“Wastewater Sludge Management from an Irish Perspective”

Wastewater Sludge Strategy - Overview

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1

Current Laws and Regulations

Legislation & Regulations

- The Sewage Sludge Directive was transposed into Irish law by Waste Management (Use of Sewage Sludge in Agriculture) Regulations 1998, as amended by S.I. 267 of 2001.

- Code of Good Practice for Use of Biosolids in Agriculture.

- IW Sustainability Strategy – targets GHG emissions
- EU Fertiliser Regulations
- Nitrates Action Plan review
- River Basin Management Plan review
- New Renewable Energy Legislation
- EU Soil Strategy
- EU Methane Strategy
- Potential review of Code of Good Practice for Use of Biosolids in Agriculture - tbc

Code of Good Practice for Use of Biosolids in Agriculture

Traceability of the Biosolids is essential.

- Certificate of analysis of the Biosolids product is required.
- Date on which the sample was taken
- Origin of the sludge from which the biosolids was produced
- Treatment process used to achieve the Biosolids product
- Analysis of the parameters specified in the Code.

- Soil samples are taken from the spreadlands for analysis.
- Biosolids producer provides a full Nutrient Management Plan – revision annually – taking into account most recent COA, soil testing results, crop type and any other changes.
- Storage required between October and February

2

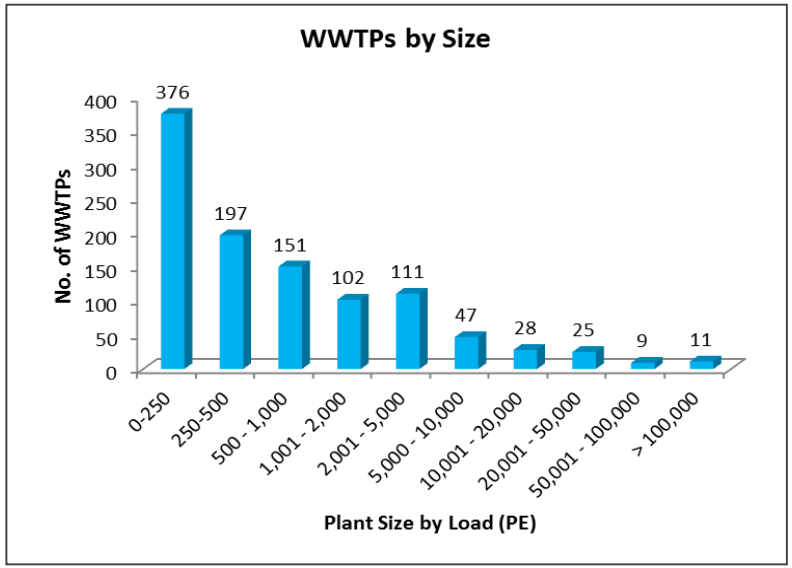
Overview of Ireland's Wastewater Asset Base

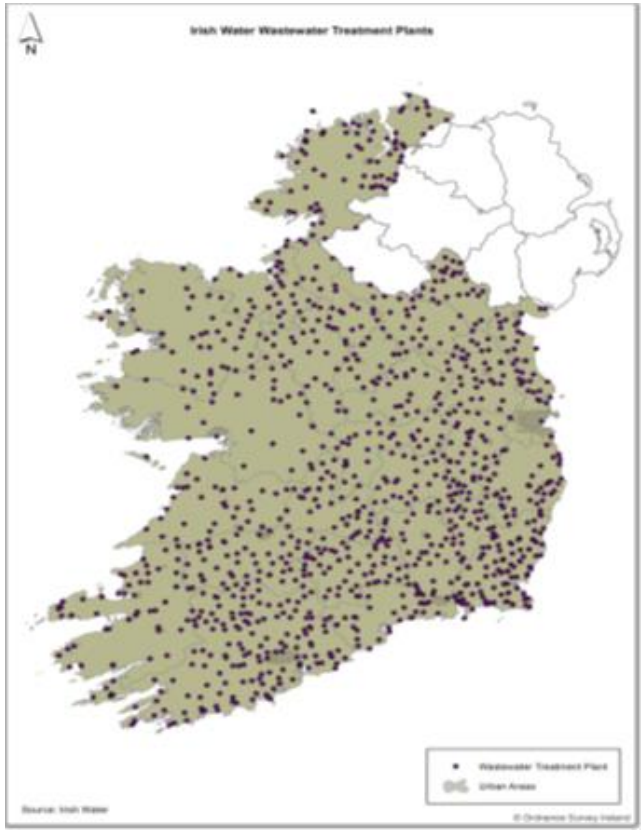
National Infrastructure

Large number of small WWTP's (over 60% < 500 p.e.)

Centralised treatment required for efficient resource recovery

~50% of WW sludge generated at 11 WWTPs > 50,000 PE





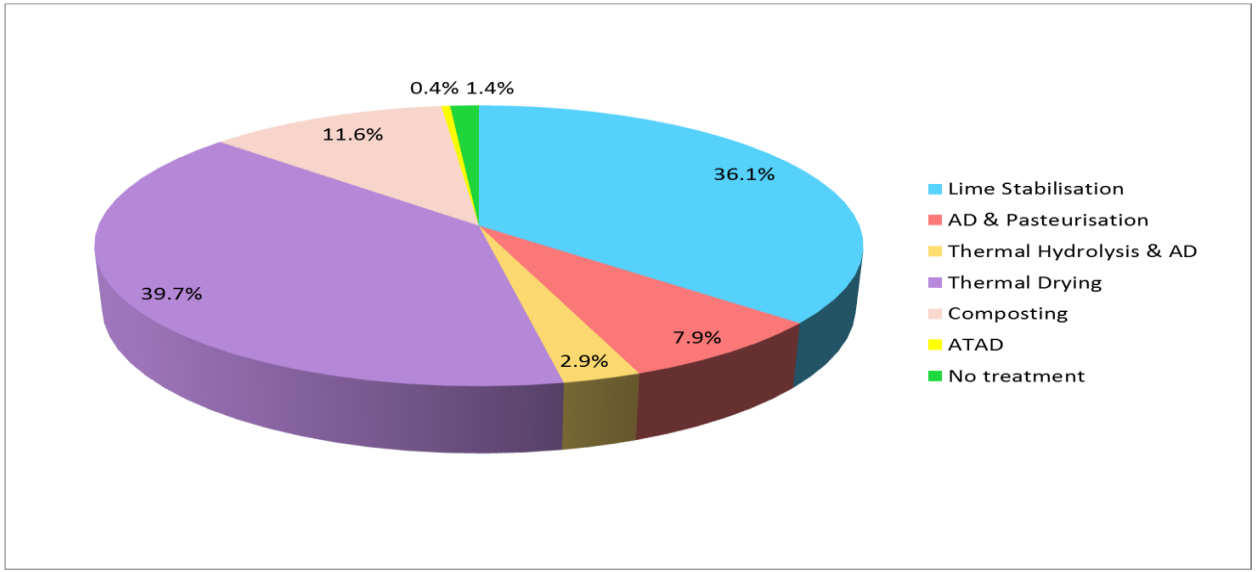
Sludge Quantities

Year	Sludge Quantity (tds/a)	Comment
2018 **2019**	58,018 58,773	• Reported sludge quantities
2025 (predicted)	87,000	Additional sludge due to: • Full compliance with regulations / licences including new WWTP's • Additional 5-6 % due to population growth • Additional desludging of WWTP's • Includes 10,000 tds/a DWWT sludge

Notes:

- Total sludge quantity approximately 230,000 tonnes per annum
- Actual sludge quantities in 2025 likely to be less than predicted

Type of sludge treatment

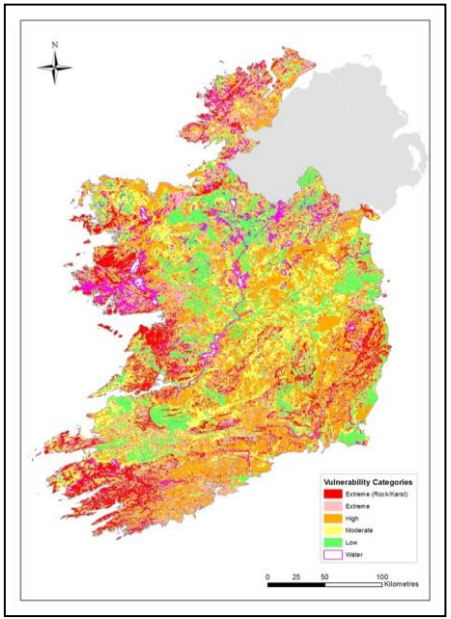


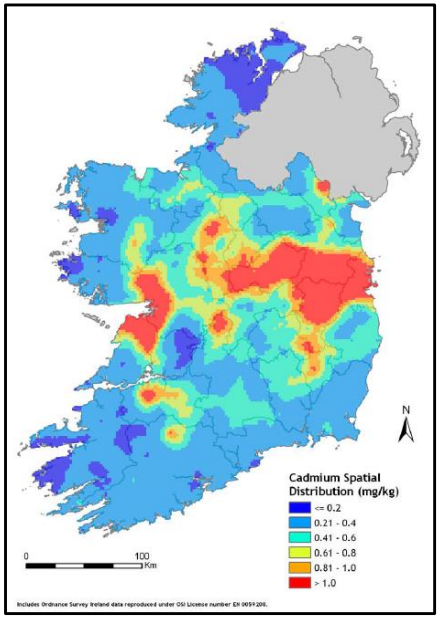
Irish Water WWTPs → Sludge Contractor (NMP) → FARMERS → Department of Environment, Climate and Communications

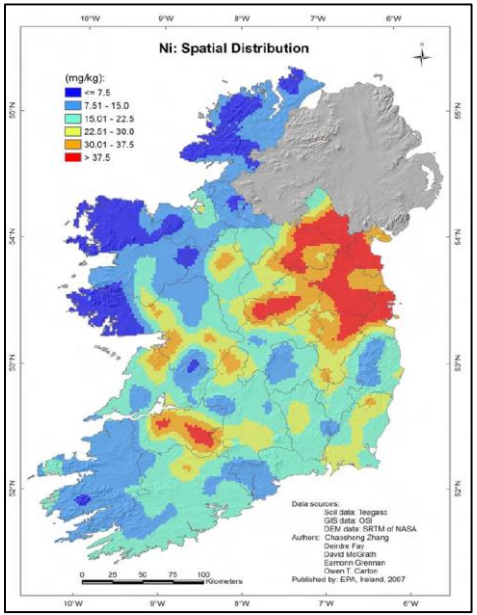
Sludge Management

- > 98% of wastewater sludge produced by Irish Water currently used in agriculture
- Small quantities of sludge going to forestry and landfill
- Pressure on sludge agricultural outlets due to food industry quality assurance schemes
- Irish Water to develop quality assurance system for re-use of wastewater sludge
- Alternative sludge outlets currently being assessed
- Options for phosphorus recovery being considered for larger wastewater treatment plants
- Upgrades to sludge treatment to increase anaerobic digestion to increase energy recovery and reduce sludge quantities

Restrictions in Land spreading







- Groundwater vulnerability
- Soil metal levels (cadmium and nickel)

3

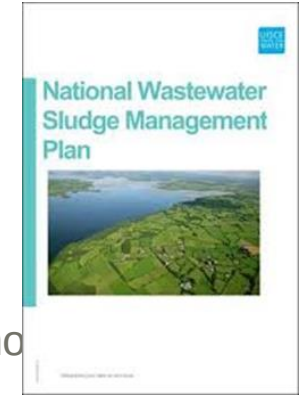
National Wastewater Sludge Management Plan

National Wastewater Sludge Management Plan

NWSMP – Published 2016, ongoing five yearly reviews – 2020

Objectives

- To establish long-term, secure and sustainable reuse/disposal methods
- To maximise the benefits of wastewater sludge as a soil conditioner
- To establish cost effective and efficient treatment and reuse disposal metho
- To reduce potential for disruption from sludge transport and sludge facilities
- To extract energy and other resources where economically feasible
- To drive operational efficiencies
- To ensure that all regulatory and legislative controls are met and Codes of Practice and Industry Guidance



Biosolids – Class A

Pathogen reduction to ensure sludge is suitable for use in agriculture

Code of Good Practice for use of Biosolids in Agriculture

- ✓ Mesophilic AD with pre or post pasteurisation
- ✓ Thermophilic AD
- ✓ Thermophilic Aerobic Digestion
- ✓ Composting
- ✓ Alkaline Stabilisation
- ✓ Thermal Drying
- ✓ Emerging Technology

Potential Value of Sludge

Energy recovery

- Biogas from anaerobic digestion used to generate heat and electricity
- Electricity produced used as renewable electricity source for wastewater treatment

Fertiliser

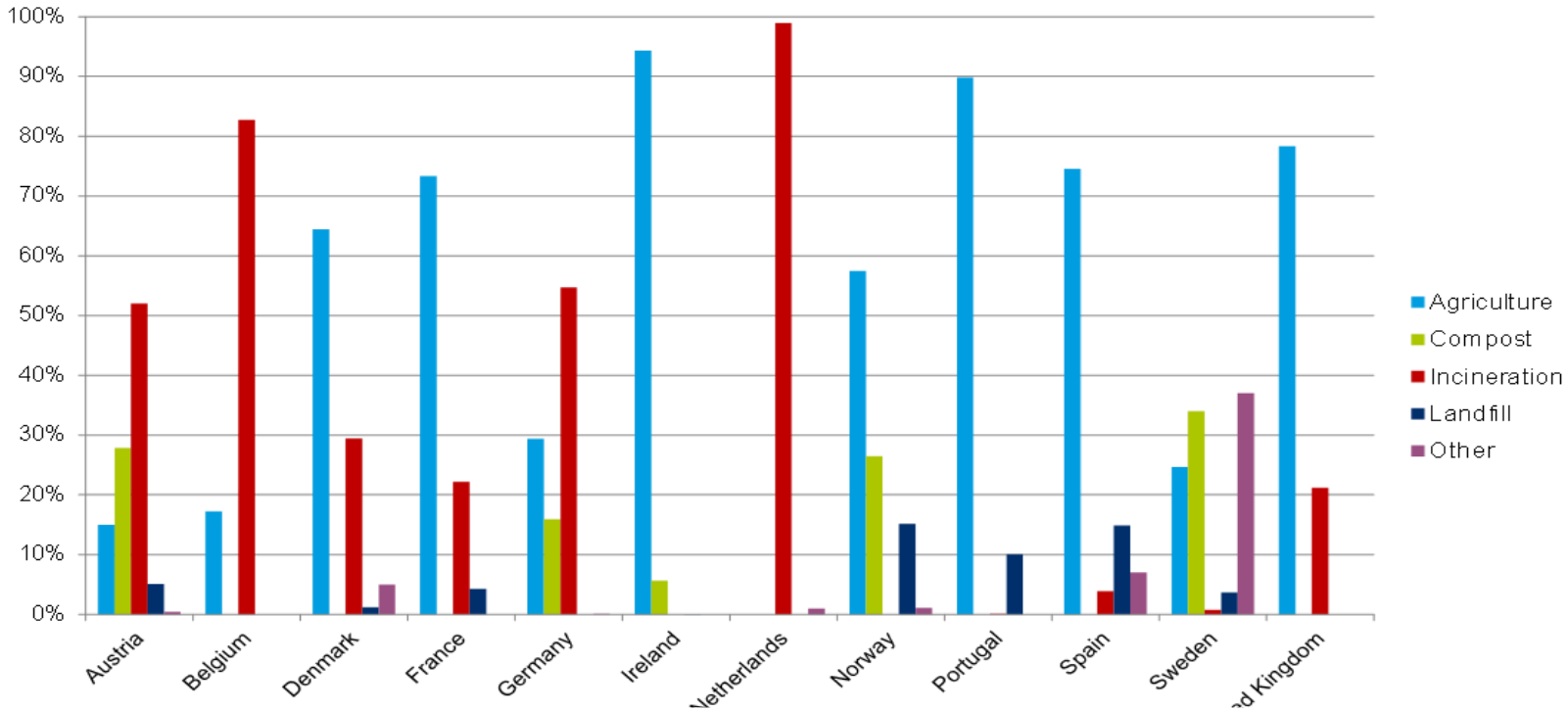
- Phosphorus and nitrogen content replacing artificial fertiliser needs

Carbon footprint

- Energy recovery from sludge reduces overall carbon footprint of wastewater treatment

Re-use of organic materials one of the key principles of the EU Circular Economy Package reduce green house gases

Sludge Disposal in Europe (2013)



- **Similar distribution of sludge disposal in USA, Canada, Australia and New Zealand**

4

Challenges

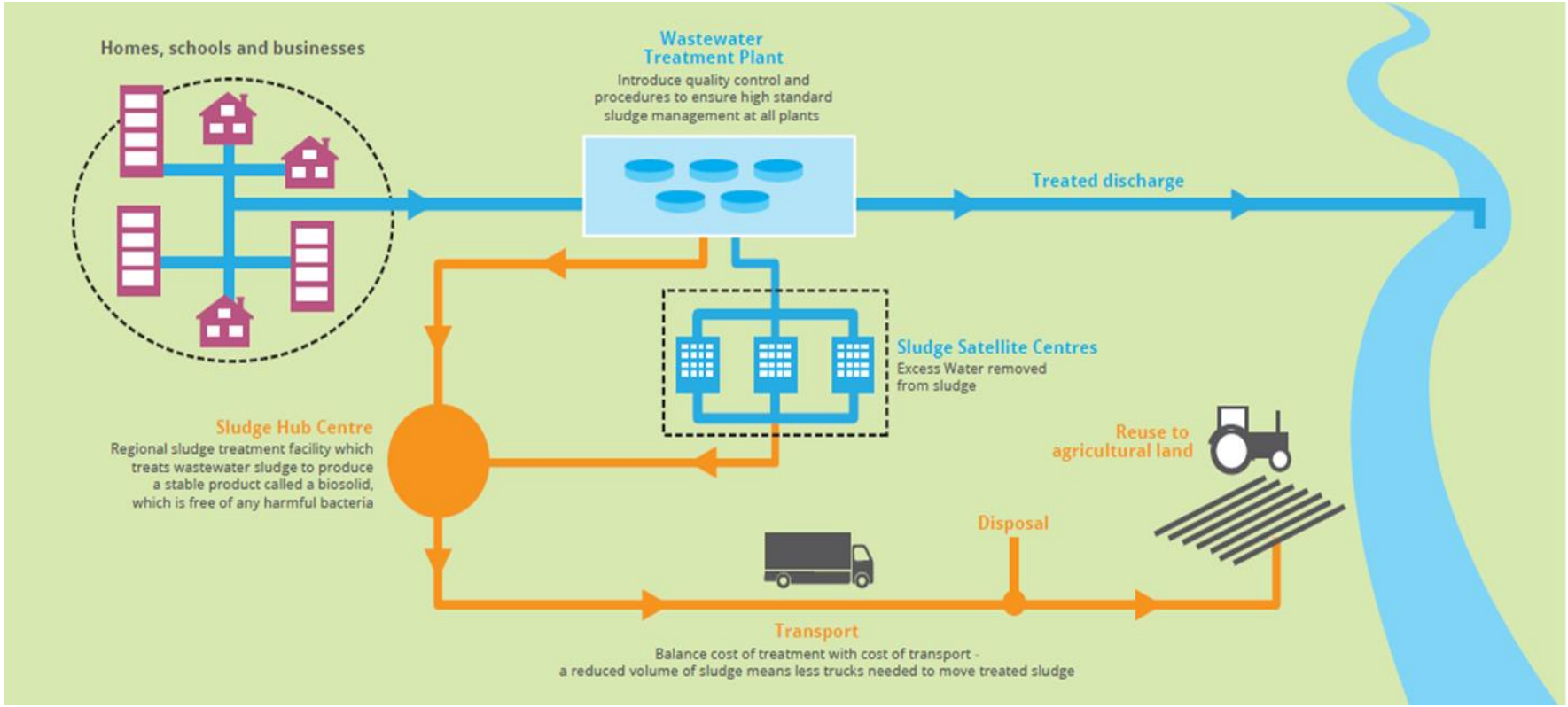
Challenges Ahead

- What if Legislation changes?
- What is International practice?
- What are the effects of microplastics, AMR's & emerging contaminants on sludge and how do they effect soils where sludge high in MPs is applied?
- What will the overall costs of implementing and maintaining an assured biosolids scheme be to IW?
- Need to reverse negative perception?
- Reduce our GHG emissions, utilize biogas generation.

5

What is Irish Water currently doing to meet Challenges now and in the Future?

Role of Sludge Hubs and Satellite Dewatering Centres



Biosolids – Quality Assurance ‘Certified’ Product

Assured Biosolids Scheme

- Investigate and develop a quality control assured biosolids scheme

Irish Water - Sludge Studies

Feasibility Study – Sludge Outlet Options

- Investigation options available to demonstrate a circular economy approach to sludge reuse
- Review alternative non-agriculture land options

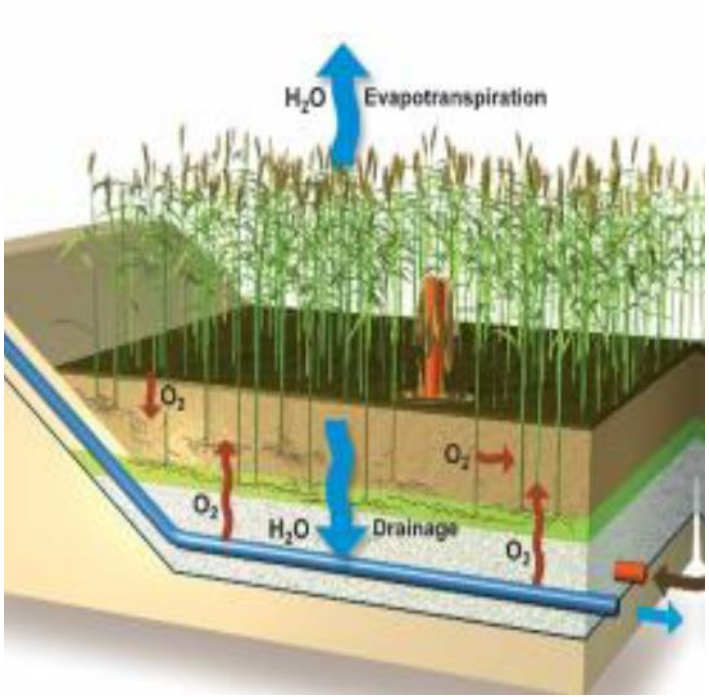
Feasibility Study - Potential for biomethane production at Ringsend WWTP

Feasibility Study – Thermal Treatment Options

- Incineration, Advanced Thermal Treatment – Thermal Hydrolysis/Anaerobic Digestion, Gasification, Pyrolysis ,Thermal Dryers

Investigate End-of-Waste options with EPA

Nature based sludge treatment solutions – Sludge Reed Bed



Bioresource Strategy Decision Support Tool

- Irish Water has engaged Business Modelling Associates to carry out a ‘Pilot’ study to validate our Sludge Strategy which combines manufacturing principles, detailed financial accounting and physical process modelling with an advanced optimisation engine.