biogas growth in Denmark

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Ministry of foreign affairs
Danish trade council of north america
The trade council - Energy and Environment

40 sector specialists working to create relations and identify business opportunities for Danish companies across North America.

…also close interface with Food and Agriculture Team in Chicago and Washington D.C.
THE STATE OF BIOGAS PRODUCTION IN DENMARK

Production in PJ

- **173% increase**

AGRICULTURAL BIOGAS PLANTS DOMINATE PRODUCTION

- 12% of manure in biogas production

- 11% biogas in the grid in 2018
- Record summer: 18% biogas in the grid in July
- Estimated green gas in the grid in 2030: 100%
Transformation of Biogas sector in Denmark

**Why a priority since mid 1980s?**

- Transformation of the energy system
  - Reduces imported fuels, increase national energy supply, flexible applications
- Agricultural waste management
  - Large livestock population, manure must be land applied, nutrient economics
- Climate impact
- Job creation
- Export of know-how

**How did we get there?**

- Political initiatives
- Professionalization of the biogas industry
- Energy infrastructure (NG grid)
- Value of biogas – subsidy
- EU green certificates
- Cross-sector collaboration
- Controlling in- and off-take
- Farmer buy-in
Danish biogas model

Danish Biogas Innovations

- Large-scale, centralized co-digestion AD plants
- Feedstocks / Co-Digestion
  - Livestock manure, deep bedding, food waste, ag residuals
  - ‘Bio-pulp’ from food waste capture
- Products
  - Organic fertilizer, RNG/biomethane, animal bedding, food-grade CO2
- Farmer cooperative model
- Framework conditions for renewable natural gas
- Transformative utility companies – fossil to renewable
Large-Scale, Centralized Co-Digestion
Food Waste Treatment
Biogas Cleaning and upgrade
Power to Gas – Biogas and Wind

The Methane Process

- **CO₂, CH₄, H₂** to **Methane Reactor with Catalyst**
- **Cleaned Biogas & Hydrogen**
- **Heat Exchanger**
- **Condensed Water**
- **CH₄**

**Sabatier reaction:**

\[ CO₂ + 4 H₂ \rightarrow CH₄ + 2 H₂O \]
Biogas Go Global (BGG) is a new public-private partnership that is set out to accelerate the U.S. biogas production by utilizing knowledge and experience from the Danish biogas model.

BGG aims to break down barriers for biogas production, support the right framework conditions, business models and technologies in the U.S.

The initiative gathers industry experts, regulators and academia into one partnership to ensure that knowledge is transferred across the different sectors simultaneously. Cross-sector knowledge-exchange is often transferred to each sector separately, so BGG ease the workflow for all parties involved and increase the transparency within the industry.

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Questions?

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