

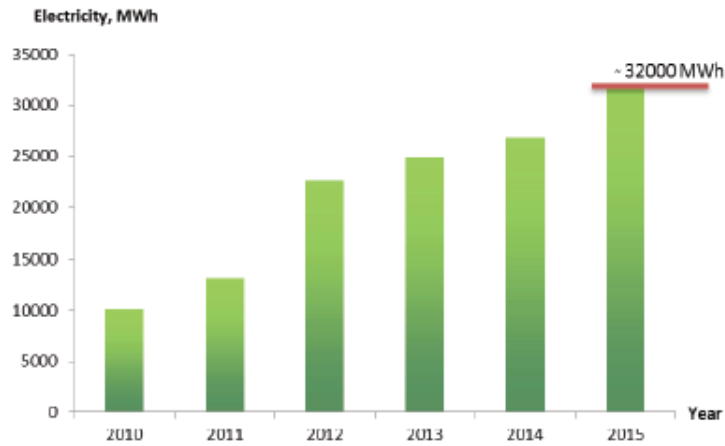
Wood-fueled gasifier plant at Skive District Heating Company, Denmark

Year of implementation:	2008, updated 2015
Location:	Skive, Denmark
Technology:	Bubbling fluidized bed (BFB) gasifier
Principle feedstocks:	Pelletized forest residues
Products/markets:	Electricity and heat (district heating)
Technology Readiness Level (TRL):	TRL 9 – actual system proven in operational environment

DESCRIPTION

At the Skive gasification demonstration project in Denmark, a bubbling fluidized bed (BFB) gasifier is used to produce gas from wood-based biomass. This gas is then cleaned catalytically and used in IC engines in a combined heat and power (CHP) application. The capacity of the plant is 6 MW electricity and 11 MJ/s heat. The heat is consumed in the local district heating network and the electricity is sold to the grid. Besides providing 70% of the district heating production for 8,500 households in the community, the facility aims to produce 40 GWh of electricity annually. Wood pellets consumption would amount 40,000 tons per year, with annual CO₂ savings of 26,000 tons.

After several years of intermittent operation, the plant has now reached a high availability and operation and outage is fully under control. Persistent efforts to improve fuel quality and alter the catalytic tar reformer have helped decreasing the forced outage and time consumption when maintaining the catalysts. This means that the energy consumption in Skive now primarily is covered by renewable sources.



Development in electrical power production in Skive Fjernvarme CHP plant

Stakeholders:	<p>Andritz Carbona & Haldor Topsøe A/S, supplier</p> <p>Danish Energy Agency</p> <p>District heating consumers in Skive / owners of Skive DH company</p> <p>Electricity consumers in Northern Europe</p>
Contribution to Sustainable Development Goals:	<p>The plant substitutes fossil fuels for electricity and heat with regionally sourced biomass (pelletized forest residues). The operation contributes sustainably to economic development in the region (SDG8), reduces GHG emissions (SDG13) and ensures affordable energy locally (SDG7) given the framework conditions regarding taxation and feed in-tariffs.</p>
Employment:	<p><i>No information available</i></p>
Replicability and scale-up potential:	<p>High replicability and scale-up potential at regional, national and international level</p>
Success factors:	<p>An interested and persistent host/plant owner, preferably with access to a district heating network to facilitate high conversion efficiency;</p> <p>High electricity price or economic favouring of solid biofuels e.g. via tax exemption of biomass for heating, taxation of fossil fuels or feed-in tariffs for electricity (<i>equalizing subsidies that apply to fossil fuels</i>);</p> <p>Supply chain that is matured to supply sustainably sourced fuel;</p> <p>A TSO (transmission system operator) that allows decentralized electricity generation;</p> <p>Education/knowledge/access to dos and don'ts when applying a recently matured technology.</p>
Constraints:	<p>Fuel quality,</p> <p>Low electricity prices (if no feed-in tariff applies),</p> <p>Lack of heat demand,</p> <p>Local disapproval of such a plant/technology</p>



Gasification plant in Skive, Denmark (courtesy of Skive Fjernvarme)

Info provided by:

Tage Meltofte, Skive District Heating

More information:

<http://www.skivefjernvarme.dk>

<https://www.andritz.com/resource/blob/32140/5d1bed6c21f7a417a92d9fd9db5563b1/04-sp-2009-pp-spectrum20-en-skive-data.pdf>

<http://task32.ieabioenergy.com/wp-content/uploads/2017/03/11-Skive.pdf>

Bodil Voss, Jørgen Madsen, John Bøggild Hansen, Klas J. Andersson, Topsøe
Tar Reforming in Skive: The Tough Get Going, The Catalyst Review, May 2016