Sludge management in the EU, following a circular economy approach

Sarah Gillman, Co-Chair EurEau Waste Water Committee

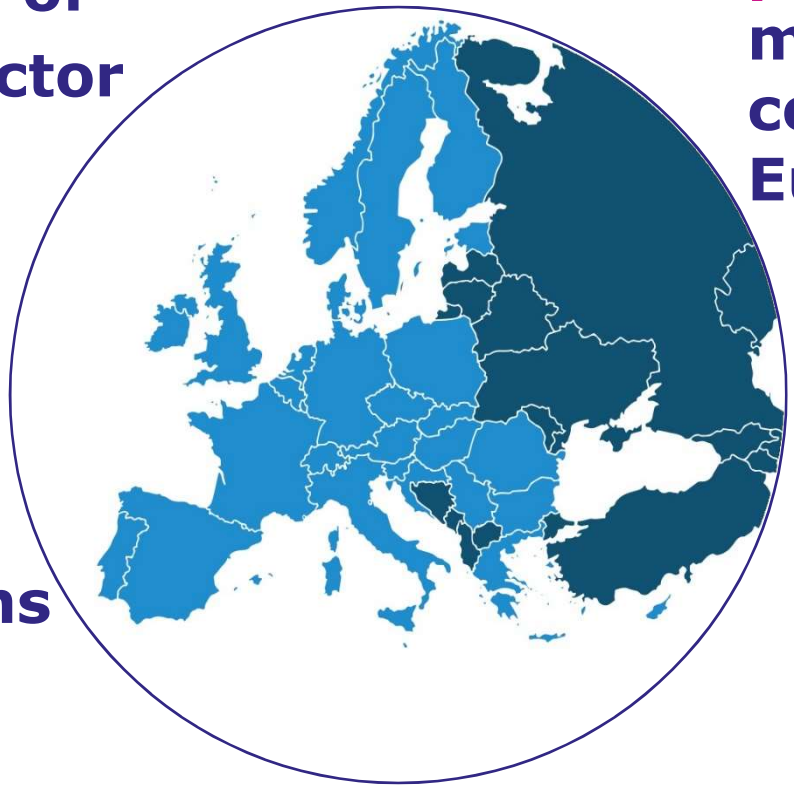
Rome, 3rd December 2019

Who we are

EurEau

EurEau - the voice of Europe's water sector since 1975

Employing 540,000 people, the sector makes a significant contribution to the European economy



Our members – national water services associations from 29 European countries

EurEau members manage 18,700 WWTP, 94% of which with at least secondary treatment

We represent public and private drinking and waste water service providers

Sewage sludge management in the EU, following a circular economy approach

1. What is the Circular Economy (CE)?
2. Can sludge management be circular?
3. Why sludge management matters.

Circular Economy…
"…circulates and cascades materials, products, components at their highest **value** for the longest time.."

Value circulates.
Value leakage is managed and minimised.
Linear models of consumption are reduced.

What's in treated sewage sludge? Is it valuable to the economy?

1. **Carbon (organic matter)**
2. **Nitrogen**
3. **Phosphorus**
4. **Residuals** =

abundant inorganic compounds e.g. silica, calcium, iron, aluminium and micronutrients (from our food).
Small proportion micropollutants .

Typical composition of treated sludge:
Carbon 25–35% dry matter
Nitrogen 4–5% dry matter
Phosphorus 2-3% dry matter
Residual 20-45% dry matter
Oxygen the remainder.

Additionally, untreated sewage sludge may include:

i. waste items (inappropriate disposals) – from any waste water network
ii. grit, sands, sediments – from combined waste water network
iii. other materials, depending on the catchment of the sewer network.

Sewage sludge destination in Europe
current situation

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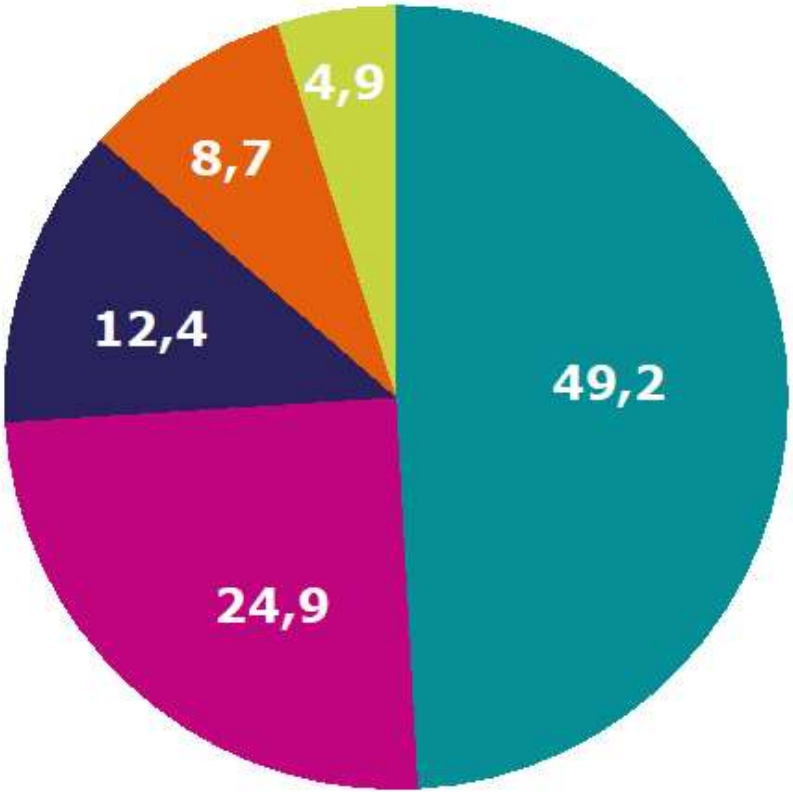
~ Extensive survey with EurEau members in 2017

~ European production of sludge (2014-15): **9.2** MtDS/y

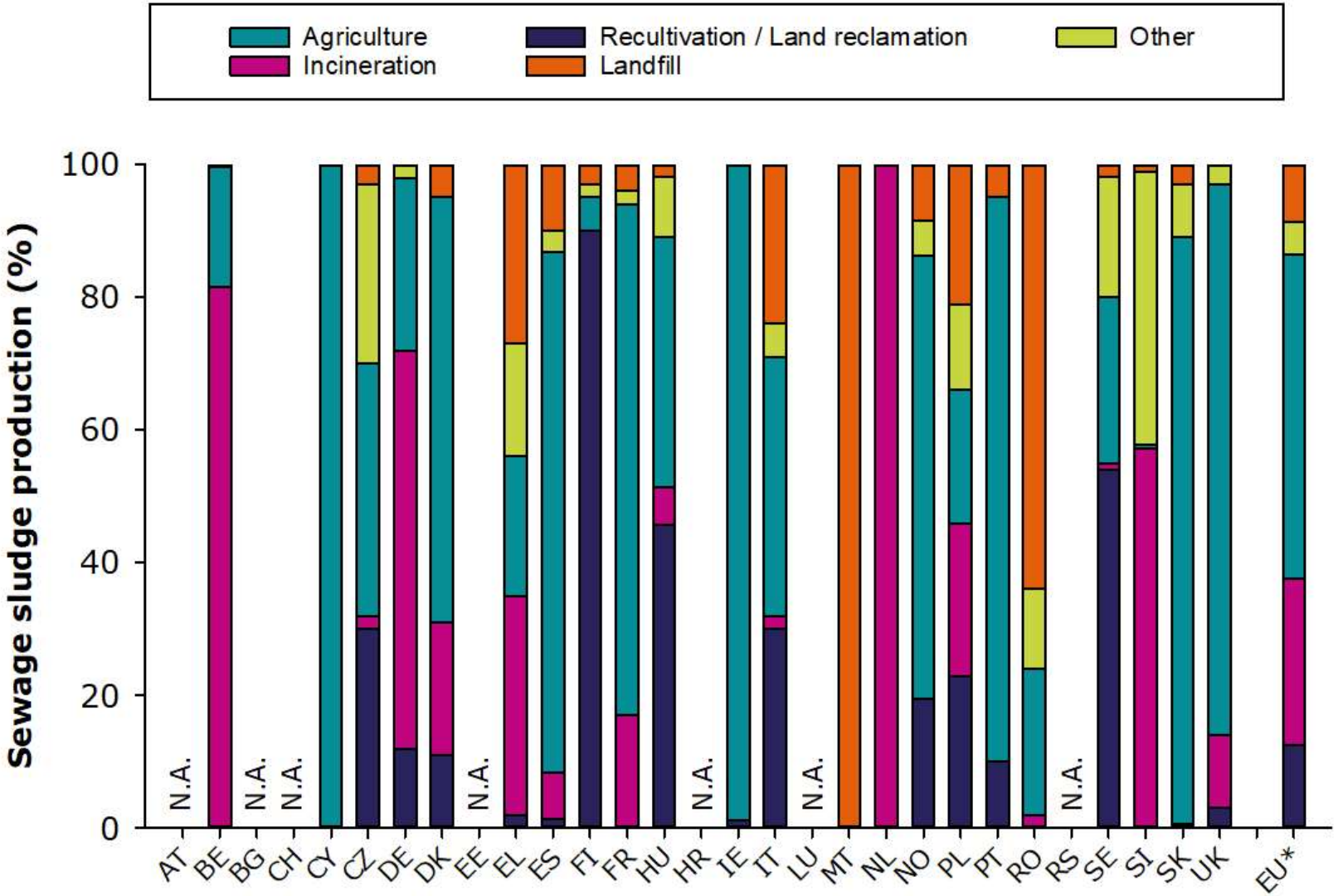


~ 4.5 M tDS/y in agriculture
~ 1.2 M tDS/y in recultivation / land reclamation

~ 5.7 M tDS/y (61.6%) of sewage sludge **returned to land**

(figure in % sludge production)

Sewage sludge destination in Europe
current situation



Situation varies between MS: high influence of local conditions and local policies and regulations.

Circular Economy: good practices

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Sweden: recycling in agriculture

REVAQ®
Renare vatten – bättre kretslopp

- **Certification of sewage sludge**
- REVAQ is operated by:
  - The Swedish Water & Wastewater Association
  - The Federation of Swedish Farmers (LRF)
  - The Swedish Food Federation

  and in close cooperation with the Swedish - Environmental Protection Agency.
- audited by an independent third-party Certification Body

Almost 5 million persons (50% of Swedes) connected to a Revaq wastewater treatment plant.

UK: recycling in agriculture

BAS
BIOSOLIDS ASSURANCE SCHEME
Assured Biosolids Limited
Biosolids Assurance Scheme

- **Certification of sewage sludge**
- BAS is operated by a not-for-profit company set up by 11 UK Water and Sewerage Companies
- BAS covers: transportation & storage, monitoring & analysis, treatment, rules for application to agricultural land, risk assessments.
- audited by an independent third-party Certification Body

https://assuredbiosolids.co.uk/

Other circular examples:

1. Recovery of energy

Various example of biogas production across Europe for

- ~ cogeneration,
- ~ purification and injection in municipal grid
- ~ upgrading to vehicle fuel

Example of innovation in energy from sludge:
Sludge → heavy fuel for transport
Aalborg University, Aalborg utility & Steeper Energy

2. Recovery of material from process

Recovery of mineral content:

Grit recovery from inlet to WWTW and at sludge treatment centres.

Already used in roads in France.

Other re-uses of grit under research.

Innovation challenge: can something be made from the rag collected at WWTP?

3. Recovery of sludge components (P, C)

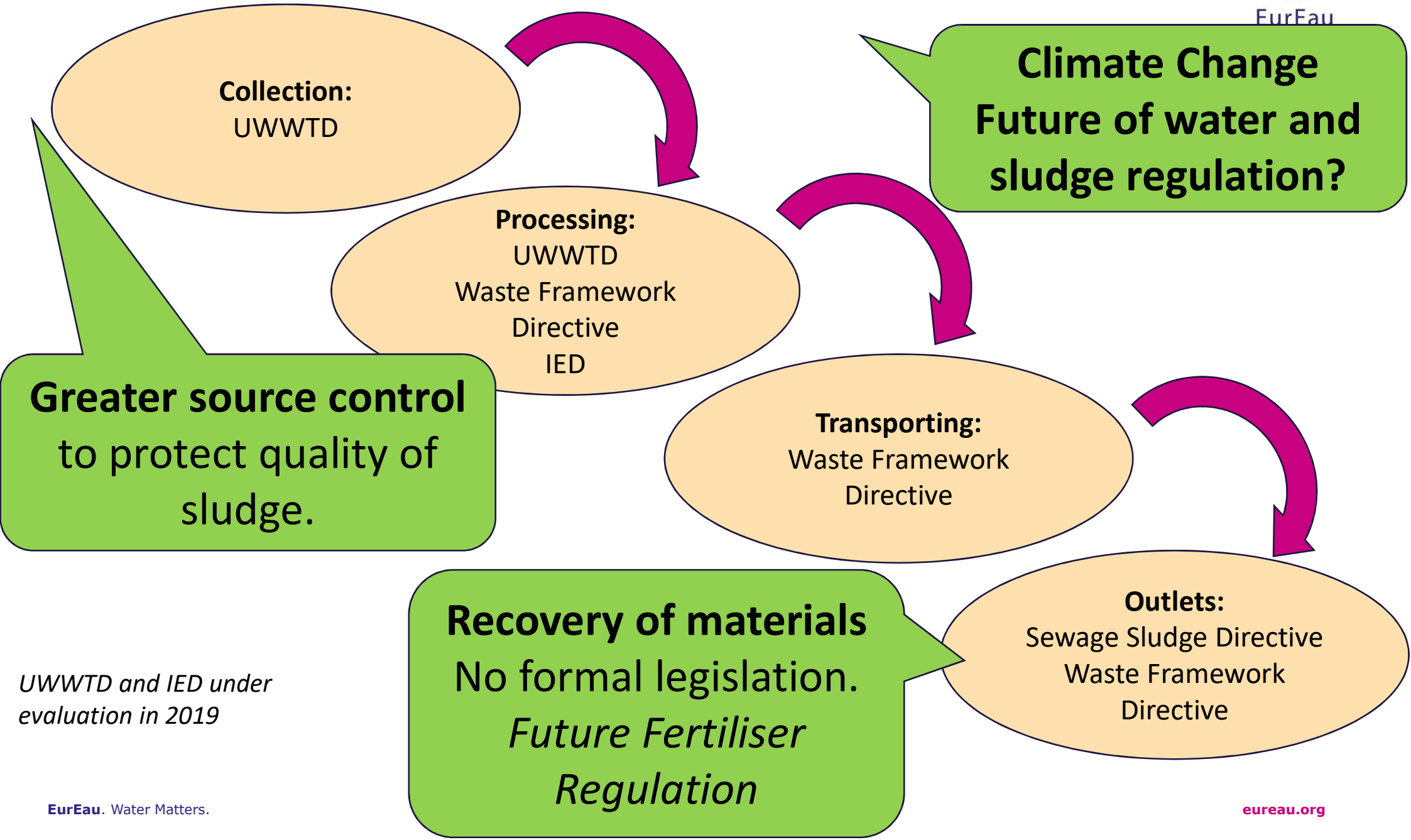
P-recovery (struvite) from digested sludge – Leuven, BE

- P-recovery from sludge (struvite)
- P-recovery from ashes (pilots)
- Bioplastics
- Bio-alginates
- New products e.g. from Netherlands **Kaumera Nereda® Gum** is a new bio-based raw material that is extracted from the sludge granules that form during the Nereda® purification process.

https://kaumera.com/english/

kaumera

EU legislation relating to sewage sludge



UWWTD and IED under evaluation in 2019

Sludge management at a cross-roads

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Regulations

Climate change

Public perception

Technologies

Extending the Circular Economy to fully utilise sludge requires some careful consideration.

Conclusions

~ **25 300 tons** DS of sludge are produced **every day** in EU

~ Sludge management, following a circular economy approach, must consider a **mix of recovery, re-uses and innovations** based on the **local economy**, **environment** and **acceptance by citizens**.

~ **Control at source of pollutants** is **key** to maintain sewage sludge quality and its suitability for future uses (more efforts needed here)

~ Regarding a possible revision of UWWTD (and other directives) a **holistic approach to regulation of the managed water cycle** is needed, to take account of sludge and the **value** and any risks it represents.

To take home …

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~ **The water sector is working on circular economy approaches for sludge – but we can't do it alone!**

~ The water sector calls for a **long-term strategic view** on the **value of sewage sludge in the circular economy** in order to develop **new business models**, considering future (huge) investments that will be required.

~ EurEau asks WAREG members to speak with operators in their countries about **making sludge management circular in future.**

Thank you for your attention

WAREG
European Water Regulators

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