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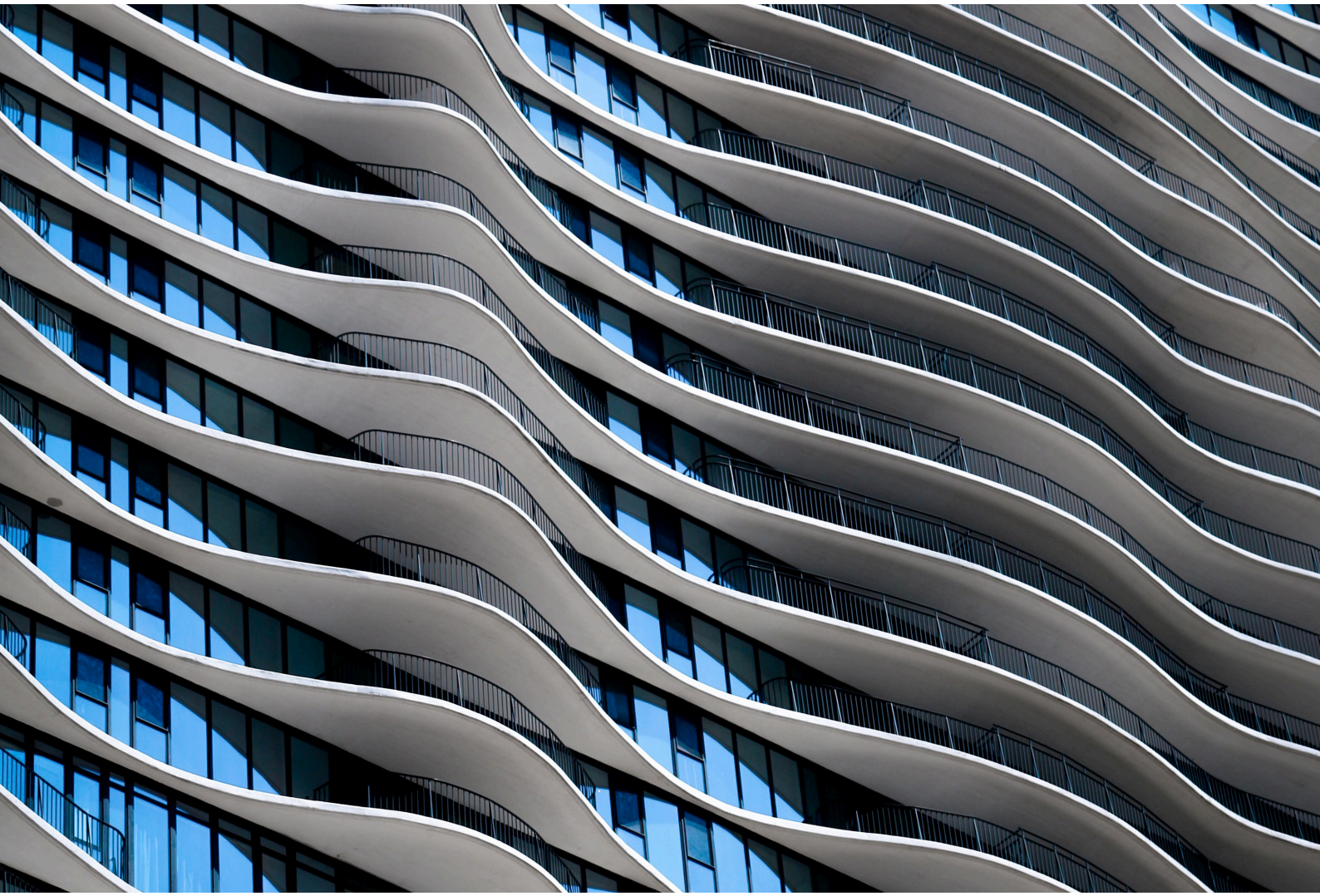

Smart Cities

Whitepaper

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Executive Summary

The UN Roadmap for Sustainable Development Goal (SDG) investing calls on the financial industry to disclose and incorporate long-term risks and opportunities into investment decision making, implement sustainable investing strategies, scale up green financial instruments, as well as measuring and reporting on impact.

More than half of the world's population live in cities. According to the UN, two-thirds of all humanity, 6.5 billion people, will be urban by 2050, and 90 percent of urban expansion will be in the developing world[14]. However, the rapid growth of cities is resulting in slums becoming a more significant feature of urban life, with inadequate and overburdened infrastructure and services and worsening air pollution. Cities account for about 70 percent of global carbon emissions and consume approximately 80 percent of global energy[14]. If cities are built or re-structured around long-term sustainable systems, a large share of the global sustainability challenges will be resolved.

At the same time, cities are powerhouses of economic growth contributing about 80 percent of global GDP[14]. Historical data suggest that on average, urban populations have higher living standards than in rural areas, and for many, cities provide a way out of poverty.

Making cities sustainable means creating career and business opportunities, safe and affordable housing, and building resilient societies and economies. It involves investment in public transport, creating green public spaces, and improving urban planning and management in participatory and inclusive ways. This whitepaper focuses on three central sub-themes that lay the foundation of success for smart cities; urban planning, mobility and water management. It introduces the sub themes' connection to the SDG targets and EU Taxonomy on Sustainable Finance.

Other Relevant Investment Themes are evident. Sustainable cities represent a broad investment field which can be split in several sub-themes. Cross-cutting areas like renewable energy, smart grids, energy storage, health services, waste management, ICT and connectivity are all important for sustainable city development. These themes overlap with other solution topics like Climate, Empowerment and Responsible Consumption and Production, and will be addressed in different whitepapers.

Urban Planning

including energy efficient and functional built environments, plays a central role to both mitigate and adapt to climate change worldwide. Buildings account for almost 40 percent of energy-related CO_2 emissions[13]. Green buildings have been graded as the segment with the highest investment potential in cities towards 2030, across all regions worldwide[12]. The investment case for resilient and energy efficient buildings is evident, since it provides instant monetary savings as well as GHG emissions reduction.

Mobility

is a major source of emissions and air pollution. Over 90 percent of urban inhabitants breathe polluted air which is above WHO's recommended limit[14]. As massive efforts are being set on reversing urban air pollution, investment in clean technology to counteract negative emissions to air will come into play. In 2018, research by the International Finance Corporation's suggests a combined USD 2.6 trillion investment opportunity in electric vehicles and public transport[12].

Water Management

is crucial to supply high quality drinking water, minimize water loss, and to adapt to climate change through resilient infrastructure. Climate-smart water systems are estimated to be the third most investable business opportunity worldwide, with a USD 1 trillion opportunity towards 2030[12].

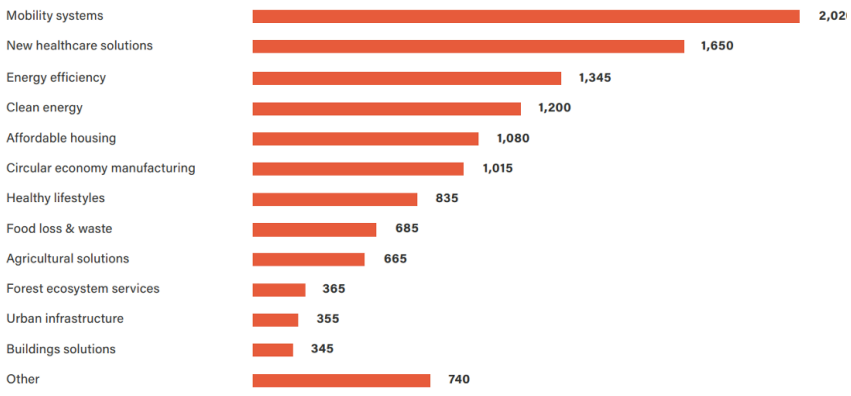
The SDGs as an Investment Theme

The UN Sustainable Development Goals (SDGs) were adopted by all United Nations member states in 2015. The SDGs represent a shared blueprint for global peace and prosperity towards 2030. The 17 goals highlight how ending poverty and conflicts can be realized alongside strategies that improve health and education, reduce inequality, contribute to economic growth while safe-guarding natural habitats, oceans and tackling climate change[1]. With the global effort to transition to sustainable societal development comes investment opportunities when new solutions need to be financed. The World Business Council for Sustainable Development (WBCSD) has identified SDG invest-ment opportunities across four economic systems: food and agriculture; cities; energy and materials; health and wellbeing. The economic gains of SDG investments can be significant. Predictions by the Copenhagen Consensus show that 19 of the 169 SDG targets can deliver more than $15 of good for society, environment and economy for every $1 spent[2].

The SDGs provide a common target and language of action to achieve sustainable development. This facilitates business opportunities when finance flows towards sustainable projects. The UN Roadmap for SDG investing calls on the financial

industry to disclose and incorporate long-term risks and opportunities into investment decision making, implement sustainable investing strategies, scale up green financial instruments, as well as measuring and reporting on impact[3]. Estimates show that a USD 12 trillion market value could be opened up by 2030 if the SDGs are realized, creating 380 million jobs in the process[4]. An estimate by WBCSD of the distribution of these investment themes is found in the figure below.

The Largest Business Opportunities Towards 2030 US$ billions: 2015 values*



*Based on estimated savings or project market sizings in each area. Rounded to nearest US$ billion. Source: Literature search; AlphaBeta analysis

Figure 1: The 12 largest business themes in world economy heading for the SDGs.
Source: Business and Sustainable Development Commission[5]

Solutions Theme: Smart Cities

Today, cities consume 80 percent of global energy and emit 70 percent of global carbon emissions[6]. Cities will become more densely populated with continued predicted growth. Since 70 percent of humanity is expected to live in urban habitats by 2050, sustainable urbanization is key[6]. Cities are facing an increased number of challenges, both related to climate change with severe droughts, storms and flooding, poor air quality and most recently the disruptive pandemic of Covid-19. To handle the challenges, city networks have emerged.

C40 is one of the most influential networks. It consists of the world's megacities that are committed to address climate change in line with the Paris Agreement 1.5 degree target. The network's primary goal is to deliver collaboration, knowledge sharing and data collection for sustainable action on climate change. Global collaboration between cities has been strengthened in the C40's channels to exchange information, plans and experiences for sustainable development. The corona crisis has been in focus lately, nudging collaboration over to the handling food systems, waste collection and treatment[7]. As a response to the corona pandemic, C40 mayors created the Global Mayors COVID-19 Recovery Task Force to rebuild cities and economies in a way that improves public health, reduces inequality and addresses the climate crisis[8].

If cities are built or re-structured around long-term sustainable systems, a large share of the global sustainability challenges will be resolved. Smart cities emerge as a concept. It is the result of efficient urban planning driven by low emission solutions. High quality of life is at the centre of functional services, housing, green spaces and seamless transport for the inhabitants. Decarbonization and re-structuring of old infrastructure in developed cities and new built areas in emerging economies provides investment opportunities that enable social advancement and resource optimization[9]. Cities provide opportunities to lift people out of poverty. Historical data suggests that on average, urban populations have higher living standards than in rural. Furthermore, access to electricity, improved sanitation, improved drinking water, access to clean fuels for cooking and heating is higher and child malnutrition is lower in urban areas. Investors can identify companies that contribute to sustainable urbanization worldwide by re-allocating capital to companies that operate in the space. If sustainable cities and communities are planned intelligently, we can achieve more equitable mobility and liveability.

Main SDGs Linked to Solutions Theme

Make cities and human settlements inclusive, safe, resilient and sustainable
Sustainable cities means attractive business opportunities, affordable housing, public spaces, clean surroundings, resilient societies and seamless transit. To reach this goal, investment is needed in public transport, green buildings and public spaces, sound urban planning and water and waste management.

Ensure availability and sustainable management of water and sanitation for all
City infrastructure is vital to obtain more efficient use and distribution of water. Water management needs to address increased demand, threats to water security and the high frequency and severity of droughts and floods resulting from climate change. To reach this goal, investment is needed in the entire water value chain, including exploration, water utilities, water purification, wastewater treatment and infrastructure.

There are many linkages to other SDGs, which will be described in the subsequent subcategories. Other relevant SDGs with crossovers will be described in other thematic whitepapers.

Investment Potential in Cities Towards 2030

Finance is a critical enabler for rapid improvements in existing industries globally. The OECD estimates that EUR 6.35 trillion a year will be required globally to meet the Paris Agreement goals by 2030[10]. The transition requires mobilization of finance from both the public sector, institutional and private capital. Investing in public transport, building efficiency and better waste management could save cities around USD 17 trillion globally by 2050 based on energy savings alone.[11]

Three sub-themes will be explored in this whitepaper. Criteria that have been evaluated are the themes' contribution to the SDG targets, weight in the EU Taxonomy on Sustainable Finance and investment potential in the research study on sustainable cities from the International Finance Corporation (IFC). The three investment themes of particular interest towards 2030 are green buildings and energy efficiency, low-emission transport and climate-smart water management. Figure 2 from IFC provides an estimate of the investment potential in these sectors worldwide towards 2030.

	East Asia Pacific	South Asia	Europe & Central Asia	Middle East & North Africa	Sub-Saharan Africa	Latin America & Caribbean	Total
Waste	$82 billion	$22 billion	$17 billion	$28 billion	$13 billion	$37 billion	$200 billion
Renewable energy	$266 billion	$141 billion	$88 billion	$31 billion	$89 billion	$226 billion	$842 billion
Public transportation	$135 billion	$217 billion	$116 billion	$281 billion	$159 billion	$109 billion	$1 trillion
Ciimate-smart water	$461 billion	$110 billion	$64 billion	$79 billion	$101 billion	$228 billion	$1 trillion
Electric vehicles	$569 billion	$214 billion	$46 billion	$133 billion	$344 billion	$285 billion	$1.6 trillion
Green buildings	$16 trillion	$1.8 trillion	$881 billion	$1.1 trillion	$768 billion	$4.1 trillion	$24.7 trillion
TOTAL	**$17.5 trillion**	**$2.5 trillion**	**$1.2 trillion**	**$1.7 trillion**	**$1.5 trillion**	**$5 trillion**	**$29.4 trillion**

INCREASING INVESTMENT

Figure 2: Investment potential in cities by region and sector to 2030
Source: International Finance Coorperation (2018), Climate Investment Opportunities in Cities[12]

Facts and Figures

70%
of humanity is expected to live in urban habitats by 2050

80%
of global GDP is generated in cities

90%
of urban inhabitants breathe air that does not comply with WHO safety standards

70%
of global carbon emission comes from cities

80%
of global energy is consumed by cities

90%
of urban expansion will be in the developing world

Rapid urbanization will set higher pressure on cities globally. Facts from UNDP[14]

Supporting Laws and Regulations

EU Green Deal - Finance and Industry Reforms

The European Commission established a Technical Expert Group (TEG) on sustainable finance in 2018 to make a guide for financing sustainable growth. In December 2019, the European Commission presented the European Green Deal, a framework and action plan to transform the European economy. The TEG's recommendations are designed to support the development of climate change mitigation and climate change adaptation. The result is the EU Taxonomy on Sustainable Finance, which is a classification system for approved sustainable business activities. The regulation was implemented by autumn 2020 and required to be disclosed by companies and investors by 2022[15].

Finance Reform	Economic Reform
• Sustainable Europe Investment Plan • Renewed Strategy on Sustainable Finance	• Rapid decarbonization of energy systems • Innovation in sustainable industry • **Large-scale renovation of existing buildings** • **Development of cleaner public and private transport** • Progress towards sustainable food systems

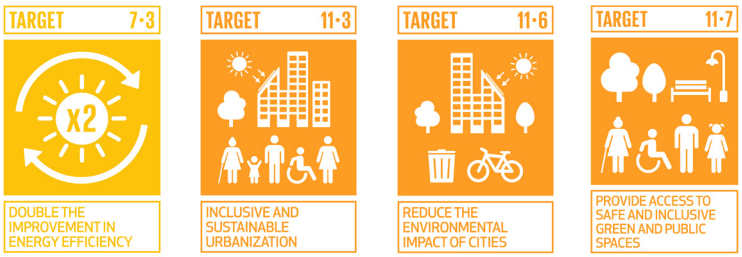
Renovation of buildings and clean transport are highlighted as central topics in economic reforms in the EU Taxonomy on Sustainable Finance[16]. These themes will be explored further in this whitepaper.

Sub Themes

This whitepaper focuses on three central sub-themes that lay the foundation of success for smart cities: Urban planning, mobility and water management. This section will introduce the sub themes' connection to the SDG targets and EU Taxonomy on Sustainable Finance.

Urban Planning

Urban Planning – Examples of Key SDG Targets



Large-scale renovation of existing buildings is one of five economic reforms presented in the EU Green Deal towards 2030. The Global Status Report 2017 of the Global Alliance for Buildings and Construction highlighted the need to reduce the energy intensity per m^2 floor space by 30 percent to reach the Paris Agreement. Buildings and construction contribute with tangible value creation. The construction sector accounts for over 10 percent of GDP in most economies and 50 percent of global wealth is locked up in building assets[17]. This represents an investment opportunity. An example of the monetary values that this investment opportunity represents, is made by the Business and Sustainable Development Commission (BSDC). BSDC predicted how incorporating the SDGs into core growth strategies and value chains open new opportunities and significant efficiency gains for companies. The BSDC found that the most promising segments within sustainable cities towards 2030 is affordable housing with annual business opportunities worth up to US$1,080 billion, and energy efficiency in buildings worth up to USD 770 billion[18].

Affordable Housing and Public Spaces

Innovation is required to optimize the use of new land and make better use of space for development. It is likely that improved urban planning and transport logistics will free up space in urban areas. This leads to more housing capacity and replacement of inadequate housing. High standards of living combined with low emission construction and affordable pricing is a very powerful tool to enable a just transition and even distribution of wealth among populations worldwide.

Energy Efficiency & Net Zero Buildings

In the EU, buildings are effectively the largest energy consuming sector, responsible for around 40 percent of energy consumption and 36 percent of CO_2 emissions[19]. Buildings are therefore the single largest energy consumer in Europe. Energy efficiency can be improved by reinforcements to the building envelope and insulation, separation of conditioned air and unconditioned air, building automation and optimized energy. At present, about 35 percent of the EU's buildings are over 50 years old and almost 75 percent of the building stock is energy inefficient[19]. Simultaneously, only about 1 percent of the

building stock is renovated each year. Renovation of existing buildings can lead to significant energy savings, as it could reduce the EU's total energy consumption by 5-6 percent and lower CO_2 emissions by about 5 percent[19]. Innovations such as retrofitting existing buildings with more efficient heating and cooling technologies and switching to efficient lighting and appliances, creates energy efficient buildings. Innovative methods in this space is a likely growth segment towards 2030. In addition to energy efficiency and sustainable building materials, net zero buildings can be achieved through renewable distributed energy systems. This can increase the uptake of renewable energy to reduce the stress put on centralized grids by buildings following indoor temperature regulation, lighting, heating of water and cooking.

Urban Heat Management

Heatwaves kill more people than any other climate risk. By 2050, 1.6 billion people living in over 970 cities, will be regularly exposed to extreme high temperatures[20]. The urban heat island effect entails that cities are typically 3 – 8°C warmer than rural areas, with mortality spikes of up to 14 percent during extreme heat waves[21]. Mitigating efforts are reflective roofs, green roofs, and vegetation that provides shade and cooling evapotranspiration. Using heat-absorbent building materials, preventing hot spots in built environment, transport and industries, and reducing air pollution could counter the heat traps. Sustainable heating and cooling using renewables can help mitigate the situation. Utilizing the interaction between waste and water streams, transport, buildings and renewables can optimize temperature exchange.

EU Taxonomy Technical Screening Criteria – Construction and Real Estate Activities

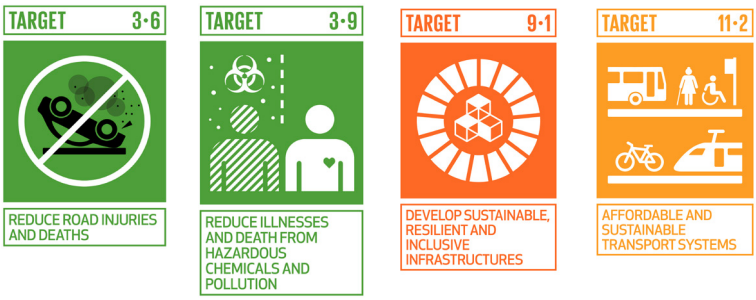
Economic Activities that Contribute to Substantial Climate Change Mitigation

Construction of new buildings	The construction of new buildings designed to minimise energy use and carbon emissions throughout the lifecycle can make a substantial contribution to climate change mitigation by saving large part of the energy and carbon emissions that would be associated with conventionally designed buildings.
Building renovation	The renovation of existing buildings to improve their energy performance makes a substantial contribution to climate change mitigation by reducing energy consumption and GHG emissions for the remaining operational phase of the buildings, and by avoiding emissions that would be associated with the construction of new buildings.
Individual measures and professional services	Individual measures make a contribution to climate change mitigation by reducing energy use and carbon emissions for the operational phase of the building. Professional services are a necessary support and validation mechanism, especially for building renovation. The investment linked to the individual measure(s) must be aimed at improving energy performance and/or reduction of carbon emissions.
Acquisition and ownership	The acquisition of buildings designed to minimise energy use and carbon emissions throughout the lifecycle instead of lower-performing ones can make a substantial contribution to climate change mitigation objectives

EU TEG Taxonomy Report - Technical Annex[22]

Mobility

Mobility – Examples of Key SDG Targets



A common challenge for major cities worldwide is to improve mobility infrastructure while reducing congestion, accidents and pollution. Mobility drives economic activity because it enables access to jobs, education, health services, production and distribution of goods and services. Transportation is the fastest growing source of GHG emissions and a significant contributor to climate change, accounting for 27 percent of global CO_2 emissions[23]. Fortunately, curbing emissions within transport is within scope. If cities combine automation, electrification and ride sharing, the transport-related emissions can be cut by 80 percent[24].

The EU Transport Council defines a Sustainable Transport System as a "system that allows the basic access and development needs of society to be met safely and in a manner consistent with human and ecosystem health. It should also promote equity within and between successive generations, be affordable, operate fairly and efficiently. Furthermore, a range of transport modes should be available, it should use renewable resources, limit emissions and waste within the planet's ability to absorb them and minimize the impact on the use of land and the generation of noise"[25].

The EU Green Deal focuses on the development of cleaner public and private transport as one of five economic reforms to be implemented by 2030. Within the transport sector, road transport is the largest source of emissions, as shown in Figure 3. Road transport accounts for more than two-thirds (72 percent) of transport-related greenhouse gas emissions[26].

Electrification and Automation

In order to contribute to climate neutrality, a 90 percent reduction in transport emissions is needed by 2050 compared to 1990. While cuts in emissions are an important driver, related benefits like improved road traffic safety, air quality and reduced congestions are evident. Transport automation covers technologies and control systems that can be implemented for automobiles and trucks, at ports, airports and distribution centres. Automation enables optimization of both traffic flow and capacity utilization. Electric transport combined with renewable electricity generation can reduce life-cycle emissions to near zero.

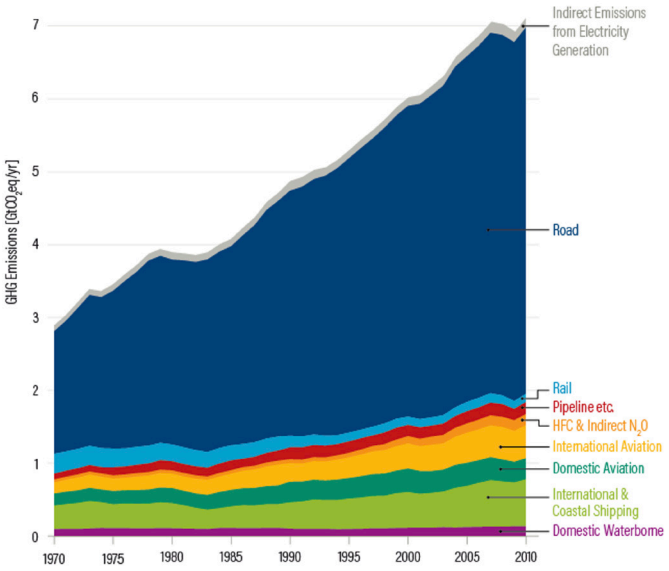


Figure 3: Origin of global transport emissions. Source: IPCC, WRI[27]

Personalized Mobility

Tailored mobility services need to include seamless logistics, compact, walkable, mixed-use communities that are centred around high-quality public transport. Ride sharing, mobility -as-a-service and functionality secures tailored mobility rather than individually owned vehicles. This is desirable to improve the transport needs of citizens, offering mobility at lower costs but also the availability of a wider range of transport modes. With rapid urban expansion, efficient urban planning and management needs to follow suit.

Micromobility

Compact cities enable walking, cycling and flexible individual transport modes. Flexibility is a valued asset, which is exemplified by the doubling of ridership using electric scooters and shared bicycles in the past year[28]. Cycle highways and designated streetscapes for Light Individual Transportation (LIT) or micromobility has emerged as prioritized infrastructure worldwide. Micromobility and LIT refers to small, lightweight transport modes operating at speeds typically below 25 km/h and ideal for trips under 10 km[29]. Micromobility can be owned individually or shared; electric or manual. Safe micromobility corridors create equitable access to more public infrastructure for a wider range of urban habitants.

EU Taxonomy Technical Screening Criteria – Transportation and Storage

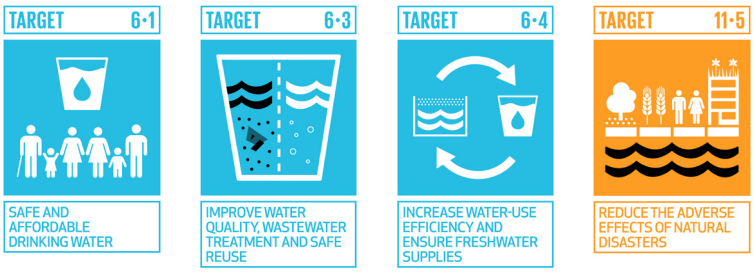
Economic Activities that Contribute to Substantial Climate Change Mitigation

Passenger Rail Transport (Interurban)	Demonstrate substantial GHG emission reduction by increasing the number of low- and zero emission fleets. Improving fleet efficiency and improving efficiency of the overall transport/mobility system
Public transport	Urban and suburban passenger land transport (public transport) with low- and zero emission fleets, improved fleet efficiency and the efficiency of the overall transport/mobility system
Infrastructure for low carbon transport (land transport)	Infrastructure for low carbon transport and land transport including construction of roads and motorways, construction of railways and underground railways and construction of bridges and tunnels
Passenger cars and commercial vehicles	Increasing the number of low- and zero emission vehicles, and improving vehicle efficiency
Freight transport services by road	Increasing the number of low- and zero emission vehicles, and improving vehicle efficiency. Increasing substitution of fossil fuels with sustainable alternative and net-zero carbon fuels.
Interurban scheduled road transport Inland passenger water transport Inland freight water transport	Increasing the number of low- and zero emission fleets, and improving fleet efficiency. Increasing substitution of fossil fuels with sustainable alternative and net-zero carbon fuels. Improvement in efficiency of the overall transport/mobility system
Infrastructure for low carbon transport (water transport)	Infrastructure for low carbon transport on water including the construction of water projects, construction of inland port and sea port infrastructure.

EU TEG Taxonomy Report - Technical Annex[22]

Water Management

Water Management – Examples of Key SDG Targets



Access to clean water is a prerequisite for human settlement. Water scarcity leads to great unrest, as experienced by Cape Town when record droughts from 2015 to 2018 almost made the city's taps go dry in 2019. Stable supply and careful conservation are necessary to ensure sustainable water consumption over time. Water demand is projected to increase by 55 percent globally between 2000 and 2050, mainly linked to manufacturing (+400 percent), electricity (+140 percent) and domestic use (+130percent)[30]. Climate change puts higher pressure on cities with the increasing frequency and intensity of extreme weather, unusual precipitation patterns and sea level rise. Water management in urban planning can therefore ensure less damage with increased precipitation patterns, secure efficient water treatment and integrate nature-based solutions to safeguard the water resources available.

Water Management and Flood Relief

Flooding is the most frequently occurring natural disaster, causing over USD 20 billion in economic damage worldwide in 2017[31]. In Europe, annual flood losses are expected to increase five-fold by 2050 and as much as seventeen-fold by 2080, which highlights the need for cities to build flood resilience[32]. The impact on both humans and ecosystems is large. Floods affect over 800 million people in 570 cities due to sea level rise, coastal flooding and flash floods[33]. The harm to infrastructure is both destructive and expensive. The economic value of assets at risk is expected to be around USD 45 trillion by 2050, a growth of over 340 percent from 2010[34]. Solutions to more resilient infrastructure includes monitoring systems for holistic water management, coastal wave breakers, dikes, drainage, retention, storage, infiltration, recapture, and integration of water in urban ecosystems.

Water Treatment and Efficiency

The World Bank calculates that 32.6 trillion litres of water is lost each year through leaks, split roughly in half between high- and low-income countries[35]. The treatment, pumping and heating of water requires enormous amounts of energy. Therefore, minimizing leakage in water-distribution networks significantly reduces water loss, energy use, and emissions.

More efficient water-consuming devices can further reduce water consumption. In total, water efficient appliances can reduce residential water use by 45 percent[36]. Water should be acknowledged as a precious resource. To illustrate, the risk of water shortages due to climate change affects 650 million people in 500 cities[37]. To safeguard the water resources, water distribution, wastewater and sewerage needs to be handled with as little energy and water loss as possible. Waterpipe repairs and renovation need to be upscaled to avoid leakages.

Nature-Based Solutions

Nature-based solutions to societal challenges can be defined as "solutions that are inspired and supported by nature, which are cost-effective and simultaneously provide environmental, social and economic benefits to help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions."[38]. In the context of water management, typical examples are the preservation of ecosystem functions through natural and built solutions to preserve water resources. Green walls, roofs, parks with water absorption capacity and surface water environmental engineering are typical examples. Solutions include water recycling, water harvest and water retention hollows to recharge groundwater and the protection of watersheds that supply urban areas[39]. The availability and quality of water can be enhanced by using the natural water cycle integrated with urban vegetation, surrounding wetlands and forests.

EU Taxonomy Technical Screening Criteria – Water, Sewerage, Waste and Remediation	
Economic Activities that Contribute to Substantial Climate Change Mitigation	
Water collection, treatment and supply	Water collection, treatment and supply with high energy efficiency of the system.
Centralized wastewater treatment	Treatment of wastewater in centralized systems (including collection and wastewater treatment plants), substituting treatment systems causing high GHG emissions (e.g. onsite sanitation, anaerobic lagoons).
Anaerobic digestion of sewage sludge	Treatment of sewage sludge in wastewater treatment plants or in other dedicated installation with the resulting production and utilization of biogas.
EU TEG Taxonomy Report - Technical Annex[22]	

Solutions Company Highlight

City Developments Limited

About

City Developments Limited (CDL) is a leading global real estate operating company with a network spanning 103 locations in 29 countries and regions. Listed on the Singapore Exchange, the Group is one of the largest companies by market capitalization. As a real estate actor focused on urban planning and urban sustainability, the company touches upon all three solution themes: Buildings, transport and water management.

CDL: Real Estate Sustainability Pioneer

Buildings play a major part in the global movement towards a low carbon economy, given their high emissions and impact on the environment. The World Green Building Council has set net zero carbon targets for new buildings by 2030, and for all buildings by 2050[41]. CDL has responded to this by setting ambitious sustainability targets for 2030. It has incorporated the SDGs, Science Based Targets in its core strategy.

Impact on SDG Targets

CDL has self-reported impact on 14 SDGs. The ten goals to the left are CDLs contributions to building sustainable cities and communities[40]. Carbon emission reduction by 59 percent and a 90 percent BCA Green Mark building certification by 2030.

Contributing to SDGs

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Appendix

EU Taxonomy on Sustainable Finance

EU Taxonomy Technical screening criteria that are important, but have not been included in the investment theme smart cities, will be addressed in different whitepapers. The relevant indicators are the following:

EU Taxonomy Technical Screening Criteria – Information and Communications	
Economic Activities that Contribute to Substantial Climate Change Mitigation	
Data processing, hosting and related activities	Storage, manipulation, management, movement, control, display, switching, interchange, transmission or reception of diversity of data through data centres, including edge computing.
Data-driven solutions for GHG emission reductions	Development and/or use of ICT solutions that are aimed at collecting, transmitting, storing data and at its modelling and use when these activities are exclusively aimed at the provision of data and analytics for decision making (by the public and private sector) enabling GHG emission reductions.

EU TEG Taxonomy Report - Technical Annex[22]

EU Taxonomy Technical Screening Criteria – Electricity, Gas, Steam And Air Conditioning Supply	
Economic Activities that Contribute to Substantial Climate Change Mitigation	
Production of Electricity from Solar PV	Construction and operation of electricity generation facilities that produce electricity from Solar Photo-voltaic
Production of Electricity from Wind Power	Construction and operation of electricity generation facilities that produce electricity from Wind Power
Transmission and Distribution of Electricity	Construction and operation of distribution Systems that transport electricity on high-voltage, medium-voltage and low-voltage distribution Systems. Construction and operation of interconnections that transport electricity between separate Systems.
Storage of Electricity	Construction and operation of facilities that store electricity and return it at a later time, in the form of electricity.
Storage of Thermal Energy	Construction and operation of facilities that store thermal energy, and return it at a later time, in the form of thermal energy or other energy vectors
District Heating/ Cooling Distribution	Construction and operation of pipelines and associated infrastructure for distribution of heating and cooling, ending at the sub-station or heat exchanger.
Installation and operation of Electric Heat Pumps	Installation and operation of electric heat pumps
Cogeneration of Heat/Cool and Power from Concentrated Solar Power	Cogeneration of Heat/Cool and power from concentrated solar power
Production of Heat/Cool from Concentrated Solar Power	Production of Heat/Cool from concentrated solar power
Production of Heat/Cool using Waste Heat	Production of Heat/Cool using waste heat in buildings

Electricity sources which could be integrated in urban context.
EU TEG Taxonomy Report - Technical Annex[22]

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Team Solutions

Philip Ripman

- Portfolio Manager & Head of Solutions, *Storebrand Asset Management*
- MA in Chinese Studies, and MA in Politics

Philip Ripman specializes within the areas of politics, climate change, the commercialization of sustainability and how to integrate the Sustainable Development Goals as investment themes.

Philip has held numerous positions within the company including Group Head of Sustainability. Through his engagement with Sustainability he has advised several governments and institutions on topics ranging from coal exclusions, environmental impacts of human activities to policy requirements to achieve international climate agreement targets.

Sunniva Bratt Slette

- *Portfolio Manager, Storebrand Asset Management*
- MSc in Industrial Economics and Technology Management (NTNU, 2016 and Ajou University, South Korea, 2014)

Sunniva joined Storebrand in 2017 as a Sustainability Analyst. In this role, her main focus areas were sustainability assessments related to the UN Sustainable Development Goals. She was responsible for the carbon footprint of investments and following up green bonds, and worked with the team on topics like corruption, human rights and environment. As an Investment Analyst for the Solutions team she focuses on research and portfolio construction of solution companies, companies with products and services that significantly contributes to the UN Sustainable Development Goals.

Ellen Grieg Andersen

- Assistant Portfolio Manager, *Storebrand Asset Management*
- Master's degree in International Economics (Lund University, 2018) and a BSc in International Business in Asia from Copenhagen Business School (2017), including a semester at Fudan University in Shanghai (2016)

Ellen joined Storebrand Asset Management's funds team in 2019 as a Project Manager trainee. In this role, she was involved in the project planning of internal processes and communication of the company's sustainability work. She also participated in the graduate program "Future Impact". As Solutions team Investment analyst she focuses on research and portfolio construction of solution companies, which means companies with products and services that significantly contributes to the UN Sustainable Development Goals.

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