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SECURING SUSTAINABILITY OF BIOMASS

Peter Kofod Kristensen, Lead Sustainability Advisor

Nordic Baltic Bioenergy 2017
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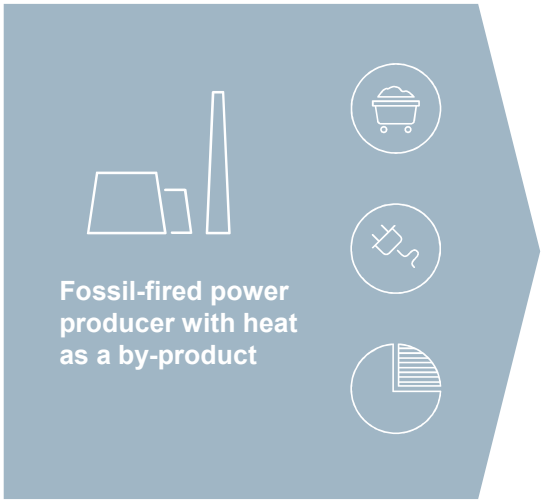
Ongoing transformation of business model

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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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.

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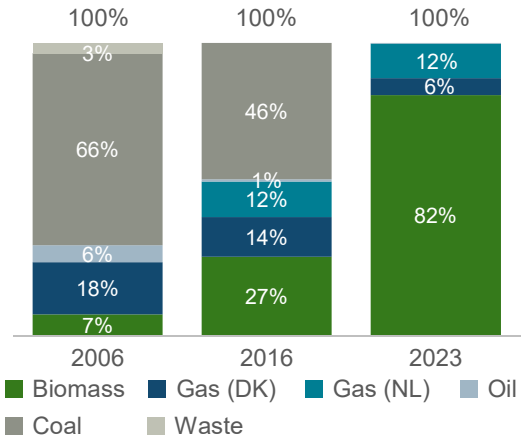
Bioenergy & Thermal Power will exit coal by 2023

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

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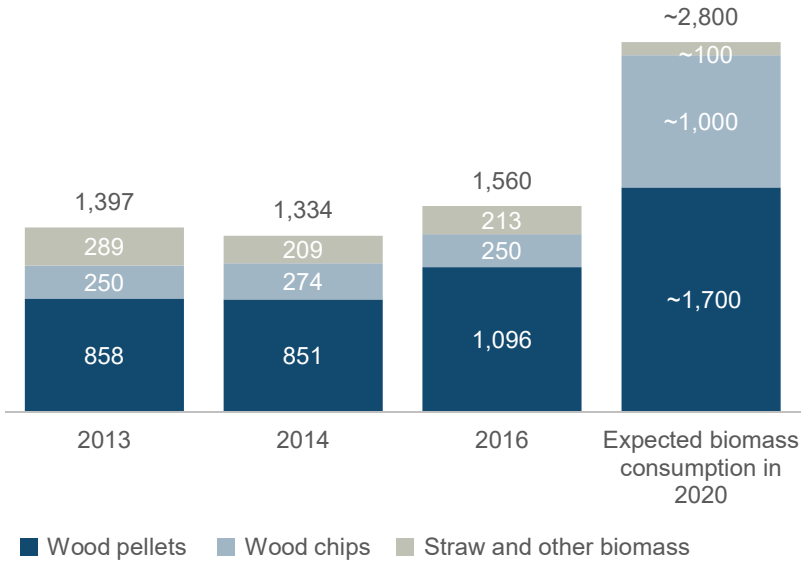
Diversified biomass sourcing portfolio across geographies and fuels

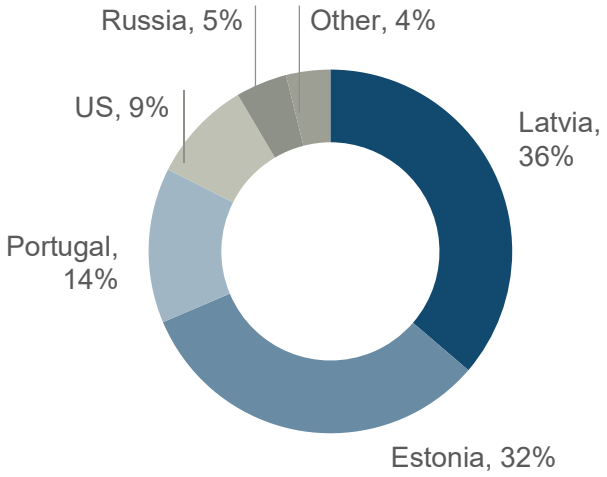
DONG Energy consumed 1.6 Mt of biomass in 2016 expected to almost double by 2020

Biomass consumption, '000 t[1]



Diversified sources of biomass

Wood pellet origin, 2016



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

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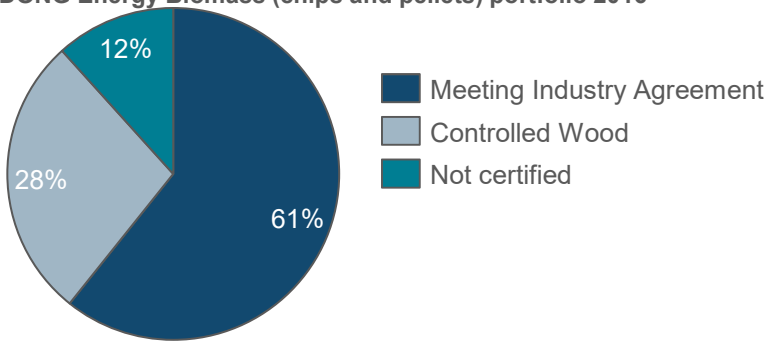
DONG Energy adheres to strict sustainability criteria

- A must that our biomass is sustainable
  - Significant GHG reductions
  - Biodiversity is protected
- DONG Energy is committed to the Danish Industry Agreement
  - means either SBP, FSC (100% or Mix) or PEFC (100%)
- In 2020 all biomass shall meet the documentation requirements of the Danish Industry Agreement
- SBP ensures us that our sustainability requirements are met

DONG Energy Biomass (chips and pellets) portfolio 2016



Ensuring sustainable sourcing of biomass

Standard of Sustainable Biomass Program (SBP)

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

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ENGIE
RWE
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HOFOR
VATTENFALL

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

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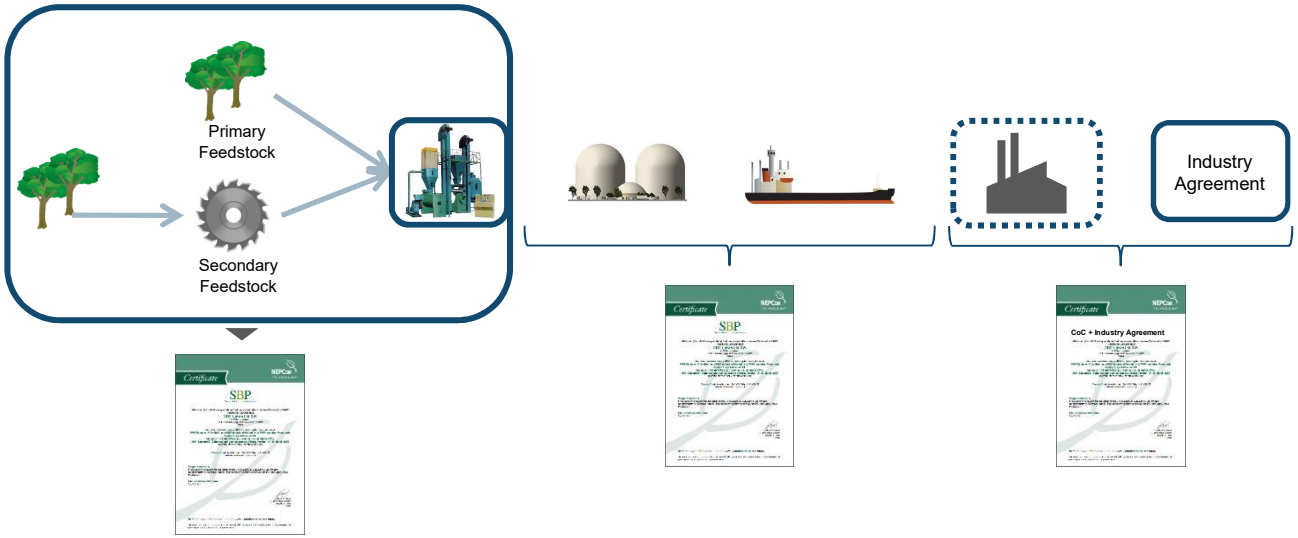
SBP – the most robust approach to ensure independant assurance of sustainability as well as GHG emissions.

- An industry standard requested by 7 European utilities representing approximately 70% of industrial wood pellets. Approximately 100 producers and traders are either certified or in process
- Allows biomass to be traded between utilities and countries
- Insures information on feedstock mix and GHG emissions are collected and passed on to final consumer – extremely important when documenting the benefit of using biomass over fossil fuels
- FSC and PEFC are fully recognised by SBP thus existing certified supply chains will relatively easily achieve SBP certification
- Risk based thus focuses on identified risks which makes it less bureaucratic in low risk countries compared to FSC and PEFC



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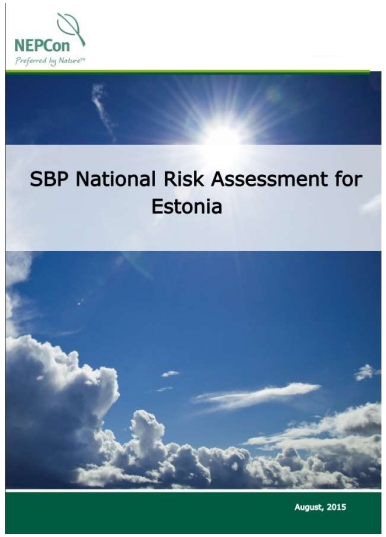
The risk based approach - Estonia

- Risk assessment made by independent consultants who based on publicly available data as well as input from local experts and the outcome of a multi stakeholder process asses the risk of non-compliance with the SBP standard
- In the case of Estonia only one out of 38 criteria has specified risk which needs to be addressed
- Risk assessment give guidance on how to mitigate the specified risk



NEPCon
Preferred by Nature™

2.1.2 The BP has control systems and procedures to verify that potential threats of forest management activities to the HCVs are identified and safeguards are implemented to protect them.

WKHs are forest habitats with high probability of present occurrence of endangered, vulnerable and rare species. WKH system is a tool to address high conservation value forest habitats in managed forests thus they are the primary mechanism for protection of ecologically valuable areas which are located within commercially managed forests.
According to the Estonian legislation, protection of Woodland Key Habitats (WKH) is optional for private forest owners. They can choose to sign a contract with the state to protect WKH. In this case, the state pays compensation to the owner for the protection of WKH. If the private forest owner does not want to protect WKH, the agreement ends and they are then allowed to cut it. According to the statistics, the amount of felling permits issued for the WKH in private forest is relatively high.

In state forest and in FSC or PEFC certified private forest WKH are protected.

In accordance with the above mentioned the level of risk for this indicator is specified for uncertified private forest and low for state forest and FSC or PEFC certified private forest.

In cases where the sourced material derives from private forests, it is important to know exactly from where the material was cut (FMU, sub-compartment). Public databases that can be used to control if the material comes from WKH or not, are available. In cases where no felling permits are issued and the FMU contains WKH, an on-site visit is required. Please see Annex 1 for a description of the detailed mitigation actions.

5. Conclusions

Based on the information available during the risk assessment process, the level of risk for each of the criteria was chosen. All except one criteria were assigned low risk. Below is the summary of the indicator for which specified risk was identified.

Indicator	Initial Risk Rating	
	Specified	Low
1.1.1		X
1.1.2		X
1.1.3		X
1.2.1		X
1.3.1		X
1.4.1		X
1.5.1		X
1.6.1		X
2.1.1		X
2.1.2	X	
2.1.3		X
2.2.1		X
2.2.2		X

Indicator	Initial Risk Rating	
	Specified	Low
2.2.3		X
2.2.4		X
2.2.5		X
2.2.6		X
2.2.7		X
2.2.8		X
2.2.9		X
2.3.1		X
2.3.2		X
2.3.3		X
2.4.1		X
2.4.2		X
2.4.3		X

Indicator	Initial Risk Rating	
	Specified	Low
2.5.1		X
2.5.2		X
2.6.1		X
2.7.1		X
2.7.2		X
2.7.3		X
2.7.4		X
2.7.5		X
2.8.1		X
2.9.1		X
2.9.2		X
2.10.1		X

Source: https://sbp-cert.org/

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