



Chapter 1 (Module 1)

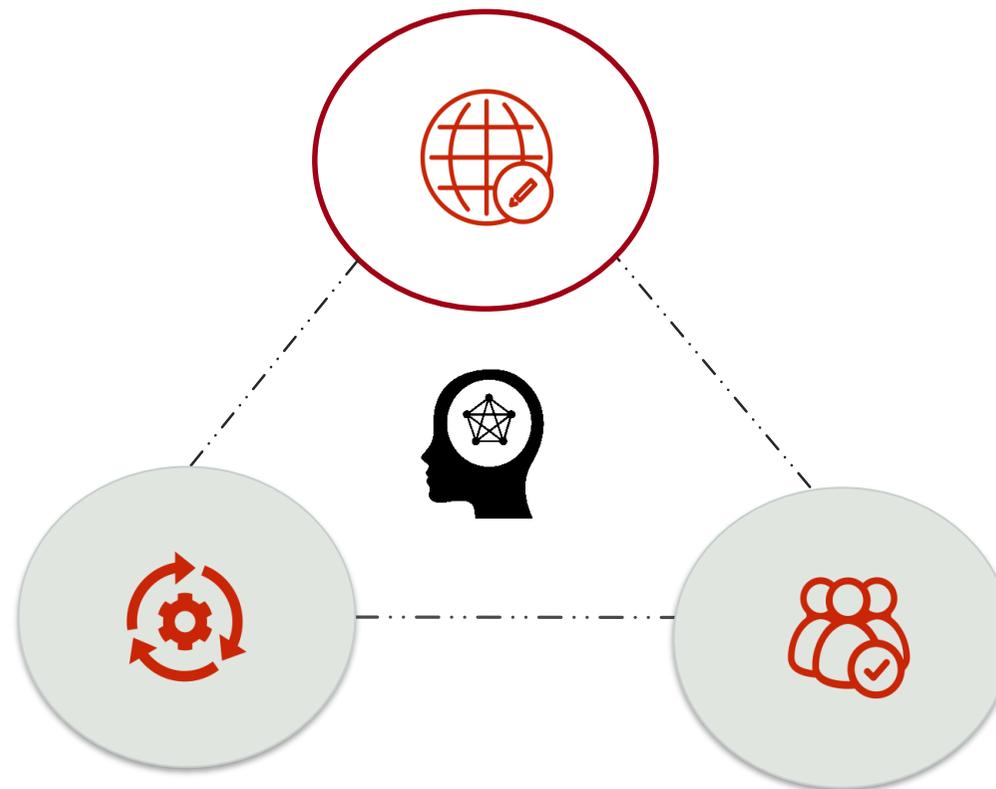
Introducing the Urban Nexus

The Urban Nexus Guide

The Urban Nexus Guide

Module 1: Linking Global Agendas and the Urban Nexus approach

Module 2:
Planning and
implementing
the Urban Nexus



Module 3:
Governing the
Urban Nexus

Learning Goals



1. Learn why integrated planning and resource management is critical to cope with rapid urbanization
2. Understand the rationale and approach of the Urban Nexus
3. Know the concept of a Circular Economy and be able to assess the situation in your city in this regard





1. Why integrated approaches to urban planning and natural resources management are needed



Rapid Urbanization



GLOBAL



Today: More than **50%** of the world's population lives in cities.



2050: **70%** of the world's population will live in cities



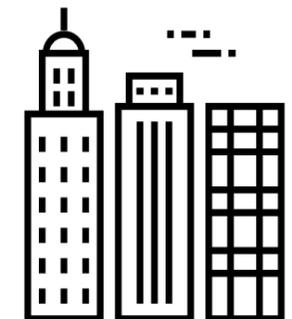
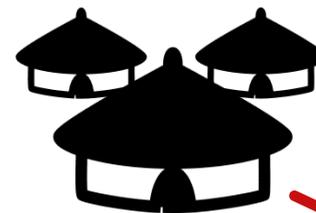
Source: Urban Hub 2016

ASIA PACIFIC

In Asia and the Pacific urban growth rates are highest.

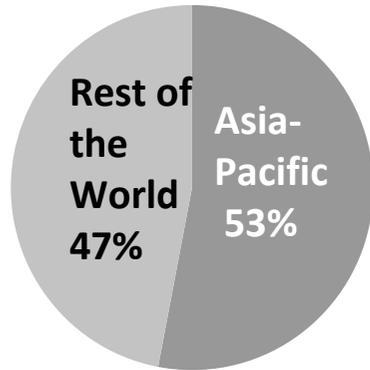
An additional **1.4 billion** people will be living in Asia's cities by 2050 on top of the existing 1.6 billion in 2010.

That translates into approx. **120,000** people per day



Source: World Migration Report 2015

Changing consumption patterns leading to pressure on limited resources



The Asia-Pacific region has become the world's **largest resource consumer** such as fossil fuel, construction materials (UNESCAP 2016). Cities are at the center of this unsustainable and inefficient resource use.



Energy demand is projected to almost **double** in the Asia and Pacific region by 2030 (UNDESA 2014).



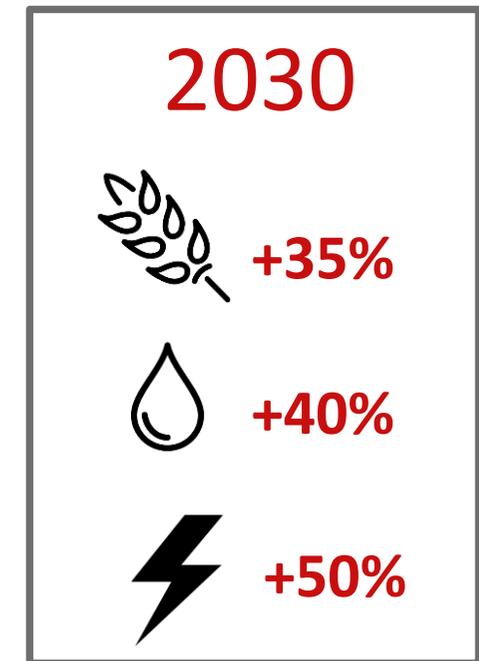
The Asia-Pacific is home to **60% of the world's population** but it has only **36% of its water resources**. By 2030, 40% of developing Asia is expected to face a severe water shortage (UNDESA 2014).



Food, Water, Energy, Waste and Land are of particular importance



- **Rising demands** for food, water and energy
- **Cities and their urbanizing regions** drive much of this demand
- Of all natural resources, **energy, water and food** are the most essential to sustain development efforts – but they are also the most vulnerable to future demand and the impacts of climate change
- **Land** is required for water, energy and food production and is a resource **becoming increasingly scarce** in the region
- Solid waste is increasingly becoming a problem in the Asia-Pacific region





- Resource management and urban planning are very much interlinked
- Des-integrated silo planning targeting only one sector at a time is no longer feasible and will fail to resolve the resource challenges of the 21st century.
- Truly integrated and holistic approaches to urban development and resource management are needed that help break barriers between sectors and stakeholders and thus utilize synergies.
- Time is a crucial factor





2. The Urban Nexus Approach





Prevailing situation on the ground

- Urban planning and management is often still done **along sectorial lines**
- Municipalities **do not utilize the synergies** of interactions across sectors and the benefits that could arise from integrated resource management and a circular economy
- **Project-based approach**



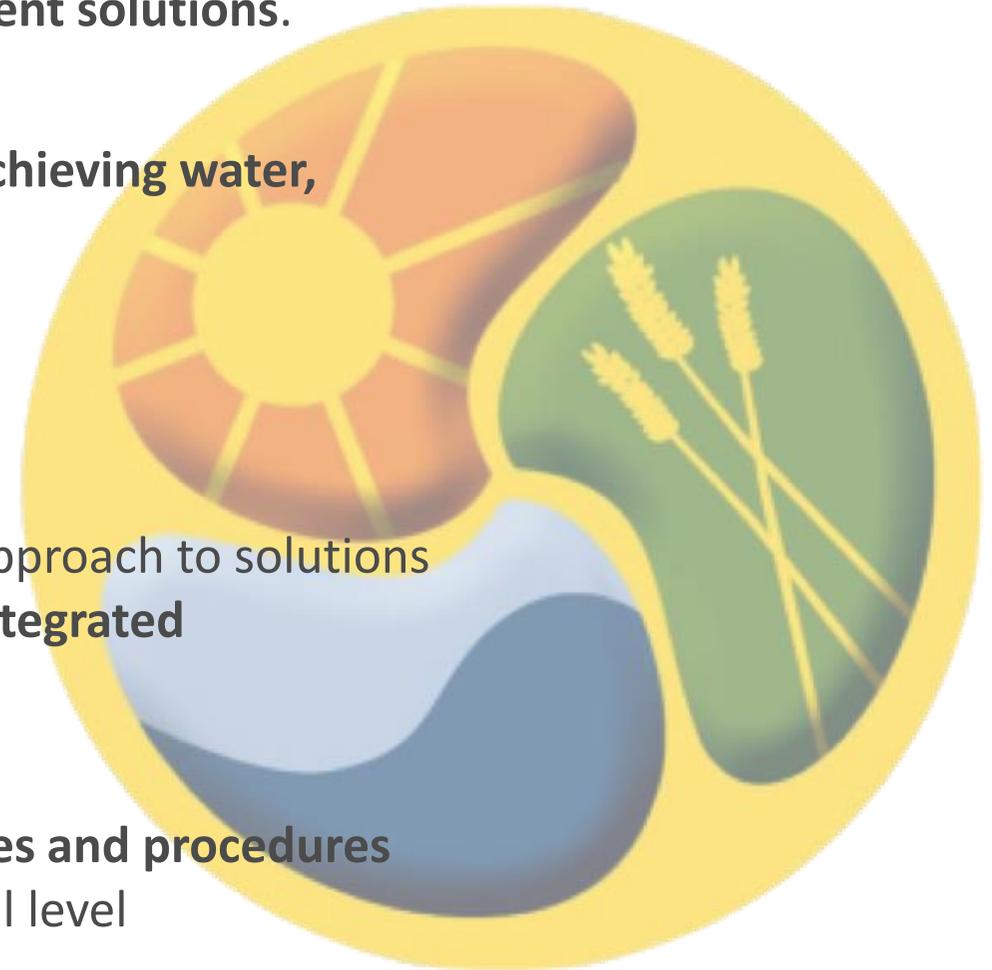
Beijing. ©Jens Schott Knudsen 2013





Aim of the Urban Nexus approach

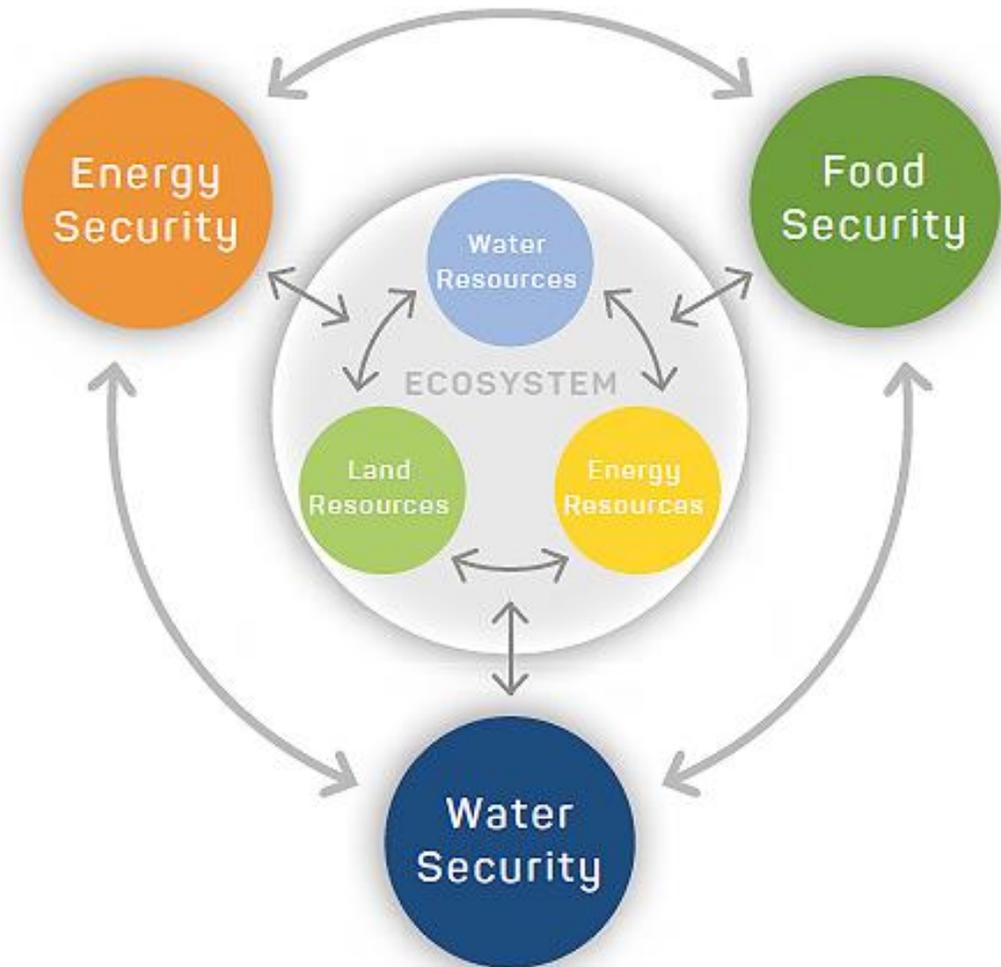
- ...seeks to **design sustainable urban development solutions.**
- ...highlights **the interdependencies between achieving water, energy and food security**
- ...is based on an **understanding of synergies**
- ...**is a fundamental shift** from a pure sectoral approach to solutions that embrace a **cross-sectoral, coherent and integrated perspective.**
-**challenges existing structures, sector policies and procedures** at global, regional, national, provincial and local level





Key resources of the Urban Nexus

- The "**supply securities**" water, energy and food depend on ecosystems and on each other.
- The **resources land, water and energy** (atmosphere) are part of this ecosystem and must be used and protected in a **balanced manner**.





Relationships across Core Nexus Sectors

Water/Energy



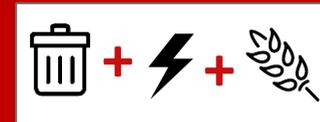
Food (Land)/Energy



Water/Food (Land)



Waste/Energy/Food (Land)



Treatment Plant

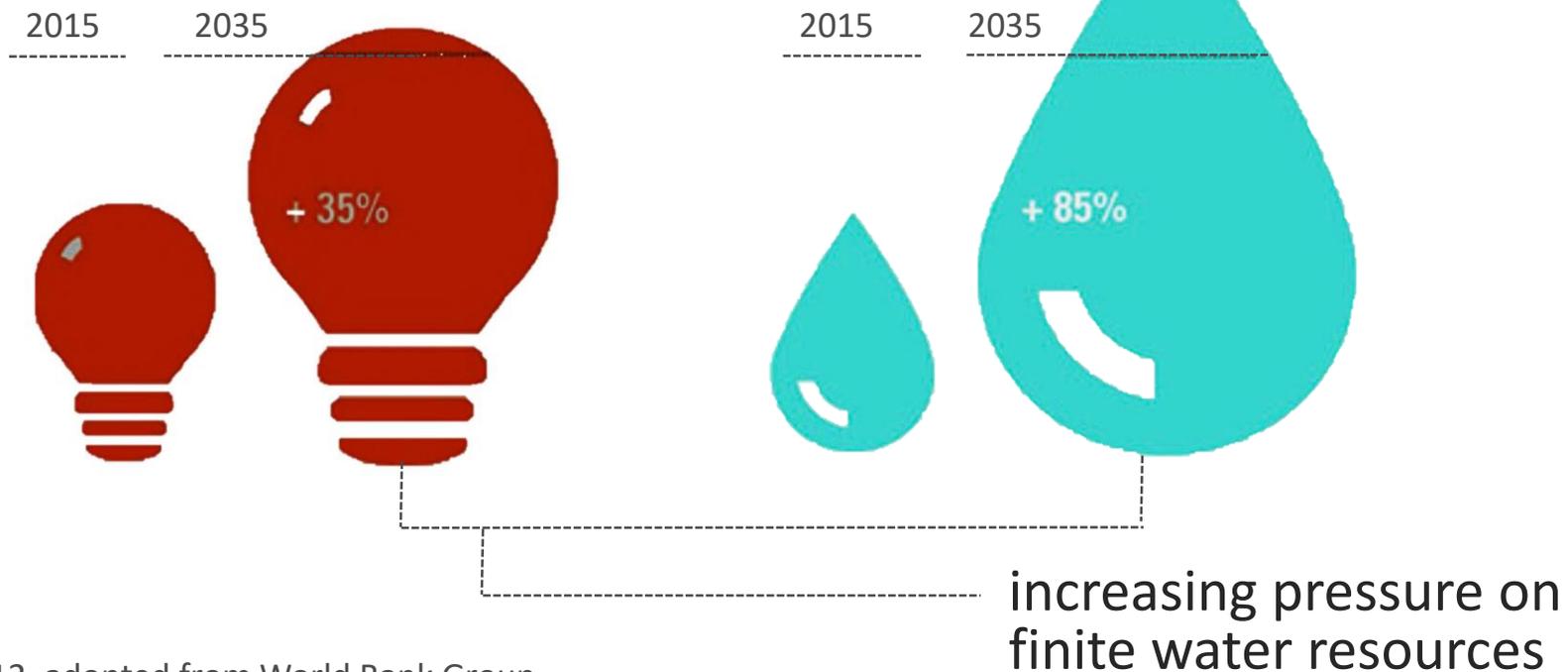


Relationships between Water and Energy



By 2035,
energy consumption
will increase by
35%

which
will increase
water consumption by
85%



Source: IEA 2012, adopted from World Bank Group



Water and energy are interconnected.

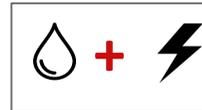
Water and energy are interlinked in two ways:

1. **WATER** is used in the production of nearly all types of **ENERGY** (coal, geothermal, hydro, oil and gas, nuclear)
2. **ENERGY** is the **dominant** cost factor in the provision of **WATER** and wastewater services (extracting and conveying water, treating water, distributing water, using water and collecting and treating wastewater).

Energy can account for up to 30% of total operating costs of water and waste water utilities.

On average 15% of the world's total water withdrawals are used for energy production

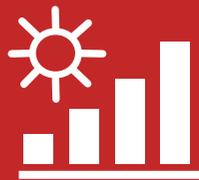




Risks for the Energy Sector



INCREASED
WATER TEMPERATURES



CLIMATE
CHANGE



SEA LEVEL
RISE



WATER
QUALITY



REGULATORY
UNCERTAINTY



DECREASED
WATER AVAILABILITY

Impact



Power plants shut
down or degraded
Power generation



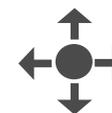
Hydropower capacity
degraded



Permits to locate power
plants or extraction
facilities denied



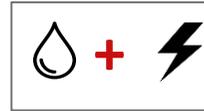
Financial losses



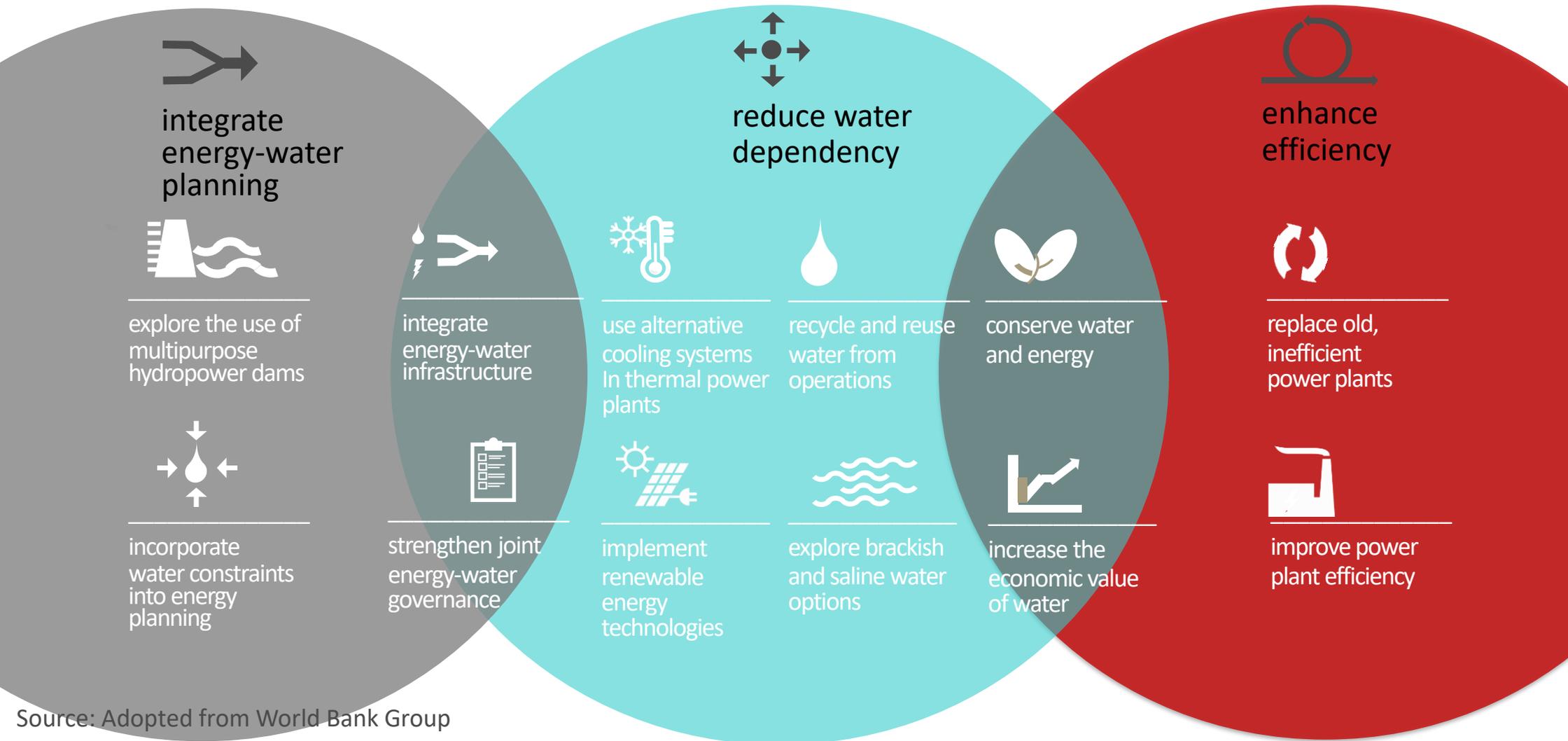
Social and political
instability

Source: Images adopted from World Bank Group





Solutions

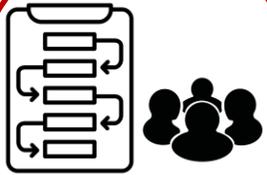


Source: Adopted from World Bank Group





Three key elements to achieve the Urban Nexus objectives



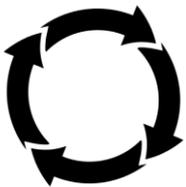
Governance, Planning and enabling frameworks (soft ware)

Horizontal and vertical governance; stakeholder engagement; empowerment of cities; urban-rural linkages



Physical infrastructure (hard ware)

Innovative engineering technologies and standards, semi-decentralized, cross sectoral infrastructure projects (grounded)



Circular economy approach



3. Circular Economy





Understanding the characteristics of a Circular Economy

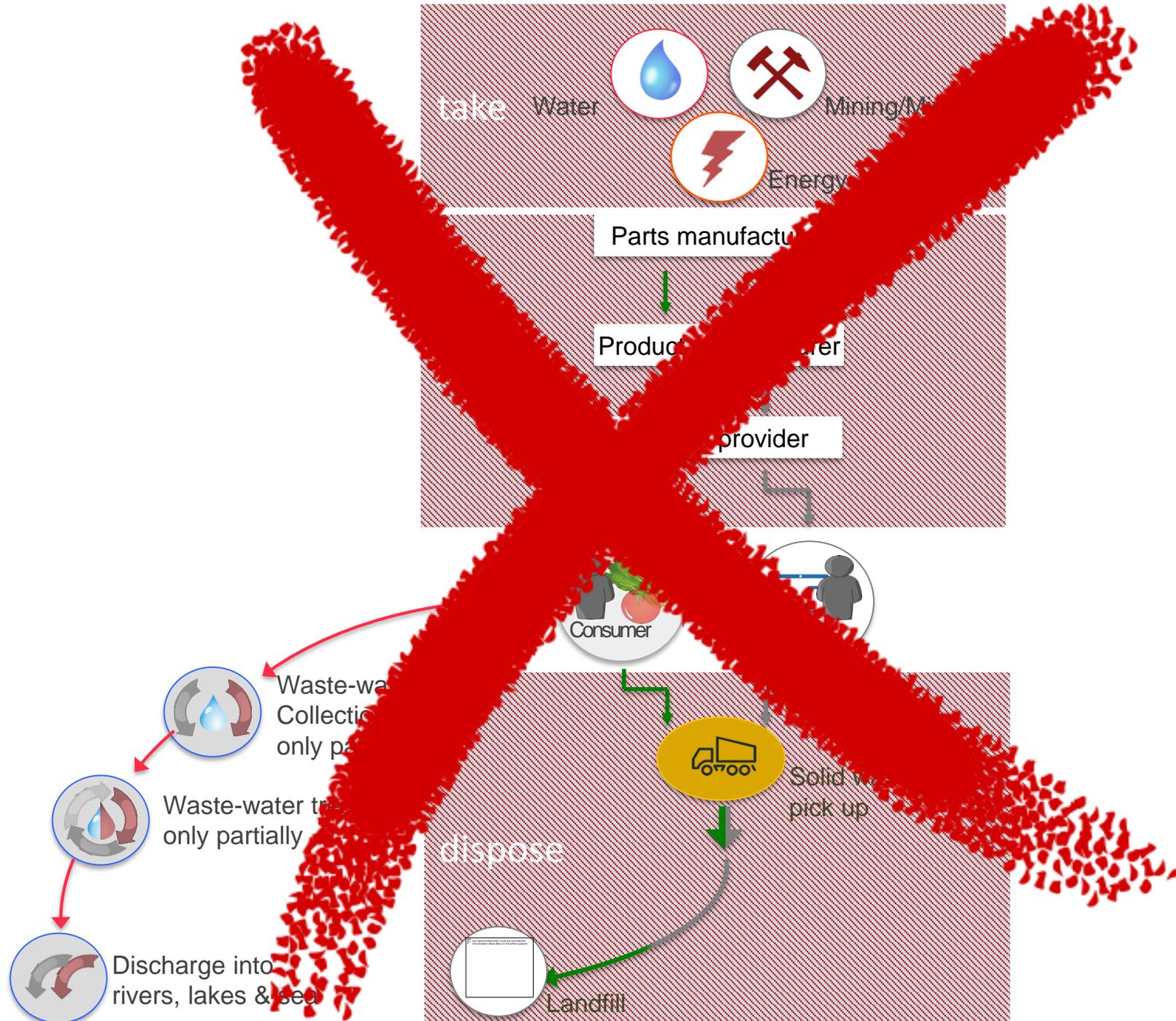
- ✓ The Circular economy is all about **systemic change**, not only individual projects
- ✓ The aim is to systematically **eradicate waste** throughout the life cycles and uses of products and their components
- ✓ An industrial economy that promotes **greater resource productivity, reducing waste and avoid emissions**
- ✓ **Decoupling** the economic and urban growth from resource use (e.g. wastewater for renewable energy generation, biomass as organic fertiliser, zero waste management and recycling)



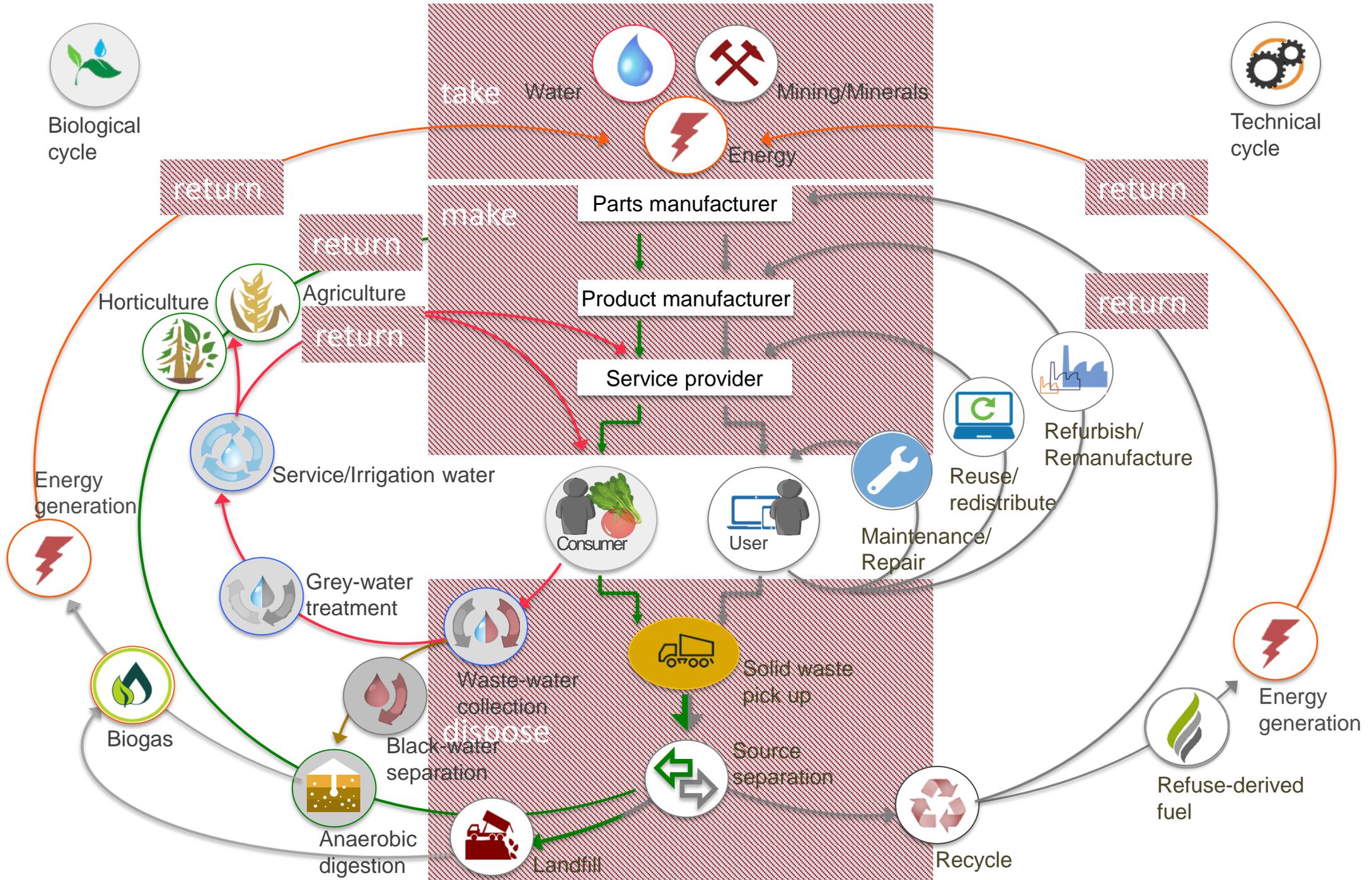
Source: <https://www.coara.co.uk/definitive-guide-circular-economy-businesses/>



Linear Economy



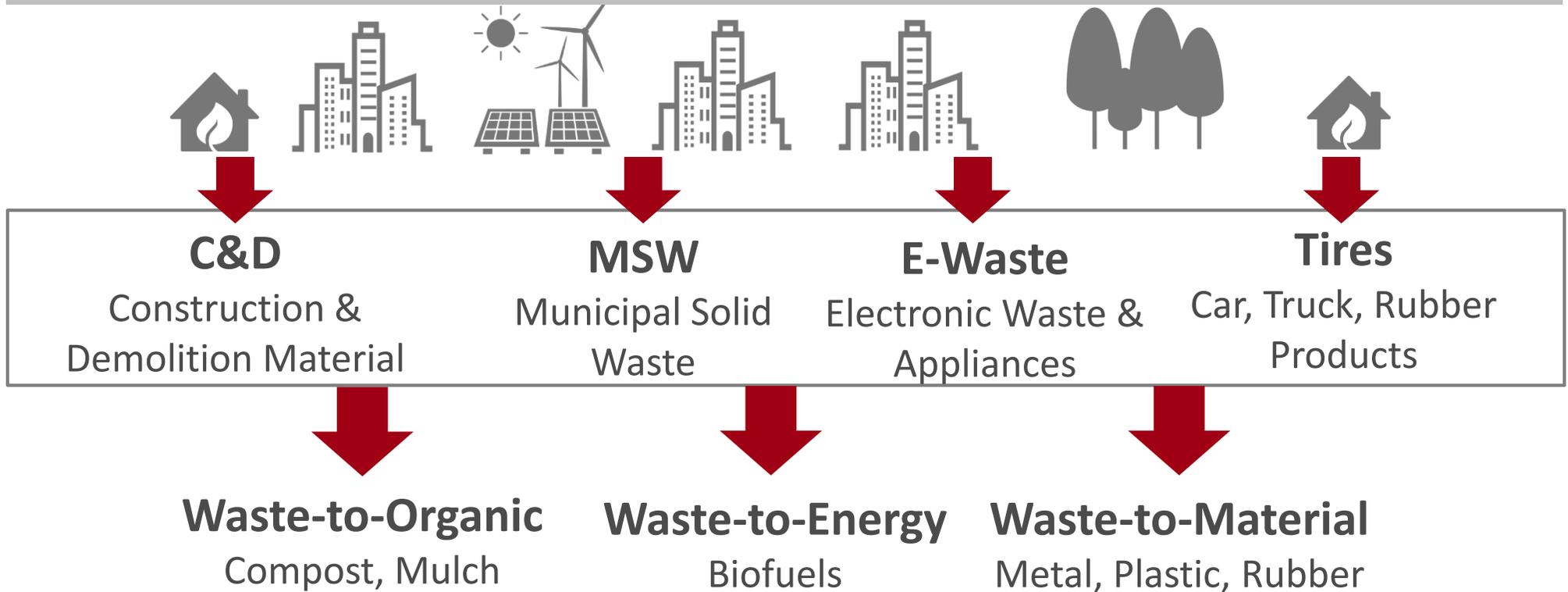
Circular Economy with Energy & Mass Flow Cycles





Circular Economy Example: Solid Waste Management

Promoting an alternative to the existing waste value chain:
Waste as a resource



Goal: Monetize urban waste streams in order to produce revenue, business and jobs; reduce pressure on natural resources

Source: Graphs adapted from German Development Institute / Deutsches Institut für Entwicklungspolitik. Illustration based on Jobeconomics.





Circular Economy Example: Solid Waste Management

Video: Liam – An innovation Story

