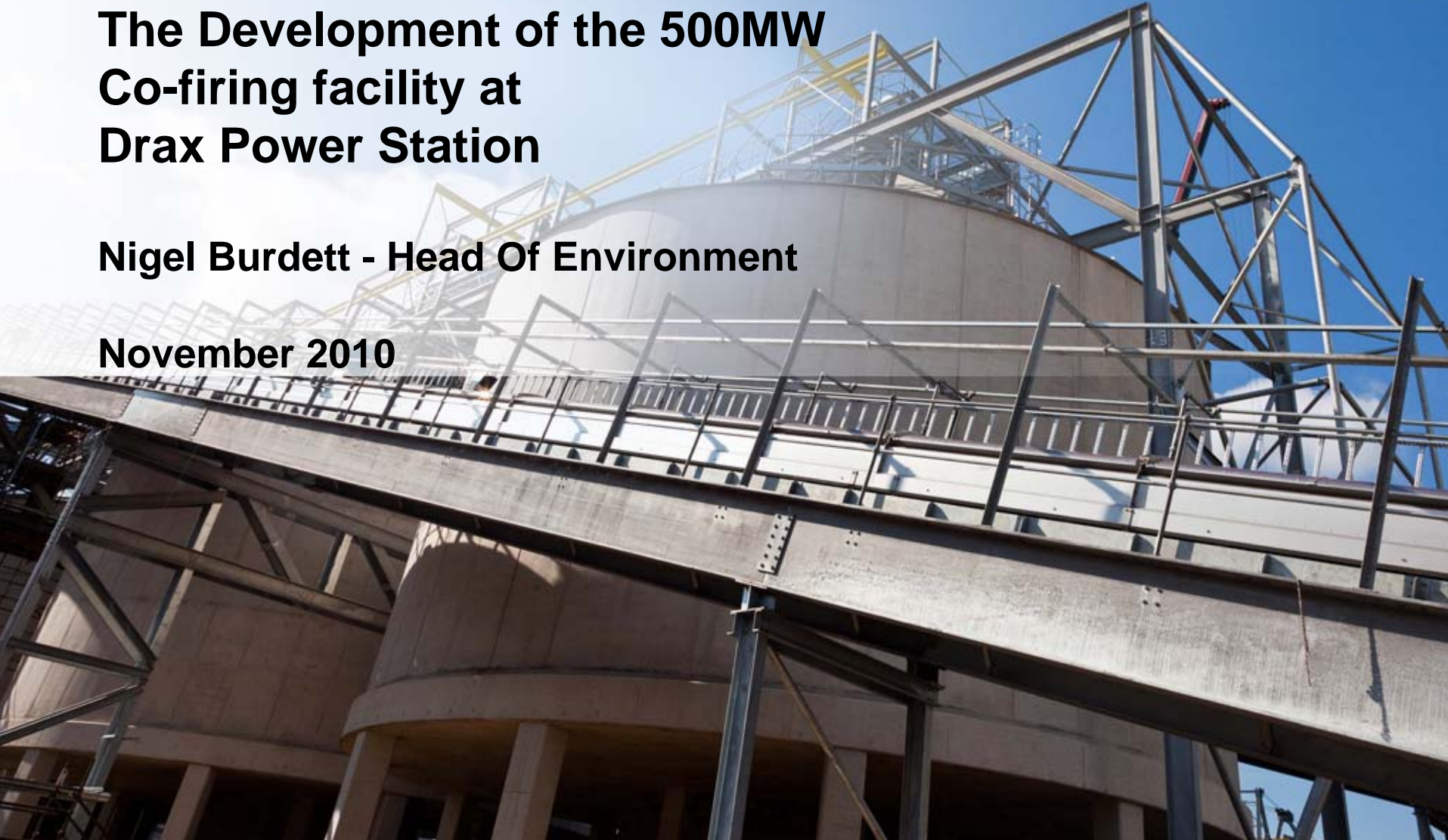


The Development of the 500MW Co-firing facility at Drax Power Station

Nigel Burdett - Head Of Environment

November 2010



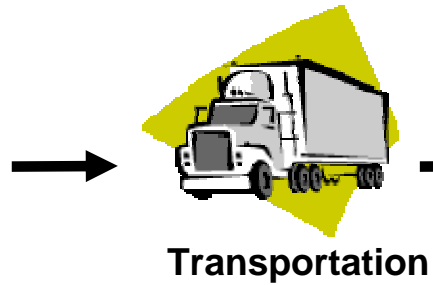
Drax: Unique Asset in UK Generation Mix

- **Drax Power Station is owned by Drax Group plc, a FTSE 250 company**
 - Drax is the newest and most efficient coal-fired power station in the UK
 - 4,000MW capacity ~ 6 units. 7-8% of total UK power production
- **Single site operation**
 - Supply business (Haven) focusing on SME/I&C
- **The single biggest challenge facing coal-fired generation is environmental - UK requirement to reduce CO₂ by 80% from 1990 to 2050**
 - Major exposure is carbon – Drax emits 20-22 million tonnes CO₂ per year
- **Drax role in this transition to reduce CO₂ emissions (from full load emission rate of 850 g/kWh to 700 g/kWh by 2011) through**
 - Renewable biomass and improving thermal efficiency
- **For Drax conversion to biomass is an economic means of transitioning to low carbon, whilst retaining security of supply through**
 - Investment in biomass co-firing infrastructure and facilities
 - Planned conversion of one or more existing coal units to biomass
 - Planned build of three 290MW dedicated biomass generating plant

Breaking down the Supply Chain



Planting and Harvesting



Transportation



Pelletising

UK Biomass

Imported Biomass



Port Loading



Ocean Freight



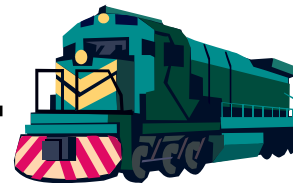
Port Discharge



Renewable Power



Storage/ Site Processing

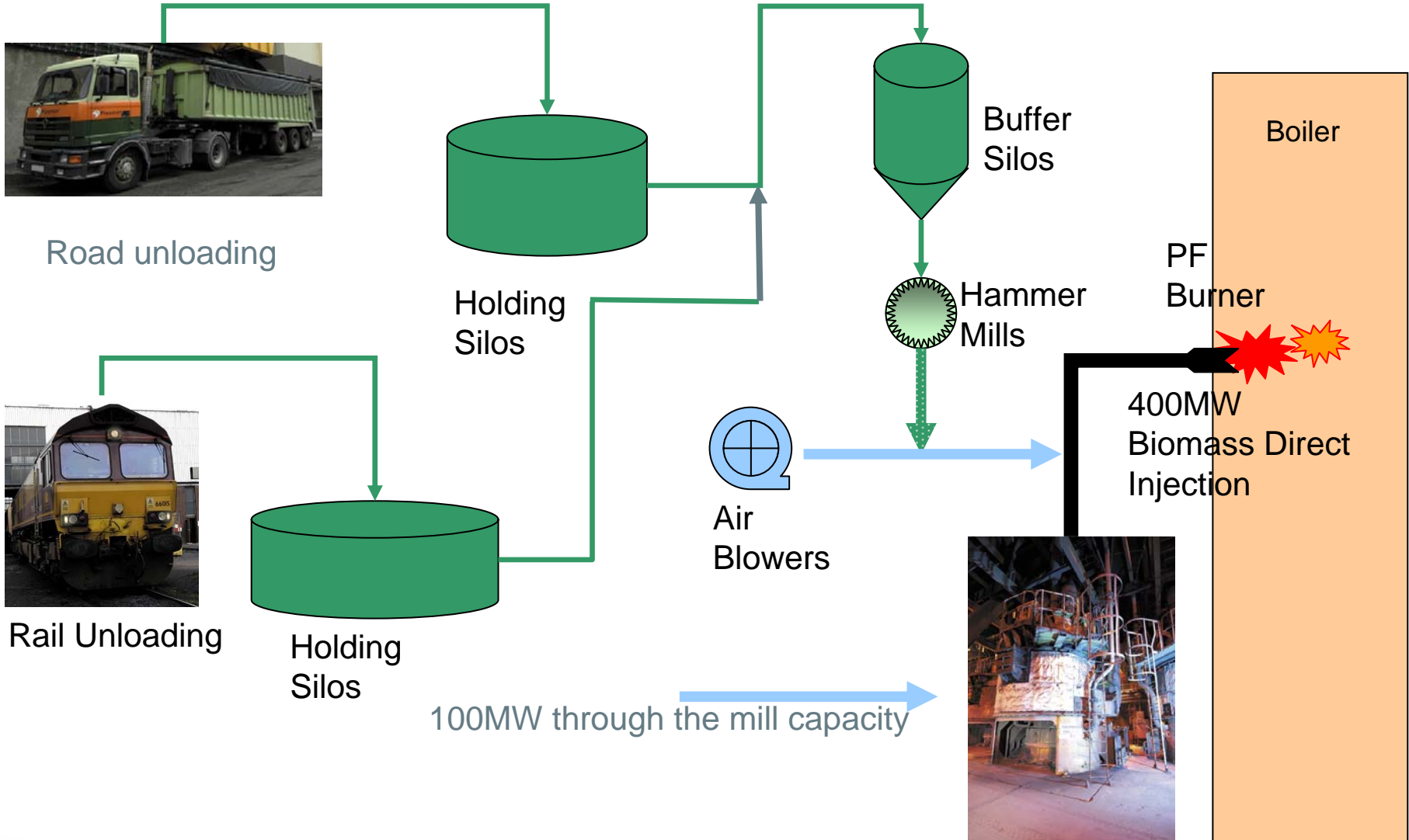


Transportation

Drax co-firing facility

- Building on several years' experience and >80 fuels
- 400MW 'direct injection' co-firing facility commissioned 2010
- 100MW 'through the mill' capacity
- Biomass storage - 36,000 m³ (~3 days at full load)
- Biomass firing rate - 16 - 40 tonnes per hour per boiler
- 1.5 million tonnes per year
- Mainly pre-processed fuel - complements existing on-site processing facilities
- Combustion 'unexceptional'

New 400MW Co-firing Facility at Drax



Biomass supply chain - logistics

**Dedicated
unloading**



**Dedicated
Rail
wagons**



Biomass Storage



**Road storage,
7,500 t**

**Rail storage
16,500 tonnes**



Biomass processing



Processing tower – biomass pellets are processed into ‘dust’ before injection into boilers for combustion



Biomass project overview



Biomass Supply chain

- Biomass is a new fuel for large scale electricity generation- supply chain undeveloped
 - Agricultural residues (e.g. straw pellet plant at Goole)
 - Forestry (e.g. residues, thinnings)
 - Energy crops (SRC, miscanthus)
- Drax aim to source substantial volumes from UK but will import
- Potential sources of economical and sustainable feedstock are abundant
- Drax confidence in long term availability of large global volumes of biomass provided that sustainability concerns overcome

Supply chain Investment

100,000 tonne pa local straw pelleting



Supply chain Sustainability

Drax is at the forefront of the implementation of credible sustainability standards into solid biomass fuel procurement activities with clear criteria and methodologies to define sustainability and to calculate greenhouse gas emissions

The Drax procurement programme incorporates

- **Rejection of all non-sustainable biomass**
- **All supply chain stages, where applicable - cultivation and harvesting, transforming, processing, and transportation.**
- **Minimum standards on**
 - **Life cycle greenhouse gas savings,**
 - **Environmental/biodiversity and**
 - **Social Issues**
- **Internal standards stricter than EC guidance and DECC Consultation proposals**
- **Compliance with policy through procurement contracts**
- **Extensive data gathering and assessment through a programme of information exchange and an improvement programme, backed by an independent third-party audit.**

Supply chain Sustainability

1. Reduce GHGs by >70% vs. Coal
2. Protect Valuable Carbon sinks
3. Avoid Food vs. Fuel concerns
4. Protect Sensitive Habitats (biodiversity)
5. Protect/Maintain Soil Quality
6. Protect/Maintain Water Quality
7. Protect/Maintain Air Quality
8. Provide Social Economic benefits within the supply chain
9. Provide Social Economic benefits for biomass communities

Conclusions

1. World's largest co-firing facility
2. Co-firing facility commissioned and operational in 2010
3. Excellent operational performance but key success factor is setting up and integrating the entire supply chain
 - Combustion
 - Processing
 - Storage/Handling
 - Logistics
 - Pelleting
 - Procurement
 - Sustainability