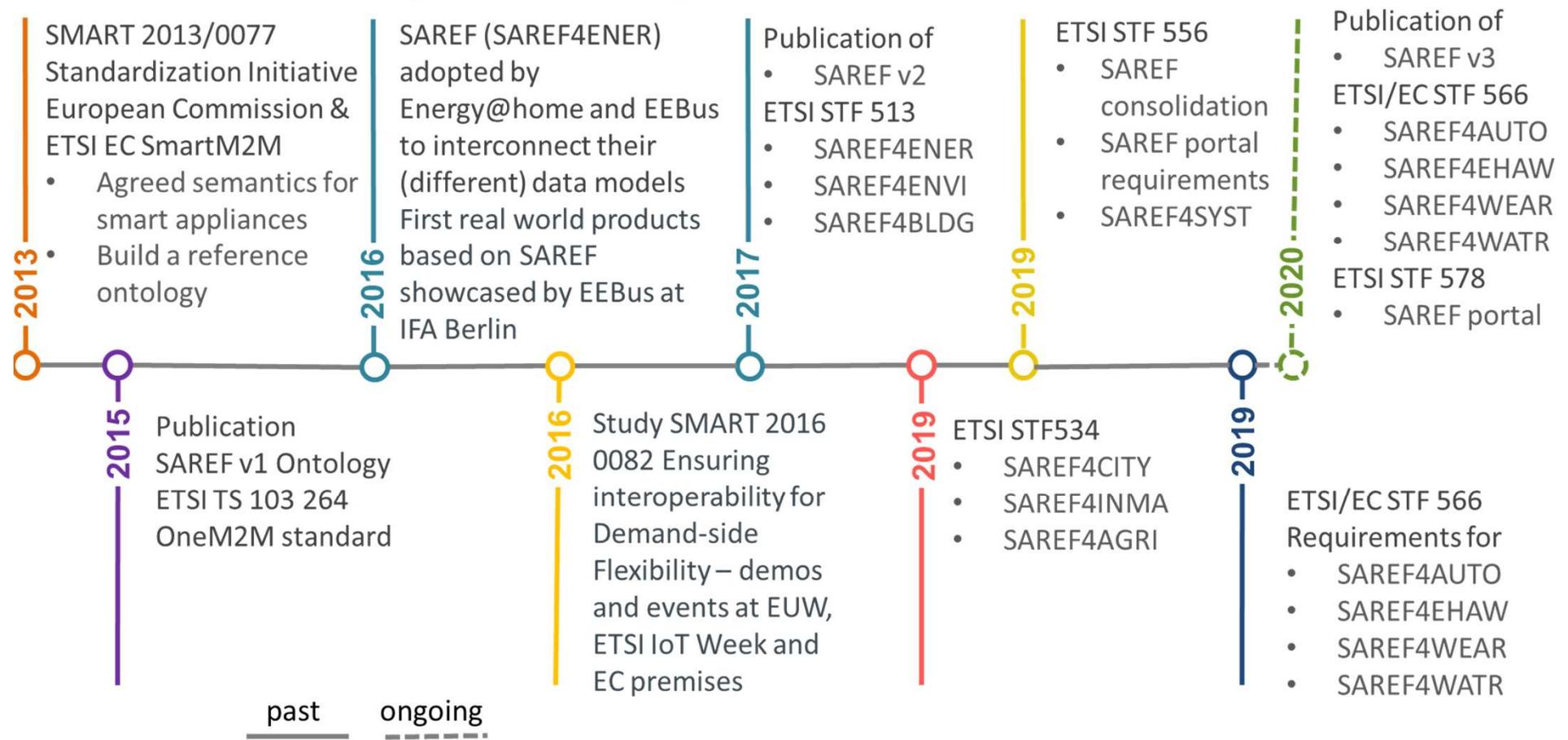
- Semantics and Ontologies – SAREF

- Digital platforms

European Commission

SAREF
Applications
Smart Appliances REFerence Ontology

2013
SMART 2013/0077
Standardization Initiative
European Commission &
ETSI EC SmartM2M
- Agreed semantics for
  smart appliances
- Build a reference
  ontology

2015
Publication
SAREF v1 Ontology
ETSI TS 103 264
OneM2M standard

2016
SAREF (SAREF4ENER)
adopted by
Energy@home and EEBus
to interconnect their
(different) data models
First real world products
based on SAREF
showcased by EEBus at
IFA Berlin

2016
Study SMART 2016
0082 Ensuring
interoperability for
Demand-side
Flexibility – demos
and events at EUW,
ETSI IoT Week and
EC premises

2017
Publication of
- SAREF v2
ETSI STF 513
- SAREF4ENER
- SAREF4ENVI
- SAREF4BLDG

2019
ETSI STF534
- SAREF4CITY
- SAREF4INMA
- SAREF4AGRI

2019
ETSI STF 556
- SAREF
  consolidation
- SAREF portal
  requirements
- SAREF4SYST

2019
ETSI/EC STF 566
Requirements for
- SAREF4AUTO
- SAREF4EHAW
- SAREF4WEAR
- SAREF4WATR

2020
Publication of
- SAREF v3
ETSI/EC STF 566
- SAREF4AUTO
- SAREF4EHAW
- SAREF4WEAR
- SAREF4WATR
ETSI STF 578
- SAREF portal

past   ongoing

One common interoperability "language" for any home
appliance to exchange energy and product related info with
any energy/building management system/entity

European Commission

Digital Platforms

Ongoing

- Bring together stakeholders
- Define reference architecture
- Take stock of ongoing initiatives, and define intervention gaps
- Empower SMEs
- Open formats / standards
- Create ecosystems

C R O S S - S E C T O R

Construction sector
BIM and building passports
Level(s) - the recently (2015-2017) developed framework to assess environmental performance of buildings, including circular economy aspects

Home/building
Large scale InterConnect IoT pilot

Ok

Smart City
EIP-SCC/Espresso - DIN 91357
PPI -> MIMs (SynchroniCity)
Scale up of urban platforms, services and testing and experimentation facilities under the Digital Europe Programme and the European scale up initiative

Living-in.EU !

European Commission

Directorate-General for Employment, Social Affairs & Inclusion (DG EMPL)

- *Skills*
- *Jobs*
- *Accessibility*

European Commission

Accessibility at EU level

- **The UN Convention on the Rights of Persons with Disabilities**

- **Situation of persons with disabilities:**

  - **70.5 million people in the EU – moderate disability**

  - **32.8 million people in the EU – severe disability**

  - **30 % versus 20,8 - people with disabilities in the EU are at risk of poverty or social exclusion**

  - **48.7% versus 72.5% - employment rate of people with disabilities versus people without disabilities**

- **The European Accessibility Act Internal Market Directive->Social Impact**

  - **Built environment**

  - **Public Procurement**

  - **EU Funds (ESIF, TEN T)**

- **Mandate 420: Accessibility requirements for public procurement in the Built Environment (including transport infrastructures) prEN 17210**

- *Mandate 473:* **Standard addressing accessibility following Design for all in the manufacturing and service delivery processes EN 17161**

- **Access City Award**

- **Employment opportunities in building renovation**

56

European Commission

Concepts – UNCRPD

Human Rights - >Non-discrimination ->

Equal access!!!!

=

Accessibility

(following design for all)

+

reasonable accommodation

(assistive technologies, personal assistance….)

Diverging national approaches to accessibility legislation

- Different approaches: technical, discrimination, procurement

- Different material scope of the various legislations, built environment, ICT

- Different level of detail of legislation

- Different level of jurisdiction: national, regional, local

European Commission