Sustainable Energy in Ireland

4th EU Biomethane Conference, Clontarf Castle, Dublin

20th September 2018

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Overview

- Targets
- Results from economic assessment
- Preliminary findings for sustainability assessment
- Supporting biomethane
- Summary

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Near term binding climate and renewable targets

- Near term (2020):

16% of energy demand to come from renewable sources by **2020.**

16% RES

10% of road and rail transport to come from renewable sources by 2020

10% RES-T

20% reduction in non-ETS emissions compared to 2005 (those sectors outside EU emissions trading scheme)

-20% Non-ETS

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Emissions targets become primary driver for 2030

- Medium term: 2030 climate and energy package

  Overall renewable target at or above **16% by 2030**

  30% reduction in **non-ETS** emissions as compared to 2005

- Energy White Paper ambition for 2050

  80% reduction in energy related greenhouse gas emissions relative **to 1990 levels**

16%

RES-T 14%

-30% Non-ETS

Energy Related Emissions -80%

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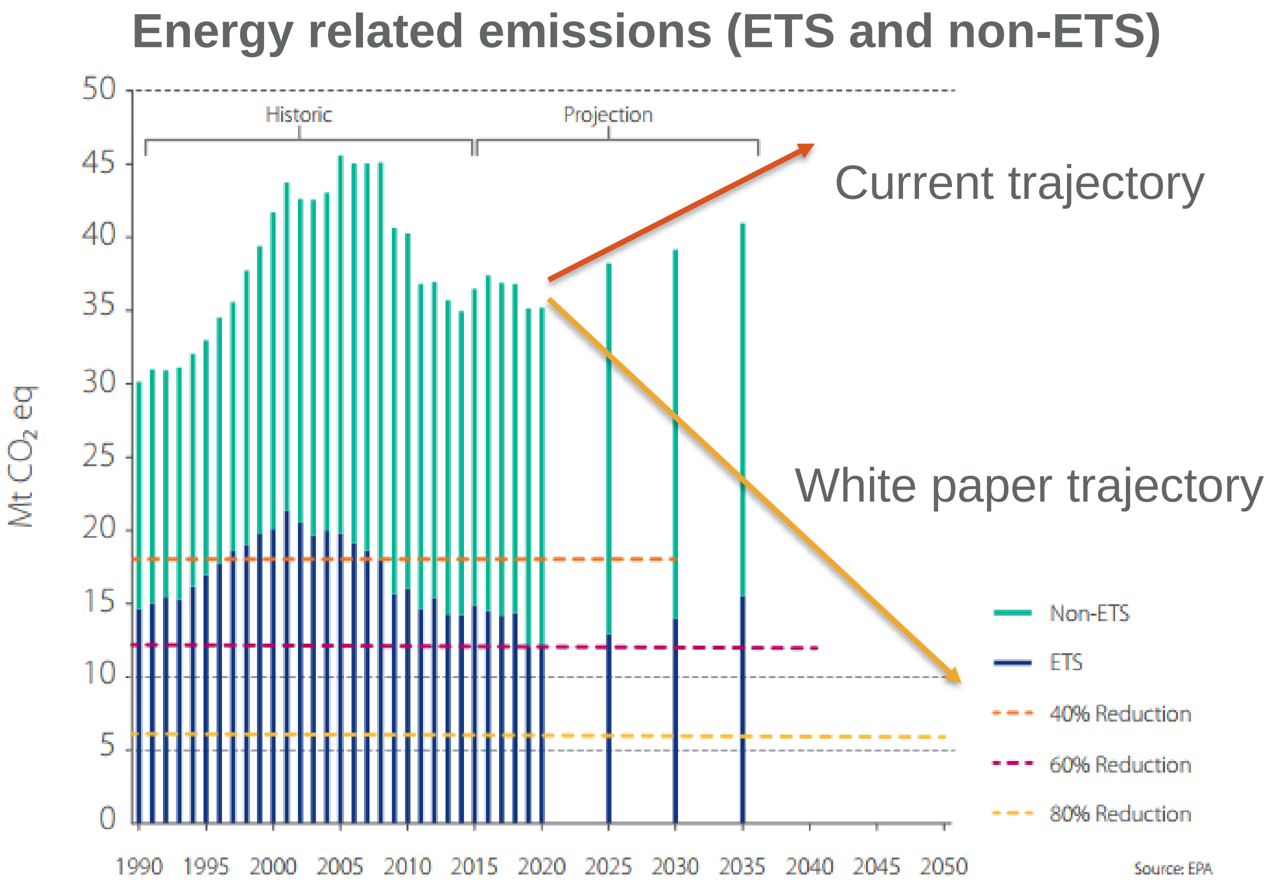
To meet the carbon reduction ambitions of the white paper, more of all types of low carbon technologies are needed

Without further policy action post 2020 energy related emissions are projected to increase

Policy required to reduce demand and increase renewable energy in heat, transport and electricity

Contributions from several forms of renewable energy sources and ongoing reductions in energy demand necessary



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Economic assessment of biogas and biomethane in Ireland

4 Scenarios Examined

- **Waste-based Anaerobic Digestion (AD):**
  - Maximum use of food and animal wastes as these resources have the lowest cost and offer the highest carbon savings.

- **Increased biomethane:**
  - Increased injection of biomethane into the gas grid utilising the most accessible and least cost injection points. Food waste, animal manures and some of the grass silage resource was used.

- **All AD feedstocks:**
  - Maximum use of all AD resources, including the potential surplus grass silage resource.

- **Exploratory:**
  - Gasification is a technology which is not yet mature, but could produce large quantities of biomethane from wood chips/ pellets and energy crops.

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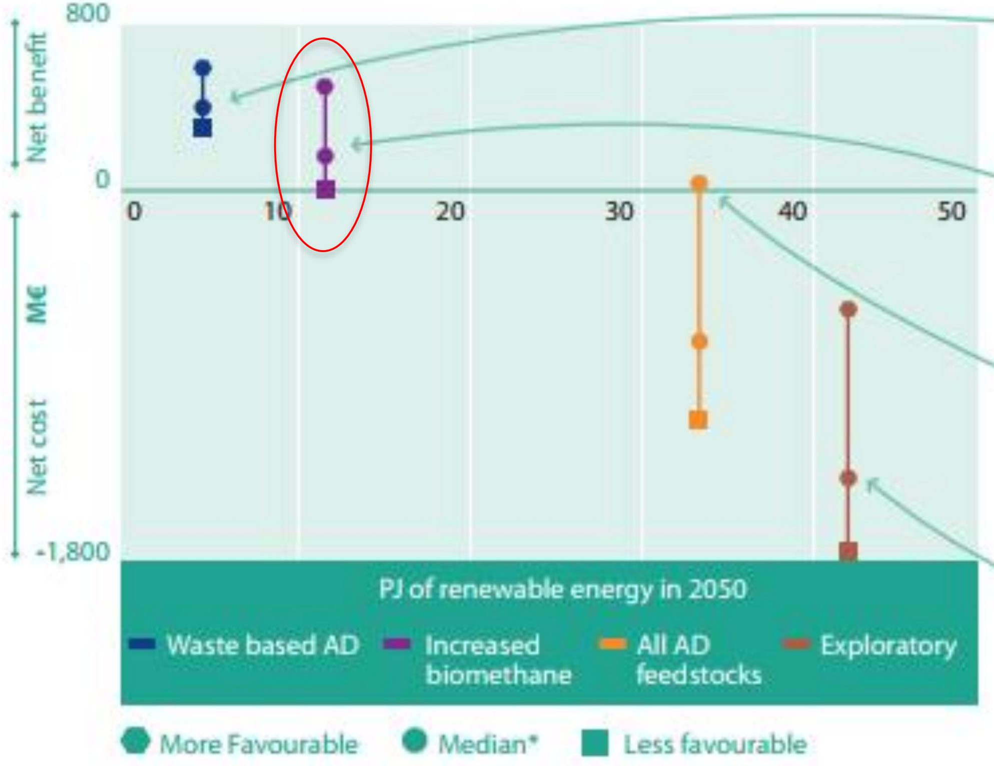
Using food waste, animal manure and some grass to produce biomethane shows a net benefit under all price sensitivities examined



Using waste resources results in a net benefit to society across the range of price sensitivities examined.

Increasing production to inject gas at easily accessible points on the grid also shows a net benefit.

Maximising the use of the grass silage delivers a net benefit under favorable conditions. This includes reducing the cost at which silage is produced.

At current cost levels, the use of gasification technology to produce biogas does not yield a net benefit.

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Increased biomethane scenario delivers **2%** RES and saves **600 $ktCO_2$** in 2030.

- **600 $ktCO_{2eq}$ annual green house gas savings in 2030:**
  - **64%** of annual emissions savings in 2030 **in energy sector**
  - **36%** from avoided **slurry storage**

- **Fuel produced in the increased biomethane scenario equivalent to 5% of current gas supply**
  - Avoids individual consumers to chose a renewable technology on their site.

- **Maximising slurry resource can increase savings.**
  - Most slurry is not currently stored or available for AD

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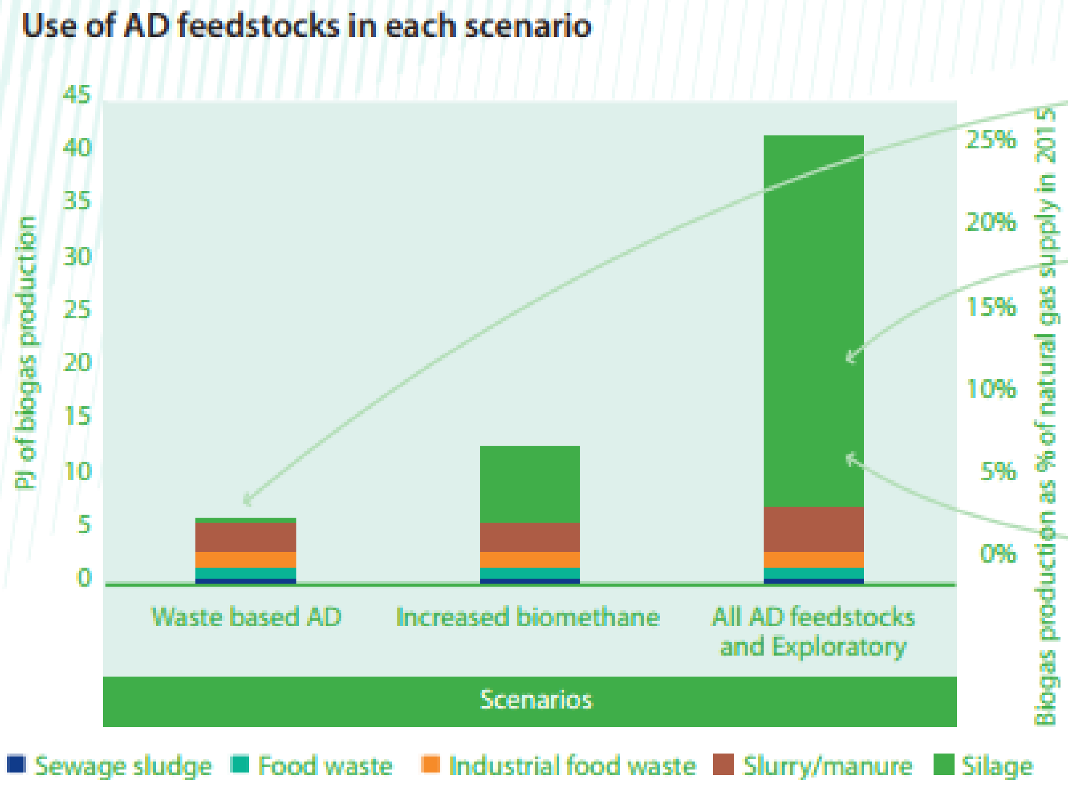
Grass is a key resource for large scale production. With increased yields, much more maybe available but it has a production cost and higher lifecycle emissions



Animal and food wastes are often available at low cost or can even command a gate fee.

The additional grass silage is a key potential feedstock accounting for 86% of the renewable energy potential.

Grass silage has a production cost that makes the energy produced more expensive. Optimising production methods could minimise this cost in the future.

Impact of RED II sustainability requirements

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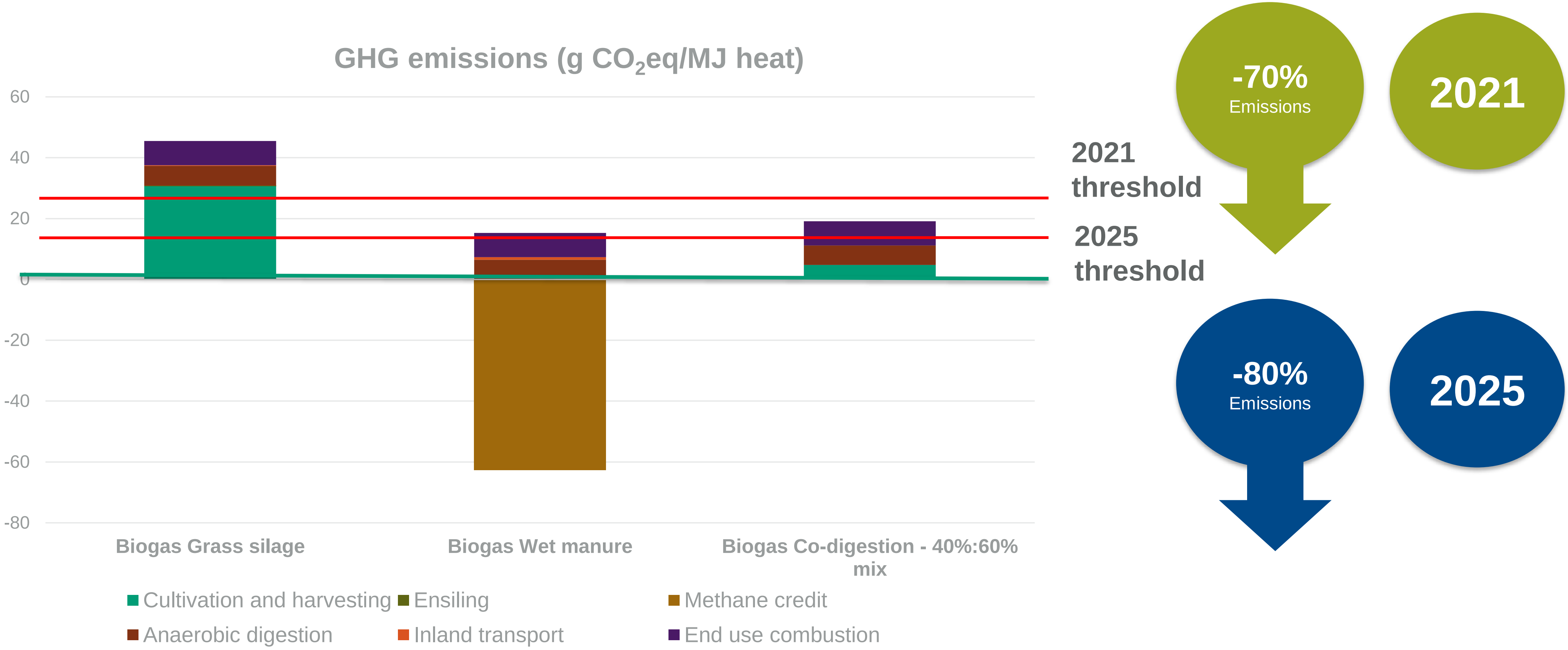
How are Irish supply chains set against EU requirements (Biogas)



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Under current cultivation practices, grass silage has high GHG emissions

16% GHG saving

9 tDM/yr

High Emissions

Typical practice

Nitrogen / no digestate

43% GHG Saving

16 tDM/yr

Central emissions

Best practice

Nitrogen and some digestate

Co-digestion with manure at 50/50 ratio required for best practice

Grass resource limited to ~X2 manure resource

76% GHG saving

13 tDM/yr

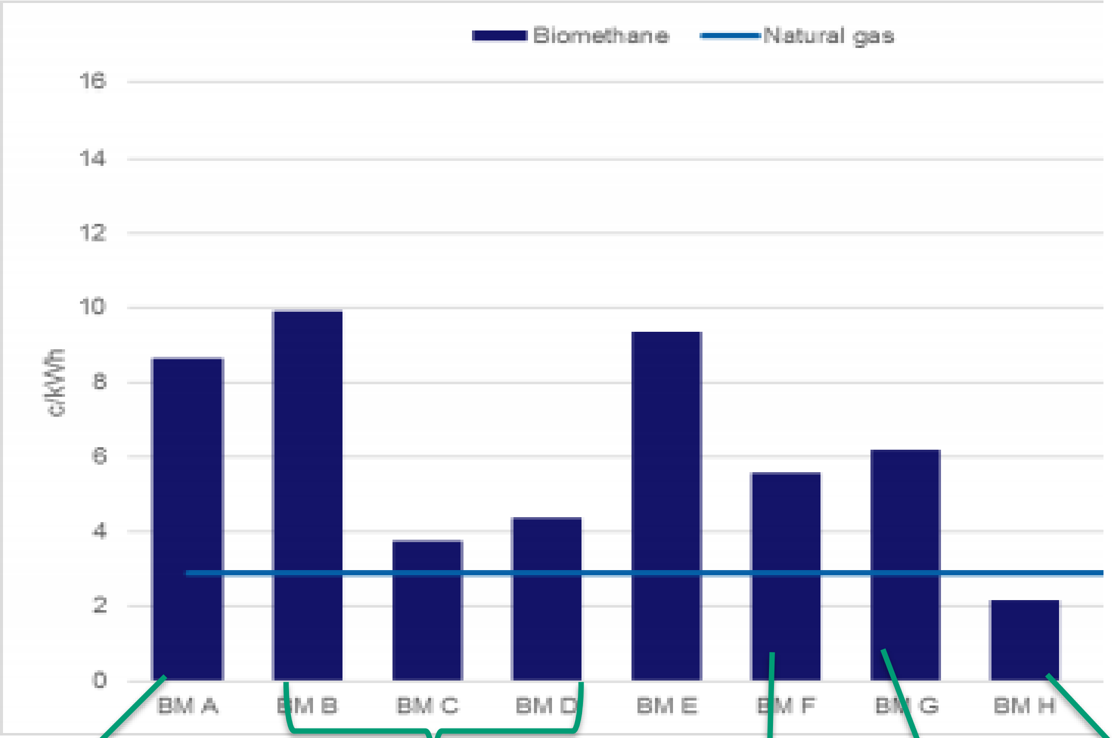
Low Emissions

Potential

Red clover, wide use of digestate

Supporting biomethane

The lifetime costs vary substantially across pathways,



Farm silage and slurry via LP biogas pipeline to upgrade and injection

Food and biowaste waste at different scales

Farm based with direct injection

Farm based compression and road distribution

Existing digesters e.g. Waste Water

- Setting tariffs has a high degree of risk
- Injection sites are typically large producers of energy. > 20 GWh per annum.
- How can support develop the market and minimise risks of overpayment and unintended consequences?
- What is most the appropriate policy mechanism to achieve this?

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Some research and policy priorities

- **Development of financially viable AD technologies at scales suitable for Irish farms.**

- **Improving the energy density of animal manures to lower transport costs.**

- **Business models for development of community and multi-farm biogas production.**

- **Examination of indirect impacts of policy development**
  - What could the impact of support be on animal numbers?
  - What can be done to avoid no-cost disposal of food waste as seen in other jurisdictions?
  - Security of supply risks linked to agricultural activity?

- **Implementation of the green gas certification scheme blueprint**

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Summary

- Biomethane can contribute significant GHG reductions that will count towards Irelands national climate targets in 2030
- The use of food waste, animal manure and some grass is the scenario that maximises biomethane output at economic an cost.
- Further increase in biomethane output can be achieved though the capture of more animal manure and through the improvement of both the sustainability and cost of grass silage.
- The lifecycle costs of various pathways differ substantially and policy must seek to match uptake with the avoidance of negative unintended consequences.
- There is still considerable scope for research to improve technology, feedstock and policy instruments which can further increase the impact of biomethane.

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