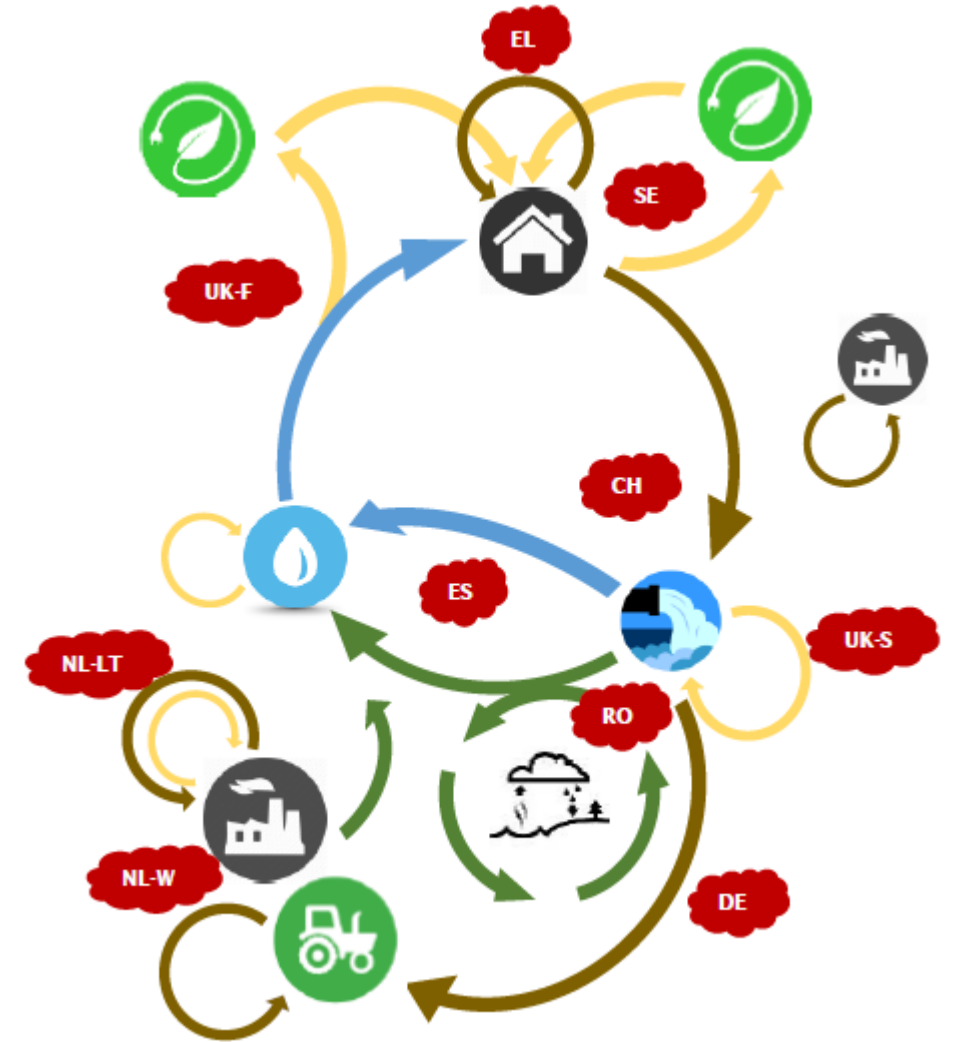




## Water Value chains

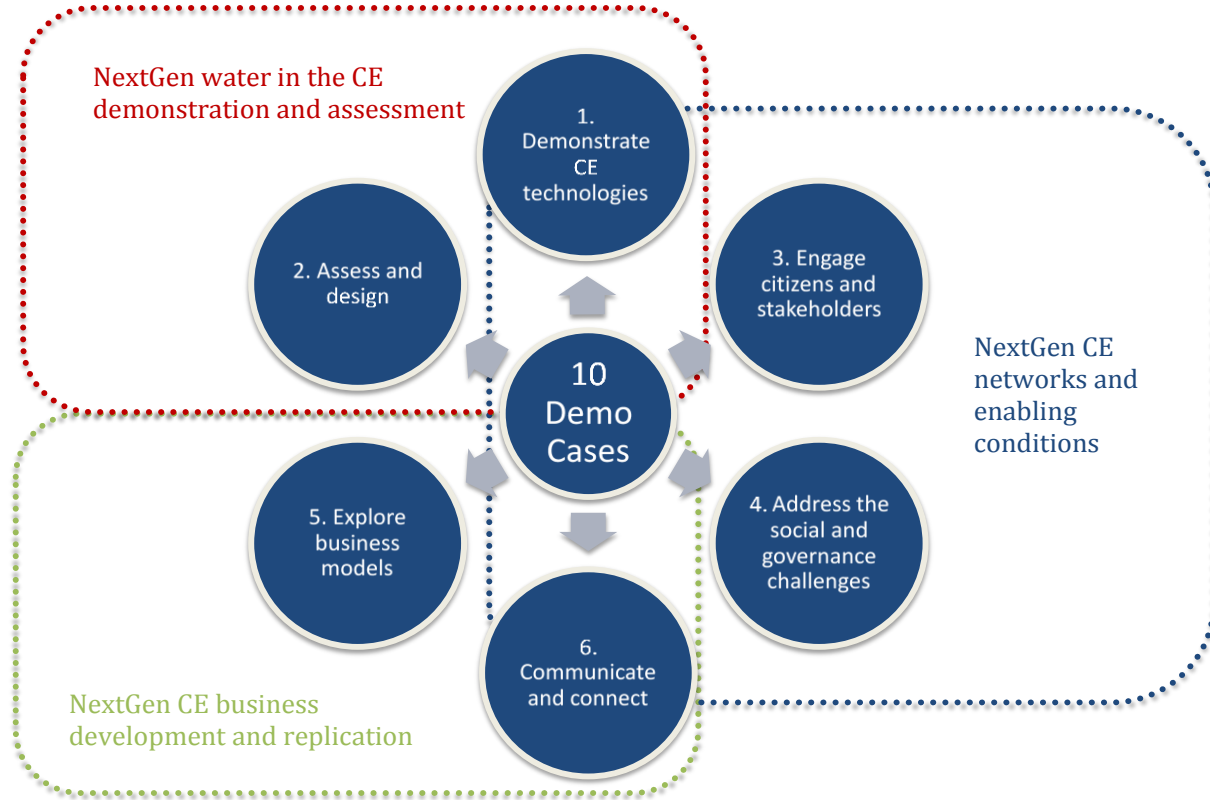
- *Water, Energy, Materials recycled*
- *10 Diverse Case Studies in 8 countries*
- *As a portfolio on **Next Generation Systems and Service***
- *Stakeholders and End-users involved*
- *Demonstrating technologies*
- *Engaging the citizens (Living Labs, Serious Gaming, Augmented Reality)*
- *Recommending governance innovation*
- *Introducing business models*





European Commission

## Water Value Chains: How / Where



CS	Name	NextGen Technologies & Circular Economy Approaches			Scale		
		Alternative Water Resources	Nutrient & material recovery and use	Energy & heat recovery and use	<0.1 MPE	0.1-1 MPE	>1 MPE
1	Braunschweig (DE)	Ammonia stripping (TRL 9)	Struvite precipitation (TRL 9)	Two-stage digestion (TRL 8 → 9)	Full-scale WWTP (320,000 PE)		
2	Costa Brava (ES)	Multi-purpose water reclamation and reuse (TRL 9)	Membrane filtration with regenerated RO membranes (TRL 5 → 7)		Large-scale region (20 WWTP, 1.1 MPE, up to 6.4 m <sup>3</sup> /year reclaimed water). Pilot demonstration.		
3	Westland Region (NL)	Water Cycle Westland: Rain water harvesting in combination with subsurface water storage and recovery (horticulture, urban water buffer) (TRL 7/8 → 9), water recycling in greenhouses (horticulture/(substrate) crop on water) (TRL 9), Collective water purification systems (horticulture) (TRL 6 → 8).	Water-Energy Cycle Westland: Heat Roundabout (TRL 5 → 7), HT-ATES: High temperature ATES (60-80 °C water) (TRL 4 → 6)	Resource Recovery Westland: Phosphate and energy recovery from waste water (TRL 9), Materials brokerage (TRL 6 → 9)	90 km <sup>2</sup> area; Full scale WWTP (1,2 Million households + 40 Thousand industries); excess heat supply of 100-150 PJ (industry) / demand 120-75 PJ (horticulture, cities)		
4	Altenrhein (CH)	Ammonia membrane stripping (TRL 7 → 8)	P-K-fertilizer production (TRL 5 → 7)	Sludge pyrolysis (TRL 5 → 6), Activated carbon production (TRL 5 → 6)	Full-scale WWTP (100,000 PE water, 300,000 PE sludge)		
5	Spernal (UK)	Multi-stream anaerobic MBR (TRL 7 → 8)	Nutrient recovery via adsorption/ion exchange (TRL 6 → 7)	Decentralized water reuse (TRL 6 → 8)	Full-scale WWTP (500 m <sup>3</sup> /d)		
6	La Trappe (NL)	Metabolic Network Reactor [MNR - plant root enhanced fixed bed bioreactor] (TRL 7 → 9) + NF/RO/ED to produce fit-for-purpose water (TRL 4 → 6)	C, N and P recovery + production of plant or microbial protein for reuse in the brewery (TRL 4 → 6)		Full-scale WWTP (360 m <sup>3</sup> /d)		
7	Gotland (SE)	Advanced rainwater harvesting incl. automatic control system for floodgates (TRL 5 → 7)	Decentralized membrane treatment of raw sewage for direct reuse and cost/energy reduction at centralized WWTP (TRL 5 → 7)	Climate neutral desalination (TRL 7 → 8)	Testbed 14 000 ha, 2000 PE, 300 000 tourists		
8	Eleonas, Athens (EL)	Sewer Mining modular mobile unit for urban non-potable water reuse (TRL 6 → 8)	Sludge treatment to produce fertilizer and biomass which be reused as part of a renewable energy solution (TRL 4 → 6)	Demonstrate system prototype for rainwater harvesting in operational environment and to qualify system (TRL 7 → 8)	Autonomous and modular water systems (25 m <sup>3</sup> /d)		
9	Filton Airfield (UK)	Integrated system of water reuse and surface water management (TRL 7 → 9)	Heat recovery from sewer (TRL 9)		140 ha area for re-development incl. 2700 new homes		
10	Bucharest (RO)	Advanced sludge and nutrient management reuse in agriculture (TRL 9)	Water reuse in industry (TRL 9)*	Use of (agro-food) industrial waste as additional carbon source for improved nitrogen removal (TRL 7 → TRL 8)	Sludge management for 5 ha cropland, feasibility study for 1.7 p.e. WWTP		
Explanation of colour code/scale indication		Alternative Water Resources	Nutrient & material recovery and use	Energy & heat recovery and use	<0.1 MPE	0.1-1 MPE	>1 MPE





## Added value by:

- **Demonstrating** CE technologies varying in scale, uses and social conditions
- **Assessing** the benefits of these technologies and solutions for exploitation (*NextGen Toolbox*)
- **Engaging** citizens and stakeholders to enhance acceptance of CE water systems and services (*Communities of Practice (CoP), Living Labs (LL), Serious Games (SG) and Augmented Reality (AR) tools*)
- Addressing **social and governance challenges** for upscaling and transferability of solutions (*evidence-based knowledge*)
- Exploring **business models /creating market opportunities** (*online MarketPlace*)