

# Life Cycle Assessment of a novel digestate treatment unit for anaerobic digestate plant: a UK case

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## Background

- Untreated AD digestate application can be problematic environmentally and economically (e.g. high volumes for transport, digestate contamination etc)<sup>1,2,3</sup>.
- Project NOMAD (Novel Organic recovery using Mobile ADvanced technology) has been developed as a mobile unit to reduce volume, remove antibiotics, and recover nutrients.



Figure 1. Schematic diagram of the NOMAD unit.

## Method

**Goal:** Evaluate environmental impacts of introducing the NOMAD process to a UK AD plant.

**Scope:** Functional unit of 1 m<sup>3</sup> of biogas and system boundary (Figure 2).

### Scenarios studied

- **Business-as-usual (BAU):** a UK AD plant, no NOMAD unit.
- **NOMAD:** one NOMAD unit, processing 5 ton digestate/day.
- **NOMAD upscaled:** assumes NOMAD unit capacity for all digestate from AD plant (76 ton digestate/day).

### Life Cycle Impact Assessment

- ReCipe 2016 method<sup>4</sup> is used.
- 7 impact categories are presented for AD and digestate valorisation as an outcome of NOMAD processes.

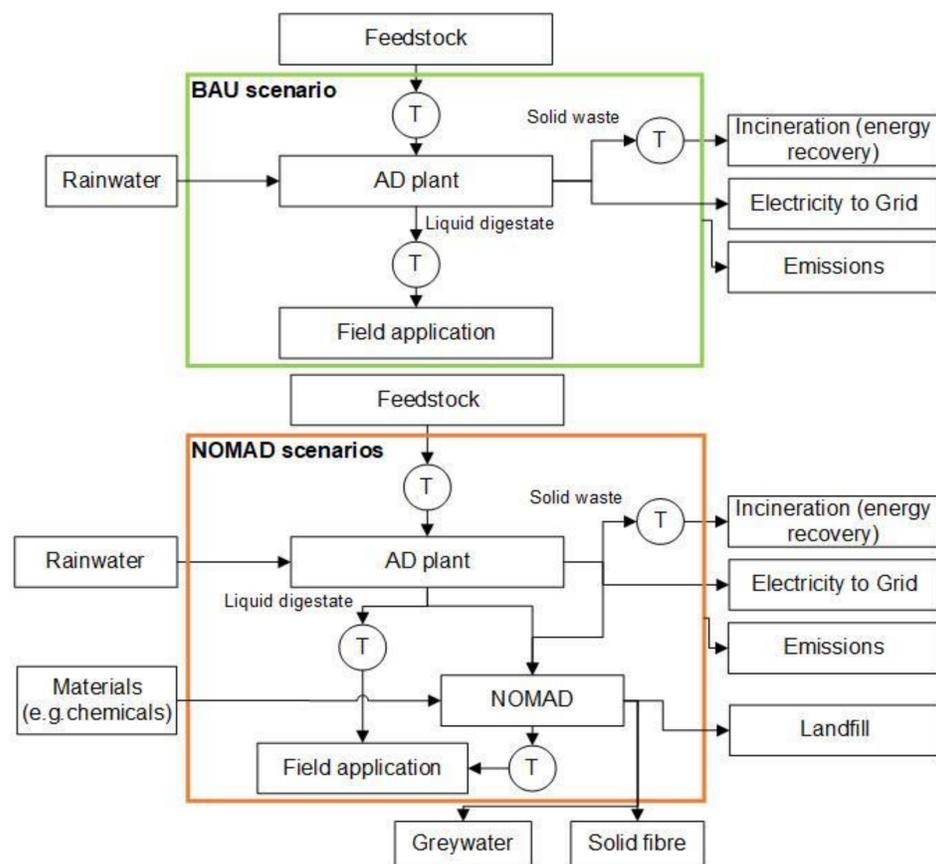


Figure 2. System boundaries of this study.

## Conclusion and Recommendation

- The NOMAD process could be used to valorise AD digestate, by reducing volumes for transport, concentrating nutrients, removing contaminations, and developing fertiliser products.
- Introducing the NOMAD process to an AD plant can help reduce environmental impacts, with higher reductions observed in NOMAD upscaled scenario.
- Further case studies to be presented for AD plants with different feedstock, in partner countries (as part of the NOMAD project).

## Key findings

- Contribution from NOMAD process itself to the impact categories considered is insignificant (less than 1%) in NOMAD scenario (Figure 3).
- NOMAD scenario (5 ton digestate/day) leads to a reduction of environmental impacts in all categories (from 2% to 24%), compared to the BAU scenario (Figure 4).
- NOMAD upscaled scenario further reduces environmental impacts in all categories (from 20% to 74%) (Figure 4).

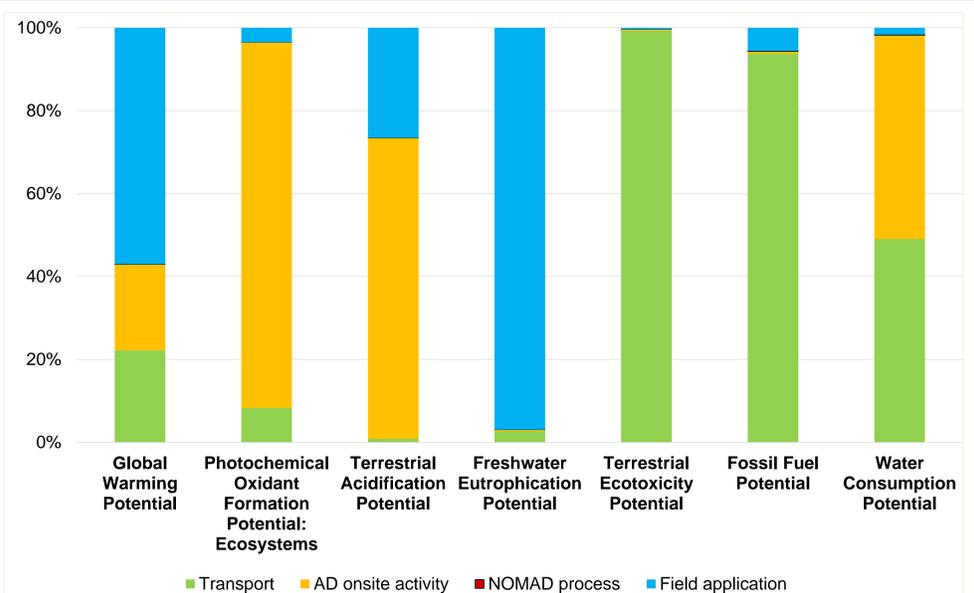


Figure 3. Contributions of environmental impacts from stages for NOMAD scenario.

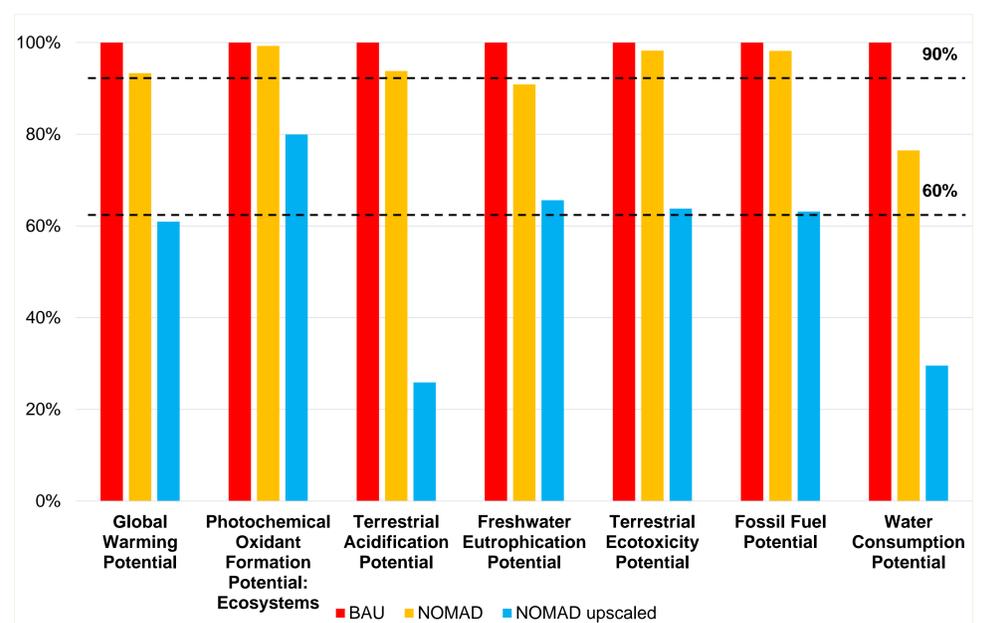


Figure 4. Result comparison between scenarios

## Reference

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