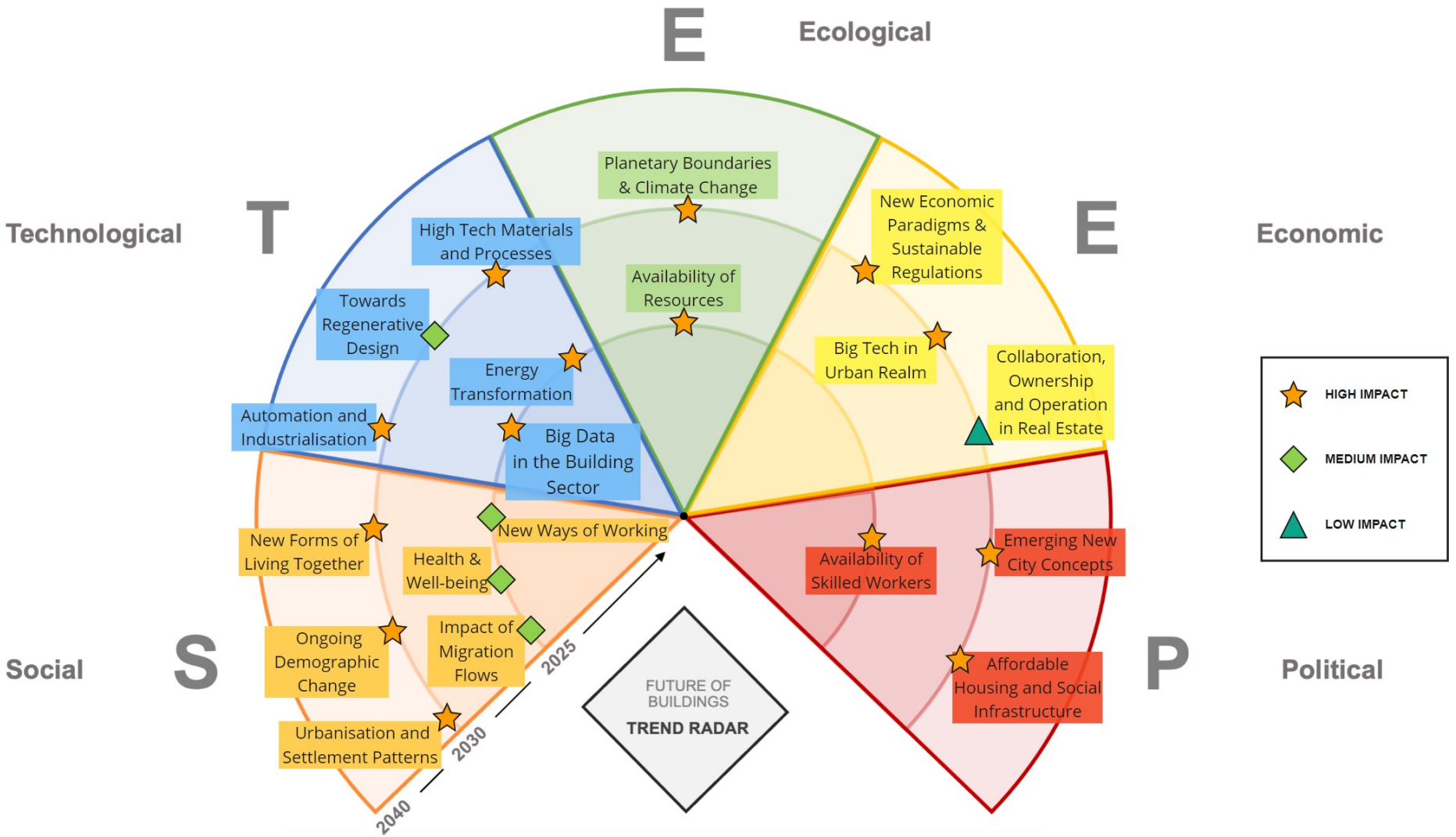
FUTURE OF BUILDINGS
DRIVER OF CHANGE

Future of Buildings Trend Radar



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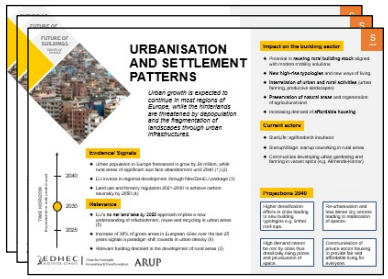
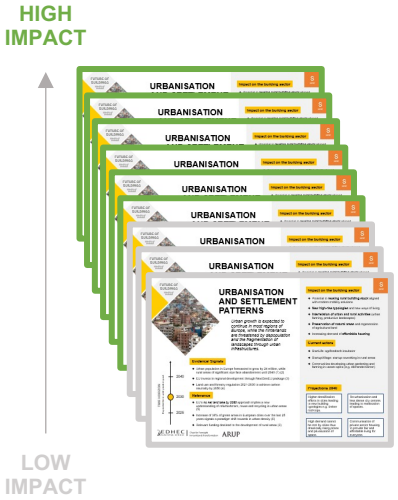
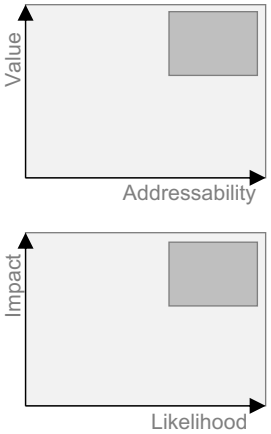
Using the Radar

We recommend to spend 2h to engage your colleagues and ready your organization for the future







DRIVER

Take 20 min to scan the Driver cards attached

IMPACT

Spend 20 min to discuss which 5-7 drivers impact your business the most

ACTIONS

Define opportunities and threats/ risks stemming from the most relevant drivers for 20 min

PRIORITIES

Use a qualitative matrix system to prioritise Actions – 30 min

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IMPACT OF MIGRATION FLOWS

Global migration flows impact on development and can contribute to balancing labor shortage. Perception of migration as positive or negative varies depending on each country's policies.

TIME HORIZON

Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- 3,3% of the world's population live outside their home countries in 2015 (1)
- Proliferation of high-skilled migration policies being implemented across the globe (2)
- UK struggles attracting construction workers after BREXIT (3)

Relevance

- 10/17 SDGs contain targets directly relevant to migration/mobility (4)
- Direct relationship with availability of skilled workers (2)
- EU and the New European Bauhaus focus on inclusion (5)(6)

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Impact on the building sector

- Migration might help **counteracting labor shortage**
- Wide **spectrum of skills** and value sets needed and potentially available
- Potentially more organizational and **educational efforts** required
- Increased demand for **affordable housing**

Current actors

- ME4Change offers training programs for migrants.
- ReDischool for Digital Integration fosters specific digital training for migrant entrepreneurs
- SINGA Business Lab is presented as an inclusive incubator for startups
- Spark puts forward entrepreneurship training for migrants

Projections 2040

Increasing national protectionism makes migration of talents hard	Adoption of automation and industrialization compensate labor shortage
Open migration policy and seamless flow of talents to and through Europe	More outsourcing outside Europe and fragmented supply chains

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URBANISATION AND SETTLEMENT PATTERNS

Urban growth is expected to continue in most regions of Europe, while the hinterlands are threatened by depopulation and the fragmentation of landscapes through urban infrastructures.

TIME HORIZON

Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- Urban population in Europe forecasted to grow by 24 million, while rural areas face abandonment until 2040 (1) (2)
- EU invests in regional development through NextGenEU package (3)
- Land use and forestry regulation 2021-2030 to achieve carbon neutrality by 2050 (4)

Relevance

- EU's *No net land take by 2050* approach implies a new understanding of refurbishment, reuse and recycling in urban areas (5)
- A 38% increase of green areas in European cities over the last 25 years signals a paradigm shift in urban space use (6)
- Relevant funding destined to the development of rural areas (3)

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Impact on the building sector

- Potential to **reusing rural building stock** aligned with modern mobility solutions
- **New high-rise typologies** and new ways of living
- **Interrelation of urban and rural activities** (urban farming, productive landscapes)
- **Preservation of natural areas** and regeneration of agricultural land
- Increasing demand of **new housing typologies**

Current actors

- StartLife: agrifoodtech incubator
- StartupVillage: startup coworking in rural areas
- Communities developing urban gardening and farming in vacant spots (e.g. Allmende-Kontor)

Projections 2040

Higher densification efforts in cities leading to new building typologies e.g. timber roof-tops

Re-urbanisation and less dense city centers leading to reallocation of spaces

High space demand cannot be met by cities. Drastically rising prices and privatization

Communisation of private sector housing to provide fair and affordable living for everyone

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ONGOING DEMOGRAPHIC CHANGE

The European population is ageing, due to an increase in life expectancy and a decrease in total fertility rates. In 2040, more than one in four Europeans will be above 65.

TIME HORIZON
Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- Silver economy spending power is expected to increase by 39% meaning over $5 trillion by 2030 in Europe (1)
- Age group of 65 + growing fastest in Europe (2)
- Older women more than twice as likely to live alone compared to men (3)

Relevance

- Ageing population trend expected to continue with mild increase after 2050 until 2100 (4)
- Demand for barrier free housing powered by significant spending power of ageing population
- Visibility of elderly and children as quality indicator for human centered cities (5)

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Impact on the building sector

- Implications on **accessible and inclusive design** at urban and building scale
- Senior cohousing, smaller apartments and **alternative typologies** for elder community living
- Higher investments in homes due to higher purchasing power
- Integration of digital **tools for independent living**
- **Flexible buildings** that allow adaptation through modularity

Current actors

- Nectarine Health Intelligent Care: smart components for independent living
- Living Cohousing: senior cohousing
- Rendever: VR for seniors
- Furhat Robotics: social robots

Projections 2040

Increase of inner-city senior co-housing and emergence of innovative living concepts	"Outsourcing" seniors to outskirts and rural areas
Digitally and robot assisted living concepts emerge and compensate human care	Fewer rental spaces and more privatization due to higher purchasing power of elderly

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NEW FORMS OF LIVING TOGETHER

Societal shifts are contributing to smaller house-hold sizes and higher demand for smaller living units. Simultaneously, new ways of collaborative housing emerge.

TIME HORIZON
Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- Platforms investigate the potential of co-living to understand and illustrate this new model of living (1)(2)
- Multi-generational housing increases while higher-density development decreases (3)
- Infill development promotes smaller, better designed homes (4)

Relevance

- Residential typologies dominated the RE investment rankings for 2020 (5)
- Housing schemes as reflection of consumption patterns and people's demands
- Real-Estate-as-a-service business model provided by digitalisation and the growing market for smart buildings (6)

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Impact on the building sector

- Continued demand for **individualisation** and mobility (Tiny housing)
- **Demand for new solutions** in individual and community living
- Experimenting with **new typologies,** floor plans community spaces and embedded services
- Impact on **design and manufacturing** (standardized structured with customised interiors)

Current actors

- One Shared House 2030: research on future living
- HOMY co-living: co-living
- The Tiny Housing Co.: micro-housing

Projections 2040

Affordable living for everyone - government regulated pricing on rents in city centers and outskirts

Increase of co-living with shared services and community indoor and outdoor spaces

Increasing rents lead to further displacement of young and poor people, increase of gated communities.

Housing ownership expansion trough micro-housing with as-a-service models focusing in mobility

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NEW WAYS OF WORKING

The blur between home and workplace has changed the design of spaces. New layouts are emerging both for offices and housing, while workplace design is increasingly becoming more demanding.

TIME HORIZON

Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- Google allows all employees to work from wherever they want (1)
- Apple's investment plans emphasise in-office work environments in a post-pandemic world (2)
- Spanish regulations on work-from-home policies (3)

Relevance

- Covid has accelerated the shift to more flexible ways of working (4)
- Workplaces have to go beyond: towards workplace making (equity, accessibility, circularity…) (4)

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Impact on the building sector

- Digital and physical **worlds are converging** through the redefinition of living and working
- Reprogramming of architecture after Covid: former typologies are being reshaped to accommodate the **new demands for working spaces**.
- Stronger focus on good domestic and office design

Current actors

- Companies involved in Future of Building Collaborative Research Arup EDHEC
- EU & Governments on guaranteeing equal telework conditions
- Toptal: platform for outsourcing telework talent
- Kaos Berlin or Wework: coworking spaces

Projections 2040

Return to conventional workplaces after Covid

New office approaches redefine the way people work, communicate and collaborate

Underoccupied office and commercial space in cities leads to new uses and higher vacancy

The future home accommodates office and flexible forms of living and working

FUTURE OF BUILDINGS

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HEALTH AND WELLBEING

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social

More people are actively choosing to live healthier and more conscious lives. The design of cities, buildings and spaces is responding to enable and contribute to this trend.

TIME HORIZON
Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- Physical inactivity, linked to poor walkability and lack of access to recreational areas, accounts for 3.3% of global deaths (1)
- European cities got 38 % more green over the last 25 years (2)
- EPW 2020-2025 focuses on ensuring more people have universal health coverage, better health and wellbeing (3)

Relevance

- Regenerating urban spaces as opportunity to improve wellbeing and incorporate biodiversity in the city
- Cities like Barcelona are investing in projects to free up public space for pedestrians (Superblocks). (4)
- Increasing demand for certification schemes (e.g. WELL) and sustainability frameworks (e.g. Level(s)) to check health and wellbeing in buildings

Impact on the building sector

- New approach towards the densification of the city to **free up public space** for its inhabitants
- **Green areas and services** within walkable distances in neighbourhoods
- Increasing demand for cradle-to-cradle approach to design healthier and more sustainable spaces
- ‘Hygge’ and slow-living trends imply an increasing focus on **conscious and thoughtful design and architecture**

Current actors

- Investors define lists of healthy materials to be used at construction of a specific buildings
- Placemaking strategists consider health & wellbeing in the programming of RE developments
- Certification schemes (WELL)
- Smart home devices (e.g. Sensibo Sky Smart AC or LIFX CLEAN Lightbulbs that eliminate bacteria)

Projections 2040

More green spaces in cities, re-densification through coliving and small housing units

People moving to outskirts and rural areas for better air quality and slow-living

Green buildings as restorative and healing entities in cities, no sign. interventions to free up space

Health and wellbeing through IoT and smart home devices for better mental and physical health

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AUTOMATION AND INDUSTRIALISATION

T technological

Advances in robotics, artificial intelligence, and machine learning are shaping a new age of automation, where machines match or outperform humans in some skills.

TIME HORIZON

Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- 3D Printed houses and components, modular fabrication and off-site construction are being subject to relevant investments (1)(2)(3)
- 1,2 billion venture capital for Katerra, however shut down in June (4)
- About 60% of occupations have at least 30% of their activities that are automatable (5)

Relevance

- Substantial savings in capital costs due to shorter construction time
- Covid-19 fastened the digitalisation of products and services
- Automation may unlock potential to improve businesses performance
- Use of VR, AR, MR and drones at a human/machine interface to optimize performance in measuring, evaluating and identifying.

Impact on the building sector

- **Performance improvement**: productivity and labor enhancement (on-time and within budget)
- New **typologies based on manufacturing process**
- **Platform-based** updating of housing devices
- Wider possibilities for design and construction, even **beyond human capabilities**
- **New allocation of tasks and responsibilities** between robots and humans

Current actors

- Katerra: sustainable construction solutions
- MX3D: 3D metal printing
- PMX 15: Sidewalk Labs model for a mid-rise timber building
- Brainbox AI: autonomous HVAC

Projections 2040

Optimised, digitalised and fully automated fabrication process	Tech giants have taken over large parts of the construction industry
Slow uptake and adoption of technology thus still low labour productivity	Back to the roots – more local supply and value chains and more craftmanship

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BIG DATA IN THE BUILDING SECTOR

Automation and digitalisation are shaping our interaction with the built environment. The European Commission has emphasized the importance of regulating the European common data space.

TIME HORIZON
Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- By 2025, an average person anywhere in the world will interact with connected devices nearly 5,000 times per day (1)
- European data strategy to regulate European data space (2) (3)
- Housing association BCHA is using Legionella IoT sensors to test water temperature (4)

Relevance

- Possibility of a common data space in the EU (3)
- Data collection expected to continue following unclear management policies in the upcoming years
- Big Techs create de facto standards for IoT solutions faster than state regulations may keep up

T
technological

Impact on the building sector

- **Data becomes key enabler** for operations along the life cycle of buildings (Circular Construction, BIM planning, Facility Management)
- **Integration of blockchain technology** (e.g. Material Passports, Predictive Maintenance)
- Shift from ***inhabiting*** to ***using*** **a building**.
- Increased demand for **cyber security**
- Platforms for information exchange between systems under development

Current actors

- Comfy: customized workplace selection app
- PropTech Companies like Mon Buildings, a platform for communities' communication, or LeafTech, for optimisation of automation systems in buildings
- Matter foundation promotes the standardisation on connectivity of smart home devices
- Giatec: sensors embedded in concrete structures

Projections 2040

Rapid adoption in almost every part of the built environment	Private companies collect, own and manage data with minimum regulation
Public administrations enforce open data: stronger regulation impacting on adoption and diffusion	Proprietary systems and data approaches without horizontal integration

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T technological

TOWARDS REGENERATIVE DESIGN

Architecture today tries to do more than minimizing negative environmental impact. Regenerative design aims at developing buildings which contribute to resilient, sustainable and biodiverse cities.

TIME HORIZON
Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- Biomimicry for general design and the sourcing of green materials and innovative building techniques. (1)
- The bio-based products sector as a key enabling technology to increase EU GDP from 15% to 20% (2)
- The New European Bauhaus redefines use of materials & design (3)

Relevance

- The New European Bauhaus keeps a regenerative approach to design, emphasizing nature-based solutions (3)
- The EU's industrial policy points biomaterials as a priority area for its potential for future growth and addressing societal challenges (2)
- By using natural materials, buildings serve as carbon sink

Impact on the building sector

- **Replacement of conventional materials** with biomaterials (e.g. bio-concrete, wood)
- **Buildings as living entities** which improve quality of life in cities
- A regenerative design **impacts** on **workflow** and **skills required** for companies, as well as in **manufacturing** and **materialization**
- Greater necessity and opportunity for **cross-collaboration**

Current actors

- Mediated Matter Group (MIT Media Lab), universities (e.g. Stuttgart, Delft) and research groups (3D printing, advanced materials)
- Mogu (mycelium studies)
- The Biomimicry Institute (research on biomimicry)
- Renggli, Rhomberg, Max Bögl (timber construction)

Projections 2040

Rapid adoption of renewable materials and design approaches stimulated by building codes	Slow adoption due to conservative demand side and risk aversiveness
Shorter building and service life-cycles due to regenerative approach	Emergence of new building typologies based on new material approaches

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HIGH TECH MATERIALS AND PROCESSES

Environmental consciousness, cost-efficiency and the advancement in research will bring about a new set of high-tech materials and processes for construction.

TIME HORIZON
Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- EU supports a sustainable-by-design and innovative approach in material prototyping (1) (2)
- The New European Bauhaus emphasizes the relevance of new materials and processes

Relevance

- The shift to a more circular economy shapes the need for searching new materials and processes, both for manufacturing and operation (4)
- Construction largely relies on traditional fabrication technologies which are unsatisfyingly slow, dangerous and energy-inefficient
- Substantial research investments in high-performing biomaterials

Impact on the building sector

- **Increased investment in new materials**, processes and supply chain partners (e.g. substitution of gypsum, plastics…)
- High expectations towards **durability, longevity and maintenance** of elements and materials
- Increased **complexity of designing and handling** new materials
- Opportunity for **collaborations across industries** and with research groups

Current actors

- Mediated Matter Group (MIT Media Lab), universities (e.g. Stuttgart) and research groups (3D printing, advanced materials)
- GXN (material research and design)
- Achim Menges (material research and design)
- ClearVue :transparent photovoltaic glass panels)

Projections 2040

Rapid adoption due to new manufacturing approaches and material efficiency policy	Slow uptake of high-tech materials; costs of raw materials limits ongoing focus on traditional materials
Only high-tech bio-materials developed due to stricter environmental regulation	Fast diffusion of high-tech materials through off-site production and circularity regulation

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ENERGY TRANSFORMA-TION

The European green Deal sets out the EU's path to climate neutrality by 2050. Decarbonisation along sectoral policy paths will determine the industry to reaching this target.

TIME HORIZON

Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- EU and national governments enact strict regulations on energy and climate action (1)
- "Barcelona Energia" fosters a more sustainable energy model based on renewable energy generation and participatory processes (2)
- Availability of substantial EU funding for energy transformation (3)

Relevance

- The shift to green energy may be compulsory through European regulations
- The transition to green energy may transform the way we design our buildings and how we refurbish them
- Strong partnerships may be key for the consecution of the ambitious targets established by the European Commission (4)

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Impact on the building sector

- More **local & autonomous energy systems**
- **Peer-to-Peer Services** in energy provision
- Less focus on operational carbon, higher **focus on embodied carbon** i.e. material efficiency strategies needed
- Building and city scale physical and infrastructural integration of renewable energy
- Materials, components and systems in line with **principles of CE**, thus stronger life-cycle aspect

Current actors

- Energy operators and renewable energy providers
- Regional Governments & European Commission
- AMMP Technologies: digital operation monitoring
- Ecoligo: crowdsourcing platform for solar projects

Projections 2040

Rapid green energy transition leading to less pressure on embodied and operational carbon	Slow transition and ongoing reliance on fossil-based energy. High cost of energy fuels social imbalance
Building operation, heating and cooling fully green electrified – no insulation	Full electricity driven by cheap, green energy and a DC network entering the building

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PLANETARY BOUNDARIES & CLIMATE CHANGE

The impact of manmade climate change, declining biodiversity and overconsumption of annually available natural resources will increasingly shape ways of production and consumption.

TIME HORIZON

Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- Earth Overshoot day 2021 falls on July 29th (1)
- Europe`s Biodiversity Strategy 2030 sets the continents path to recovery by the end of the decade (2)
- Dutch court ruling demands Shell to reducing Scope 3 Emissions in line with Paris Agreement (3)

Relevance

- Zeitgeist significantly impacts character of projects, will likely drive the market and make funding for sustainable projects available
- Consequences of Paris Agreement are being translated into binding national laws and sectoral policy paths
- Holistic understanding and integration of consequences from climate change, declining biodiversity and availability of resources

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E ecological

Impact on the building sector

- **Mitigation** of climate change: reducing embodied and operational carbon
- **Adaptation** to climate change: increasing resilience, biodiversity, reducing urban heat
- Buildings as **carbon storage:** towards regenerative design
- Collaboration between nature and the human-built
- High attention on **whole life cycle** impact and building performance **enabled by data systems**

Current actors

- City of Amsterdam's green procurement policy sets out to respect planetary boundaries at top priority (Doughnut Economy) (6)
- EU harmonizes taxonomy & climate change measures
- Climate research institutes (PIK, etc.) impact policy development

Projections 2040

Success in CC adaption hinders progress in fighting CC

Stronger perceived urgency leading to stricter demand-side measures and regulation

New, symbiotic relationship between natural and human-built systems, typologies & systems

Consistent global approach levels playing fields for industry

Different ambition levels cause fragmentation and hinders industry to create new solutions

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AVAILABILITY OF RESOURCES

Europe's construction industry relies heavily on the availability of raw materials and foreign resources. Their supply is endangered by scarcity and the increasing complexity of supply chains.

TIME HORIZON

Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- European Raw Material Alliance founded 2020 to ensure supply of critical raw materials (1)(2)
- EU Circular Economy Package recognises importance of circulating materials to guarantee their future availability (3)
- Demand for construction wood skyrocketing in Europe in 2021 (4)

Relevance

- Raw materials and advanced materials are key enablers for a green energy transition
- International Resource Panel Report highlights importance of residential sector for a low carbon future (5)
- The circular economy contributes to restoring biodiversity and natural capital in Europe (8)

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E ecological

Impact on the building sector

- Increasing **price** and **supply chain volatility**
- **Substitution** of conventional materials
- Buildings developed as **material banks**
- Higher focus on material efficiency (design side) over resource efficiency (supply side)
- Shift towards **renewable materials** as standard material choice
- Increased importance of **longevity** and **durability**

Current actors

- Madaster develops 'Buildings as Materials Banks' (6)
- Material providers review reverse logistics strategies for their products
- Mogu produces mycelium based construction materials (7)

Projections 2040

No serious stress on resources, traditional supply chain management and business as usual	Serious stress on global supply chains – high price and supply volatility – rapid adoption of CE.
More local supply and value chains due to increasing national protectionism	Geo-political collaboration and resource trade and sharing

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NEW ECONOMIC PARADIGMS & SUSTAINABLE REGULATIONS

Economic paradigms are under pressure to adapt to changing standards in trade, sustainability, digitalisation and operations. EU published its taxonomy for classifying sustainable activities in April 2021

TIME HORIZON
Expected time until peak impact

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2030

2025

Evidence/ Signals

- Circular Economy as a central pillar in the European Green Deal (1)
- Ship accident in Suez Canal in April 2021 seriously impacted global supply chain
- Carbon price for EU Emission Trading System (ETS) doubled to over 50 €/ton CO2 since introduction in June 2020 (2)

Relevance

- Construction economy looks back at decades of little growth. Analysts forecast high potential for growth in the industry (3)
- Investment decisions are increasingly based on satisfying non-financial standards (3)
- Construction industry has high potential for carbon savings, as building related emissions (construction and operation) currently sum up to 38 % of global carbon emissions (4)

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economic

Impact on the building sector

- **Supply chain resilience:** more local and shorter setup of construction supply chains
- **New disclosure requirements** for project financing
- Regulating **operational** and **embedded carbon**
- Redefinition of **ownership and operation models** (Fractional ownership, renting, sharing)
- **Platformisation** of services and business models

Current actors

- Real estate holders scanning portfolios on compliance with EU Taxonomy and expected future targets
- Hilti shifted to providing tools as a service when a key client required holistic tool management services (6)
- Philips offers light as a service (7)

Projections 2040

EU economy will be substantially circular by 2040. Consumption and Materialism will be largely reduced

Transition to Circular Economy slow in the construction sector due to fragmentation and risk aversiveness

Slow adoption of sustainability measures due to neglectable demand

Full transition to sustainable practices regardless of policy instruments to avoid risks

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BIG TECH IN URBAN REALM

Big Tech understands cities as playing-field for new products and services with large economic opportunities and easily accessible data. Public administrations will have to set up the right scenario for this interventions.

TIME HORIZON
Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- IBM provides Smart City services for Rio de Janeiro (1)
- Waymo, a google spin-off collaborates with the city of Arizona in providing autonomous public transport (2)
- Tesla's Boring Company provides safe, fast-to-dig infrastructure tunnels (3)

Relevance

- Cultural shift from *having* to *having access*
- Car sharing consortiums supplant private mobility from city centre to the outskirts
- Concerns on data ownership and monopoly position of Big Tech (4)
- 'My home is my castle' attitude offers protection from social conflicts

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E
economic

Impact on the building sector

- **Platformisation** of services and planning
- **Productisation** of building solutions
- Big Techs create **de facto standards** quicker than public bodies
- Adaptive **real-time management** of cities
- **Mutual reliance** of Big Tech and construction industry
- High expectations on **agile project delivery**

Current actors

- Google sidewalk labs specifically founded to invent services and products for city building (5)
- City of Hamburg develops urban data platform (6)
- Dialog Platform Smart City aligns public and private actors (7)

Projections 2040

GAFA has taken over the AEC industry to a substantial extend	GAFA has failed to revolutionize the AEC industry
Special building typologies and e.g. campuses fully designed and operated by tech giants	Stronger collaboration between traditional industry with tech firms in new ecosystems

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COLLABORATION, OWNERSHIP AND OPERATION IN REAL ESTATE

Strong collaborations across institutional and organizational borders likely become the new normal in Real Estate. Collaboration spans over the whole life cycle covering inception, financing, construction and operation.

TIME HORIZON

Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- Increasing number of project-specific zoning plans in Germany
- EU to allocate bigger budget for PPP and improvement of PPP regulations (1) (2)
- Berlin University and Fraunhofer Institute codevelop progressive urban quarter for 10.000 inhabitants at former Airport (3)

Relevance

- PPP models attract investment and provide services effectively
- Public bodies use PPP for steering
- Complex projects benefit from diverse skillsets

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E economic

Impact on the building sector

- Wider **variety of actors**: private builders, consortia, international investors
- Construction projects grow **bigger in size**
- ***Real Estate as a Service*** providing integrated solutions of housing, mobility, multimedia services. *Branded homes,* codeveloped by different companies
- **Platformised services in operation** (serviced apartments, outsourced facility management.)

Current actors

- 2019, first PPP for social housing in Ireland (4)
- Building cooperatives in Germany unite non professional investors driven by idealism and monetary interests
- Future of Building: Collaborative Research Format
- Graft and Mercedes Benz collaborate on branded homes

Projections 2040

Accumulation of RE in the hands of ever bigger holding companies	Low interest rates stimulates private RE acquisition and thus distributed ownership
Social value driven ownership models with limited aim for competitiveness	PPPs becoming new normal with balanced adoption of social and market prices

FUTURE OF BUILDINGS

DRIVER OF CHANGE

P
political

EMERGING NEW CITY CONCEPTS

Urban development and city branding will increasingly rely on holistic concepts to face challenges on urban planning. Overcoming monofunctional organization of cities is often a shared approach.

TIME HORIZON
Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- Paris Mayor Anne Hidalgo sets out to transforming Paris towards a 15 minute city (1)
- 51 European cities sign Circular Cities declaration (2)
- Germany pilots Smart Cities projects in 13 cities (3)

Relevance

- Cities globally compete for attracting inhabitants, companies and events; a competition increasingly carried out through city branding and conceptualisation
- Urban planning shifts from functional organisation of spaces to applying holistic and integrated concepts of city steering

Impact on the building sector

- Revival of **mixed use developments**
- **Programmatic requirements of projects** might be embed in goals and targets of city concepts
- Strong **cross sectoral alignment** between building sector and public services (mobility, utilities and social services)
- Significant **public funding** for implementation of city concepts

Current actors

- Networks of Cities and Mayors (C40, 880 Cities)
- Spearheading cities correct sustainability targets towards higher ambitions (Glasgow CO2 neutral in 2035, Helsinki in 2035)
- DGNB develops Urban District Certification (5)
- Urban Land Institute (ULI) brings together Cities and Real Estate Companies

Projections 2040

Rapid adoption of new city paradigms in Europe – e.g. no cars or 15 min city	Human- and green centered city design paradigms – new masterplans and new building typologies
BAU – cities emerge and adapt organically due to poor policy instruments	Post-pandemic effects leading to new use paradigms e.g. fewer offices, more co-creation and labs

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FUTURE OF BUILDINGS

DRIVER OF CHANGE

AVAILABILITY OF SKILLED WORKERS

Access to human resources with right skillset will become more difficult to find in the future. Training for future challenges may become more complex and involve digital tools

TIME HORIZON

Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- UK Construction Media have highlighted that in England alone, a staggering half a million builders are needed. (1)
- Employment in German construction rose by 500.000 (30%) between 2010 and 2020 (2)
- Dual study in construction sector actively promoted (3)

Relevance

- Construction workers retire earlier due to hard labor conditions
- Human labor will remain crucial in the building industry, requiring traditional craftsmanship and new digital skillsets
- Frequent education and training for workforce (lifelong learning)

P

political

Impact on the building sector

- More **complex skillset** required
- Shortage of workforce and availability of technical solution instigate a faster **industrialisation**
- Shift from **blue collar to white collar**; new education models
- **Salary raises** in the construction sector
- Construction process streamlined for **building with smaller teams**

Current actors

- Construction contractors promote dual education systems connecting apprenticeship and studies (4)
- Max Bögl builds serial residential construction requiring minimized number of specialized workforce (5)

Projections 2040

Ongoing skilled labor shortage putting industry under constant pressure	Rapid adoption of automation compen-sates labor shortage
Strong migration effects in Europe stimulate labor markets including new job profiles	Economic downturn of the AEC industry reduced demand for skilled workers

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FUTURE OF BUILDINGS

DRIVER OF CHANGE

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political

AFFORDABLE HOUSING AND SOCIAL INFRASTRUCTURE

States and public bodies might overtake significantly more responsibility in providing social built infrastructure, such as social housing, swimming pools, libraries and playgrounds

TIME HORIZON
Expected time until peak impact

2040

2030

2025

Evidence/ Signals

- Nearly unlimited bail-outs during Covid-19 suggest a changing role of the state in terms of service provision for its citizen (1)
- Affordable Housing Initiative from the EU stresses the need for an efficient and sustainable infrastructure (2)(3)
- Referendum on communalisation of privatised housing in Berlin (4)

Relevance

- Affordable housing impacts relocation decisions of corporations
- Significant restrain of refurbishment investments during implementation of rent cap in Berlin
- Private investment dependent on obtention of profit on rent market
- Increasing demand for affordable housing and public services provision

Impact on the building sector

- Potentially **more state financed projects** (implications on budget, procurement, project execution)
- **Shift in typologies**: redesign with less complexity
- Alignment of **social and environmental sustainability**. Making sustainability widely affordable
- As 80% of building stock in the year 2050 exists already, initiatives will likely **focus on retrofitting**

Current actors

- EU boosting investment in Social Infrastructure in Europe (2)
- Interreg Europe (EU-funded) works towards greening the social housing sector (5)
- Eigen Haard (NL) aims to turn affordable housing stock circular (6)

Projections 2040

Investments in affordable housing and social infrastructure increase significantly	Higher adoption of mixed developments 40% social, 60 market prices
Private investors take over – cities are privatised and become less affordable	Higher utilization of existing building stock for housing – e.g. former industrial areas

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Overview Drivers of Change

You can further enlarge the workshop by also including the long list of drivers

Social	Technological	Ecological	Economic	Political
Impact of Migration Flows	Automation and Industrialisation	Planetary boundaries and climate change(2)	New Economic Paradigms & Sustainable Regulations(3)	Emerging New City Concepts
Urbanisation and Settlement Patterns	Internet of Things in Construction	Availability of Resources	Big Tech in Urban Realm	Availability of Skilled Workers
Ongoing Demographic Change	Towards Regenerative Design	Environmental Pollution	Collaboration, Ownership and Operation in Real Estate	Affordable Housing and Social Infrastructure
New Forms of Living Together	High Tech Materials and Processes	Waste and Landfill	Abundant Availability of Risk Capital	Geopolitical Powershifts
New Ways of Working	Energy Transformation	Groundwater Depletion	New Business Ecosystems	Participation and Citizen Involvement
Health and Wellbeing (1)	Human Machine Interfaces	Sustainable Lifestyles	Data Economy	Role of City Centers
Income Disparities	Data Ownership			Bilateralism/ Multilateralism

(1) Added upon Workshop on 07.06 based on stakeholder input
(2) Merge between *Perception of Climate Change* and *Loss of Biodiversity*
(3) Merge between *New Economic Paradigms* and *Sustainable Investment & Regulations*

Key Messages of long-listed Drivers I

Updated after FOB Radar Workshop

Social

Income Disparities	Growing income disparities within individual countries and across the European Union might reflect in how and what we build.
Heterogeneity/ Spectrum of value sets	Outlook on life, priorities and ambitions of social groups will diversify.
Consumption patterns	The way we consume will change due to new forms of retail and increased environmental awareness in societal mainstream.
Digital Lifestyles	Apps, social networks and digital ways of earning money give rise to new digital lifestyles.

Technological

Human Machine Interfaces	Communication and collaboration with machines will become more frequent, intuitive and seamless.
Data Ownership	Access, utilization and ownership of data may be discussed and regulated on principle at European level.

Ecological

Environmental Pollution	Impact of environmental pollution becomes concern of legislators, producers and consumers alike.
Waste and Landfill	Regulations raise the bar on waste management and demand local treatment and disposal of of waste.
Groundwater Depletion	Agriculture and climate change result in significant depletion of groundwater in several European states.
Sustainable Lifestyles	Sustainability becomes mainstream and more people orient their buying behavior towards reducing environmental impact.

Key Messages of long-listed Drivers II

Updated after FOB Radar Workshop

Economic

Abundant Availability of Risk Capital	Ongoing pressure on real estate markets and new disruptive technologies attract large amounts of risk capital into the building sector.
New Business Ecosystems	Reorganization of supply chains, new products and services establish new business ecosystems.
Data Economy	Data based business models will continue to impact on the construction sector.

Political

Geopolitical Powershifts	Geopolitical powershifts such as the ongoing European integration or the increasing tensions between China and the USA influence the boundary conditions of the industry.
Participation and Citizen Involvement	Role and impact of citizens on city making might grow in the coming years as placemaking becomes a cornerstone of real estate development.
Role of City Centers	City centers are transforming due to a changing retail sector and a covid-induced trend to new suburbia.
Bilateralism/ Multilateralism	Changing paradigms of (interstate) collaboration influence the volatility of material supply and feasibility of international projects.