REDOL Replicator cities

Amsterdam (NL)

Johan de Jong, AMS Institute

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What is the AMS Institute?

First a brief introduction to what is the AMS Institute

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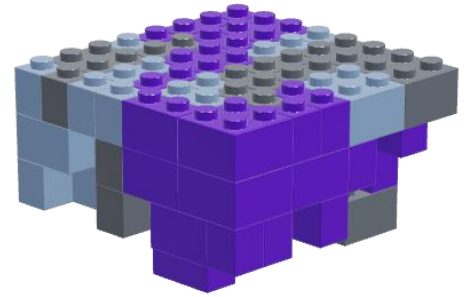
ADVANCED METROPOLITAN SOLUTIONS

What is the AMS Institute?

Urban challenges
Integral urban challenges,
City framework



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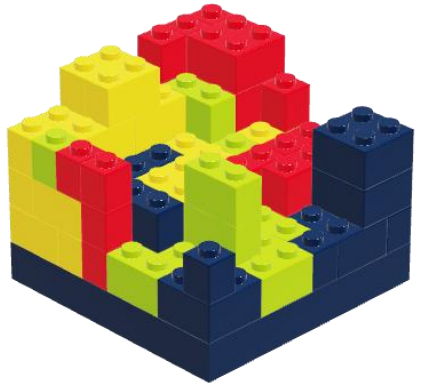
TU Delft
Delft University of Technology

Education **Research** **Valorisation**
Discipline based,
Academic framework



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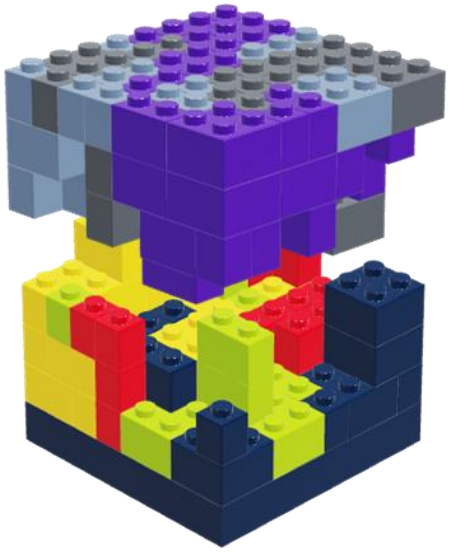

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Re-invent cities

Ideas Collaboration Talent

Education Research Valorisation
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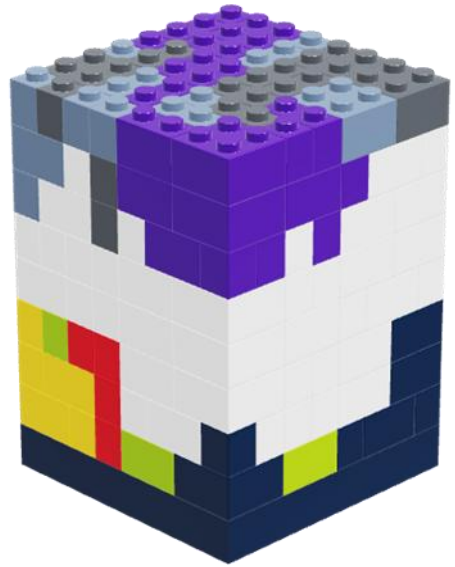

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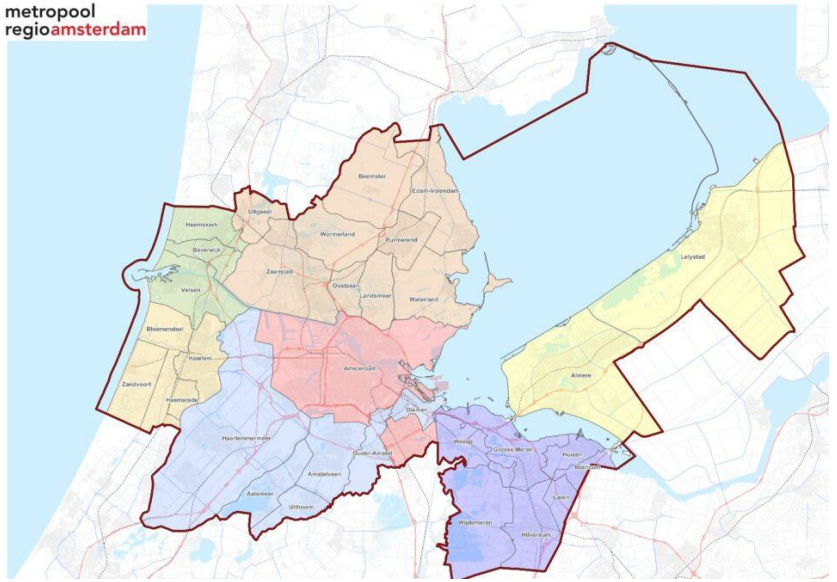
AMS Institute way of working

AMS Institute **accelerates** the development of science-based solutions to make cities resilient, regenerative, and just.

Amsterdam Context and I-US Background

- Metropole Region Amsterdam (MRA) is one of the core industrial clusters in the Netherlands (~20% of Dutch GDP)
- **356 kg urban waste per capita** in the city of Amsterdam (in 2024):
  - ~60% is recycled
  - ~25% incinerated
- Circular ambitions, i.e. reduction of primary resources:
  - 50% in 2030
  - 100% in 2050
- Many companies already engaged with circular strategies (predominantly recycling).
- Highest I-US opportunities in Amsterdam:
  - Construction and Demolition Waste (CDW, ~69% of all waste)
  - Waste Electric and Electronic Equipment (WEEE, critical minerals)
  - Plastics (however, recycling facilities went bankrupt in Amsterdam)



Amsterdam Context and I-US Background

- I-US mainly exists in fragmented forms, particularly in the port and construction sectors.
  - ➢ However, these exchanges are not yet systematically coordinated as a city-wide symbiosis strategy, which is precisely where REDOL adds value.

- In sum: given the proximity of dense industrial areas, the city of Amsterdam, and the port, there are many opportunities to establish I-US within and across value chains.

- Project status: replication is at an early stage.

Examples of I-US activities in Amsterdam

From the classis waste-heat symbiosis

1.4 million tons of household & industrial waste

- 1.2 GJ of heat (~30k households & ~270 industrial customers)
- 750 MWh of electricity (for ~365k households)
- 30k tons of materials recycled and recovered
- Ashes used for construction (roads, concrete…)

Why is this "Symbiosis"

- AEB benefits because they have a "customer" for their waste heat, increasing their total energy efficiency.
- The City benefits because they get a reliable source of heat that doesn't require burning natural gas, reducing CO2 emissions (~80%).

To industrial by-product exchange

Simadan
Cargill
ADM WILD

Organic waste (e.g. fruit residues, refinery fats, and used cooking oils)

Grey water

Biogas

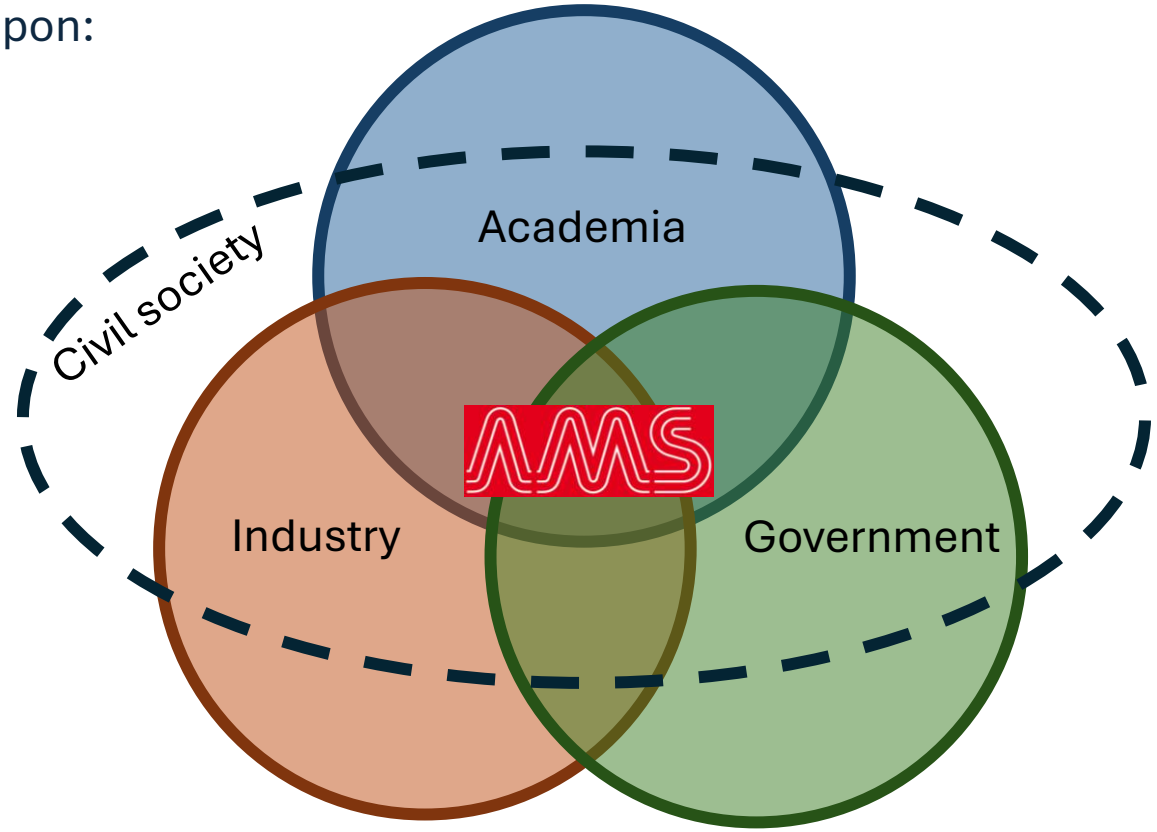
- Electricity
- Heat
- Steam
- Fertilizer
- Clean water

Why is this "Symbiosis"

- The suppliers dispose of their waste for free and they receive it back as power for their production processes.
- Greenmills receives the raw "food" to generate energy.

AMS Institute as facilitator for I-US in Amsterdam

- I-US success depends upon:



➢ AMS as facilitator to establish collaboration within and across sectors

2026 goals for replication in Amsterdam

What we will work on and achieve in 2026:

- (Mar. 2026) Connect and activate the network of partners needed for U-IS:
  - set up a governance structure
  - involve external stakeholders – such as talks with the Port of Amsterdam and other potential partners.
- (Mar. 2026) Conduct a baseline assessment of current value chains:
  - including detailed stakeholder mapping & analysis
  - characterizing current local value chains
  - quantification of waste resources in harbor and city.
- (Oct. 2026) Develop spatial planning scenarios that detail what circular value chains and waste management could look like in Amsterdam in the future.
- (Oct. 2026) Develop a strategy for Circular Industrial-Urban Symbiosis and potentially a Circular Economy Hub in Amsterdam.

Next steps

Goal: Develop a REDOL replication strategy to strengthen circular I-US in MRA

1. (Mar. 2026) Map and analyze value chains in Amsterdam to identify I-US gaps – (MRA)
    - By inviting stakeholders for participation workshops, surveys, work group.
2. (Apr. 2026) Material flow analyses to map current flows and identify gaps.
    - By organize workshops (3) to understand current operations, ambitions, challenges to move towards circular value chains.
3. (Apr. 2026) Identify I-US gaps with stakeholders.
    - By conducting interviews and surveys with participating stakeholders.
4. (Jun. 2026) Discuss replication opportunities and overcome barriers.
    - By hosting workshops with stakeholders on how to overcome these gaps, including exploring what technologies and innovations can help achieving I-US.
5. (Aug. 2026) Develop strategies on how to establish I-US in Amsterdam/NL.
    - By collecting, translating and polishing all the lessons learned during our work into a final report.
6. [optional] (Oct. 2026) Implement a digital tool for mapping material flows within and across value chains.

Barriers and bottlenecks in Amsterdam and the Netherlands

- Available land & spatial planning:
  - Not a lot of land available for industry, competing with housing, nature and agriculture
  - Intensive industry close to residential areas
  - Land is expensive.
- Environmental laws complicate issuance of permits (e.g. excess nitrogen emissions, water pollution from 2027 onwards).
- Establishing trust between companies (with entangled business cases) is challenging.
- Primary resources are too cheap to compete with (esp. plastics), complicating business cases for circular strategies for waste recycling.
  - ➢ Several waste recycling companies went bankrupt in NL & Amsterdam.
- Port of Amsterdam is focused on keeping companies in the port and needs to balance sustainability ambitions and earnings:
  - Companies consider leaving because of:
    - stricter regulations
    - high energy costs
    - Big share of income Port of Amsterdam comes from fossil fuels (coal, gasoline). Building a new model takes time (i.e. Greenport Amsterdam).

In a nutshell

- I-US already present in the Metropole Region Amsterdam
  - ➢ Many more opportunities for implementing I-US strategies.
- AMS Institute is the ideal facilitator for I-US in Amsterdam; establishing I-US requires cross-sectoral collaboration and facilitation, which is in the core of AMS.
- Goals for 2026:
  1. Activate and establish a network of potential I-US partners.
  2. Map and analyze potential partners and value chains (CDW, WEEE, plastics, textiles).
  3. Develop spatial planning scenarios for I-US and the circular economy in Amsterdam
  4. Develop a strategy for establishing Circular Industrial-Urban Symbiosis in Amsterdam

Thank you!

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Construction and Demolition Waste (CDW) in Amsterdam

- CDW is the largest stream of materials in terms of weight and volume in Amsterdam and : construction materials have high embodied carbon (climate impact).
- Most companies do something with recycling (either themselves or with partners)
- Initiatives within and between companies to make concrete from secondary resources (recycled concrete). Most times, granulate is produced for road construction. But, increasingly, also for new concrete (mix of new and recycled concrete)
- Some companies apply circular demolition principles.
- There is a Concreet Agreement in the Netherlands from 2018 (https://www.betonakkoord.nl/). Agreement between municipalities, provinces, ministries, concrete producers, users, and recyclers. Goals is to make concrete sustainable and circular.
- Demand for recycled concrete for high-end applications is lagging behind. First projects are delivered in the past 5 years.