NEW TECHNOLOGIES FOR A RESOURCE-EFFICIENT CITY ENVIRONMENTAL SUSTAINABILITY IN URBAN CENTERS

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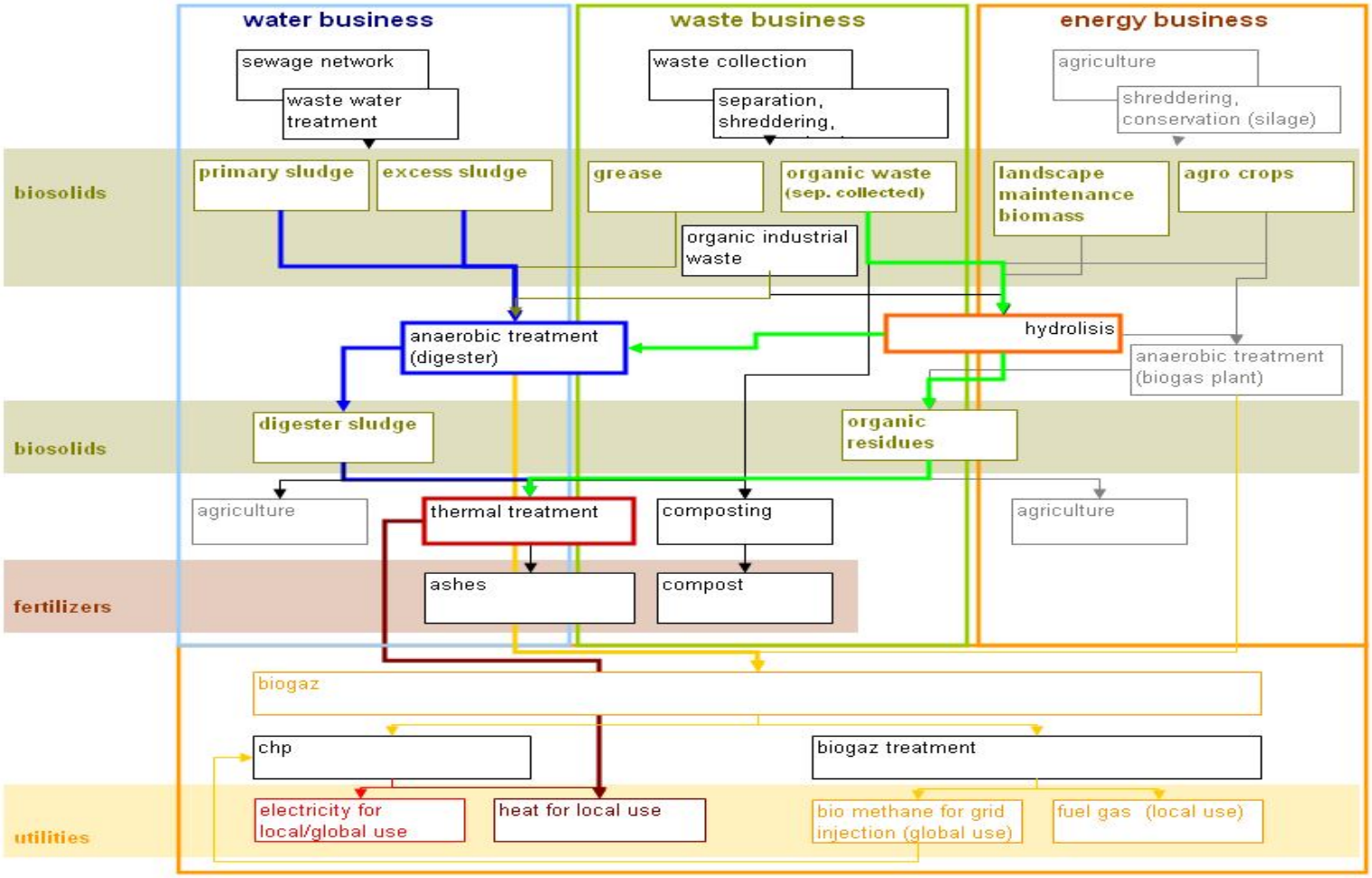
Main ideas

- **New technologies and innovation at the interaction between different sectors**
  - Water, energy and resources interactions
  - Waste, energy and resources interactions
- **Innovations for better data management and improved knowledge**
  - Sustainable asset management
  - Innovative products and solutions from smart meters & real time information
- **Innovation in business offers and contractual arrangements**
  - City Biose/LCA Biose measuring for progress for cities
  - Cities to integrate sustainable development criteria in tenders
  - Innovative environmental performance offer

Most innovation potential lies at the intersection of several industrial & economic sectors

- Effciencies and economy of scale in interlinkages between activities
- Flexibility and scalability to match end users needs
- Reduction of enery and resource losses along the value chain

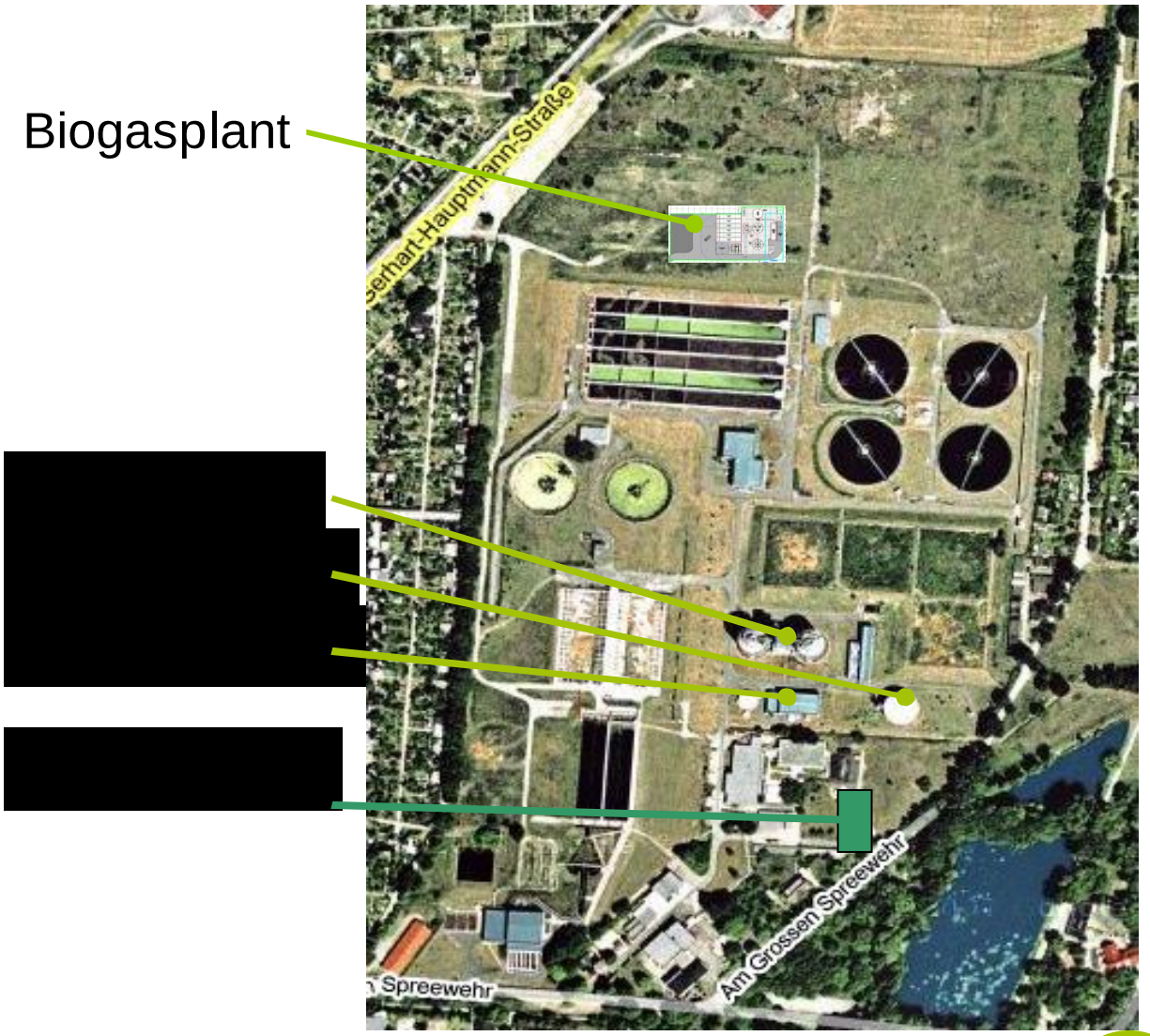


Examples of water, energy, and resources interactions

- **Energy from sewer networks (Levallois-Perret, France)**
- **Thermal treatment of sludge (Valenton, France; Suzhou, China)**
  - Excess heat sold to industrial customers or district heating
  - Recovery of metals, and e.g. phospor
  - Recovery of ash in buidling material
- **Hydro-electricity in waste treatment plants (As Samra, Jordan)**
- **Land & marine biodiversity and ecosystems protection & restoration**
- **Land use: vegetalised roofs, urban waterbodies & parcs to mitigate stormwater events, recreational spaces**

From wastewater treatment to energy production plant Municipal Biowaste-Treatment Center

- Joint treatment of biowaste and wastewater
- Combined usage of treatment facilities
- Synergetical use of staff know how
- Integration of biowaste and biomass treatment
- Forward integration of energy upgrading technologies
- Forward integration of energy customization



Examples of waste, energy, and resources interactions

SOME EXAMPLES

- **Waste-to-Energy plants**
- **Biogas energy recovery**
- **Material recovery: *Bottle-to-Bottle***
- **Material & energy recovery: *Plastics-to-fuel***
- **Land use: pneumatic collection**
- **Nutrients from composts**

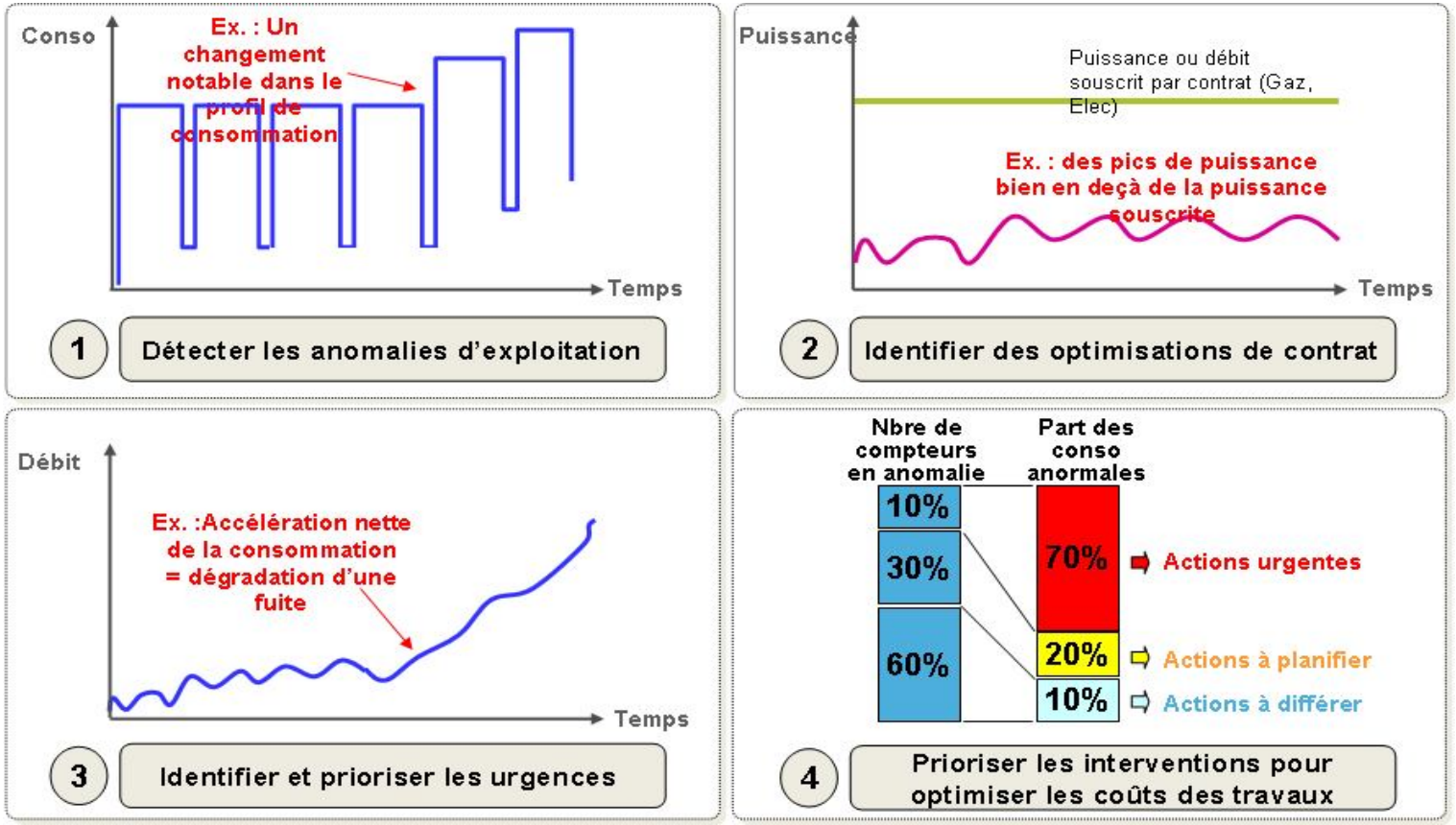
Innovations for sustainable asset management

- City of Dijon, France
- 180 fixed leak sensors
- +50% of leaks detected
- « Hidden » leaks detection time: from 180 to 3 days
- 1.2 millions m3 of water saved after 1 year
- Enhanced network mapping
- Commitments on quantified performance improvement

Measure, evaluate, assess and inform in real time
Internet portals for local gov’ts, comm. & industrial users,…

- Smart-meters
- Realtime information on consumptions
- Raises awareness and reduces maintenance reaction time
- Allows better targeting and prioritisation of corrective measures

- Collective housing
- Commercial
- Industrial
- Public services



… also adapted to the individual user

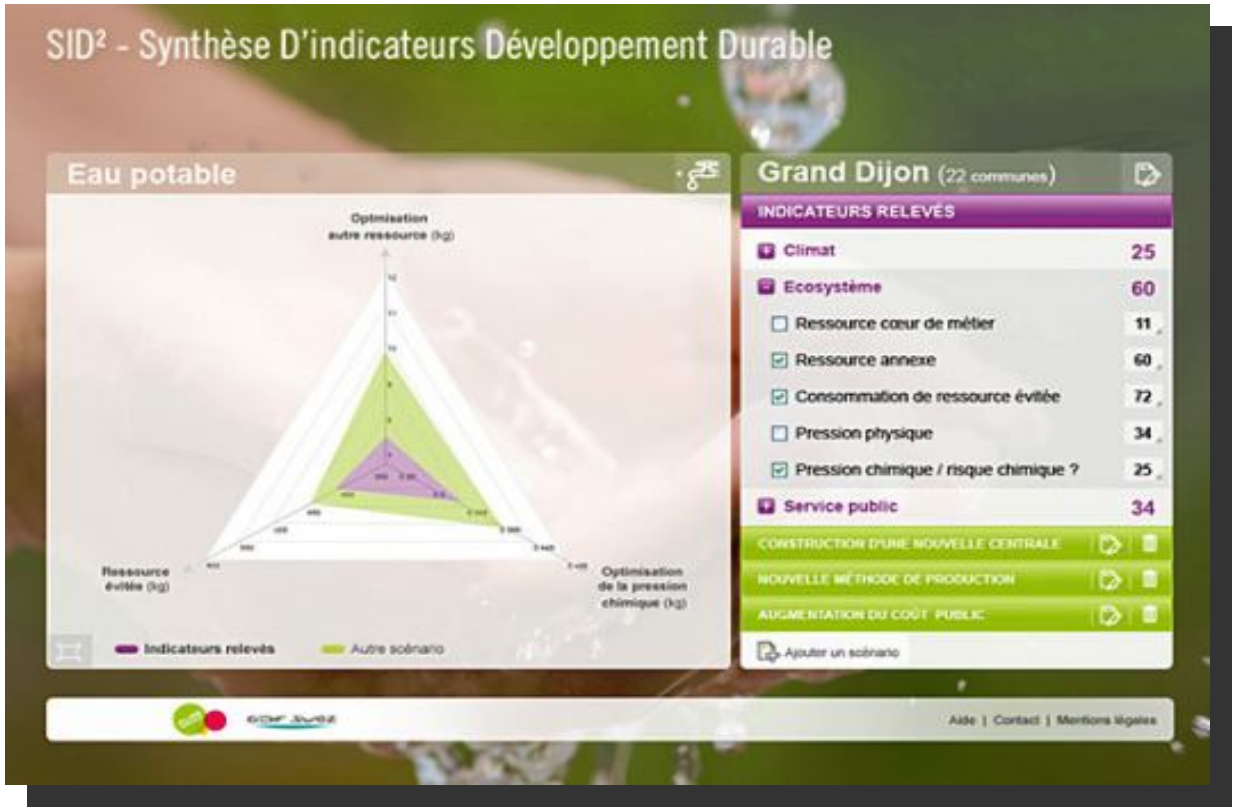
- **Remote meter reading**
- **Leakage alerts on mobile phones**
- **Leakage insurance and assistance services**
  « *Life Line* »
- **Builds water use awareness**

Focus: waste management in the office

- No more individual rubish bins
- Replaced by « Box office » system
- From mixed waste to source separated waste
- Individuals bring their waste to waste-gathering containers
- Tracable waste treatment material/energy recovery
- Chips in containers inform on waste volumes & optimise collection rounds **(in development)**
- Builds waste awareness
- Benchmarking

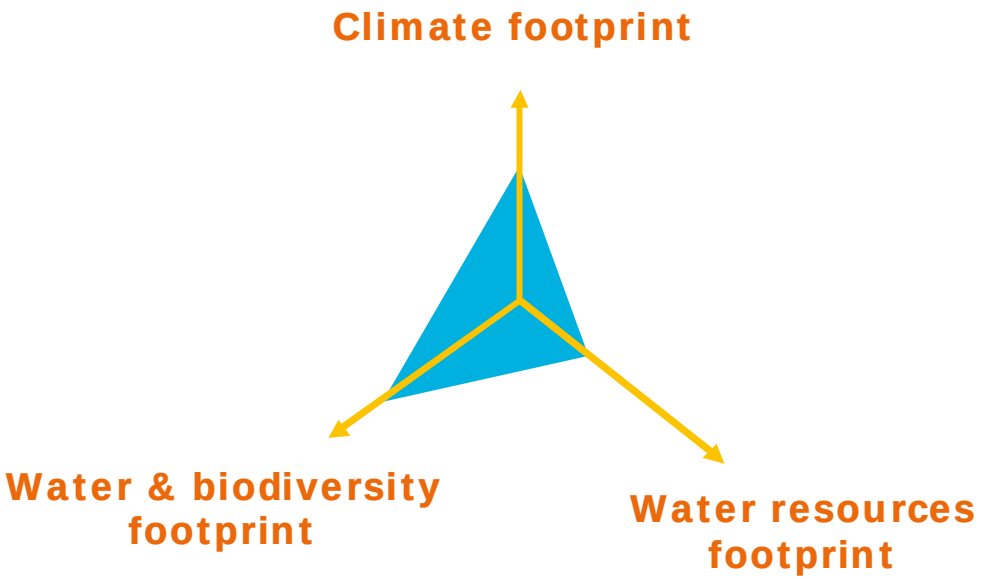
City Biose & LCA Biose
Measuring & managing cities' overall environmental impacts

- **Calculate baseline of environmental impacts from several public services**
  - Energy
  - Water & wastewater
  - Waste
  - Transportation
  - Public lighting
- **Measure impacts according to different development scenarios and identify possible conflicts**
- **Set quantified targets**
- **Measure progress**



Innovative business offer

- **Evaluation of the baseline environmental footprint of a service provision**
- **Contractual commitments to reduce various aspects of environmental footprint linked to:**
  - Resource conservation
  - Energy efficiency & GHG emission reduction
  - Biodiversity preservation and restauration
- **Reward / penalty formula built in the contract**
- **An internal label: EDELWAY**
- **Independent third party verification of actual results**



Sustainable City Governance
Empower Citizens & Harness Open Innovation