BIOENERGY & THERMAL POWER

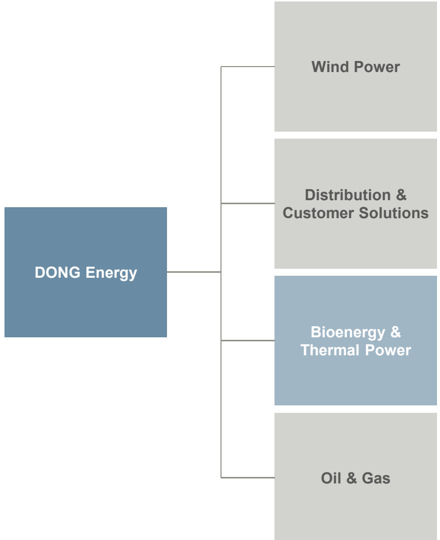
Thomas Dalsgaard, Executive Vice President

Meet the Management, 2 February 2017

Thomas Dalsgaard

EVP
Bioenergy & Thermal Power

2011 –	Executive Vice President, Bioenergy & Thermal Power
2010 – 11	DONG Energy, Senior Vice President
2008 – 10	DONG Energy, Vice President
2004 – 08	IMF, Washington D.C., USA, Senior economist
2003 – 04	DONG Energy, Head of Management and Board Secretariat
2001 – 03	Danish Ministry of Finance, Head of Division
1998 – 01	OECD, Paris, France, Senior economist
1993 – 98	Danish Ministry of Finance, Economist



Ongoing transformation of business model

From

Fossil-fired power producer with heat as a by-product

To

1. Bio-converted DK CHPs

- Biomass-based heat producer with power as flexible back-up
- Setting new standards for effective, smart and safe plants operations

2. REnescience organic growth in waste-to-energy

- Proof of concept expected at Northwich plant during 2017
- Cost-out / recycling-up programmes to bolster competitiveness

Regulated earnings Commodity exposure

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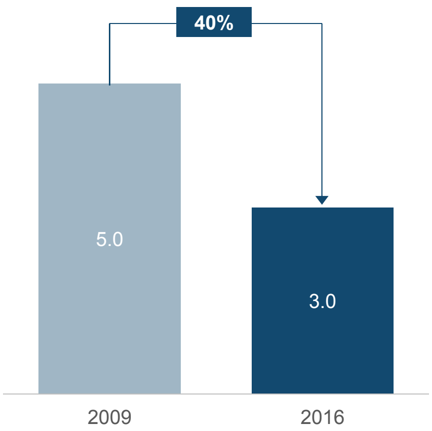
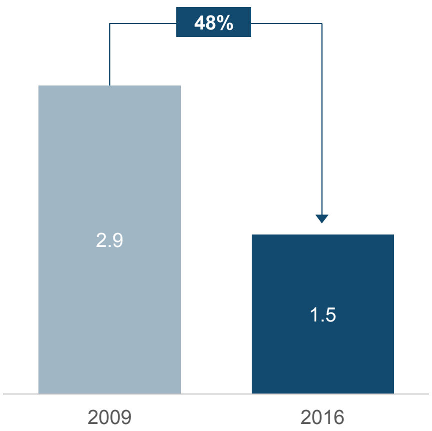
Transformation of DK business well underway

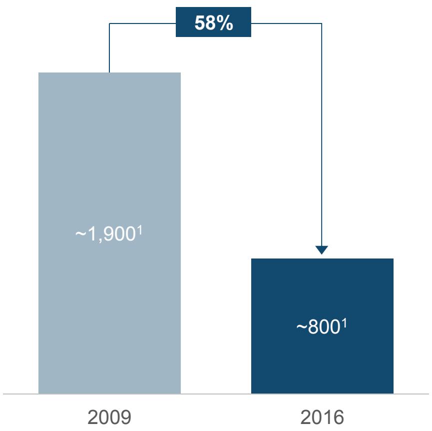
Major reductions in power generation capacity since 2009…
Danish portfolio of central plants (GWe)



… as well as in OPEX spend…
OPEX (DKK bn)



…and FTE numbers
# of FTEs



1. Adjusted for divested activities

Bio-conversions progressing as planned

Conversion CHP (MWe/MWth)[1]

Herning (77/150)

CoD **2009**

Primary fuel types: Gas ▶ Wood chips / wood pellets

Avedøre 2 (394/541)

CoD **2014**

Primary fuel types: Natural gas ▶ Wood pellets

Studstrup 3 (362/513)

CoD **2016**

Primary fuel types: Coal ▶ Wood pellets

Avedøre 1 (254/359)

CoD **2016**

Primary fuel types: Coal ▶ Wood pellets

Skærbæk 3 (95/320)

CoD **2017**

Primary fuel types: Natural gas ▶ Wood chips

Asnæs 6 (25/125)

CoD **2019E**

Primary fuel types: Coal ▶ Wood chips

Esbjerg (55/150)

CoD **+2020E**

Primary fuel types: Coal ▶ Wood chips

Total:

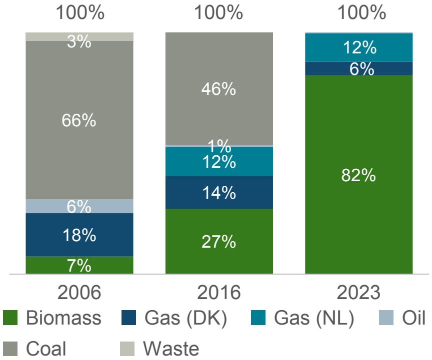
1,262 MWe
2,158 MWth

1. Biomass capacity after conversions. MWe refers to converted power capacity. MWth refers to converted heat capacity.

Bioenergy & Thermal Power will exit coal by 2023

Biomass conversions facilitate zero coal from 2023

DONG Energy fuel composition (%)



Coal may be used in force majeure circumstances

First major utility to fully exit coal

- Putting further action behind DONG Energy's vision for leading the energy transformation
- Heat customers support early coal phase-out

Smart Plant Programme: Running the power plant of the future – smart, green and safe

Smart Plant Programme will cover five priority areas

01 Fuel & logistics

Reduce cost of fuel ownership across the full supply chain from 'cargo to silo'

02 Plant performance

Improve productivity from office to plant by automating and digitalising processes

03 Organization & employees

Make the most of our talent and build **a flexible organisation** where skills & expertise brings biggest impact

04 New technology

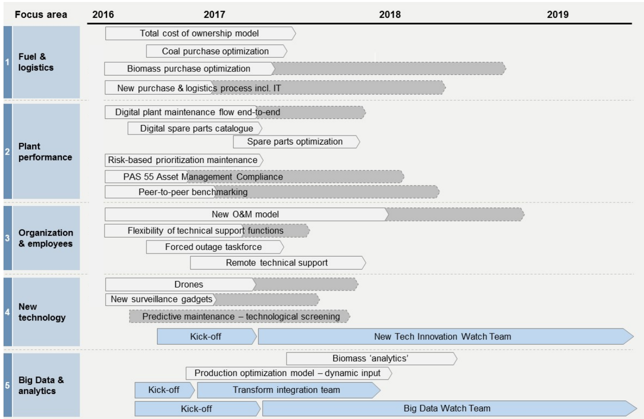
Be on top of technological advancement and bring in **intelligent new tech solutions** to daily routines

05 Big Data & analytics

Better use of data to support timely business decisions across the organization from trading to production floor

The 3-year programme kicked off January 2017

Smart Plant 2020 roadmap:



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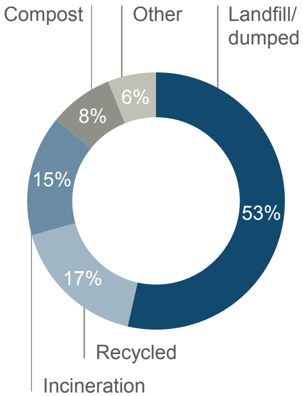
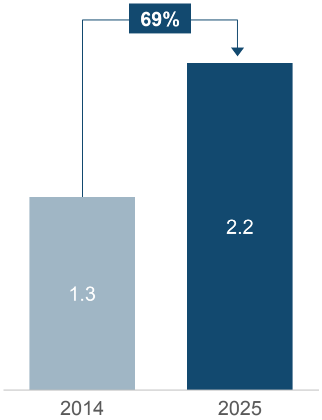
REnescience: A growth opportunity in the global waste market

Global MSW[1] disposal[2], %



Global MSW[1] generation[2], billion tons



Waste management - a growing global mega-trend

01 **Global population growth** (7bn ⇨ 9bn people over next two decades)

02 **Rapidly growing middle-class** in emerging markets

03 **Migration to cities** from rural areas

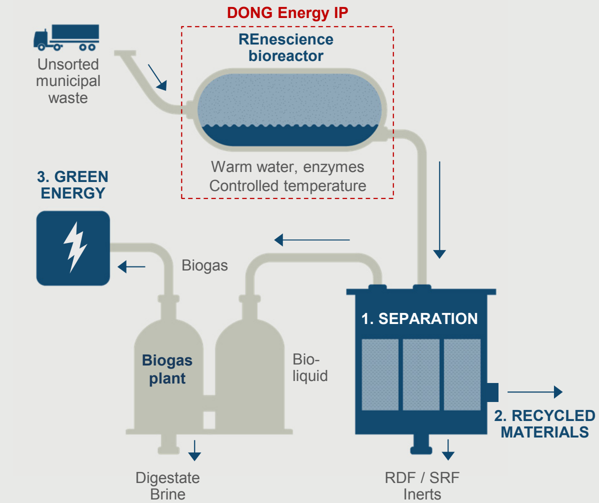
04 **Scarcity of resources** and increased awareness on **environmental and health** benefits from responsible waste handling

05 Regulatory push for **enhanced recycling and landfill avoidance** in many regions, countries and cities

1. Municipal Solid Waste
2. World Bank: A Global Review of Solid Waste Management

Converting household waste to green gas, green power, and recyclables

REnescience process



REnescience Northwich

Value proposition

- High green gas yield, low CO_2 footprint
- Cheaper and more convenient than source separation
- Higher recycling rate than incineration

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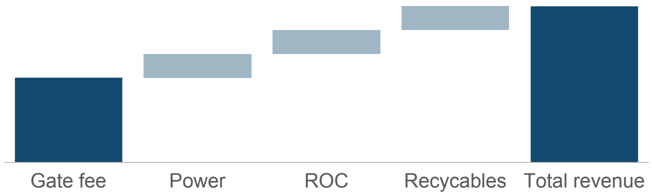
REnescience Northwich – first commercial plant after successful demonstration in Denmark

Facts about the facility

- 5 MW of baseload electricity generation (supported through Renewable Obligation Certificates)
- 120,000 tons of mixed waste processed per year
- CoD May 2017 (currently under construction)
- Total CAPEX ~DKK 600 MM

Business case driven by multiple revenue streams

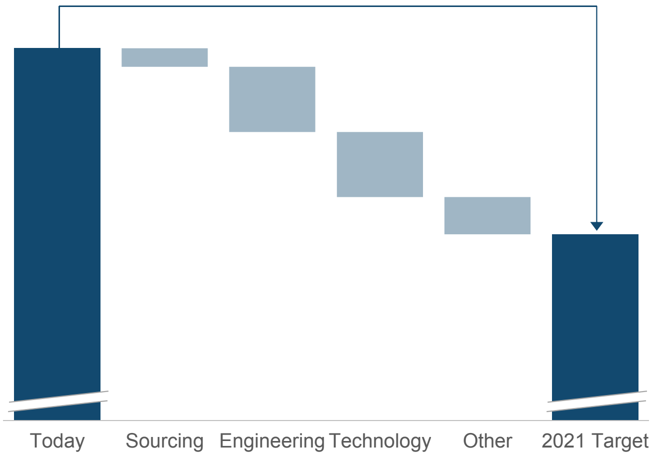
Revenue build-up of typical REnescience plant, UK example
Illustrative



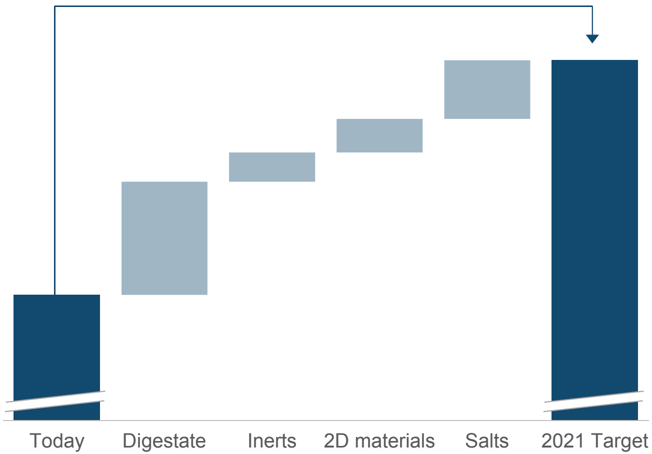
Size and composition of revenue drivers differ from project to project

Reinforcing REnescience competitiveness through cost-out and recycling-up programmes

Cost-out programme – reducing net treatment costs



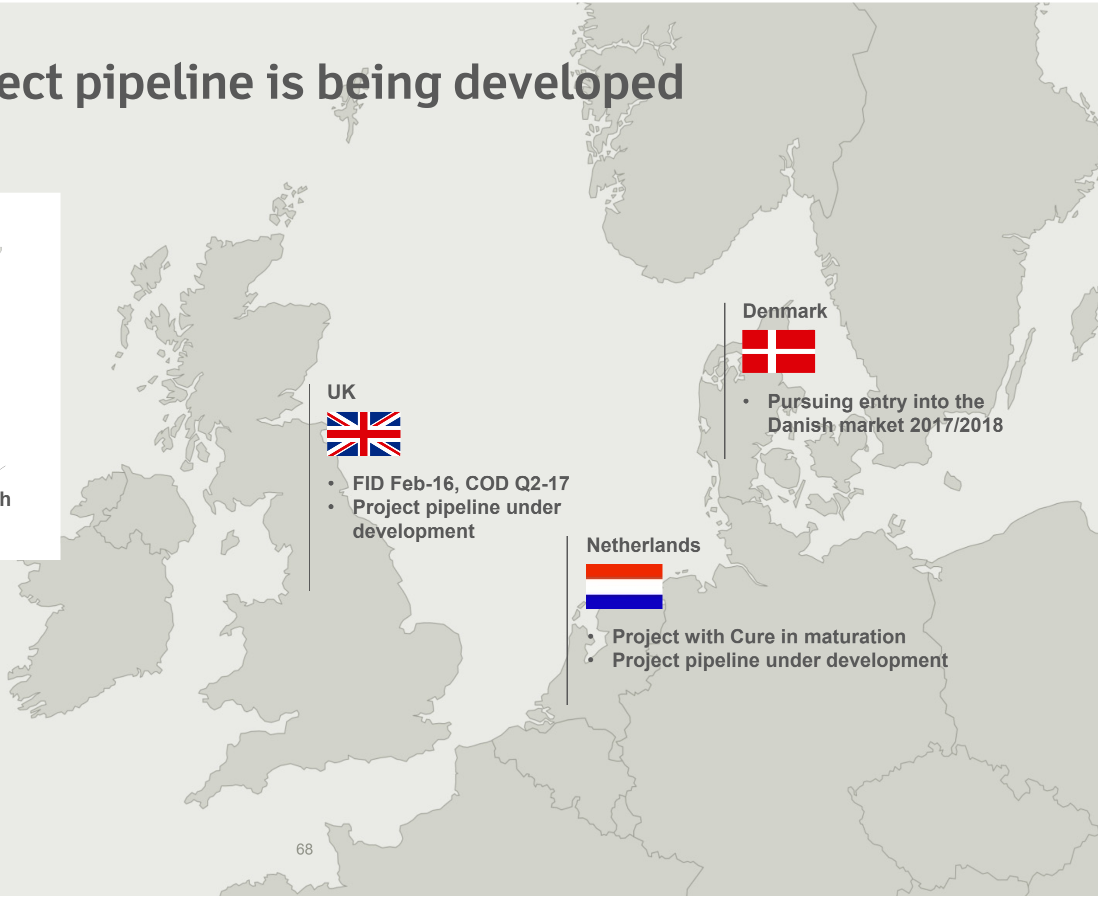
Recycling-up programme – increasing recycling rate



REnescience project pipeline is being developed

Malaysia

- Expected FID Q4-17 / Q1-18
- Signed partnership memorandum with local waste operator Cenviro



UK

- FID Feb-16, COD Q2-17
- Project pipeline under development

Denmark

- Pursuing entry into the Danish market 2017/2018

Netherlands

- Project with Cure in maturation
- Project pipeline under development

On track to deliver on targets set out in IPO

AREA		2015	2016	TARGETS FROM IPO PROSPECTUS (BASED ON 2015)	CURRENT EXPECTATION
EBITDA	Heat (DKKm)	346	407	• Expected to more than double from 2015 to 2017	
	Power (DKKm)	-446 (-934 excl. one-offs)	-607	• Subject to market conditions, underlying improvement over medium term from new heat contracts and enhanced flexibility	
	Ancillary services (DKKm)	383	300	• Relatively stable income going forward	
Cash flow	Cash flow (DKKbn)	1.6	-0.6	• Expecting positive free cash flow from 2018	
Volumes	Heat volumes (TWh)	9.3	9.2	• Stable long-term heat offtake	
Capacity	Biomass share (%)	19	41	• 60% of heat capacity in 2020 is green	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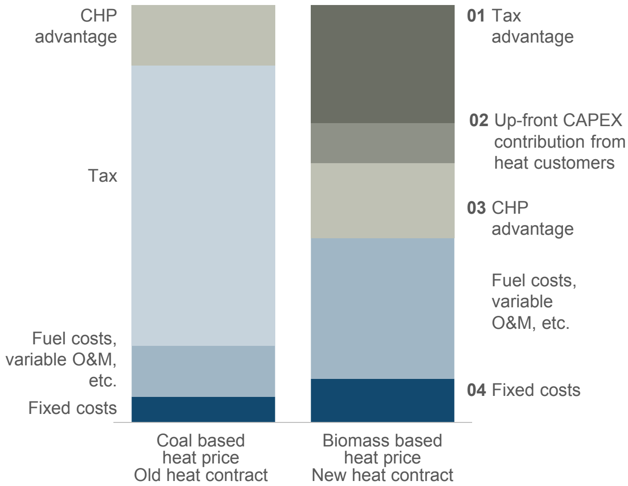
Appendix

New heat contracts and bio-conversions are key value drivers

Heat price is regulated by Danish Heat Supply Act

DKK/MWh, Illustrative example



Value drivers from new heat contracts

01.Sharing of tax advantage	Replacing fossil fuels with biomass implies tax savings that can be shared between heat producers and heat customers	Heat EBITDA impact
02.Up-front CAPEX contribution from heat customers	Value creation for BTP driven by the wedge between DONG Energy WACC and the regulated interest rate DONG Energy would otherwise receive from heat customers for fully financing the project. Heat customers benefit from the wedge between the regulated interest rate and their financing costs	
03.Sharing of CHP advantage	Shared efficiency gain from combined heat and power production	
04.Cost sharing	Improved cost coverage for heat production plus coverage of loss from forced production	
Bio-to-power subsidy	A premium feed-in subsidy of 150 DKK/MWh for power produced on biomass	

Elsam case

Elsam timeline
– cases brought by competition authorities

2003-2004	**Elsam 03-04:** Alleged abuse of a dominant position in the form of excessive pricing in the Western Danish market for wholesale electricity in 2003 - 2004
2005	**Elsam 03-04:** DCC[1] determined that Elsam had abused its dominant position during 2. half 2003 - 2004
2006	**Elsam 03-04:** DCAT[2] stated that Elsam had abused its dominant position during 2. half 2003 - 2004
2007	**Elsam 03-04:** Decision appealed to DMCHC[3]. Case is stayed on outcome of Elsam 05-06
2005-2006	**Elsam 05-06:** Alleged abuse of a dominant position in the form of excessive pricing in the Western Danish market for wholesale electricity in 2005-2006
2007	**Elsam 05-06:** DCC[1] determined that Elsam had abused its dominant position during 2005 - 2006
2008	**Elsam 05-06:** DCAT[2] determined that Elsam had abused its dominant position during 2005 – 2. half 2006
2008	**Elsam 05-06:** Decision appeal to DMCHC[3]
August 2016	**Elsam 05-06:** DMCHC[3] upholds that Elsam had abused its dominant position during 2005 – 2. half 2006
Dec. 2016	**Elsam 05-06:** Appeal to Western High Court

1. Danish Competition Council
2. Danish Competition Appeals Tribunal
3. Danish Maritime and Commercial High Court

Pending claims for damages and economic exposure

- **Claims for Damages**. Based on Elsam 03-04 and 05-06, 1,106 plaintiffs have in November 2007 filed a claim for damages with DMCHC[3]. The preparation of the case has been restarted after the judgement in Elsam 05-06 from DMCHC[3] and is ongoing
- The primary claim for damages amounts to **DKK 4.4 billion with addition of interest** calculated as per the date of the individual payments of the alleged excessive prices and until the payments have been settled
- Based on what we know so far concerning the plaintiffs' loss calculation, it significantly underestimates Elsam's actual costs of producing power
- We have claimed dismissal of the entire claims for damages
- As a reaction to the claims for damages**, we have currently provisioned DKK 298 million** which with addition of interest calculated from the date of the plaintiffs' commencement of legal proceedings against us amounts to DKK 504m as of 1 April 2016. Our provision is based on DCC's[1] estimation of consumer losses in **Elsam 03-04** and **Elsam 05-06**

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Key features of bio-conversions

Typical plant modifications

Logistics

- Crane for unloading

Storage

- Silo for keeping pellets dry
- Chips stored in the open
- Conveyor belt to transport chips/pellets from vessel to storage/plant

Plant

- Mill/burner upgrade
- New boiler required for gas/coal-to-chips

Conversion project development & execution

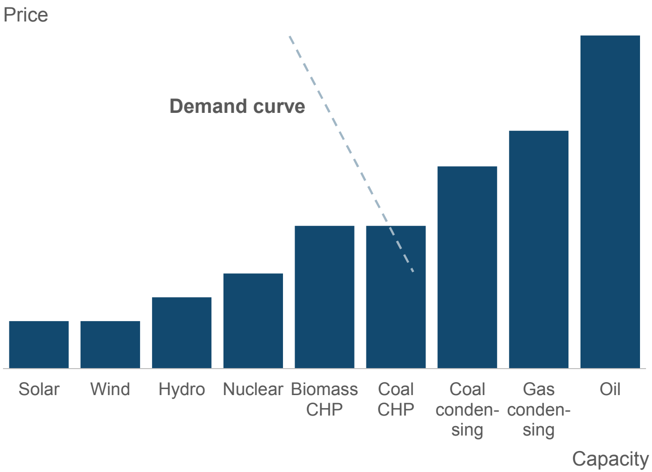
Concept design → Basic engineering → Procurement → FID → Construction → CoD → O&M

- BTP manages project development, execution and O&M of bio-conversion projects
- Core competencies in project management, concept design, process chemistry, control & optimisation as well as safety management maintained in-house
- Detailed engineering outsourced

Power is sold day-ahead, intraday and as ancillary services

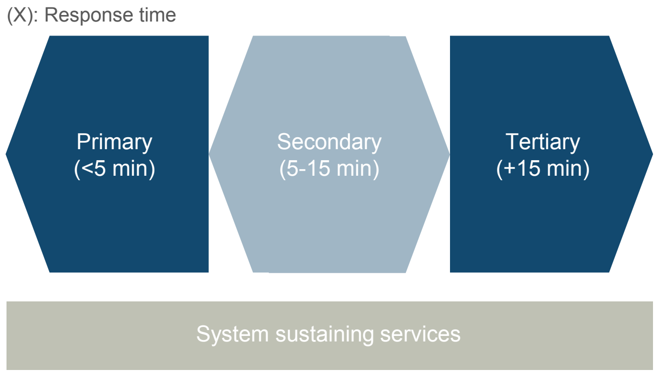
BTP CHP production is competitive with condensing production

Nordic power plant merit order and demand curve, Illustrative



Ancillary services ensure stability of electricity grid

Illustration of ancillary services



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Bioenergy & Thermal Power well-positioned in ancillary services and power markets

Continuous work to improve plant flexibility
Example of initiatives to improve plant flexibility (not exhaustive)

Bypass and heat accumulators	Turbine bypass and heat accumulators to decouple heat and power production
Minimum load	30% ⇨ 13% of full load (Avedøre 2)
Load gradients	4%/min ⇨ 8%/min (Skærbæk 3)
Minimum load with ancillary services	60 MWe ⇨ 20 MWe (Asnæs 2)

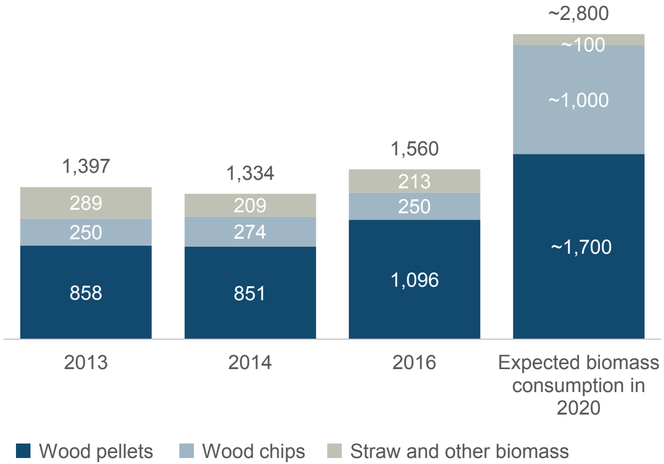
Solid competitive position in DK and NW Europe

- CHP production enables cost-efficient and swift delivery of ancillary services during winter and shoulder periods
- Closure of thermal capacity in the Nordics and the Continent likely to enhance BTP's market position

Diversified biomass sourcing portfolio across geographies and fuels

DONG Energy consumed 1.6 Mt of biomass in 2016 expected to almost double by 2020

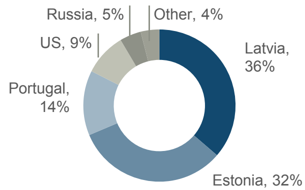
Biomass consumption, '000 t[1]



1. Energy content per tons biomass: wood chips=10.5 GJ/ton, straw=14.5 GJ/ton, wood pellets=17.5 GJ/ton
2. CIF ARA converted from USD to EUR at respective daily exchange rate

Diversified sources of biomass

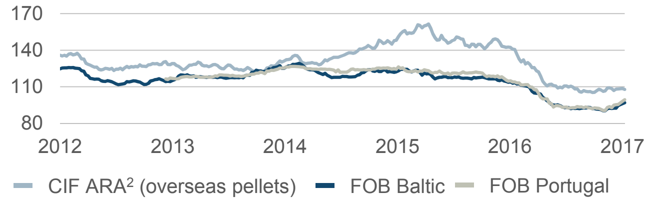
Wood pellet origin, 2016



- Mix of contracts with different lengths (10-year, 2-3 year, annual and spot)
- Chips are sourced from Denmark and neighbouring countries, incl. the Baltics

European wood pellet prices have declined in 2016

Historical wood pellet prices, 1-year forward prices, EUR/ton



Source: Argus

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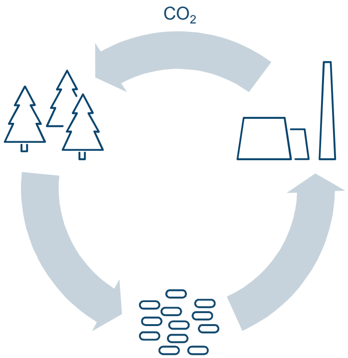
DONG Energy adheres to strict sustainability criteria

Combustion of biomass from sustainable forestry is CO_2-neutral



0 gCO_2 | kWh

Forest growth = CO_2 release from furnace

Ensuring sustainable sourcing of biomass

Standard of Sustainable Biomass Program (SBP)

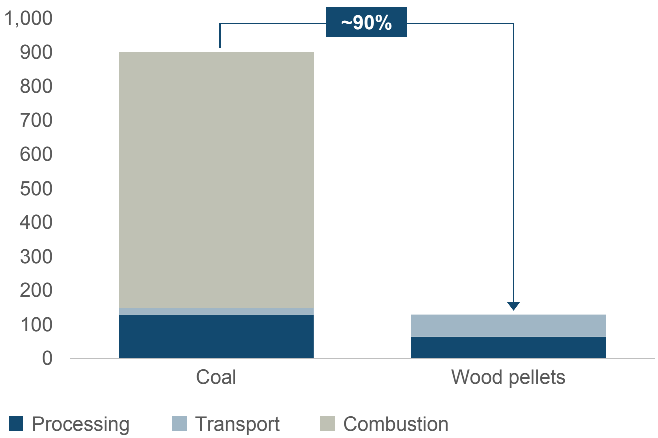
- Protection of key ecosystems or habitats
- Forest productivity and health is maintained
- Rights of indigenous peoples and local communities
- Protection of health and safety and basic labor rights
- Regional carbon stocks are maintained or increased over the medium- to long-term
- Genetically modified trees are not used
- End-to-end accounting for greenhouse gas emissions

Independent 3rd party auditors certify suppliers through annual audits, recertification every 5 years and carbon accounting from forest to furnace

Substantial CO_2-reduction compared with coal

Across the life-cycle, emissions reduction of ~90% vs. coal[1]

Life-cycle emissions by technology, gCO_2/kWh



1. Source: Life-cycle assessment of wood pellets for energy applications, Aalborg University, the Danish Centre for Environmental Assessment

Under EU regulation, biomass is considered CO_2-neutral

- EU regulation assumes that carbon released when biomass is burned will be re-absorbed through tree growth
- Biomass currently accounts for two-thirds of renewable energy produced in the EU
- EU Commission's current Clean Energy Package contains proposed regulation on biomass sustainability that is broadly aligned with the Danish Industry Agreement and SBP

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Policies are supportive of further resource utilisation

EU

- The EU Waste Framework Directive set a target of 50% recycling of household waste by 2020
- Proposed EU ‘Circular Economy’ package includes a target of 65% recycling of household waste by 2030

Country

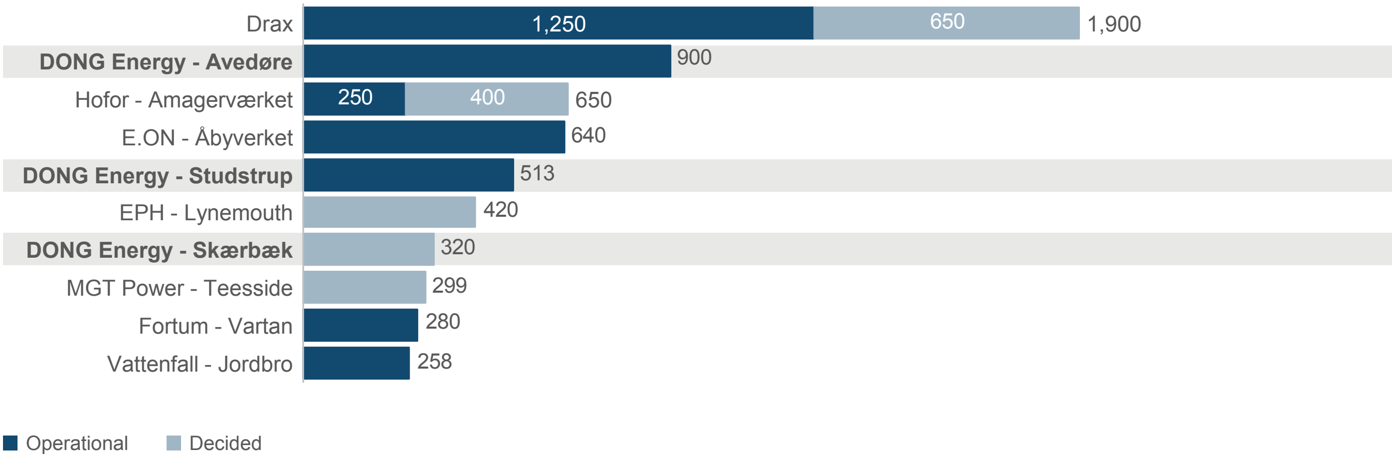
- Growing number of country-level targets to move away from landfill and increase recycling rates within and outside the EU

City

- Waste planning and target-setting takes place at a highly decentralised level

10 largest biomass-fired facilities globally

Biomass plants – capacity[1]
MW output



1. For CHP or heat producing plants, the heat capacity is shown, whereas for power producing plants, the electrical output is shown.
NOTE: Does not include plants where biomass is not the primary fuel (for example co-firing applications); does not include industrial applications