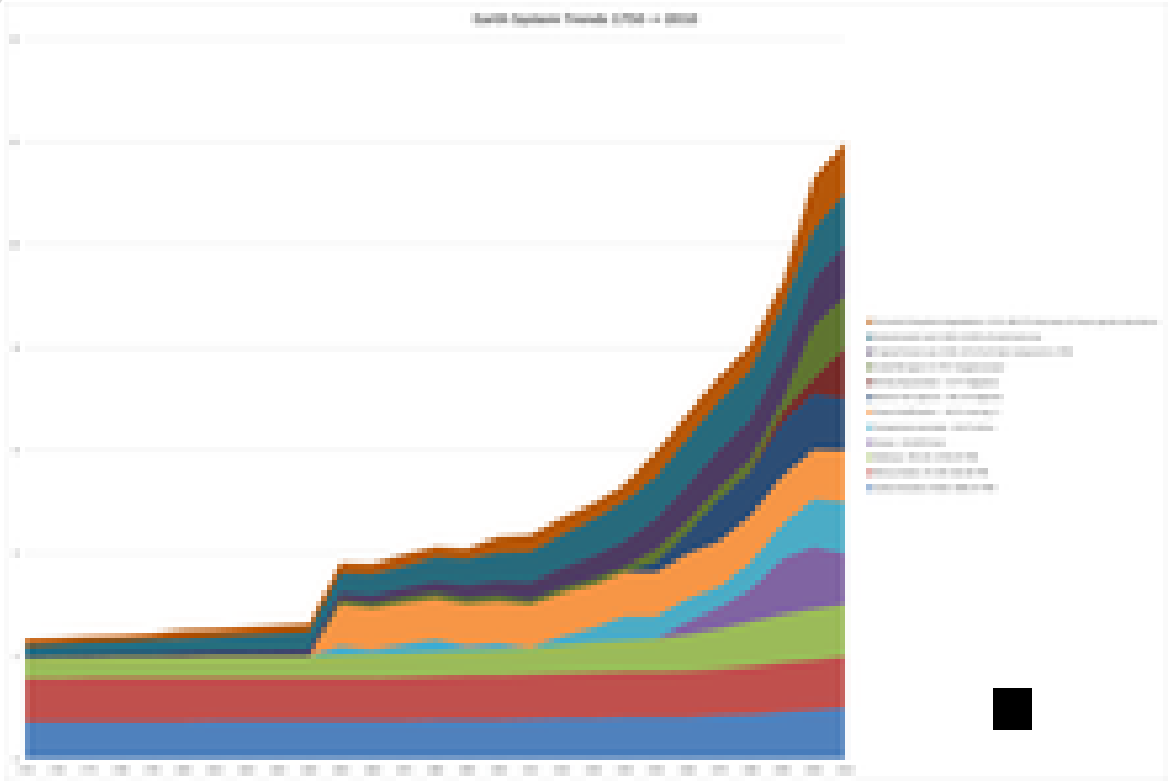
Property and Construction Sustainability

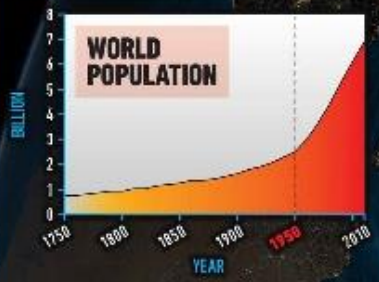
How Everything Must Change

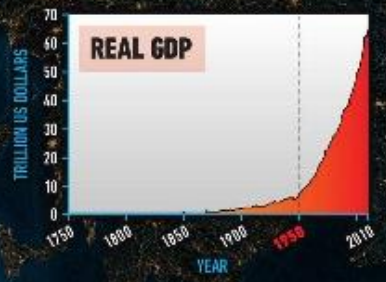
The Great Acceleration – 1950 to present

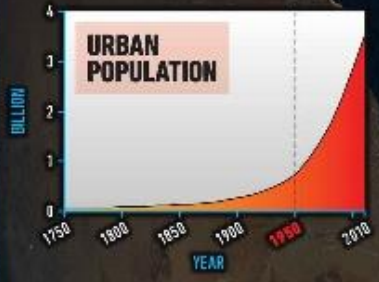


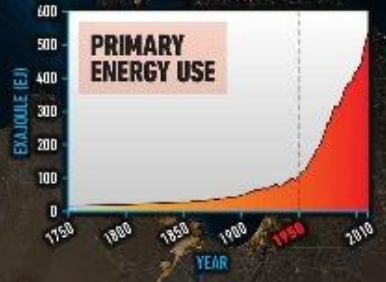
THE GREAT ACCELERATION

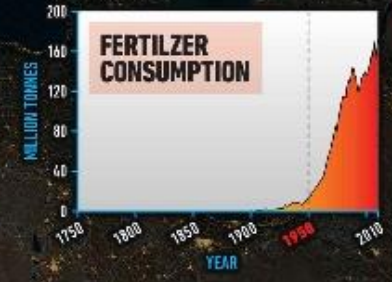
SOCIO-ECONOMIC TRENDS

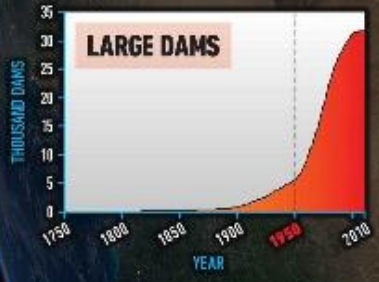


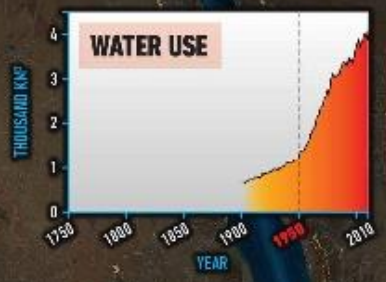


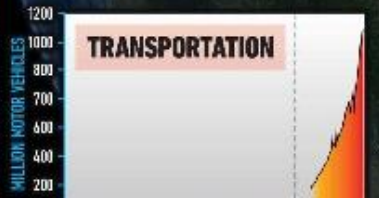


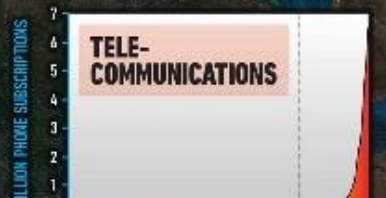




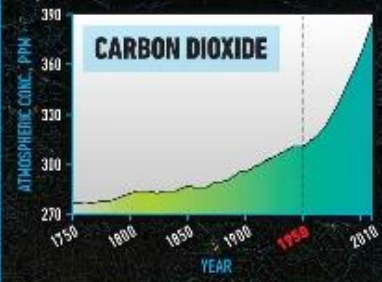


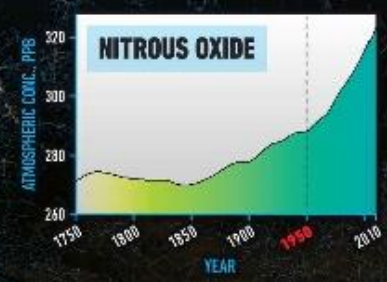


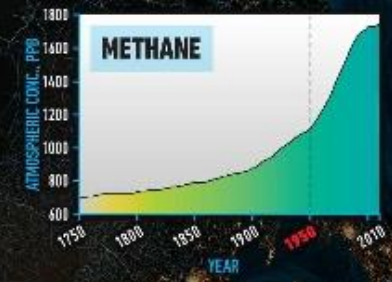


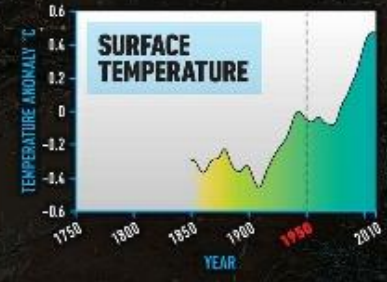


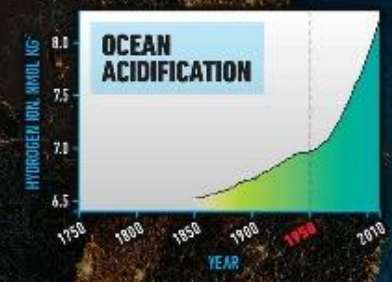
EARTH SYSTEM TRENDS

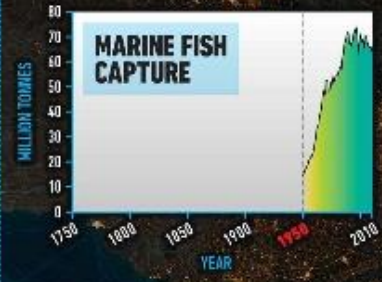


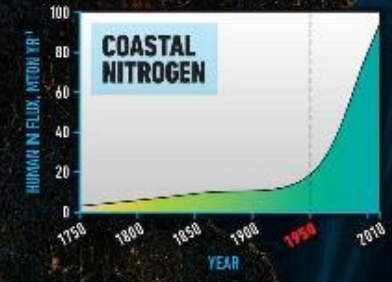


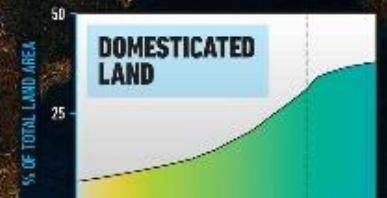


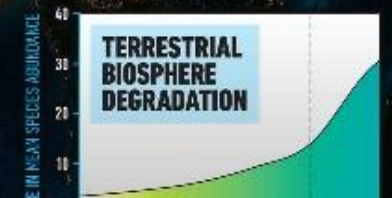












Anthropocene

The period during which human activity has been the dominant influence on climate and the environment.

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Implications of living in the "Anthropocene"

Humanity is now living far beyond the planet's means, consuming the Earth's renewable resources as if we had 1.75 planets to draw upon.

100% of our economic activity is dependent on services being provided by natural systems.

The more we degrade these natural systems, the more, in the end, we imperil economic activity and business success.

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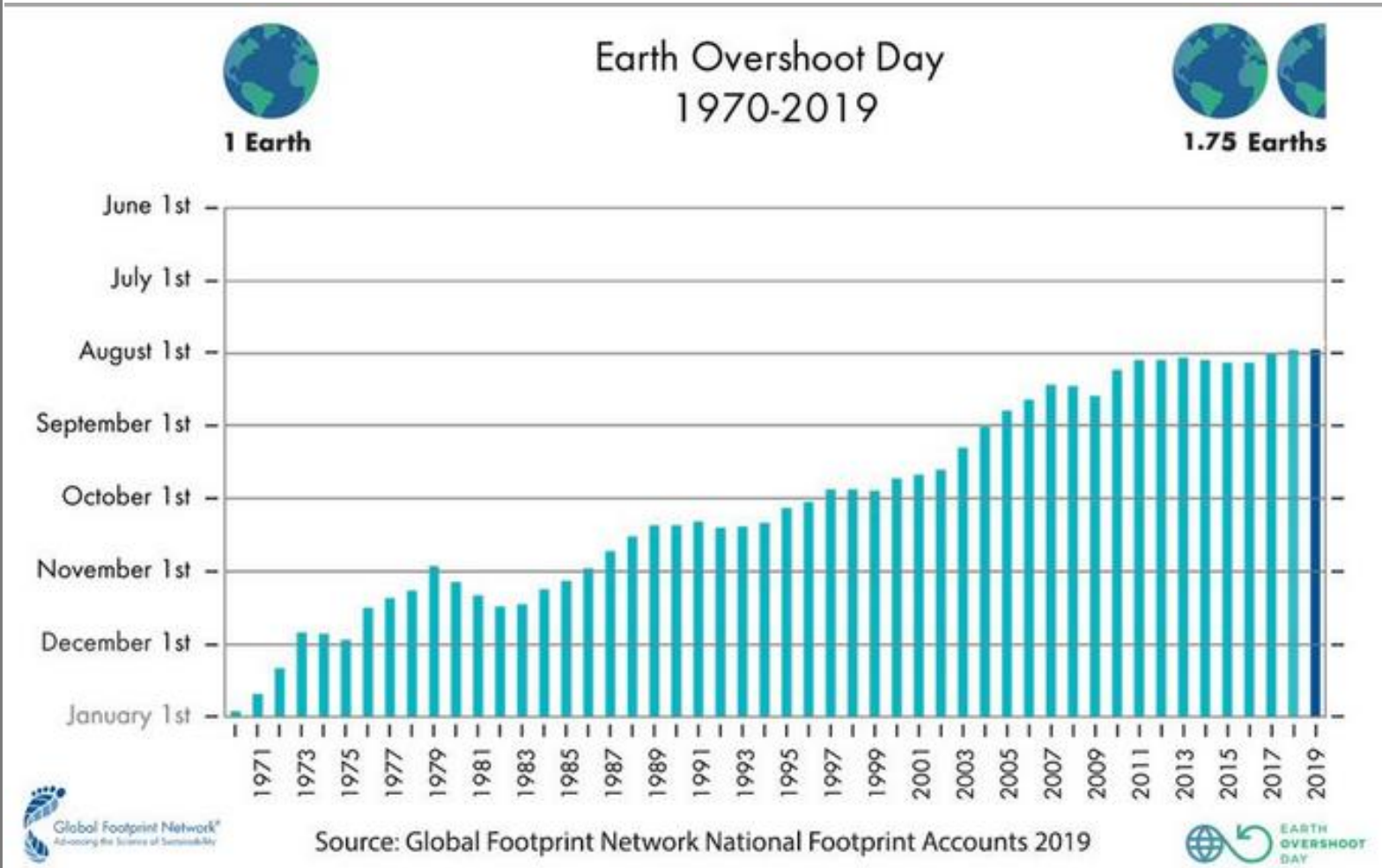
Earth Overshoot Day 2019 – 29th July

Note: Ireland did significantly worse than the world average, overshooting our yearly resources on April 27th 2019.



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By 2030

- Global population will increase from **7.7 billion** (March 2019) to **8.6 billion** (United Nations Department of Economic and Social Affairs, 2017);
- Demand for **food** will increase by **50 percent**;
- Demand for **energy** will increase by **30 percent**; and
- Demand for **water** will increase by **30 percent**.

The Challenge

To keep global temperatures from rising by more than 1.5°C (IPCC, 2018)) will require **transforming** how the world economy sources and uses energy, with **profound** implications for society, economies, business and industry.

Any less than that will not enable the world to achieve carbon neutrality (zero carbon), which **must** be achieved to prevent dangerous climate change and ocean acidification.

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SUSTAINABLE DEVELOPMENT GOALS

Achieving The Goals

Will require a **complete recalibration** of the existing economic, energy, and industrial agendas.

The world needs to build resilient zero carbon economies **quickly**.

This will radically alter some business models and potentially eliminate others.

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Beyond CO2

The planet is also facing unprecedented biodiversity loss, with 200 species currently becoming extinct **PER DAY**.

This is coupled with a massive and growing waste crisis, along with unprecedented water shortages and air pollution levels worldwide.

Six Global Transformations that are Necessary and Potentially Sufficient to attain the SDGs

[TWI2050, 2018 report to the HLPF in July 2018, work in progress]

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Property and Construction

Property and construction are **critical** to worldwide sustainability, environment, society and economy.

Buildings and construction account for 36% of global final energy use and 39% of energy-related carbon dioxide (CO2) emissions when upstream power generation is included (United Nations, 2017).

50% of all materials and energy are used in buildings.

33% of all water and waste are used in/arise in buildings.

Less than 1% of buildings are assessed for sustainability.

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Additionally

- The property sector is **directly and acutely** impacted by physical and transitional risks brought by climate change.
- 2015 RICS study - modelled the potential for increased costs of running a building in eight European countries in commercial buildings which are not retrofitted to address climate risks.
- The model indicated that by 2050 the total increase in energy bills from 2010 levels for the eight countries would be £457 billion.
- For Germany, Spain and Greece, the cost would be more than 8% of their gross domestic product.

What does the property and construction sector need to do?

As an industry, we need to focus on **sustainable development and construction** and **sustainable property**.

We need to embed sustainability at company and organisation level, incorporating it into day to day operations and decision making.

Simultaneously, we need to engage, collaborate and advocate to lead the change required.

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The Future of Housing

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What do we need to think about?

Sustainable Construction

Circular economy principles and practises

Embedding sustainability in design

Renewables

Deep retrofit of existing buildings (commercial and domestic)

Sustainable Property

Green Leases

Green Management

Mitigation

Adaptation

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Fourth Industrial Revolution

"**The Fourth Industrial Revolution represents a fundamental change in the way we live, work, and relate to one another.** It is a new chapter in human development, enabled by technology advances that are commensurate with those of the first, second and third industrial revolutions, and which are merging the physical, digital, and biological worlds in ways that create both promise and peril. The speed, breadth, and depth of this revolution is forcing us to rethink how countries should develop, how organisations create value, and even what it means to be human; it is an opportunity to help everyone, including leaders, policy-makers and people from all income groups and nations, to harness technologies in order to create an inclusive, human-centred future."

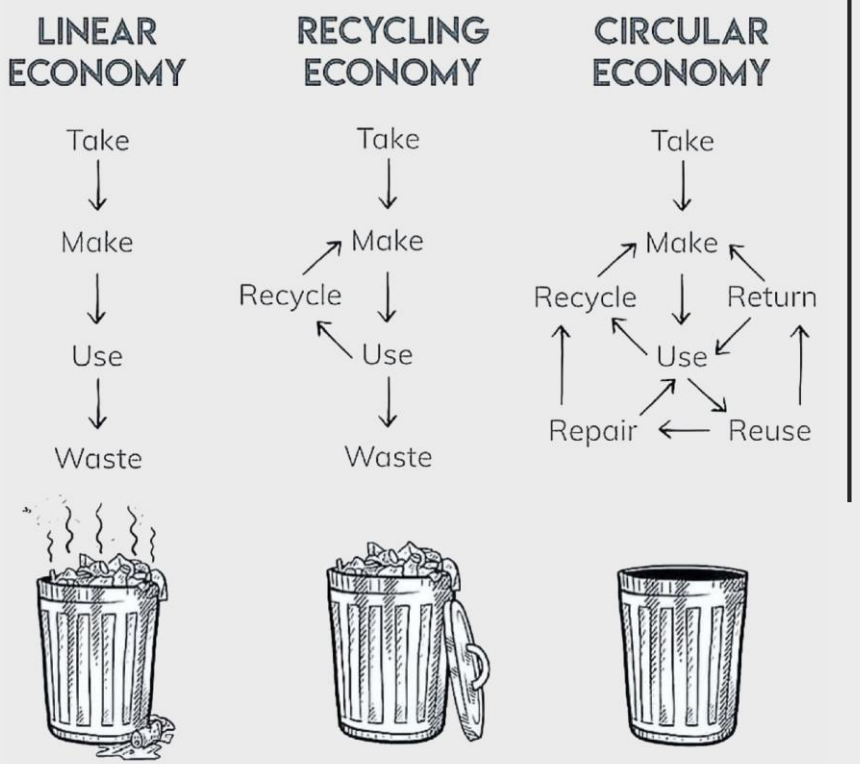
(World Economic Forum, 2018)

Integral Sustainability

For **sustainability** to become embedded, it needs to become **integral to business strategy** in its broadest sense, and to pervade what every executive, every manager and every employee does.

It needs to be embedded into corporate culture.

CIRCULAR ECONOMY



*Circular material use, including **recycling**, **reuse** and **refurbishment**, aims to **reduce the generation of waste** as well as our **economy's dependence on extraction and imports of raw materials**.*

*As such, it has the potential to bring both **environmental** and **economic** benefits, and it is increasingly recognised as the resource use mechanism that would allow **societal** and **environmental** sustainability.*

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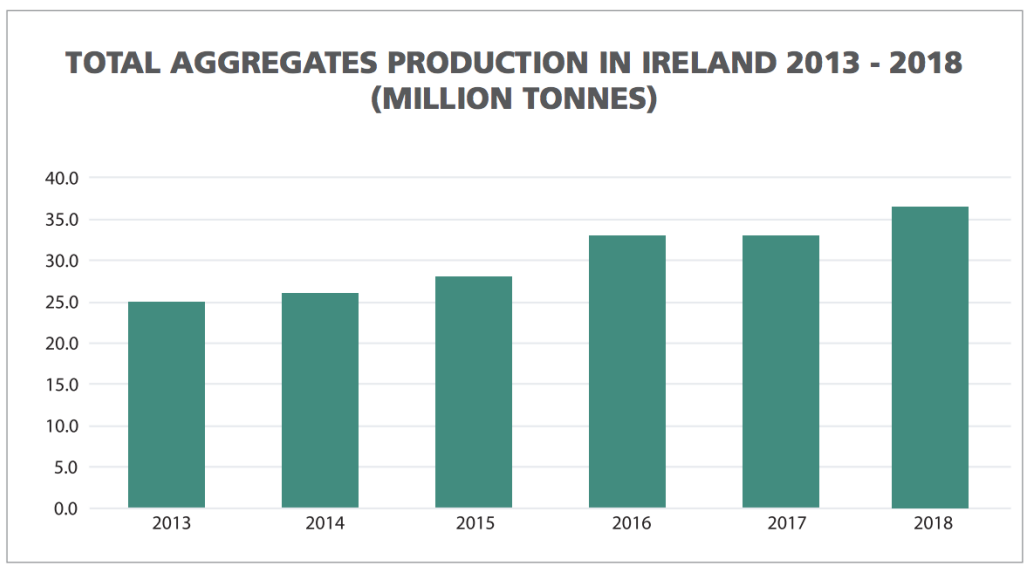
Aggregate Report – The Irish Concrete Federation



"The National Development Plan will bring public capital investment in Ireland to be amongst the highest in the EU.

It is therefore ***inevitable that demand for aggregate based construction materials will continue to increase in the coming years****, given that the planned investment in housing, transport and education infrastructure and other priorities identified in the Plan will require a sustainable supply of aggregates from our national aggregate reserves.*

ICF estimates that approximately 1.5 billion tonnes of aggregates will be required to meet Ireland's societal investment needs to 2040*."*

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CRADLE TO CRADLE (C2C)

- The **Cradle to Cradle** (**C2C**) philosophy promotes the use of **construction** materials and products that are recyclable, or preferably can be upcycled. Upcycling means recycling a used product into a new product with better properties than its predecessor.
- In Cradle to Cradle inspired buildings only materials which can circulate in biological or technical production cycles are used.
- By using renewable energies, buildings can provide more energy in the long term than they use themselves – an energy-positive building.
- Building Materials Passports.
- Buildings as Material Banks (BAMB).

Reburg – The World's most circular city

Construction Waste

- By 2025, the world will generate **2 billion tonnes** of construction waste annually.
- Building materials account for **half** of the solid waste generated every year worldwide.
- Construction and Demolition Waste (CDW) is the largest waste stream in the EU – despite much of this waste being reusable.

Circular Material Use

Circular material use, including recycling, reuse and refurbishment, aims to reduce the generation of waste as well as our economy's dependence on extraction and imports of raw materials.

As such, it has the potential to bring both environmental and economic benefits, and it is increasingly recognised as the resource use mechanism that would allow societal and environmental sustainability.

Case Study: Utrecht

In 2050, Utrecht wants to be 100% circular.

“**In a renewable city we make optimal use of raw materials, and materials, renewable energy sources and human capital, in a way that is good for inhabitants and their environment**. As a municipality we want to stimulate, connect, facilitate and embrace new circular initiatives.”

The city of Utrecht distinguishes **three areas of attention** within the context of the circular economy:

- **Construction and demolition**
- **Waste management**
- **Sustainable procurement.**

Further information about circularity:

- https://www.igbc.ie/wp-content/uploads/2018/06/IGBC-Report-Web-Final-21.06.18.pdf
- OneClickLCA design software https://www.oneclicklca.com/
- Healthy materials
- Certification systems – WELL, LEED, BREEAM, Home Performance Index
- EPD's – Environmental Product Declarations

Sustainability in Design

https://www.intechopen.com/online-first/comprehensive-strategy-for-sustainable-housing-design

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Challenges

As many as 500,000 new homes must be built in Ireland by 2040 under the Government building programme.

Irish homes use 7% more energy than the EU average and emit 58% more CO_2eq.

Over 80% of Irish homes and other buildings assessed for their BER have a rating of C or worse.

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NZEB

- A step on the way to net zero
- Industry unprepared
- Potential risks with poor implementation and detailing
- Overheating challenges
- Condensation and mould challenges
- Human health challenges
- Training and education
- New methods and technologies required

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Home Performance Index

Moving beyond nZEB to more comprehensive sustainability assessment.

https://www.igbc.ie/certification/hpi/

The Home Performance Index (HPI) is Ireland's first national voluntary certification system for quality and sustainable residential development.

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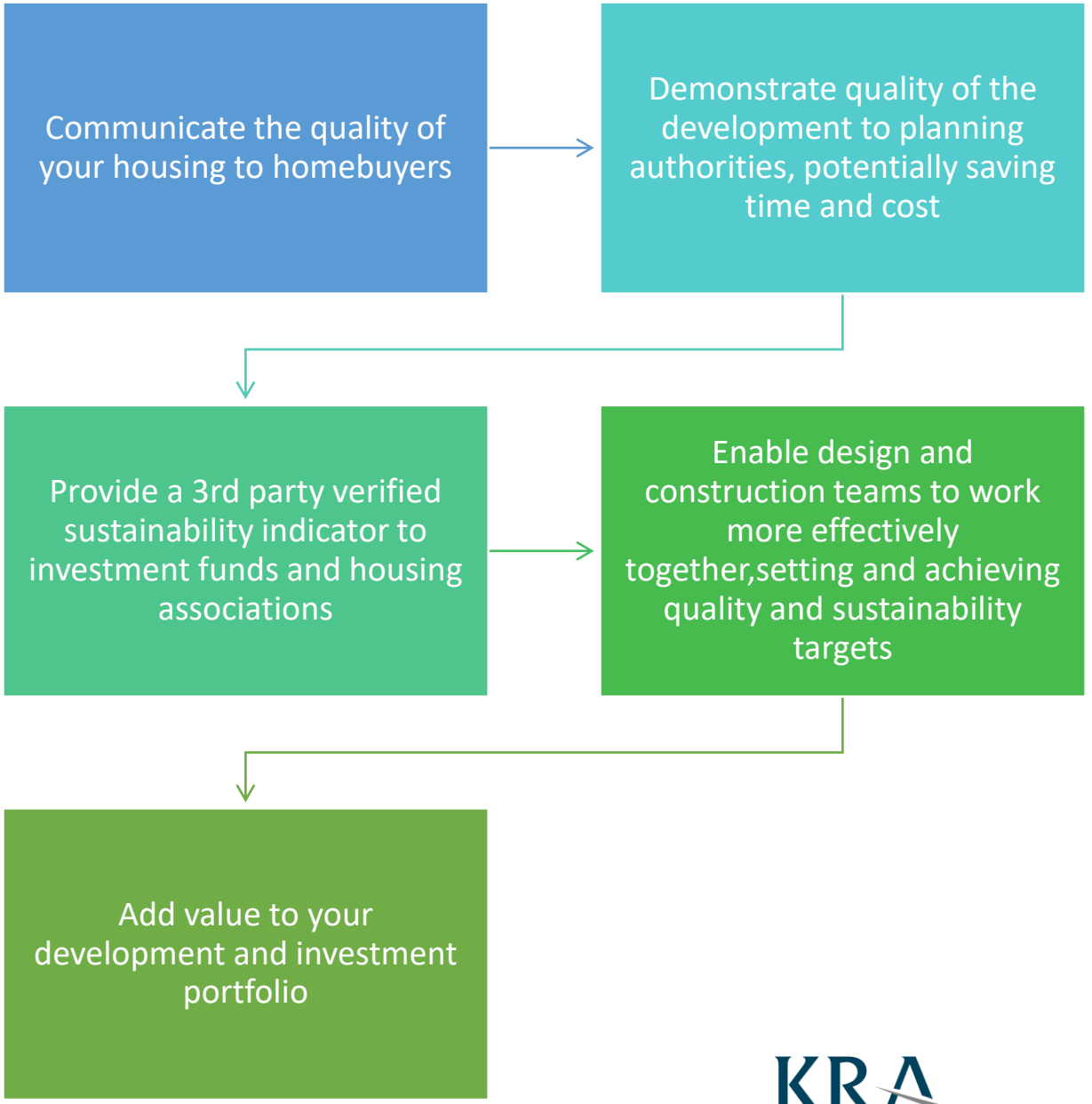
Advantages for the Developer



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Climate Action Plan

Targets:

- Reduce CO_2eq emissions from the sector by 40 - 45% emissions relative to pre-NDP 2030 projections
- Sharply reduce fossil fuel use, given the current heavy reliance on gas, oil, coal and peat in the sector
- Complete 500,000 building retrofits to achieve a B2 BER /cost optimal equivalent or carbon equivalent
- Install 600,000 heat pumps (400,000 to be in existing buildings)
- Increase the number of Sustainable Energy Communities to 1,500
- Complete the rollout of the SSRH, including support for biomass and anaerobic digestion heating systems
- Deliver two initiatives of municipal scale which have the potential to provide heat equivalent to the needs of about 50,000 homes

Best Practice

WORLD GREEN BUILDING COUNCIL

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It's not that easy being green

Tuesday 01st October 2019

Above: Bosco Verticale, Credit: Chris Barbalis

Share

What is embodied carbon?

Learn more about our work on embodied carbon

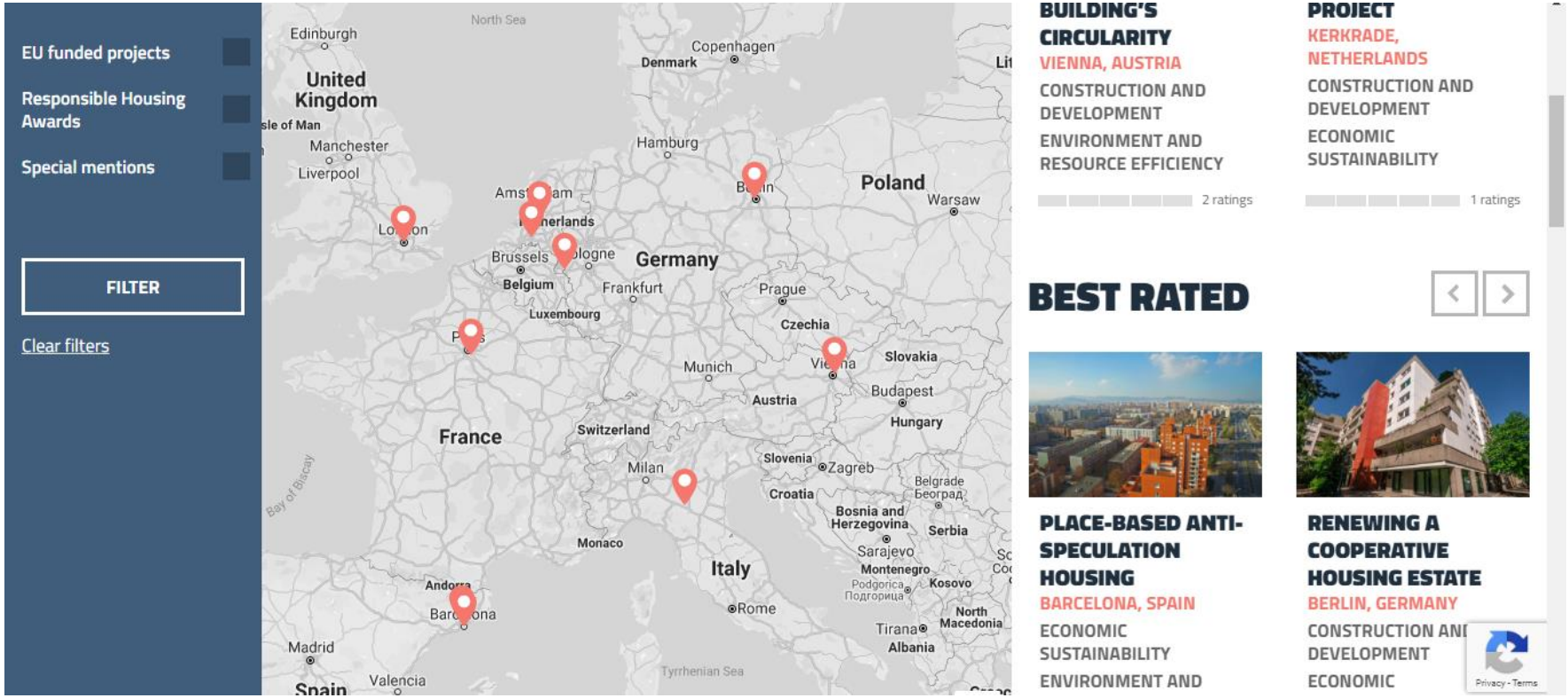
Read More

Case Study: Nansledan, Duchy of Cornwall

- Every building in Nansledan has been designed to fit harmoniously with the overall masterplan concept of a traditional Cornish community.
- This includes using local slate and granite quarried and worked from within an hour of the site.
- Local sourcing is hugely important to the Duchy. It impacts positively on the local economy, reflects local identity and meets sustainability objectives.
- It also keeps traditional construction methods alive and creates durable, energy-efficient buildings.
- Nansledan is leading a revival in the use of Cornish materials by employing local craftsmen passing their skills through apprenticeships to the next generation.

Housing Evolutions – EU

https://www.housingevolutions.eu/



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Case Study: Navarra Social Housing, Spain

- During 2018-21, 524 social housing units will be built in Navarre under the Navarra Social Housing project.
- The units are for young and elderly people on low incomes, families with limited means and people in critical need of accommodation.
- Building the units based on the ‘passive house’ energy standard will result in energy savings of 90% and nearly zero costs.
- The construction work will create 298 jobs in the period to 2020.
- The EU has provided 50% (€40 million) of the funding for the project through the European Investment Bank.

Smart and Green Technologies

- http://smartopenlisboa.com/housing/

Renewables

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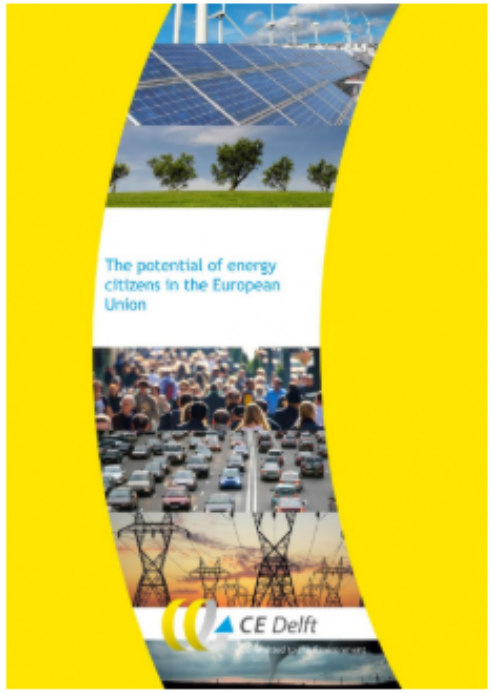
Half of EU Citizens Producing Their Own Energy By 2050

Friends of the Earth Europe

for the people, for the planet, for the future

Climate & energy | Democracy | Nature & food | Resource use | About us | Publications | Ne



CE Delft: The potential of energy citizens in the European Union

26 SEPTEMBER 2016

This research demonstrates that half of all European Union citizens could be producing their own electricity by 2050, and meeting 45% of the EU's energy demand. Our energy market is switching from fossil fuels and nuclear to renewable energy, but it's also shifting from a centralised market dominated by large utilities to one in which people produce their own energy and help to manage demand. Without these "energy citizens", the transition to a 100% renewable energy system won't be possible.

https://energy-cities.eu/wp-content/uploads/2019/06/EnergyCities_RNP_Guidebook_Web.pdf

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Examples across Europe

In the Netherlands, within the framework of the 2030 national 2030 climate agreement, a decision was taken that solar and wind energy developers should open 50% of the capital of their projects to local communities.

In Germany, the district of Steinfurt, which gathers 24 municipalities representing some 445,000 inhabitants, plans to become 100% self-sufficient in renewable energy by 2050, largely through community involvement.

The city of Ghent, Belgium, has a target of 15% of residential energy consumption to be covered by locally produced renewable energy by 2019.

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seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND

Home Energy | Community Energy | Grants | Business & Public Sector | Technologies | Data & Insights

Home / Community Energy / Sustainable Energy Communities

Sustainable Energy Communities

Deep Retrofit

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Challenges and Opportunities

- Extremely complex and difficult to get right
- 500,000 homes to be retrofitted by 2050 (Climate Action Plan)
- 60,000 homes each year from 2021
- Costs? Estimates vary from €15,000 to €90,000 per home
- Resources? Who will do this work?
- Skills shortages – professional and trade
- Standards?
- The Construction Industry Federation will be seeking an informal advisory group with industry, the SEAI and the Department of Communications, Climate Action & Environment with a view to implementation.

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Issues to Consider

Historic buildings and protected structures

Shallow retrofits and renewables

Financing retrofits and renewables

Green finance

Zero or low interest loans

Grants

Direct funding

Alternative funding sources – PPA, ESCO etc.

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Biodiversity and habitat retention/restoration

National Biodiversity Action Plan 2017 - 2012

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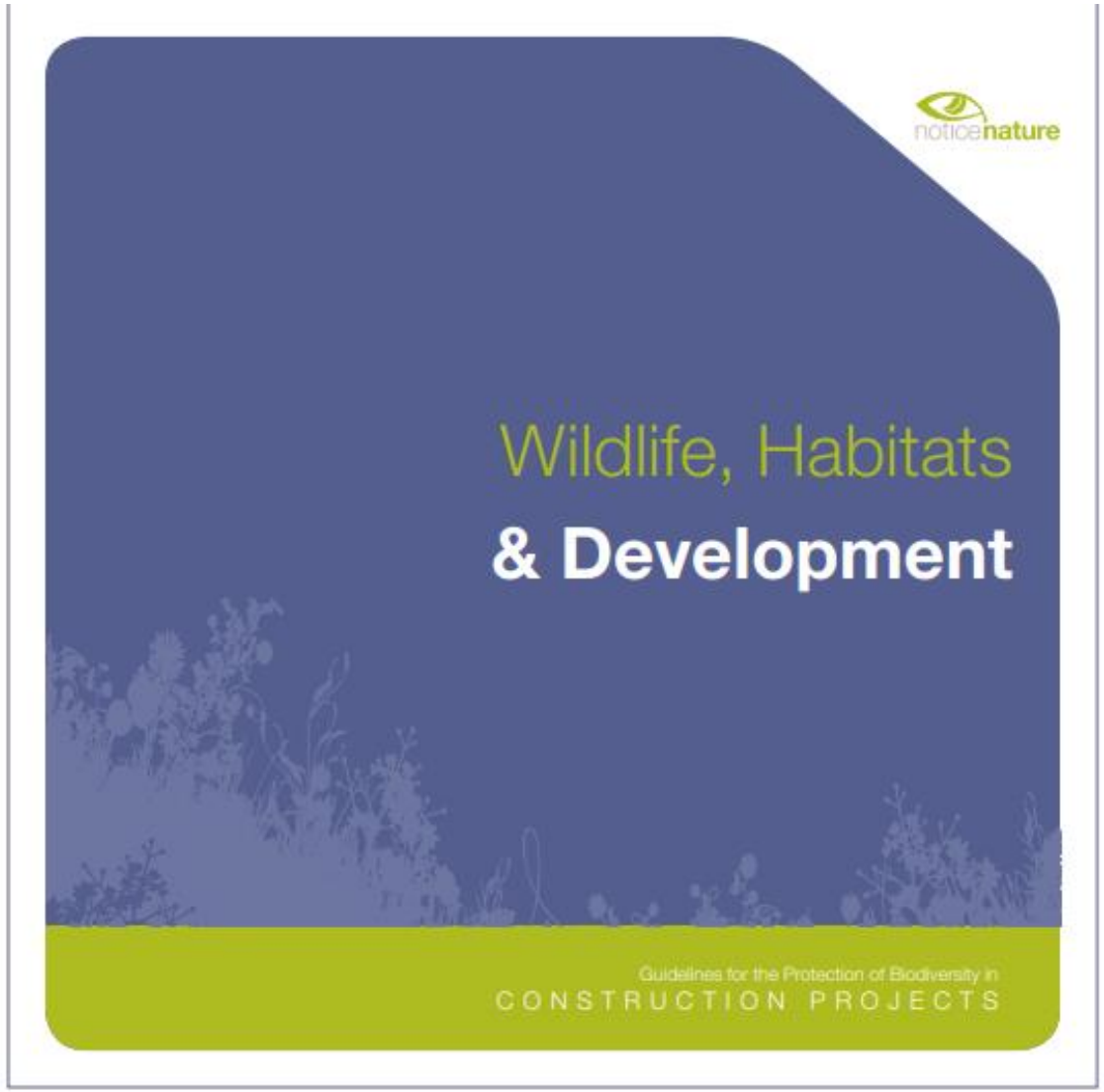
noticenature
Wildlife, Habitats
& Development
Guidelines for the Protection of Biodiversity in
CONSTRUCTION PROJECTS

All Ireland Pollinator Plan

https://pollinators.ie/

What can property and housing professionals do?

Prevent habitat destruction.

Wildlife friendly design eg; bat boxes or creating hedgehog gaps in fencing on housing developments.

Pollinator friendly landscaping and site development.

Leaving “wild” areas, and areas for community gardens.

Think outside the box and get expert inputs.

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What else should we be thinking about?

- Whole life carbon assessment of buildings (in Finland this is already a statutory requirement).
- Sustainable Energy Communities and community energy production and ownership schemes.
- Microgrids and local energy resilience.
- The future of transport, electric car charging and vehicle to building/vehicle to grid technology.
- Renewables and EV technology is advancing faster than anyone could have imagined – as a country we need to keep up.

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Nottingham gears up for EV rollout with EU-backed vehicle-to-grid trial

27 February 2019, source edie newsroom

Nottingham City Council is set to trial new electric vehicle (EV) infrastructure, including battery storage and bi-directional chargers, as part of an EU-funded vehicle-to-grid (V2G) project.

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Nissan Leaf gets approval for vehicle-to-grid use in Germany

Leaf is the first electric vehicle to qualify as a backstop for the German power grid

Tue, Oct 23, 2018, 16:07

Nissan's Leaf became the first electric vehicle (EV) to secure regulatory approval as an energy backstop for

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Planet Earth 2030

You're leaving work in 2030.

Your children walked or cycled to school in your sustainable community, and you are driven home in your self-driving electric car.

When you get home, the car plugs itself in to charge your house for its' peak evening requirements.

There is ample fresh, organic food.

The beehives in your neighbourhood are buzzing with activity.

You head over to the community garden to pick fresh salad for dinner.

Your neighbourhood is safe and secure.

The fear of global collapse and environmental catastrophe has been averted.

Isn't this something to aim and work for – together?

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Thank you

Krystyna Rawicz MA Oxon, FSCSI, FRICS

KRA Visionary Project Partners

KRA Renewables

087 968 0106

20 Harcourt Street, Dublin 2