

# **Development of Woody Biomass for Energy & Transport Fuels**

**James Pendlebury & Helen McKay  
Forestry Commission**

## Drivers

- **Kyoto Protocol - binding targets for emissions reductions**
  - came into force 16th February 2005
- **European targets**
  - 12% of total energy consumption from renewable energy by 2010
- **Security of supply**
  - EU currently imports 50% of its energy requirements

**If we do nothing then the EU will be 70% dependent on external suppliers by 2020**

- **Scottish Climate Change Programme.**
- **Securing a Renewable Future: Scotland's Renewable Energy.**
- **Focus on renewable electricity generation.**
  - **18% by 2010**
  - **40% by 2020**
- **ROCs only available for electricity generation not heat.**
- **Renewable Obligation Order for Scotland considering redefining energy crops for co-firing to include material from managed woodlands.**
- **FREDS: Forum for Renewable Energy in Scotland.**

**FCS with other partners such as HIE, Scottish Enterprise & the Scottish Executive are working on delivering key recommendations such as:**

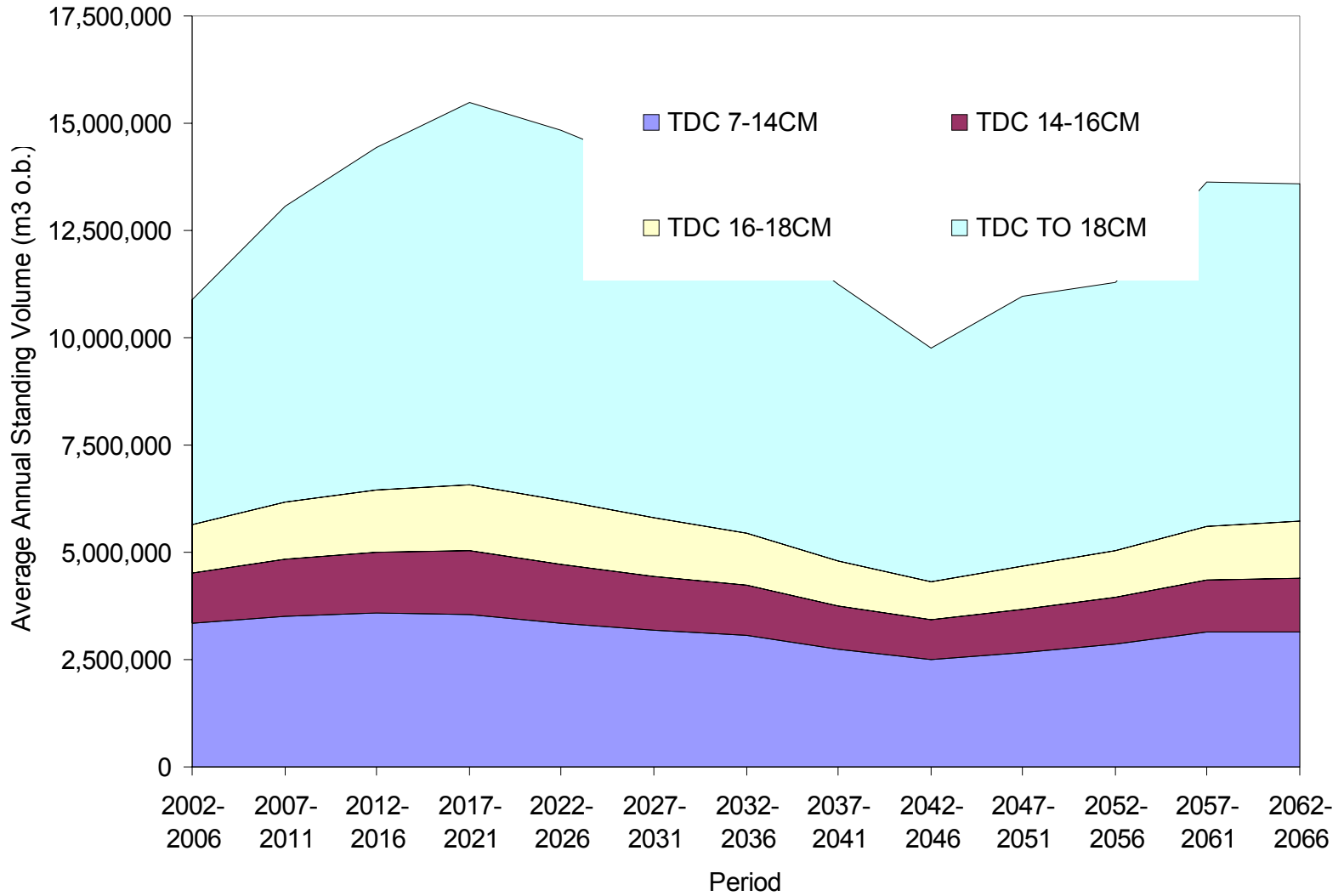
- **establishing a biomass energy network;**
- **appointing wood fuel information officers**
- **working on waste definition issues;**
- **reviewing wood fuel resource estimates**
- **creating a one stop shop wood fuel website.**

**Related Policy Drivers - Green Jobs Strategy, rural development, fuel poverty, energy efficiency, business growth**



- **FCS are responsible for delivering the Scottish Strategic Timber Transport Fund (£13 million over 3 years) to facilitate the sustainable transport of timber in rural areas for the benefit of local communities and the environment.**
- **FC began using biodiesel in 2003 and currently has 120 vehicles using biodiesel and 133 dual fuel/LPG vehicles.**
- **FC have also kept a watching brief on developments in the field of using biomass for transportation fuels.**

- **Wood availability in Scotland is set to double over the next 15-20 years although the majority of this increase will be private sector production.**
- **Many forests are in rural areas, remote from industrial markets and from mains gas.**
- **Recognised that woodfuel can contribute to rural development and alleviating fuel poverty.**



# Additional woodfuel resources

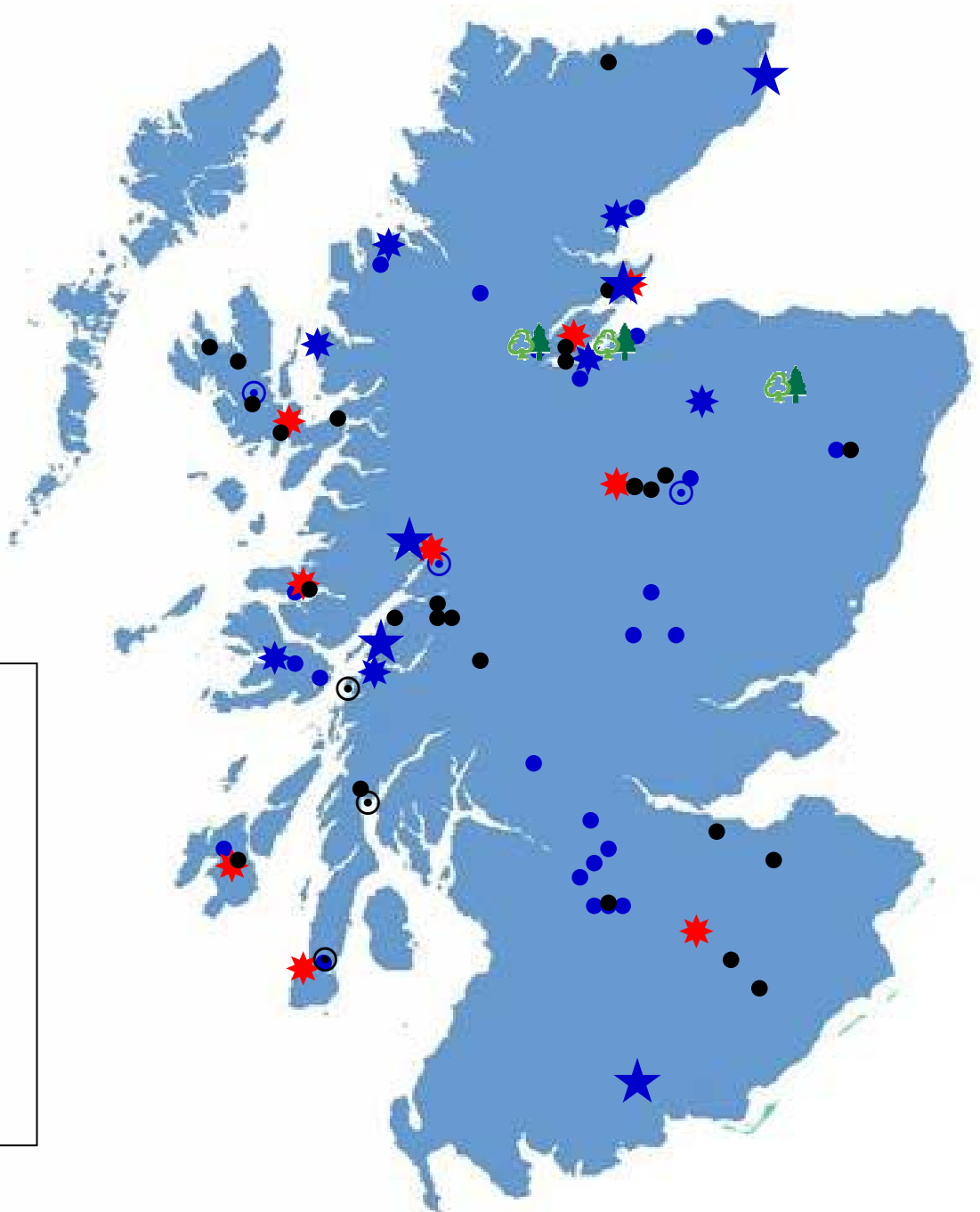
- **Lop and top (brash, harvesting residues)**
- **Arboricultural arisings**
- **Short rotation coppice**
- **Deadwood**
- **Pre-commercial thinnings**
- **Recycled clean wood**
- **Wood from waste stream**

# Resource in the presence of existing markets (k oven dry tonnes y<sup>-1</sup>)

Product	England	Scotland	Wales	Britain
Stemwood 7-14cm diameter	34	70	15	119
Poor quality stemwood	94	113	70	278
Stem tips	15	14	6	35
Branches	237	126	78	441
Sawmill conversion products	29	40	17	86
Arboricultural arisings	313	18	10	341
Short rotation coppice	13	0.6	0.2	14
<b>Total</b>	<b>735</b>	<b>381</b>	<b>196</b>	<b>1,314</b>

# Some Woodfuel Clusters in Scotland

- wood chip boiler
  - ⊙ district heating scheme
  - ★ wood chip suppliers
  - ★ CHP
- projects in development are indicated in blue



# Energy Projects in Planning – Summary

	Projects (no.)	Scale (MW)		Scale (modt/yr)	
Electrical generation	>5	N/A		N/A	
CHP	8	147		0.874	
Heat only	28	21		0.016	
Pellet plant	3			0.100	
<b>Total</b>	<b>&gt;40</b>	<b>&gt;168</b>		<b>&gt;0.99</b>	

# **Support for development, ongoing FCS research and horizon scanning**

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## CHP

- Bioenergy Capital Grants Scheme (**under review**)
- Renewable obligation certificates (ROCs)

## Renewable Energy Installations - Communities

- Scottish Community & Householders Renewables Initiative Energy (**under review**)
- Savings Trust Community Energy Programme (**under review**)
- Scottish Energy Efficiency Office (**various**)

## Renewable Energy Installations - Business

- Highlands & Islands Woodfuel Development Programme (**ends Dec 2005**)
- Loan Action Scotland

## Scottish Forestry Grant Scheme

- Energy Crop Grant - Short Rotation Coppice
- S11 Pilot - Developing Farm Woodland Energy £60K or 40%

## Highlands & Islands Community Energy Company

- Advice & assistance to communities on all renewables

## Bioenergy Infrastructure Scheme **(closed)**

- £3m UK wide & a number of Scottish applicants

## Scottish Executive

- “Biomass capital grant scheme” **(under development)**

- **Forest Research - Woodfuel Resource**  
([www.woodfuelresource.org.uk](http://www.woodfuelresource.org.uk))
- **FCS Nationwide Woodfuel Usage Survey** details the current (and proposed) amount of woodfuel use in Scotland in both the domestic and commercial sectors.
- **FCS/HIE Woodfuel Website** - in development.
- **Forest Research** - increasing the efficiency of extracting material.

# Ongoing activity - FCS (cont)

- **FCS currently commissioning the Macaulay Land Use Research Institute to look at the opportunities for future forest development (expansion) in Scotland.**
- **FCS provide production forecast, volume availability and transport solutions for larger scale CHP and energy generation projects.**
- **Forest Research - research into expanding the resource by purpose grown crops (taking account of climate change).**
- **FC maintain links with the National Non-foods Crop Centre, UK Energy Research Centre, NE Biofuels (NE England) and the National Farmers Union Scotland.**

# Other recent research

- **Assessment of impact of energy markets on wood panel sector (Jaakko Poyry for DTI).**
- **Commercial opportunities for biomass heating systems (Scottish Enterprise).**
- **Issues surrounding the use of wood fuel for heat in Scotland (Forest Research and North Energy Associates Ltd for the Sustainable Development Commission Scotland)].**
- **Biomass task force report (DTI and DEFRA).**
- **Renewable heat and heat from Combined Heat and Power Plants - Study and Analysis (Future Energy Solutions for DTI and DEFRA).**

- ***Woody crops offer a range of possibilities for fuels, including conversion into hydrogen or alcohols, either methanol or ethanol.***
- ***Although they cannot yet be used within existing transport fuel markets, indigenous wood or other lignocellulosic crops could in the long term satisfy most, or even all, UK transportation fuel demand through the production of methanol, ethanol or hydrogen.***
- ***A defensible conclusion seems to be that using woody biomass to manufacture hydrogen or alcohol for use in an efficient fuel cell vehicle has comparable C savings to using biomass for CHP, and probably has larger benefits than using biomass for either heat or power generation alone.***

- **Carbon savings analysis of different end uses for woody biomass - electricity generation/CHP/ conversion to biofuels.**
- **Price sensitivity analysis of different options (ie Costs versus benefits for growers and producers?)**
- **Detailed examination of real capacity for expansion of woody biomass and energy crops in Scotland.**