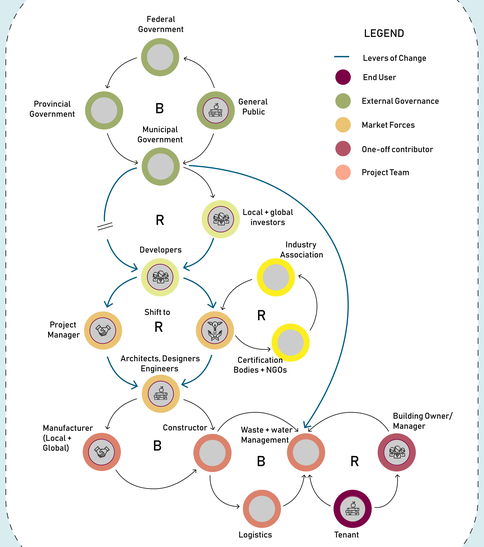
Disruption, Innovation, Opportunity : The Power of Circularity

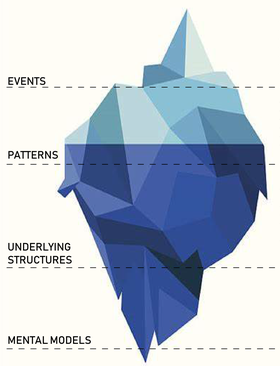
A circular economy is one that is restorative and regenerative in design. In our age of disruption, dwindling supplies and climate change, that sounds like a nice concept, but what is it really all about, and more to the point, what can it mean to you? Well in the commercial building sector, using circular strategies can mean a lot!

In this poster, you'll see how everyone involved in our built environment can use circular economic principles – designing out waste and pollution, keeping products and materials in use, and regenerating natural systems – to unlock innovation and generate wealth / value that isn't built on unsustainable principles.

So find your SuperPower and run circles around our current linear process!
You'll be part of the $4.5 TRILLION opportunity that circularity is poised to deliver to the global economy.



MENTAL MODELS

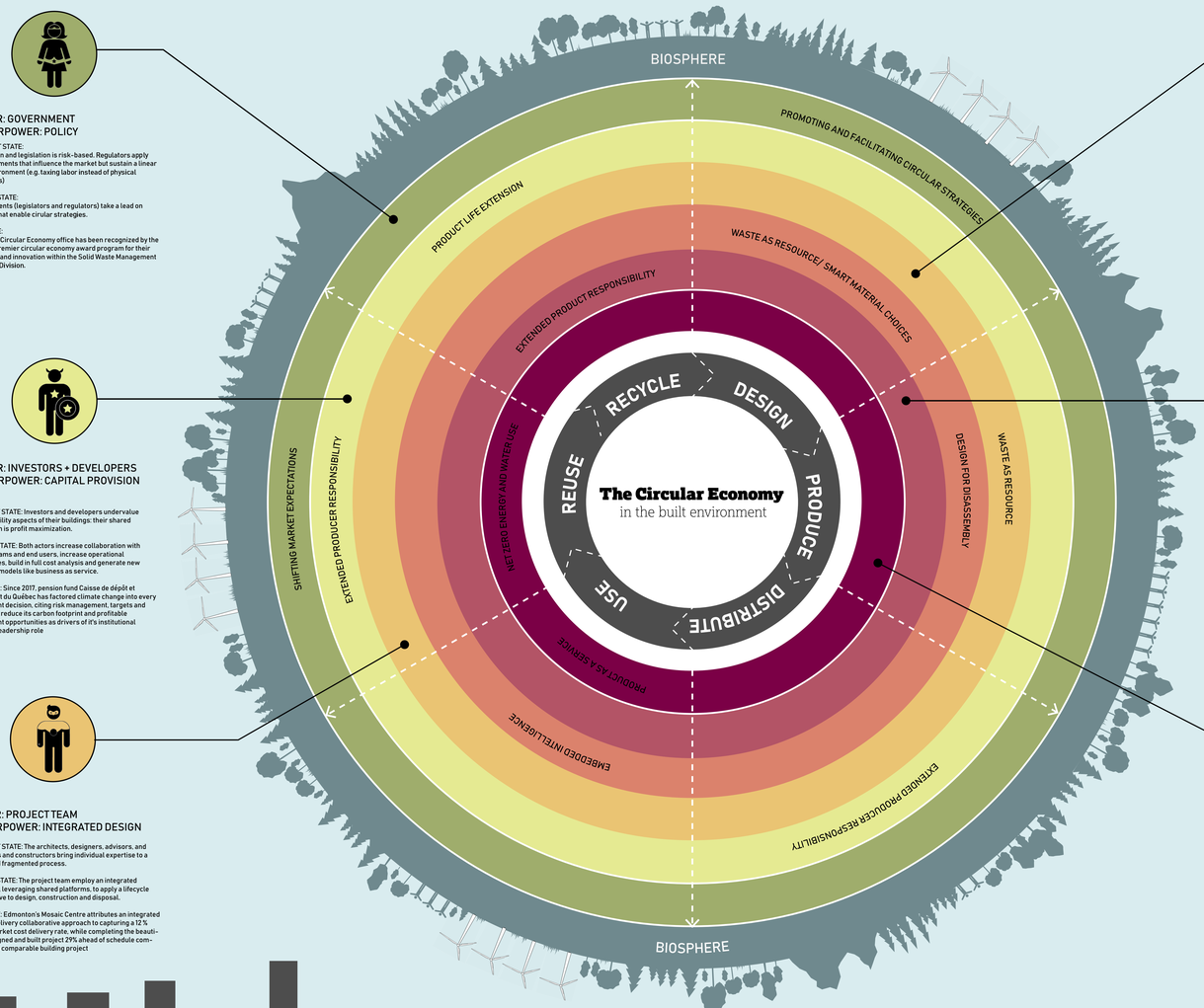


- Built environment + large carbon footprint
- Green Certification is expensive
- Construction creates waste/leak in value chain
- Risk increasing
- Design is static + no incentive to innovate
- Risk adverse actors (engineers, contractors)
- Green washing/ blame shifting
- Resources are cheap
- Resolving symptoms, not structural issues

- Over-consumption/ emphasis on new as better
- Lack of care, misuse of items
- Disconnection of waste
- Increase in co-working/ shared spaces
- Demolition is cheap
- Government turn-over + short-lived green policies

- Investors: Financial ROI + Market premiums for green certifications
- Industry: Building Codes
- Government: Externalities priced effectively
- Actors: Fragmented project delivery / increasing demand
- Society: Rapid urbanization and urban population growth, shift in demographics

- Perception of prosperity
- Disenfranchisement
- Individualism within a capitalist system
- Trapped in status quo



The goals of Paris Climate Agreement are reached and global warming is limited to 1.5°C above pre-industrial levels, and climate disruption risks are reduced.

ACTOR: GOVERNMENT
SUPERPOWER: POLICY

CURRENT STATE:
Regulation and legislation is risk-based. Regulators apply measurements that influence the market but sustain a linear built environment (e.g. taxing labor instead of physical resources)

FUTURE STATE:
Governments (legislators and regulators) take a lead on policies that enable circular strategies.

EXAMPLE:
Toronto's Circular Economy office has been recognized by the world's premier circular economy award program for their research and innovation within the Solid Waste Management Services Division.

ACTOR: INVESTORS + DEVELOPERS
SUPERPOWER: CAPITAL PROVISION

CURRENT STATE: Investors and developers undervalue sustainability aspects of their buildings: their shared motivation is profit maximization.

FUTURE STATE: Both actors increase collaboration with project teams and end users, increase operational efficiencies, build in full cost analysis and generate new business models like business as service.

EXAMPLE: Since 2017, pension fund Caisse de dépôt et placement du Québec has factored climate change into every investment decision, citing risk management, targets and actions to reduce its carbon footprint and profitable investment opportunities as drivers of it's institutional investor leadership role

ACTOR: PROJECT TEAM
SUPERPOWER: INTEGRATED DESIGN

CURRENT STATE: The architects, designers, advisors, and engineers and constructors bring individual expertise to a linear and fragmented process.

FUTURE STATE: The project team employ an integrated approach, leveraging shared platforms, to apply a lifecycle perspective to design, construction and disposal.

EXAMPLE: Edmonton's Mosaic Centre attributes an integrated project delivery collaborative approach to capturing a 12 % below market cost delivery rate, while completing the beautifully designed and built project 29% ahead of schedule compared to a comparable building project

ACTOR: SUPPLIERS + MANUFACTURERS
SUPERPOWER: MARKET SHARE

CURRENT STATE: Manufacturers provide cost-driven primary resources, materials and products, with limited room for improvement and modifications.

FUTURE STATE: Suppliers expand their business by offering products with sustainable and socially just 'material passports' demonstrating transparency and circularity.

EXAMPLE: Interface carpets revolutionized the industry, pioneering the 'product as service' model by leasing carpet tiles, closing the loop on materials and water use, and generating or offsetting energy in manufacturing processing, capturing world leading market share in the process

ACTOR: BUILDING OWNERS + OPERATORS
SUPERPOWER: INVESTMENT

CURRENT STATE:
Building owners manage their assets (short- and long-term) to guarantee the highest value of the building and operating margin.

FUTURE STATE:
The value of a circular building is determined by function, level of circularity and user behaviour. The role of owners evolves from the asset ownership model to provider of smart solutions and support for optimal use.

EXAMPLE:
The Edge in Amsterdam is a model of sustainability and one of the smartest office buildings in existence. This has made it a recruiting tool for owners Deloitte, a satisfying side effect of a project designed to both redefine efficiency and change the way people work.

ACTOR: TENANTS
SUPERPOWER: DEMAND BASED ON INFORMED CHOICES

CURRENT STATE: Tenants view a building as an object that fulfills a spatial need or function.

FUTURE STATE: Tenants prefer sustainability-certified buildings that create a healthy living and working environment. Using smart tools, tenants help sustainability programs meet targets, and their informed choices impact the entire building lifecycle.

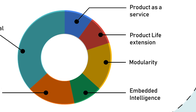
EXAMPLE: Research shows buildings with sustainable certification outperform similar non-green buildings in terms of rental rates, occupancy levels, tenant satisfaction scores, and the probability of lease renewals.
Since 2004, 4,000 buildings have certified by LEED in Canada with the second highest number of LEED projects anywhere in the world.

CASE STUDY: ENABLING CIRCULAR DESIGN

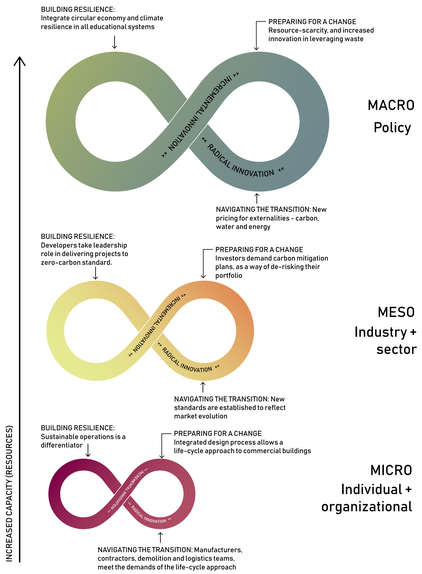
WHAT: Circular Economy workshop at Kasian Architecture Interior Design and Planning

WHY: Generate insights about key leverage points to help designers uptake circular strategies

RESULTS: Choosing smart materials, designing for modularity and product take-back were favoured for immediate opportunities to design for circular products and services!



TRANSFORMATION MODEL



KEY INSIGHTS

LEADERSHIP
The power of vision and strategy to build and lead a team towards success in circular economic modelling and execution

OPEN INNOVATION
The power of transparency to increase the intent, impact and speed of innovation across businesses and sectors

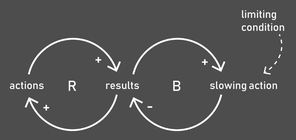
PARTNERSHIPS
The power of collaboration to support circular strategies at each step of the value chain

EDUCATION
The power of knowledge to challenge current paradigms and enable all future actors to embrace and execute circular strategies

LIMITS TO GROWTH

Today, the built environment encounters a "Limits to Growth" archetype. As introduced by Donella Meadows, growth cannot continue unabated in an unrestricted positive reinforcing behavior. There are limits that eventually make themselves known and felt over time.

In our case, depleting resources of the Earth such as minerals, water, energy, increasing urban population and carbon emissions; mounting pollution and waste are now pushing back. We have approached limits to growth. The linear businesses in built environment begin to lose their effectiveness and rate of growth will reverse accordingly. If we do not plan for limits now, we are planning for failure.



CARBON

Built environment responsible for a vast environmental footprint that contributes 33% of global carbon emissions.

Canada's total greenhouse gas emissions in 2016 were 704 megatonnes (Mt) of carbon dioxide equivalent (CO2 eq).

RESOURCES

Built environment sector consumes over 40% of the world's yearly extracted resources.

In 2018, built environment consumed 41.1 gigatons of materials out of 84 gigatons in total.

URBANIZATION

Half of humanity–3.5 billion people– lives in cities today, and by 2030, almost 60% of the world's population will live in urban areas.

95% of urban expansion in the next decades will take place in developing world.

The world's cities occupy just 3% of the Earth's land but account for 60–80 % of energy consumption and 75 % of carbon emissions.

ENERGY

The building sector is the largest energy consuming sector, accounting for over one-third of the final global energy consumption

WATER

Water usage in cement production varies from 147 to 3,500 litres per tonne of cement. Concrete production uses between 100 and 240 litres of water per cubic metre of concrete.

Already today, 3.3 billion people live in areas that experience severe water scarcity during at least a quarter per year.

WASTE

According to Statistics Canada data, CRD (construction, renovation and demolition) waste accounts for about 12% of all solid waste generated in Canada, most of which is currently disposed.

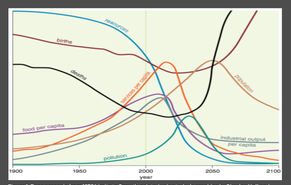


Figure 1. Base scenario from 1972 Limits to Growth, printed using today's graphics by Charles Hall and John Day in "Revisiting Limits to Growth After Peak Oil" http://www.esf.edu/efb/hall/2009--09Hall0327.pdf

BARRIERS

FINANCIAL: Perceived and actual upfront costs and impact on profit margins associated with transitioning to the circular economy prevents many organizations from shifting to circular systems.

STRUCTURAL: Unclear understanding of the division of tasks, responsibilities and reporting for a circular system can block the strategic development or implementation of circular strategies.

OPERATIONAL: The challenge of coordinating circular infrastructure across supply chain and product (or service) lifecycle partners can delay transition to circular business opportunities.

TECHNOLOGICAL: Technological paradigm shifts requiring upfront R&D and design investment in circular products and services are often the largest and most immediate barrier to entering the circular economy.

ATTITUDINAL: A lack of understanding and shallow perception of the business value of circular solutions blocks the realization of circular business opportunities. A shift in mindset, culture and values will drive movement towards a more circular economy.

Rebecca Black, Chantal Frenette, Jale Gonulkapan Suder, Steph Rebello