



# (TE)NORM residue and waste streams in the Netherlands

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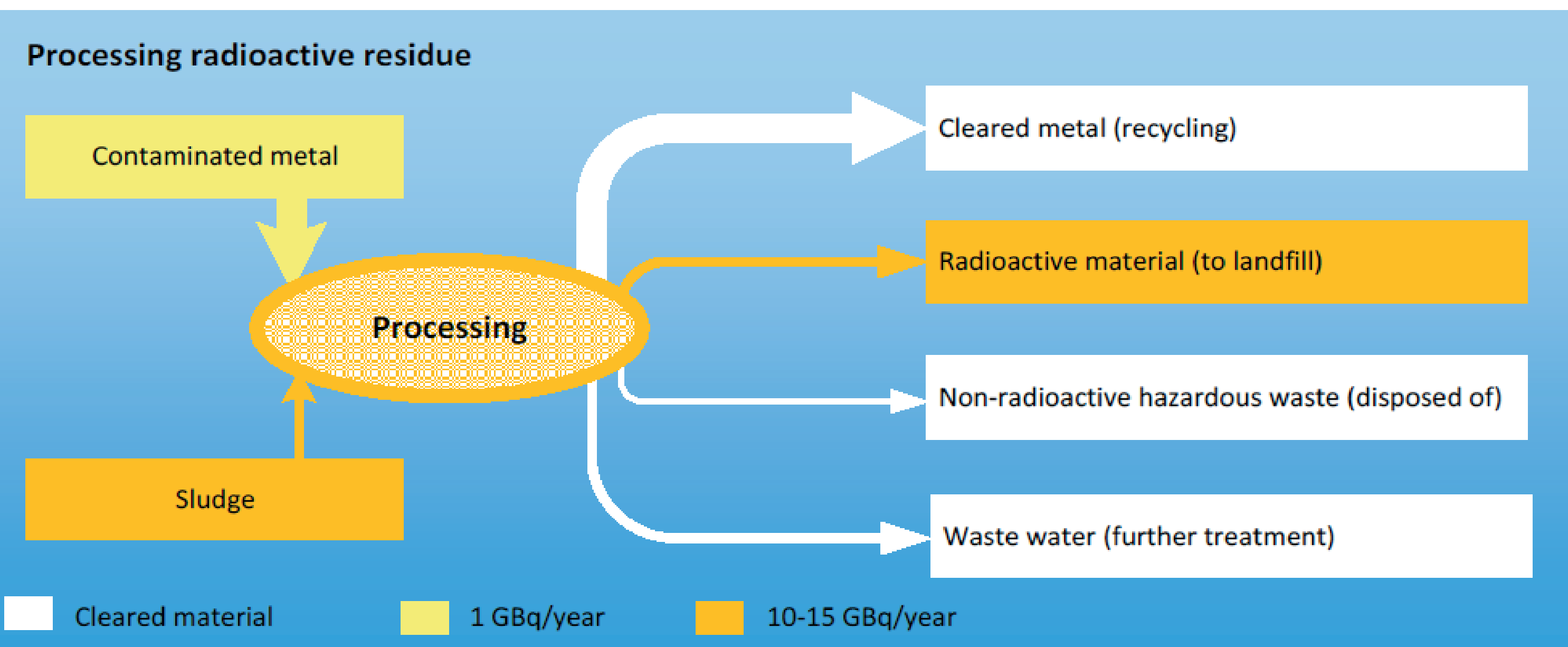
## Background and Goal

Directive 2011/70/Euratom requires member states to have a national policy for safe management of spent fuel and radioactive waste. Additionally, Dutch national policy recommends governance towards a circular economy. As a first step to determine how to prevent or minimize radioactive waste in the Netherlands, RIVM has made an inventory of waste streams (see also poster # 123). This poster describes waste from industrial sectors involving naturally occurring radioactive material (NORM).

For (TE)NORM residue and waste disposal routes, the relevant radionuclides, total activity and total mass were identified. Additionally, possibilities to minimize waste were examined.

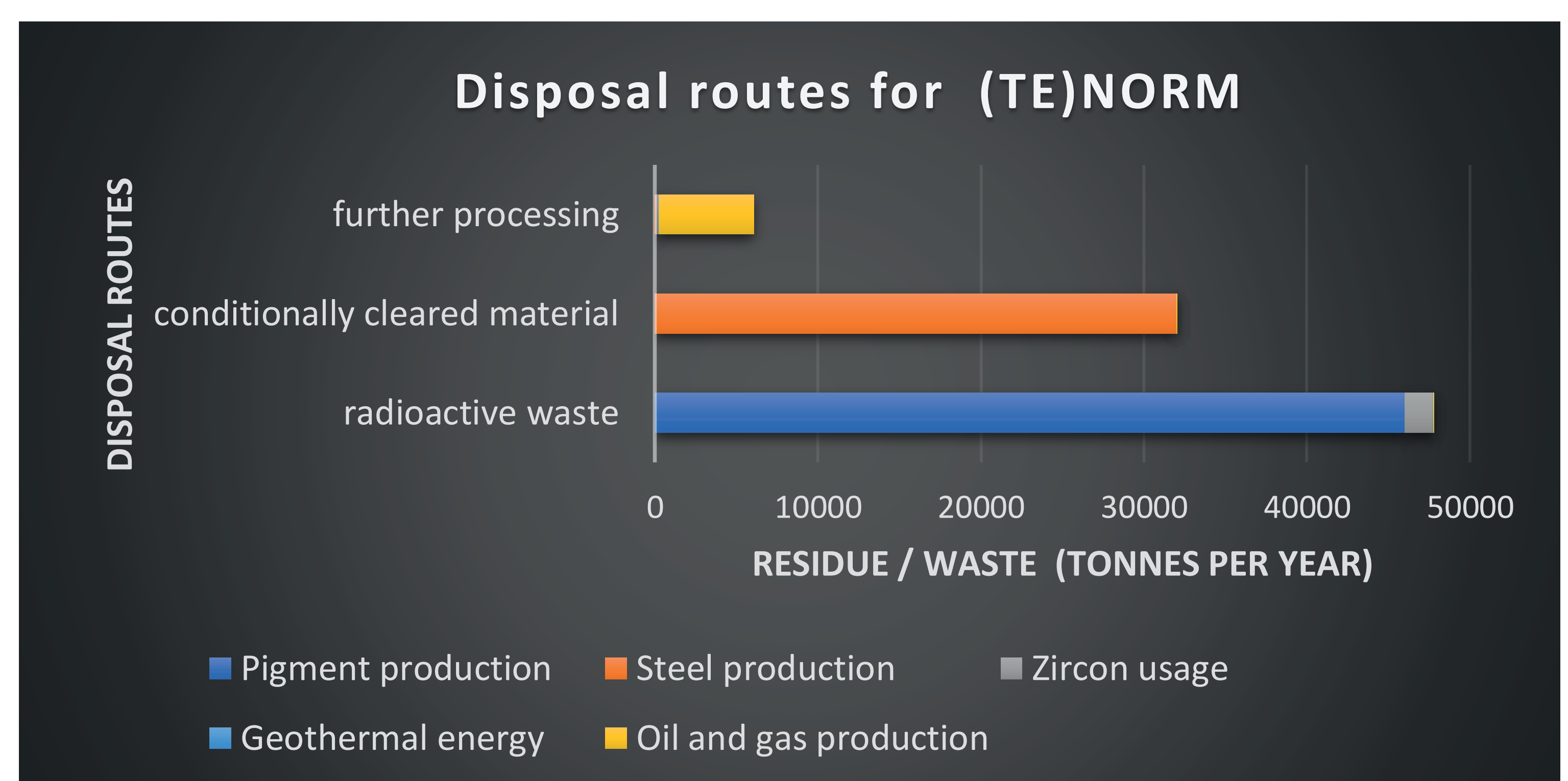
## Methods

- Industries generating (TE)NORM residue/waste were divided in five sectors.
- Per sector, the radioactive residue/waste streams were explored (from cradle to crib).
- An annual average from the period 2018-2020 was determined for the amount of radioactive residue and waste per sector, expressed in both mass and radioactivity.
- Information was gathered from literature, licenses, annual reports and interviews with stakeholders.



## Conclusion

- About 86000 tonnes (500 GBq) per year (TE)NORM is disposed of in landfills both as radioactive waste and as radioactive residue (conditionally cleared material).
- Recycling is effected primarily through decontaminated scrap metal.
- For low radioactive non-metal waste, recycling appears to be technologically feasible while still complying with safety levels.
- Whether recycling is practically feasible, however, depends on factors such as the costs involved, societal factors, policies and regulations.



## (TE)NORM sectors in the Netherlands and their waste with relevant radionuclides

Sector	Waste and Radionuclides
Pigment production	Cake: U-238, Ra-226/228, Pb-210, Th-228
Steel production	Dust/ cake/ sludge: Pb-210+, Po-210
Zircon usage	Solid waste: U-238sec, Th-232sec
Oil and gas production	Sludge: Pb-210, Ra-226/228 (with mercury) Metals: Ra-226/228, Pb-210, Th-228
Geothermal energy	Sludge: Pb-210 (without mercury) Metals: Ra-226/228, Pb-210, Th-228

## Reference (in Dutch):

Radioactive residue and waste streams in the Netherlands. An inventory.  
M. van der Schaaf, P.D.B.M. Bekhuis, L.H.A. Boudewijns  
<http://hdl.handle.net/10029/626133>



Landfill 'Mineralz' in the Netherlands