



The **15 circular** steps for **cities**



Author: Jonas Byström, EIB

Illustrations: Chiara Continenza, EIAH

More circular information: www.eib.org/circular-economy

Contact: CircularEconomy@eib.org

European Investment Bank, December 2018

The 15 circular steps for cities

Why a circular economy?

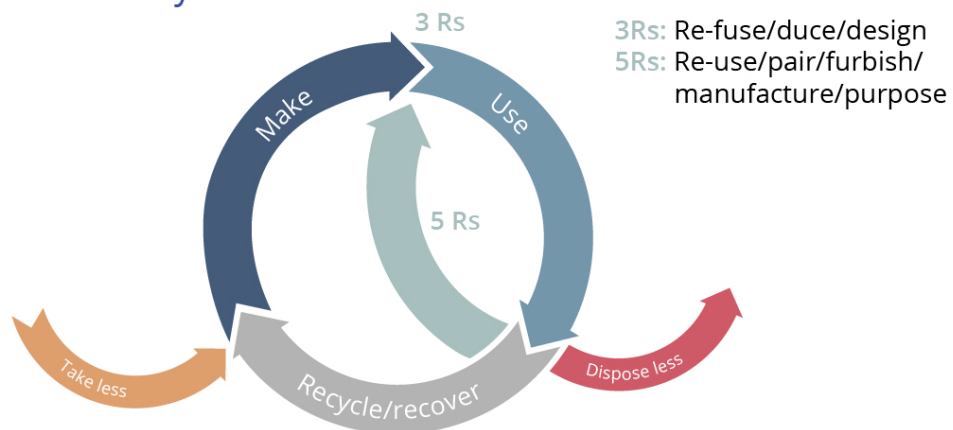
With a quickly growing global population and prosperity, the increasing consumption and related extraction of often scarce and finite resources is unsustainable. This prompts a shift from our current linear take-make-use-dispose production and consumption approach to a more circular economy, where we maximise the use and utility of resources, products and assets, and minimise resource consumption and wastage in all forms.

In its most simple form the circular economy transition can be depicted in the following way.

From a **linear economy**:



to a **circular economy**:



The transition from a linear to a circular economy

The transition to a circular economy not only conserves resources, but also reduces environmental and climate impacts. At the same time, it fosters innovation and thereby increases competitiveness and creates new jobs.

While this approach may seem new and revolutionary, the “Waste Not” mantra of the circular economy was a central principle in our society until the industrial revolution introduced a culture of mass production, consumption and disposal. In a sense, the transition to a circular economy therefore involves going forward to the past.

What problems are facing cities today?

On a global scale, cities use about 1% of the land area¹, and house about 55% of the world population (almost 75% in Europe). With increasing urbanisation, the share of the population living in cities is expected to increase to 70% on a global scale by 2050, and up to 85% in Europe².

Cities generate about 85% of global GDP. In doing so they consume about 70% of global resources and 70% of all energy generated. Furthermore, they emit 70% of all greenhouse gases and generate about 50% of all waste. Cities also waste assets, resources, utilities, space and time. For example, a car is parked more than 90% of the time on average, 30% of food is wasted, and the average office is used only 35-50% of the time.

As a consequence, many cities suffer from what could be called linear externalities, for example emissions to air and water, noise and congestion. They are also exposed to the linear risks related to increased demand for resources and diminishing supplies. This shows that linear cities are not sustainable, and makes a good case for **change**.



Examples of wastage and linear externalities in today's linear cities

Why are cities relevant in the circular transition?

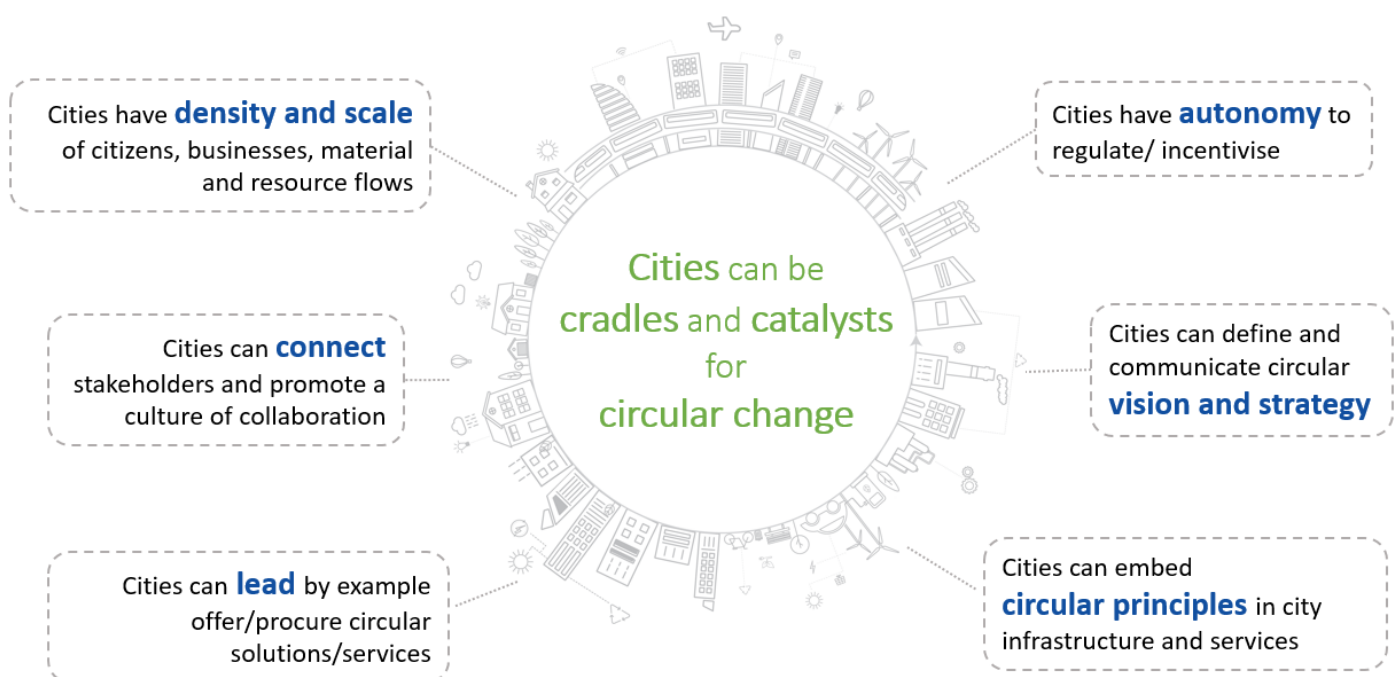
Cities have a density and concentration of producing businesses and consuming citizens that generate material and resource flows with circular potential. Most cities also have a scale that on the one hand enables quick decisions, building on the autonomous power to regulate and incentivise, and on the other hand is large enough to enable the establishment of new circular city functions and services, and circular business models. Cities also have infrastructure, utilities and services with circular potential.

¹ <http://www.newgeography.com/content/001689-how-much-world-covered-cities>

² <https://population.un.org/wup/Download>

What is also relevant is that cities have administrations that can define and communicate a circular vision, define a circular strategy and embed circular principles in city functions and services, and thus create a good framework for the circular transition. City administrations can also lead by example, e.g. offering and/or procuring circular solutions and services. Finally, city administrations have the ability to build circular awareness and promote a culture of collaboration among all stakeholders.

In summary, a circular city is not the sum of its circular activities. It must also fully realise and exploit its potential to be a **cradle for circular development**, and use its governance tools and levers as **catalysts for circular change**.



Cities as cradles and catalysts for circular change

What will a circular city look like tomorrow?

Central for a circular city is that it conserves and reuses resources and products, shares and increases use and utility of all assets, and minimises resource consumption and wastage in all forms.

Circular cities have modular and flexible buildings designed for reuse/repurposing, to enable effective utilisation, and for disassembly rather than demolition, to facilitate reuse and recycling. They use renewable, local energy production, e.g. powered by the sun, wind or secondary resources to the extent possible.

Citizens use shared, clean and effective mobility systems, powered by renewable energy to the extent possible, and where possible automated with sharing and on-demand services.

A local urban bio-economy ensures that all organic waste and by-products are recovered and used as feedstock for nutrient or chemical recovery, with residues used for energy generation and later returned to the soil. Urban farms recycle organic waste and by-products, reuse water and waste heat and produce vegetables for the local market.

Waste and wastewater generation is minimised, with maximum value recovery, and residues are processed for return to soil or use in urban farming.

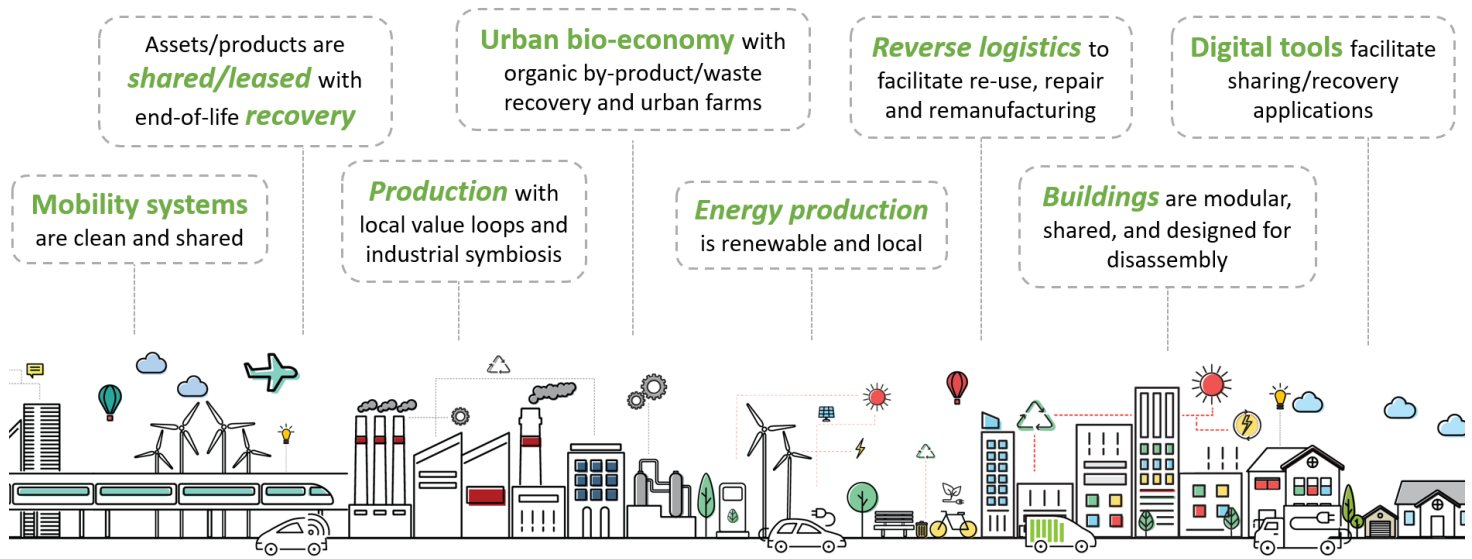
Production and consumption is localised to the extent possible, with local product and material return loops and residue recovery. Companies are located in industrial clusters and matched to facilitate and enable industrial symbiosis where residues, by-products or waste heat/water generated by one company can be used by another, thereby saving feedstock costs for one company and waste management costs for the other.

Transport companies increase the efficiency of their operations by engaging in reverse logistics for take-back and returns of products for reuse, repair and remanufacturing for products and recycling for materials.

Circular test-labs, repair shops and sharing centres are available throughout the city to enable and encourage citizens and entrepreneurs to test and practice their new circular ideas and business models.

Digital tools facilitate asset/material tracking, and product/material/service exchanges facilitate sharing applications, industrial symbiosis and monitoring of circular progress.

Circular cities are regenerative and resilient to diminishing resource supplies and to climate change. They are also clean, prosperous, liveable, and therefore attractive for citizens and companies, and for city planners and decision-makers.



A circular city tomorrow

The 15 circular steps for cities

The journey towards circularity in a city involves planning, acting on different levels and mobilising stakeholders, as elaborated further in the 15 steps below.

Plan

As an important first step, the city administration together with all relevant stakeholders should look at the current linear issues and future circular potential, and then map out a circular way forward. This comprises the following three steps:

1) Characterise and analyse local context and resource flows, and identify idle assets:

The focus of a circular transition must be on the economic and industrial profile of a city, identifying the sectors with highest wastage and potential for increased product and asset use/utilisation, waste minimisation and closing of material loops. This can be done through an urban metabolism study that maps all resource flows. Some cities have employed resource brokers to help companies identify wastage and possibilities to increase circularity in local value loops. Idle or underutilised buildings and other assets must also be identified.

2) Conceptualise options and prioritise among sectors with circular potential: Trying to pursue circularity on all fronts at the same time may be challenging, and successful circular cities usually identify a few target sectors that are important in their socio-economic context and have a high potential for creating and closing local value loops and increasing use of idle assets. Commonly targeted sectors are construction, food and beverages, trade, electric and electronic equipment, and textiles.

3) Craft a circular vision and strategy with clear circular goals and targets: A circular vision for the circular transition will serve as a guiding light for further strategic planning and implementation. Defining this vision should be done in a participatory manner, ensuring involvement and buy-in from all relevant stakeholders.

The circular vision provides the basis for preparation of a strategy for the circular transition with goals and targets for development and division of tasks and responsibilities for all stakeholders. The strategy should cover all relevant city functions and services, as well as the identified target sectors and business activities with circular potential. The preparation of the strategy should involve all relevant stakeholders (for example citizens, businesses, research and teaching institutions, media and civil society) and offer opportunities for awareness-building and fostering a culture of collaboration.



Act

With the circular potential of a city translated into a vision and strategy for circular development, the city administration and relevant stakeholders can start the implementation through a number of key actions outlined below.

4) Close loops by connecting waste/residue/water/heat generators with off-takers and users of such secondary resources: This is one of the central themes in a circular city and should be at the core of the journey towards circularity. The urban metabolism study prepared as a basis for the strategy will identify local value loops that can be closed. Material brokers may interact with companies to help them identify residue streams, wasted heat or water that could be used as feedstock or inputs for other companies. Efforts should also be made to increase the collection and recycling of organic waste streams and by-products for use in bio-refineries, urban farms or for energy production, with residues returned to soils.

5) Consider options for extending use and life of idle assets and products: This can be achieved by establishing reuse and repair centres, helping companies to go from linear sale of products to new sharing, leasing and product-as-service business models, and by repurposing or promoting the sharing of idle and abandoned buildings and other assets. Such measures will not only save costs, but also extend the life and utility of assets and products and facilitate value recovery at end-of-life. Supporting the set-up of **reverse logistic networks** that facilitate the return and take-back of products for repair and remanufacturing is an important enabler.

6) Construct and procure circular buildings, energy and mobility systems: Many cities have a steady influx of new citizens due to urbanisation and migration, and the building stock is also aging, which creates demand for new buildings, energy and mobility systems. The demand for new buildings should be met by planning, procuring and constructing circular buildings. Such buildings are flexible and modular, designed for repurposing to extend their life, and as material banks for disassembly instead of demolition to facilitate reuse and recycling. Energy systems should be planned on the basis of renewable energy sources and local generation to the extent possible. Mobility systems should be planned with a view to increasing efficiency, reducing congestion and reducing emissions. They should be shared and where possible automated and on-demand.

7) Conduct circular experimentation – address urban problems with circular solutions: There is not one formula for circularity in cities, and developments can and should not follow a static circular blueprint. City administrations should instead encourage testing and experimentation with new circular concepts, approaches and business models. This can be facilitated by establishing circular labs and possibly a flexible regulatory framework under which new business models can be developed and tested. By establishing circular support hubs or similar, cities can encourage and help entrepreneurs to develop their circular ideas into viable businesses.

8) Catalyse circular development through regulation, incentives and financing:

Regulatory sticks and incentive carrots should be used as tools and levers for circular change. Charging the full cost, including externalities, for waste management and other environmental services is a good start. Ideally, this should include a differentiated fee structure that incentivises reduction, reuse and recycling over disposal.

Providing or subsidising land for circular clusters is an effective way of promoting industrial symbiosis, as is introducing circular requirements in licensing and permitting.

City administrations have an important role in supporting circular start-ups in securing access to financing. Where justified, this can take the form of grants or subsidies, or guarantees to secure access to external financing.

9) Create markets and demand for circular products and services – be a launching customer:

Public procurement amounts to about 15% of GDP in the EU. By applying circular principles and criteria in procurement of construction, products and services, city administrations can contribute to demand and help establish best practice. Cities can also encourage the inclusion of secondary raw materials in packaging and products by setting such requirements in their procurement criteria or through voluntary pledge programmes.

10) Capitalise on new ICT tools supporting circular business models: Identifying and offering underutilised assets or products to clients willing to share rather than buy or build is facilitated by digital tools such as asset or material exchanges where supply and demand can be matched. Many product-as-service business models also require asset tracking to facilitate return and take-back. The internet-of-things and other forms of smart development are both enabling and facilitating many aspects of circular developments, and circular and smart city developments should therefore progress in parallel. City administrations have an important role in identifying needs and demand for such tools and services, and should establish or support the establishment of the required infrastructure and tools.



Mobilise and monitor

11) Coach and educate citizens, businesses, civil society and media: Progress towards a circular economy does not happen solely in city administration offices, but also through creative ideas and entrepreneurial efforts in homes, offices and companies. In order to mobilise this creative force, it is in the city administrations' interest to disseminate the agreed circular vision and strategy, and then build awareness and understanding among their citizens and businesses to enable them to take part in and further the circular transition.

Mobilising education and research institutions, media and civil society will facilitate and increase the efficiency of such efforts.

12) Confront and challenge linear inertia, stressing linear risks and highlighting circular opportunities: Many individuals and companies are firmly rooted in their old linear patterns and business models, and benefit from not having to pay the full costs of linear externalities. This disincentivises companies to explore circular models.

However, with increasing awareness about the implications of resource scarcity, rising prices and volatility, competition from innovative circular companies, increased customer concerns and awareness, and potential regulatory changes, companies will have to pay more attention to future linear risks and value current linear benefits differently. This will focus attention on, and support the transition to, more circular alternatives such as product-as-service business models.

City administrations can have a role in building awareness about linear risks and circular opportunities and thus encourage innovation and transition from linear to circular business models.

13) Connect and facilitate cooperation among circular stakeholders: Circular developments and business models rely on cooperation among entities along value chains. City administrations are well positioned to connect and mobilise stakeholders by involving them in the circular planning and by establishing circular hubs and support centres.

Establishing waste, material or reuse exchanges facilitates value chain cooperation, as does the active matching of companies with potential for circular synergies to establish circular clusters built on industrial symbiosis.

14) Contact and learn from circular pioneers and champions: For cities taking their first circular steps, associating with and learning from cities that have reached higher levels of circularity can be inspiring, and help in navigating around obstacles and avoiding mistakes. Equally important is to identify circular champions in the local community that – with the combination of insight, energy and passion – can drive and inspire circular change.

15) Communicate on circular progress based on monitoring: This will help circular stakeholders follow the progress and focus their efforts. It will also mobilise new circular stakeholders and encourage further circular developments.

Monitoring and reporting on circular progress enables tracking of achievements towards the objectives and targets included in the circular vision and strategy, and may point at the need to change or intensify efforts on different fronts.



The **15 circular steps for cities** presented in the preceding sections are summarised in the table below.

The 15 circular steps for cities

PLAN	1. C haracterise and analyse local context and resource flows, and identify idle assets
	2. C onceptualise options and prioritise among sectors with circular potential
	3. C raft a circular vision and strategy with clear circular goals and targets
ACT	4. C lose loops by connecting waste/residue/water/heat generators with off-takers
	5. C onsider options for extending use and life of idle assets and products
	6. C onstruct and procure circular buildings, energy and mobility systems
	7. C onduct circular experimentation – address urban problems with circular solutions
	8. C atalyse circular developments through regulation, incentives and financing
	9. C reate markets and demand for circular products and services – be a launching customer
	10. C apitalise on new ICT tools supporting circular business models
MOBILISE/ MONITOR	11. C oach and educate citizens, businesses, civil society and media
	12. C onfront and challenge linear inertia, stressing linear risks/highlighting circular opportunities
	13. C onnect and facilitate cooperation among circular stakeholders
	14. C ontact and learn from circular pioneers and champions
	15. C ommunicate on circular progress based on monitoring

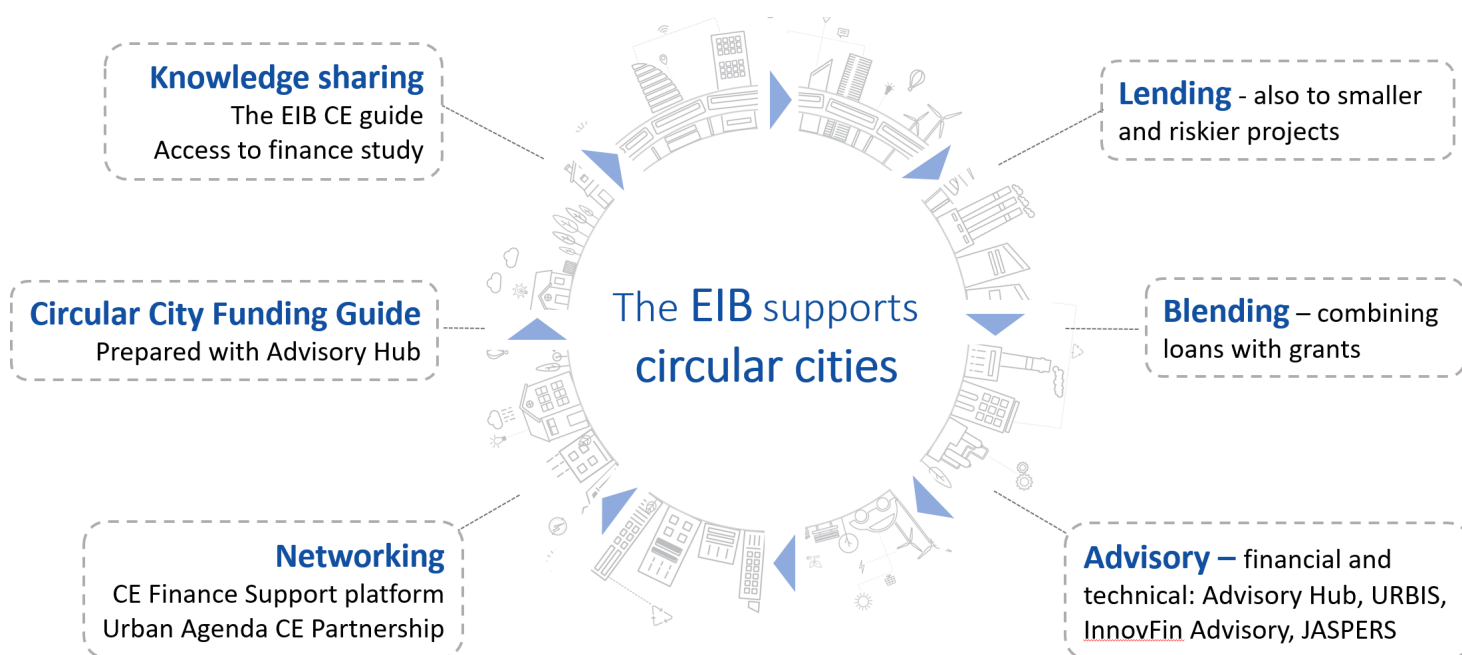
The EIB supports cities in their circular transition

As the EU bank, we provide lending on attractive terms to both public and private promoters, including for smaller and riskier circular projects. For cities we offer **municipal framework loans**, which are multi-scheme credit lines that can finance a city's circular investment programme. We also offer **intermediated lending** through other banks, which can finance investments in the city itself, its utility companies and private sector municipal service providers. We can also finance **Urban Development Funds**, which can be purely private or blended with EU or other public funds to invest in circular city projects, including through revolving funds. For circular economy projects with higher risk, the EIB also has access to guarantee facilities through the **European Fund for Strategic Investments (EFSI)** under the Investment Plan for Europe.

In addition to lending, the EIB provides financial and technical advisory to cities, in particular through the European Investment Advisory Hub, URBIS (a facility to support urban investment in the EU), Innovation Finance advisory, and JASPERS.

A summary of our involvement in supporting the circular city transition is given in the figure below. More information can be found in the ***EIB Circular Economy brochure*** and the ***EIB Circular Economy Guide***, both of which can be downloaded on www.eib.org/circular-economy.

In the context of the Urban Agenda Partnership on Circular Economy³, the EIB, in cooperation with the European Investment Advisory Hub (EIAH) is in the process of preparing a ***Circular City Funding Guide***, a web-based tool that will provide guidance to circular fund-seekers and funders in an urban context.



³ <https://ec.europa.eu/futurium/en/circular-economy>



The **15 circular** steps for **cities**



**European
Investment
Bank**

The EIB bank

years
60

European Investment Bank
98-100, boulevard Konrad Adenauer
L-2950 Luxembourg
☎ +352 4379-22000
www.eib.org – ✉ info@eib.org

© European Investment Bank, 12/2018

eBook: QH-05-18-130-EN-E ISBN 978-92-861-4038-9 DOI 10.2867/431882
pdf: QH-05-18-130-EN-N ISBN 978-92-861-4037-2 DOI 10.2867/39283