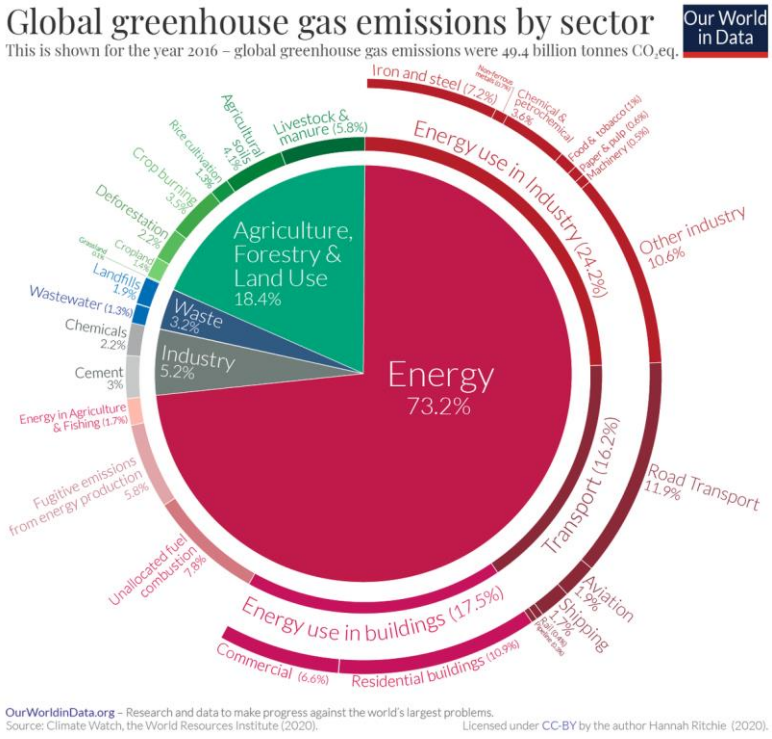
Fueling the Future:
Smells Like Methane

NEW HOLLAND

Growing Focus on Climate Change & Sustainability

Agriculture is increasingly under the spotlight



The Issue

Agriculture is a significant contributor to Global Greenhouse Gas (GHGs) Emissions (between 12%-25%).

Methane (86x CO_2 warming potential over 20 years)
Livestock and their manure are major sources of methane.

Nitrous oxide (270x CO_2 warming potential over 20 years)
Inorganic fertilizer applications, manure, leaching, run-off and Fossil fuel combustion.

Carbon dioxide
The main source of atmospheric carbon dioxide is the burning of fossil fuels and disturbing the soil.

Addressing the Issue

1. Farming practices will have to evolve to address these emissions.
2. We are doing our part by replacing fossil fuel demand with sustainable alternatives in our drivelines.

Leader in Clean Energy, Built to Sustain

- Electrification development
- Alternative fuels development

2006
New Holland Clean Energy Leader® strategy

2009
Fuel cell hydrogen tractor concept

2013
1st gen. methane tractor working prototype

2019
Hybrid tractor concept at Agritechnica

2019
Industry's 1st methane construction vehicle

2020
Industry's 1st fully electric backhoe loader

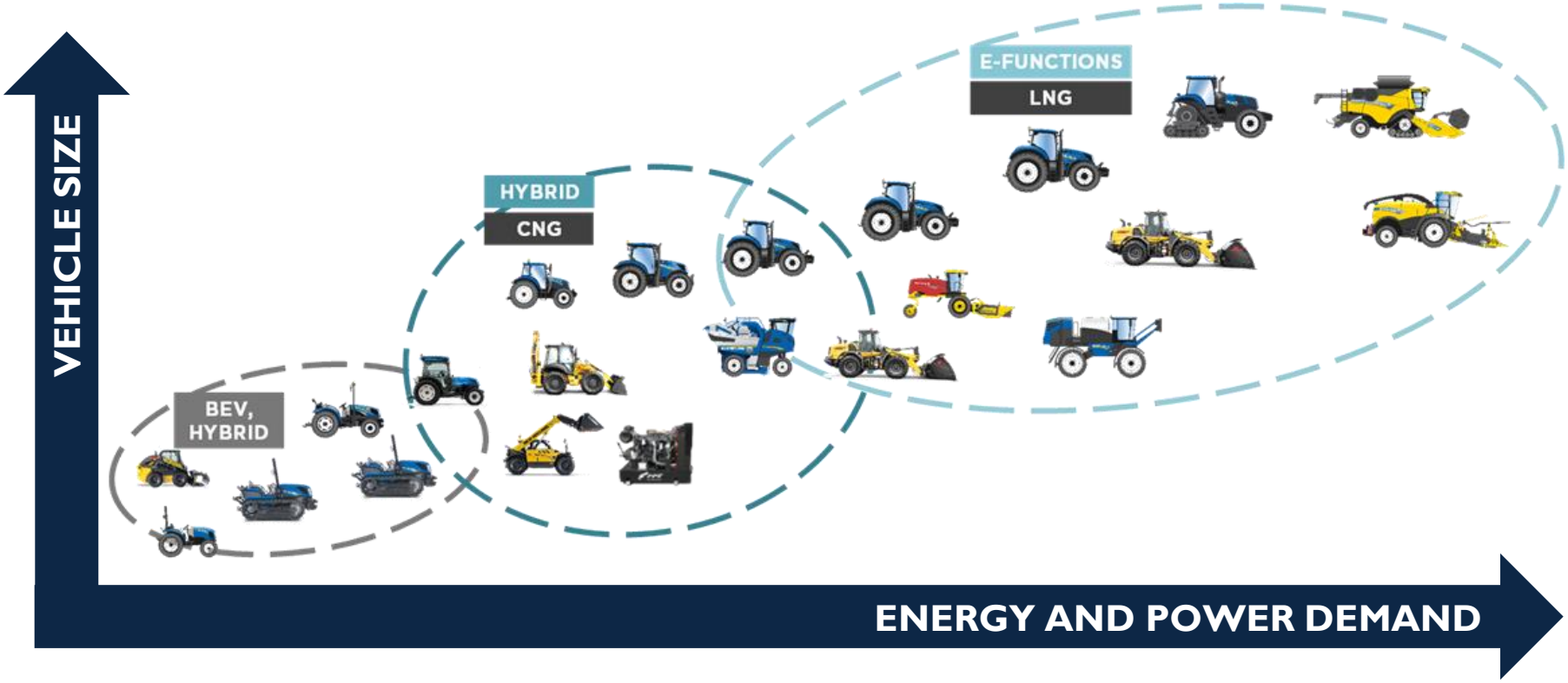
2021
e-Source Power pack

2021
Sustainable Tractor of the Year

2022
Industry's first fully electric utility tractor

2022
Industry's first LNG tractor

Product Portfolio Evolution



T6.180 Methane Power Tractor

Designed to minimize emissions while maximizing profitability and productivity without sacrificing performance.

- **Sustainable Solution -** Low pollutant emissions (-98% PM emission) and reduced CO_2 emissions (–10-15%) over Stage V Diesel.
- **Low Operating Costs -** Running costs saving up to 30% vs. diesel on a T6 Methane Power tractor tested in transport application.
- **Diesel-like Performance -** FPT Industrial NEF 6.7 l CNG powered engine with maximum output of 175 hp and 738 Nm (same as a standard T6.180).
- **Simple Maintenance Free ATS -** Stage V emission compliance, no cEGR, no DPF and no need for active regeneration.
- **High Reliability -** High strength structural block and oil sump specifically designed for installation on tractors and specific piston shape for optimized combustion and compression ratio.

Powering This Direction – FPT Natural Gas Engines

T6.180 METHANE POWER

20 years of experience in producing natural gas engines.

Main Features and Benefits

- 100% natural gas engines with diesel-like performance; compatible with CNG, LNG and biomethane.
- Stoichiometric combustion strategy pioneered from 1995 for clean combustion and low emission.
- Multipoint injection and proprietary model-based engine control (patent pending).
- Reduced operating costs and low CO_2 emissions — nearly zero when operating with biomethane.
- Simple 3-way catalyst for Stage V emission compliance.
- Lower noise and vibration compared to Diesel (5 db).

The Fit

Farm Biogas Access

- Transport of waste into the AD Plant - Primary
  - Cattle slurry
- Transport of solid digestate out of the AD Plant
- Transport of liquid digestate out of the AD Plant
- Gas compressed from own biogas facility
  - Cost of fuel considered 'free', if not actually free it is likely offset by incentives/tariffs.
- Focused on transport
- Not seasonal
- High hours 1,000-3,000 hours per year
- Constant trips in and out of the AD plant allows for regular refuelling.

Municipalities / Fleets

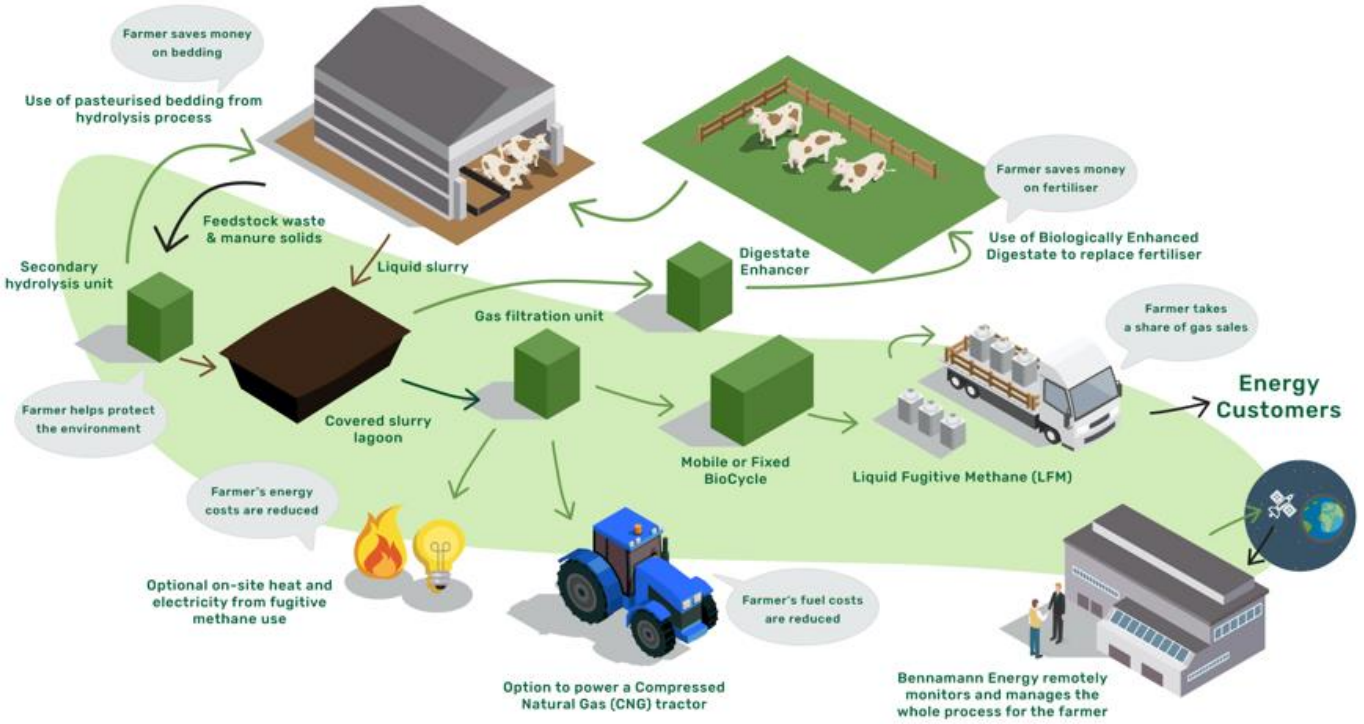
- Narrow Tractor portfolio
  - Customer application: Roadside mowing, right-of-clearing, snow removal, land management.
- Buyer Driver: High product capabilities to handle heavy implements outweigh pricing.
  - HD axles, high hydraulic flow
  - Telematics – fleet customers
  - Emissions reduction targets
  - Grid gas availability
  - Access to methane

Large Professional Vegetable Growers

- Broad Tractor portfolio
  - Customer applications
    - Planting with "transplanters," spraying, harvesting, tillage land preparation, land levelling, spraying, harvesting in vegetable application
- Buyer Driver: High product capabilities to handle heavy implements outweigh pricing.
  - High hours usage
  - Environmentally focused
  - Telematics – large fleets
  - Access to methane

The Energy Independent Farm Concept

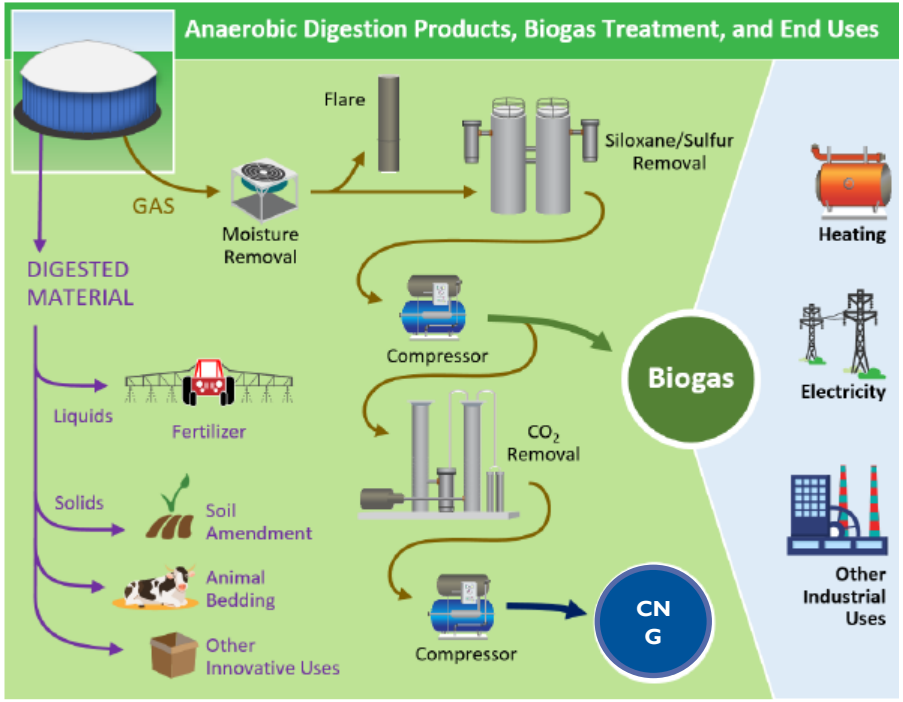
Easing the burden of energy costs.

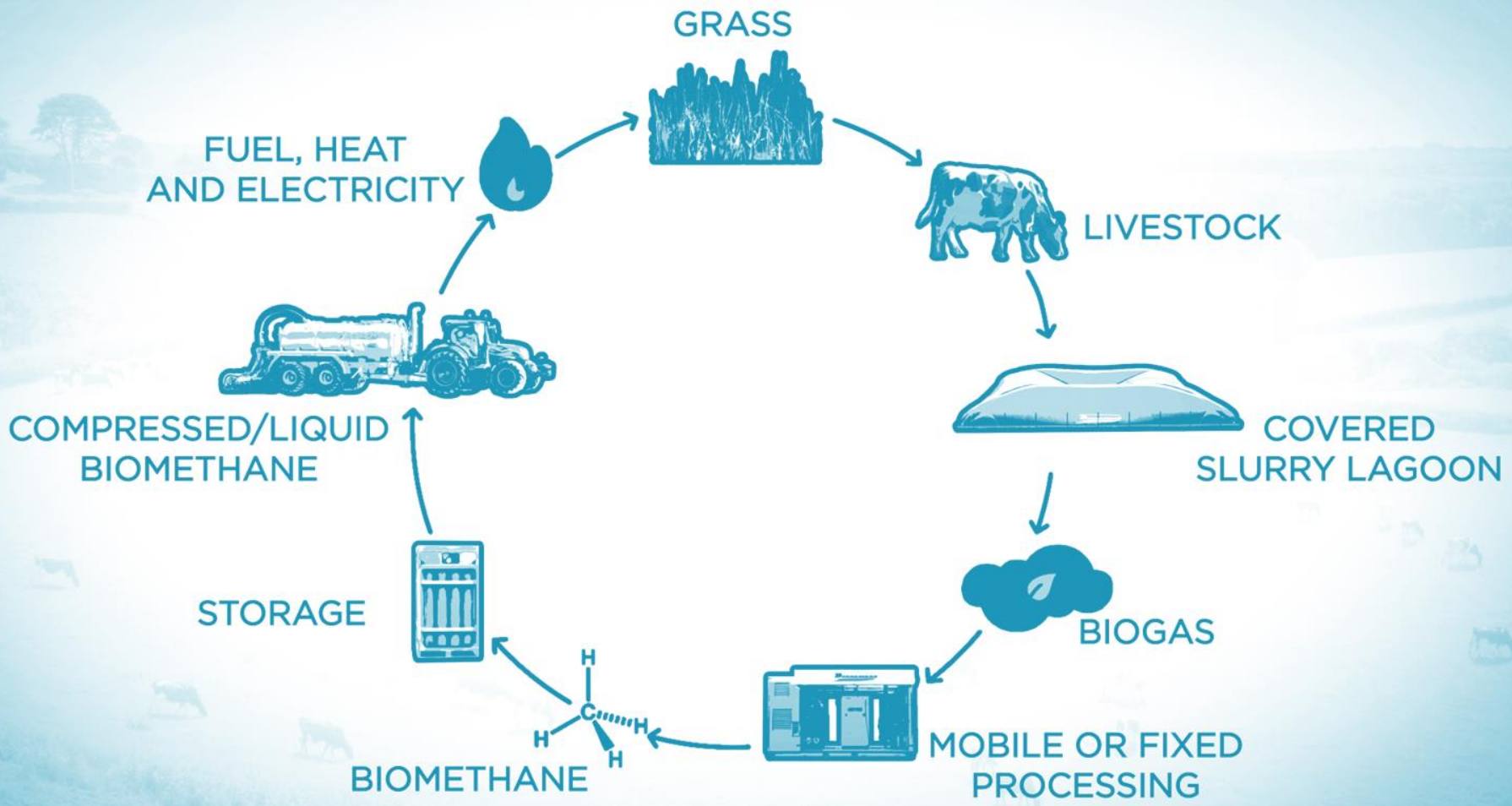


Biomethane Production

Process required for methane to be used as fuel:

- Methanization is the production of biogas, which can either be used directly as fuel to generate electricity and heat or upgraded to produce biomethane.
- Biomethane is biogas that has been 'scrubbed' of impurities and other gases, so that it meets the necessary quality standards to be injected in the natural gas grid.
    - The natural gas grid contains both renewable and non-renewable sources.
- The final step for fuel usage for the T6.180 Methane Power tractor is compression, as the fuel storage and delivery system has been designed to operate on CNG.




GRASS
LIVESTOCK
COVERED SLURRY LAGOON
BIOGAS
MOBILE OR FIXED PROCESSING
BIOMETHANE
STORAGE
COMPRESSED/LIQUID BIOMETHANE
FUEL, HEAT AND ELECTRICITY

Questions?

Thank you!