Crops
Environment
& Land Use
Programme

National Bioenergy Conference 2012

'Growing the Bioeconomy'

Hodson Bay Hotel, Athlone, Co. Westmeath

Wednesday, 25 April 2012

teagasc

Agriculture and Food Development Authority

National Bioenergy Conference 2012

Published by

Teagasc,
Crops Environment and Land Use,
Oak Park Crops Research,
Carlow

Wednesday, 25 April 2012

Tel: 059-9170200
Fax: 059-9182097

Programme

9.00am Registration/ Tea/Coffee

9.30am Welcome Address by Jim O'Mahony, Teagasc

9.45am **Session 1: Irish Bioenergy Policy**
Chair: Dr. John Finnan, Teagasc

EU's Sustainability, Food/Fuel Criteria
Andreas Pilzecker, EU Commission

Meeting 2020 Targets with Bioenergy
Barry Caslin, Teagasc

Leader – Bioenergy funding options
Joe Potter, Westmeath Leader

10.50am Questions and Answers

11.05am Tea/Coffee – View Exhibition Stands

11.30am **Session 2: Delivering Bioenergy to the Market**
Chair: Peter Young, Irish Farmers Journal

Beet to Ethanol
Chris Harmon, BEET Ireland

Anaerobic Digestion
Cathal Gallagher, Bord Gais

Biomass to Mega Watts
John O'Halloran, Bord na Mona

12.35pm Questions and Answers

13.00pm Lunch – View Exhibition Stands

14.00pm **Session 3: Forestry our largest resource**
Chair: Mary Ryan, Teagasc

Timber Supply and Demand
Henry Phillips

Supplychip – Locating the resource
Joanne Fitzgerald, Teagasc

Leveraging additional biomass from the forest resource
Tom Kent, Waterford Institute of Technology

Warming to Wood Energy – Clare County Council
Tom Coughlan, Clare County Manager

15.10pm Questions and Answers

15.30pm **Session 4: Panel Discussion – Bioenergy Offers on the table**
Chair: Damien O'Reilly, RTE

John Gilliland, Rural Generation
Donal Whelan, ITGA
Paddy O'Toole, Quinns of Baltinglass
Pat Farrelly, Farrelly Willow
Des O'Toole, Coillte
Declan Kennedy, Biotricity
Joe O'Carroll, Imperative Energy

16.30pm Close of Conference
Tom Kelly, Head of Knowledge Transfer, Teagasc

Contents

EU's Sustainability, Food/Fuel Criteria

Andreas Pilzecker,
DG Agriculture H4,
European Commission

Athlone, 25 April 2012

Content of the presentation

- **EU Policy Framework**
- **Biofuel sustainability requirements,monitoring and review**
- **Impacts on agricultural markets**
- **Baseline Study 2008**
- **EU actions to promote the next generation biofuels and sustainable bioenergy**

EU Renewable Energy Directive (2009)

- ***Part of the EU climate and energy package (20/20/20)***
- ***A single, comprehensive Directive for 20% renewable energy in the EU in 2020***
  - Combat climate change, environment protection
  - Security of energy supply, diversification of energy supply sources
  - Green jobs, innovation
  - Regional development, especially in rural and isolated areas
- ***Mandatory targets***
- ***Specific 10% target for renewable energy in transport***
  - No specific biofuel target
  - Apart from biofuels: electric vehicles, hydrogen
- ***Biofuel sustainability: criteria & monitoring***

EU sustainability criteria for biofuels

irrespective of whether the raw materials were cultivated inside or outside the territory of the EU

- **GHG saving of at least 35% (50%-60% from 2017/18) compared to fossil fuel**
- **No conversion of land with high carbon stock and/or high value for biodiversity**
  - » *Densely forested areas, wetlands, peatlands*
  - » *No raw material from land with high biodiversity value*
  - » *Primary forest, nature protection areas, highly biodiverse grasslands*
- **Have to be met in order to:**
  - » *Count toward the targets of the EU Member States (10% and the '20%')*
  - » *Count toward obligations (put on suppliers)*
  - » *Be eligible for financial support (for their consumption)*

Impacts of EU policy on wider sustainability issues

- **Difficult to link to individual consignments of biofuel**

  and

- **Raises issues under international law**

  therefore

- **Addressed through:**
  - » *International cooperation instruments*
  - » *Voluntary certification schemes*
  - » *Monitoring, Reporting*

EU actions - cooperation with third countries

- **ACP-EU Energy Facility:** priority given to access to energy projects which allow not only the supply of electricity but also projects which have a demonstrated impact on agriculture-related and other economic activities
- **GBEP (UN CSD partnership):** 24 sustainability indicators were adopted in November 2011 as a set of analytical tools that can inform the development of national bioenergy policies and programs and monitor the impact of these policies and programs, environmental, social and economic aspects of sustainable development are covered
- **UN, G8, G20, FAO, IMF, OECD initiatives**, including the G20 pilot initiative for a "Regional Emergency Food Reserve in West Africa", FAO (BEFCI) Bioenergy and Food Security Assessment tool, and FAO negotiated Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security

EU sustainability schemes for biofuels

The Commission has approved 7 voluntary schemes, more to come soon, check on http://ec.europa.eu/energy/renewables/biofuels/sustainability_schemes_en.htm:

- **ISCC** (*International Sustainability and Carbon Certification: companies, research, **NGO's**, industry associations)*
- **Bonsucro EU** *(a roundtable initiative: companies and **WWF**)*
- **RTRS EU RED** *(Round Table on Responsible Soy EU RED: companies and civil society, including **NGOs**)*
- **RSB EU RED** *(Roundtable of Sustainable Biofuels EU RED: companies and civil society, including **NGOs**)*
- **2BSvs** *(Biomass Biofuels voluntary scheme: **EU** companies' based scheme)*
- **RBSA** *(Abengoa RED Bioenergy Sustainability Assurance: **EU** based company scheme)*
- **Greenenergy** (***Brazilian** Bioethanol verification programme, for Brazilian sugarcaine only)*

Monitoring and reporting

- **December 2010:** *Report on Indirect land use change ('ILUC')*
  Conclusion: ILUC can reduce the GHG-benefits of using biofuels. But considerable uncertainties and limitations associated with the modelling remains.
- **31 January 2011:** *Communication Renewable Energy: Progressing towards 2020 target*
  Accompanying documents include also statistical data and analysis on biofuels production and imports from third countries
- **By 31 December 2011:** *reports of each EU Member State on progress in the promotion and use of energy from **all** renewable sources*
- **2012:** *Impact Assessment on ILUC and, if appropriate, a legislative proposal for amending the Renewable Energy Directive and the Fuel Quality Directive as necessary*
- **Before 31 December 2012:** *first biennially report of the European Commission to the European Parliament and the Council*
  Report will also include information on the origin and impacts of the EU policy in the EU and in third countries

EU action – broader renewable energy framework

- ***Sustainability of solid biomass for energy***
  Conclusion of the work soon
- ***Renewable energy progress reports available:***
  http://ec.europa.eu/energy/renewables/transparency_platform/template_progress_report_en.htm
- ***Commission's first progress report due end of 2012***
- ***Renewable Energy Strategy beyond 2020***
  Communication forthcoming

Renewable Energy Directive: Safeguards

Member States report on changes in commodity prices and land use (1st report was due by the end of last year)

The Commission monitors the commodity price changes

Based on 1. and 2., the Commission reports on the impact on sustainability, considering economic and environmental impacts (by end of 2012 for the first time)

If appropriate, it proposes corrective action

Agriculture

Monitoring and reporting by the Commission

Article 23 (1)

The Commission shall monitor the origin of biofuels and bioliquids consumed in the Community and the impact of their production on **land use** in the Community and the main third countries of supply. Such monitoring shall be based on Member States' reports and those of relevant third countries, intergovernmental organisations, scientific studies and any other relevant pieces of information. The Commission shall also monitor the **commodity price changes** associated with the use of biomass for energy and any associated positive and negative **effects on food security**.

Article 23 (5)

The Commission shall, if appropriate, propose corrective action.

Agriculture

Article 23 (8)

Monitoring and reporting by the Commission

By 31 December 2014, the Commission shall present a report, addressing, in particular, the following elements […] an assessment of the feasibility of reaching the target whilst ensuring the **sustainability of biofuels production** in the Community and in third countries, and considering **economic, environmental and social impacts**, including indirect effects and impacts on biodiversity, as well as the commercial availability of second-generation biofuels; the impact of the implementation of the target on the **availability of foodstuffs at affordable prices**; […]

On the basis of that report, the Commission shall submit, if appropriate, proposals to the European Parliament and the Council, addressing the above elements.

Agriculture

What impacts on agricultural markets?

Agricultural activities related to the renewable energy sector generate a gross value added of well over €9 bn per year.

DG Agriculture (2010)

Sources

*DG Agriculture: "**Prospects for agricultural markets 2011-2020**"*
http://ec.europa.eu/agriculture/publi/caprep/prospects2011/index_en.htm

*Joint Research Centre – IPTS: **"Impacts of the EU biofuel target on agricultural markets and land use: a comparative modelling assessment"***
http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=3439

EU Biofuels market, 2010–2020 (billion litres)

	2009	2010	2011	2020
Usable production	**15.8**	**16.7**	**18.1**	**36.7**
of which Ethanol	5.6	6.4	7.2	18.2
of which 2nd gen.	0.0	0.0	0.0	0.4
of which Biodiesel	10.2	10.3	10.9	18.5
of which 2nd gen.	0.4	0.5	0.7	3.6
Consumption	**18.8**	**21.0**	**20.8**	**45.0**
of which Ethanol	6.7	8.0	8.5	24.2
non fuel use of ethanol	2.3	2.5	2.5	2.5
of which Biodiesel	12.1	13.0	12.4	20.8
Net trade	**-3.0**	**-4.2**	**-2.7**	**-8.3**
of which Ethanol	-1.1	-1.6	-1.3	-6.1
of which Biodiesel	-1.9	-2.7	-1.5	-2.3

Agriculture

EU cereal market projections, 2010-2020 (mio t)

	2009	2010	2011	2020
Usable production	**294.1**	**277.9**	**277.3**	**305.1**
Consumption	**280.5**	**276.7**	**277.7**	**293.4**
of which bioenergy	*7.6*	*9.3*	*10.5*	*30.3*
bioenergy %	*2.7%*	*3.4%*	*3.8%*	*10.3%*
Imports	**8.0**	**13.3**	**16.4**	**12.0**
Exports	**27.4**	**31.8**	**20.8**	**22.8**

Agriculture

EU vegetable oils market projections, 2009-2020 (mio t)

	2009	2010	2011	2020
Usable production	**14.6**	**14.5**	**14.0**	**16.0**
Consumption	**23.3**	**22.4**	**22.6**	**26.1**
of which bioenergy	*9.1*	*9.1*	*9.5*	*13.9*
bioenergy %	*39.0%*	*40.5%*	*42.3%*	*53.2%*
Imports	**9.4**	**9.0**	**10.0**	**11.3**
Exports	**0.9**	**1.0**	**0.9**	**0.9**

Agriculture

JRC-IPTS

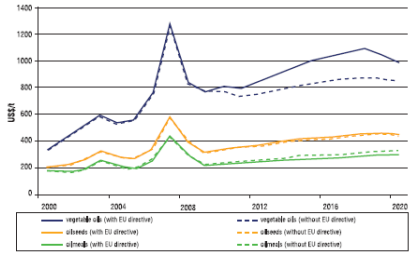
Analyses and discusses the global impacts of the RE target for transport on agricultural production, markets and land use, as simulated by three agricultural sector models, AGLINK-COSIMO, ESIM and CAPRI.

The impacts identified include higher EU production of ethanol and biodiesel, and of the crops used to produce them, as well as more imports of both biofuels.

However, as the extra demand is small in world market terms, the impact on world market prices is limited.

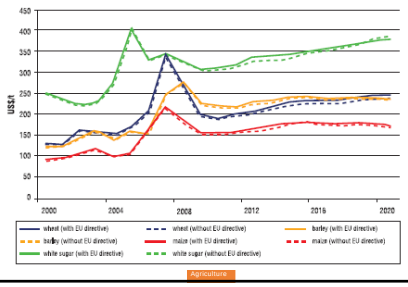
Agriculture

Impact on biodiesel feedstock prices



Agriculture

Impact on ethanol feedstock prices



Agriculture

ESIM: impact on oilseed complex

Prices for the main EU-produced biodiesel inputs (oilseeds, plant oils) increase. The prices of rapeseed and sunflower seed increase by 9.7% and 11.2% respectively, and those of rapeseed oil and sunflower seed oil by just over one-third.

The prices of rapeseed and sunflower seed meals fall by a third or more.

Agriculture

ESIM: impact on grain prices

EU prices for ethanol inputs are higher, by 8%, 21% and 22% for soft wheat, sugar and maize, respectively.

Agriculture

Summary – Impacts

	AGLINK	ESIM	CAPRI
EU			
Production Fuels			
Ethanol	↑↑	↑↑↑↑	↑↑(by assumption)
Biodiesel	↑↑↑	↑	↑↑(by assumption)
Production Feedstocks			
Wheat	↑	↑	↑
Coarse grains/maize	↑ (< 1 m t)	↑	↑ (small)
Oilseeds	↑	↑	↑↑
Production livestock products	negligible	↑ (small, pork and poultry only)	cattle numbers slightly ↓
Prices Fuels			
Ethanol	↑ (small)	↑	
Biodiesel	↑↑	↑↑	
Prices Feedstocks			
Ethanol feedstocks	ca. zero	↑ (wheat), ↑↑ (maize)	↑ (cereals)
Biodiesel feedstocks	ca. zero (oilseeds)	↑	↑ (oilseeds)
	↑ (oils)	↑↑ (oils)	↑ (oils)

Agriculture

Key findings of the EU Study "Biofuels Baseline 2008" – land use

- *If accounting for co-products that reduce land needs elsewhere, the total **net land use for EU biofuels is estimated at 3.6 Mha***
- *The increase in biofuel production in the EU between 2000 and 2008 has led to an increased **global agricultural land use of 1.3 Mha** (0.02% of global agricultural land).*
- *A part of the land used for biofuels feedstock production became available through yield improvements of other crops, or at the cost of decreasing production of other crops.*
- *Countries, mostly influenced in their land use by biofuel export to the EU market - **Argentina** (soybean), **Brazil** (soybean and sugarcane), **USA** (soybean) and **Ukraine** (rapeseed), to smaller extent - **Malaysia** and **Indonesia** (both oil palm)*

Key findings of the EU Study "Biofuels Baseline 2008" – environmental and social impacts

- *Increased EU biofuel consumption is estimated to have contributed **only little** to the historical cereal price increases in 2007 and 2008.*
- *The EU biofuel demand is estimated to account for a rather **small share** of local environmental impacts from biofuel crop cultivation in most exporting countries*
- *Several third countries providing biofuels or feedstocks for the EU market seem to have **insufficient requirements for Environmental Impact Assessments***
- *In the **EU**, over **100,000 people** may have a job relating to biofuels. The **global employment** related to biofuels may be over **1.5 million**, half of which in Brazilian cane and related ethanol production*

EU actions - incentives for advanced biofuels (produced from ligno-cellulosic feedstock and wastes)

- **Counting double** *towards the 10% target and towards Member States' biofuel obligations put on suppliers*
- **Supported** *under the 7th RTD Framework Programme (research)*
- **Specific initiatives** *under the Strategic Energy Technology (SET) plan, including the European Industrial Bioenergy Initiative (technology transfer and up-take)*

Conclusions:

EU rules for sustainability of bioenergy are evolving

Impact of the 10% target for RE in transport on agricultural markets and food prices is low to moderate

Need to monitor and improve

teagasc

AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY

The Irish Agriculture and Food Development Authority

Meeting 2020 Targets with Bioenergy

National Bioenergy Conference

Hodson Bay Hotel, Athlone, Co. Roscommon
April 25th 2012
Barry Caslin, Teagasc, Bioenergy Specialist
barry.caslin@teagasc.ie

teagasc
The Irish Agriculture and Food Development Authority

Ireland's Renewable Targets

RED 2009/28/EC – 16% TFC by 2020

- RES-E 40% renewable contribution by 2020
- RES-T 10% renewable contribution by 2020
- RES-H 12% renewable contribution by 2020

Additional Targets

30% co-firing with biomass at peat power stations 2015
800MWe of CHP by 2020

teagasc
The Irish Agriculture and Food Development Authority

Energy Forecasts

TFC RES- E 2,665 ktoe
TFC RES- H 4,126 ktoe
TFC RES- T 4,910 ktoe

TFC for 2020 = 11,701 ktoe

16% = 1,872 ktoe

What Technologies?

RES – E (5.6% bioenergy)
- Wind
- PV

RES – H (9.7% bioenergy)
- Geothermal
- Solar

RES – T (8.6% biofuel and 1% electric)
- Bioethanol
- Biodiesel
- PPO

Bioenergy Contribution to TFC

Sector	2020 (ktoe)	% biomass	ktoe biomass	GWh biomass
RES-E	2,665	5.6%	149	1,733
RES-H	4,126	9.7%	400	4,652
RES-T	4,910 (4,006)	8.6%	345	
Total	11,701	**7.6%**	894	6,385

Bioenergy in Ireland

- Wood residues – pulpwood, sawmill residues, forestry residues, recycled wood.
- Dry agricultural residues – Straw, poultry litter, spent mushroom compost.
- Wet agricultural residues – animal manure / slurry
- Industry residues – sludge, fats, meat & bonemeal, food processing residues.
- Purpose grown energy crops – oilseed rape, cereals, sugar beet, short rotation coppice willow, miscanthus
- Others – recovered vegetable oil

Ireland Land Situation 2011

Area Farmed	4,261,100 ha
Crops	277,900 ha
Grassland	3,466,767 ha
Hill / Rough Land	471,400 ha
Forestry	730,000 ha

Crop	Area (ha)	Production (tonnes)
Potatoes	12,100	403,100
Barley	167,700	1,141,765
Wheat	84,400	801,800
Oats	19,700	139,870
Oilseed Rape	12,300	47,970
Hay	264,600	2,381,400
Grass Silage	1,211,200	26,084,100

Why Do We Need Energy Crops?

- Kyoto agreement
- Global warming
- Depletion of fossil fuels
- Fuels and Security
- Increasing energy prices

Biomass Conversion Technologies

- Biomass - Heat only
- Biomass CHP – Large & Small
- Biomass to Power
- Waste to Energy – CHP
- Waste to Energy – Power only
- Electricity co-firing with biomass
- Anaerobic Digestion (AD) on farm
- Biomethane – on / off farm
- Municipal Sewage AD
- Landfill Gas
- Biofuels (Bioethanol, Biodiesel, PPO)

RES-E biomass forecasts

2020 forecast Gross Final Consumption = 2,665 ktoe

100 MWe of Solid Biomass CHP
50 MWe of AD CHP

Result
(Power)
150 MWe **or 84 ktoe** biomass produced electricity

RES - E agricultural biomass requirement

149 ktoe biomass	MW	Input Energy	ktoe	Ha / t
Biomass Edenderry Power	35	747 GWh	64 input 23 output	5,000 ha willow 110,000 t chip 70,000t PKS…
Biomass combustion Small scale CHP	100	825 GWh	223 input 71 output	52,000 ha willow and 127,000 t straw
AD CHP	50	151 GWh	36 input 13 output	10,000 ha grass **or** slurry from 800,000 cattle

RES-T

2020 Target is 10%

Forecasted demand for Transport = 345 ktoe

1% Electric Vehicles
9% biofuels

OSR

RES - T agricultural biomass requirement

345 ktoe divided	ktoe	Litres	Hectares Needed
Diesel Use (61%)	210	266m	90,000 wheat or 60,000 sugar beet
Petrol Use (39%)	135	268m	230,000 OSR
	Total	534m	320,000

RES- H biomass forecasts

2020 forecast Gross Final Consumption = **4,126 ktoe**

100 MWe of Solid Biomass CHP
50 MWe of AD CHP

Result
(H)
240 MW heat or **128 ktoe**

RES - H agricultural biomass requirement

	MW	Input Energy	ktoe heat	Ha / t
CHP	240	1,488 GWh	128	52,000 ha willow and 127,000 t straw
Biomass Boilers heat only	790	3,945 GWh	339 input 271output	1.3m fresh tonnes forest wood chip & 18,000 ha of willow or miscanthus.
AD CHP	50	415 GWh	36 input 13 output	10,000 ha grass **or** slurry from 800,000 cattle

Issues in reaching heat target

- Cost of energy crop production
- Support services / infrastructure
- Drying of willow/wood chips
- Miscanthus boiler
- Local supply chains
- Transport costs
- Coilltes supplies committed
- Getting farmers to thin plantations

Summary

To meet the 2020 targets would require:

- 215 ktoe of forest pulpwood / thinnings (1.3 m fresh tonnes)
- 127,000 t straw from 25,000ha of tillage ground
- 70,000 ha willow or miscanthus
- AD will contribute possibly 10,000ha grass or slurry from 800,000 cattle.
- To meet the transport targets requires almost 1m ha of tillage land. This wont happen without imports.


teagasc
Agriculture and Food Development Authority
The Irish Agriculture and Food Development Authority
Thank you for you attention!
teagasc
The Irish Agriculture and Food Development Authority

The LEADER Approach

- Rural Development Programme

LEADER Funding
for Farm Diversification

Joe Potter – Westmeath Local Action Group

25th April 2012

Contents

- Delivery Structure
- LEADER, what is it?
- Context of the programme
- Details of the measures
- Details of grant levels
- Application to Approval Process
- Activity
- Questions

Local Action Groups- What are they?

- 53 Local Development Companies delivering a range of programmes.

Rural Companies deliver
RDP (LEADER)

Using LEADER Approach very important
for European funding in the future

What is LEADER

"Links between actions for the Development of the Rural Economy"

The LEADER approach

- **Local Implementation**
- **Local identification of needs and solutions**
- **Innovation in products and processes**
- **Networking of local actors and partners.**
- **Co-operation projects**
- **Focus on economic activity, expansion, development and sustainability and job creation.**

"Improve the quality of life in rural areas and diversify the rural economy"

EU 55% and state 45% funding.

Department of Environment, Community & Local Government

L.E.A.D.E.R

Economic Dev. Measures		
Farm Diversification		
Business Creation and Development		
Encouragement of Tourism Activities		
Training		

Enterprise Rates of Grant

Capital

50% max of €150,000

Analysis & Development

75% max of €30,000

Training

100%

LEADER in Agriculture

1. Diversification into non-Agricultural Activities

Aim: to significantly increase the percentage of holdings where the fixed assets of the farm are utilised in any non-agricultural activity by a member of the farm household for economic gain.

Examples of possible projects:

- Agri-tourism including educational tourism
- Farm shops
- Energy conservation including biomass and forestry products
- Arts and craft projects
- Food Network
- Horticulture products
- Recycling projects using farm waste
- Food production units

Key Aspects of a Project

Evaluation Of Project

- Promoter's background and expertise
- Viability of the project
- Innovation
- Sustainability
- Markets for the product / service and non-displacement of existing enterprises
- Potential for job creation
- Benefits to the local area
- Cross checks with other Agencies

Application, Evaluation and Approval process

- Expression of interest meeting / discussion with rural development officer.
- Application process. Quotations, planning permission, business plan, etc
- Assessment by Evaluation Committee, recommendation to the Board.
- Approval or refusal of funding.
- Following approval letter of offer and contract to the promoter.
- Acceptance to be signed and returned within 14 days

Application, Evaluation and Approval process

- Contract expiry date. Extension @ discretion of Board
- Grant payment is made on completion and submission of valid documents.
- Site visits by staff. Further inspections possible by the Dept of Environment, Community and Local Government, Dept of Agriculture, Fisheries and Food Inspectors.
- Appeals process to LAG and Dept.

Important to note

1. Planning permission
2. Matching funds (bank statement or Loan approval)
3. Plan (Business and marketing)
4. Quotations
5. Tax clearance applicant
6. C2 / Tax clearance contractor suppliers
7. Insurance
8. Proof of ownership / Lease (or legal agreement)
9. SFP documentation

Contact

Westmeath Community Development

044 9348571

info@westcd.ie
www.westcd.ie
www.ildn.ie

BEET
IRELAND

Redeveloping the Irish Sugar Industry

Sugar Beet to Ethanol

Presentation at National Bioenergy Conference
by Chris Harmon
25th April 2012

© BEET Ireland

BEET

Presentation Content

- Introduction to BEET Ireland
- The Opportunity
- Sugar Beet to Ethanol
- The Road Ahead…

© BEET Ireland

BEET

Introduction to BEET Ireland

© BEET Ireland

BEET

What is BEET Ireland?

BEET Ireland is an Independent Steering Group
With No Links To the Former Sugar Industry

- Michael Hoey - MD of Country Crest
- Simon Cross - MD of Cross Agricultural Engineering
- Jim O'Regan - Grower representative from Cork
- Pat Cleary - Grower representative from Kildare/Laois/Carlow
- Brian Arnold - Business Consultant
- Chris Harmon - Financial Controller of Country Crest

© BEET Ireland

BEET

BEET Ireland's Vision

"To re-establish a sustainable sugar beet processing industry in Ireland where the beet grower is put at the heart of the business model"

© BEET Ireland

BEET

The Journey so far..

Jan 2010	-Presentation at the **National Tillage Conference** -Potential of a new sugar beet industry in Ireland
Oct 2010	-Series of beet **grower meetings** to gauge interest
Mar 2011	-**Country Crest appointed PM Group** to undertake feasibility study -**BEET Ireland** formed -Met **Minister Coveney** to announce launch of study
July 2011	-Interim progress update to Minister
Sept 2011	-**Feasibility Study/business plan** presented to Minister
Oct 2011	-Formal endorsement of plan received from Minister -Announcement of **proposal to abolish sugar quotas**
Nov 2011	-Series of further beet grower meetings -**Expressions of Interest** sought
2012	-Reviewing regional locations / **site selection**

© BEET Ireland

BEET

The Opportunity

© BEET Ireland

BEET

Irish Policy Framework

Sector	Dairy	Beef	Pigmeat	Sheep	Poultry
Target Growth € million	700	200	150	50	15

© BEET Ireland

BEET

The Irish Sugar Economy

Every grain of sugar consumed in Ireland is imported

© BEET Ireland

BEET

Targets for Bio-ethanol Use in Ireland

"10% of all transport fuels to be from renewable sources by 2020"

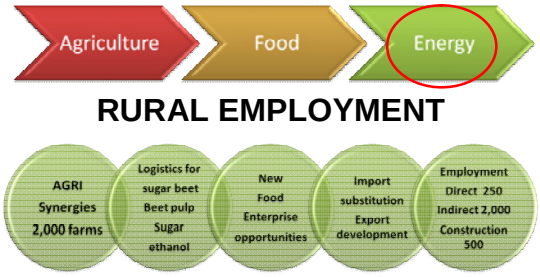
Year	2012	2013	2014	2015	2016	2017	2018	2019	2020
Target (ktoe)	60	70	80	90	100	110	120	129	139
Import (ktoe)	20	30	40	59	59	69	79	89	99

Source: NREAP

© BEET Ireland

BEET

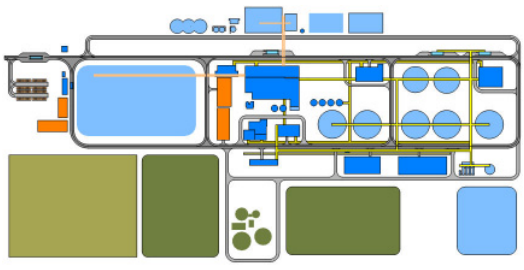
Redeveloping the Sugar Industry Will Impact



© BEET Ireland

BEET

Sugar & Bio-Ethanol Processing Plant Represents A €400 million investment



© BEET Ireland

BEET

Making Production Feasible

- Single location Sugar & Bio-ethanol plant
- 3 Phases for production expansion growing to 1.8 million tonnes sugar beet requirement
- Project financing by way of grower stake + equity + bank finance

© BEET Ireland

BEET

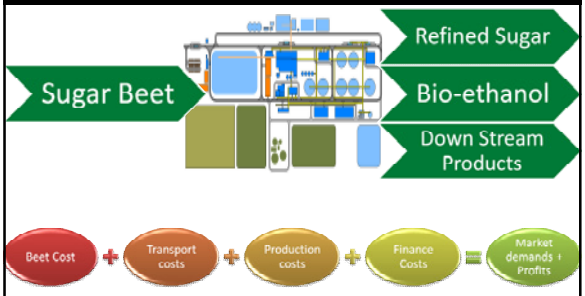
Strategic Partnership With Growers

- Sugar Beet is critical raw material
- Traditionally supply prices negotiated in an employer/union type model
- New model will give growers a share in the value added processing profits as well as on-farm supply profits
- Grower partnership will ensure better working relationships and sustainable supply arrangements

© BEET Ireland

BEET

The Business Case



© BEET Ireland

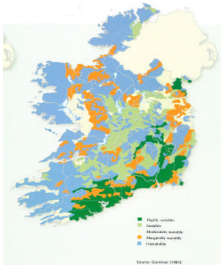
BEET

Site Selection Is A Key Business Decision

Key Criteria:

- Proximity to Tillage Land
- Raw Material Supply – Sugar Beet
- Accessibility – Road Network
- Suitable Water Supply
- Natural Gas Supply
- Electricity Supply
- **5 regions** analysed

Tillage Soil Suitability Map



© BEET Ireland

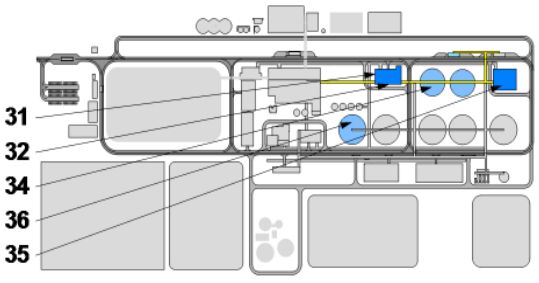
BEET

Sugar Beet to Ethanol

© BEET Ireland

BEET

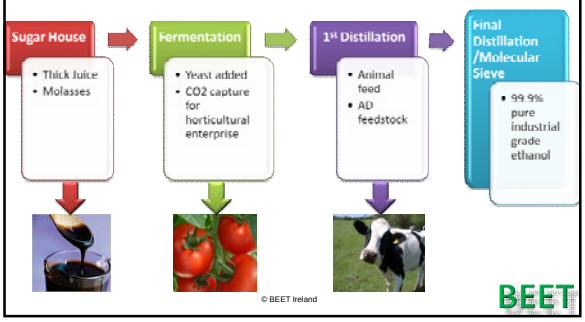
Bio-ethanol plant elements < 10% of total capital spend



© BEET Ireland

BEET

Ethanol Production Process



© BEET Ireland

BEET

Ethanol Production Capacity

Phase	Sugar Beet (000 tons)	Ethanol Maximum (000m3)	Ethanol Minimum (000m3)
1	800	47.0	4.8
2	1,200	56.0	6.5
3	1,800	56.0	11.0

© BEET Ireland

BEET

Ethanol Production Capacity (Cont'd)

Phase	Sugar Beet (000 tons)	Ethanol Maximum (000m3)	Ethanol Minimum (000m3)
3	1,800	56.0	11.0

This maximum production capacity almost equates to the 57 million litres of "bio-fuel in gasoline" consumed in Ireland in 2011

Source: NORA levy returns 2011

© BEET Ireland

BEET

Sugar/Ethanol Production Cycle

Activity	Duration
Sugar beet campaign	120 days
Thick juice campaign	210 days
Ethanol production	330 days

© BEET Ireland

BEET

The Road Ahead…

© BEET Ireland

BEET

Driving the Project Forward

© BEET Ireland

BEET

BEET
IRELAND

Thank You!

Presentation at National Bioenergy Conference
by Chris Harmon
25th April 2012

© BEET Ireland

BEET

Bord Gáis Energy
think beyond

Future for Renewable Gas in Ireland

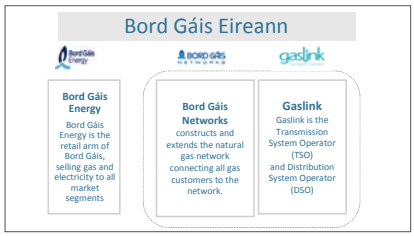
National Bioenergy Conference 2012

Cathal Gallagher
New Energy & Technology

© Bord Gáis Energy

About Bord Gáis Éireann

BGE was founded in 1976 to develop the natural gas industry in Ireland. It is a commercial state body operating in the energy sector. The company employs just over 1,000 staff and is headquartered in Cork City, Ireland. Today, BGE is a leading energy provider, serving c. 1m energy customers in Ireland. BGE owns and operates 13,150km of gas pipelines, including two sub-sea interconnectors with Scotland from where Ireland gets over 93% of its gas supplies. Bord Gáis has both a transmission pipeline business and a gas supply/distribution business in Northern Ireland.



About Bord Gáis Energy

Bord Gáis Energy

Taking advantage of liberalisation in the energy markets, BGE entered the business electricity supply market in 2001. In February 2008, the company entered the residential electricity sector and by year-end had gained over 400,000 additional customers thus increasing its share of the total electricity supply market to 15%.

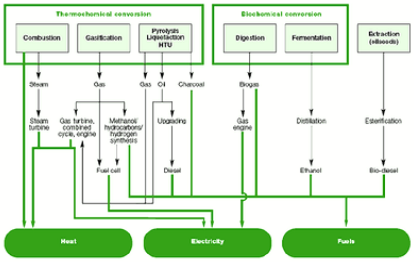
In Dec 2009 BGE completed the purchase of 37MW Natural Resources, one of the largest wind generators in Ireland. During 2010 BGE completed construction on its 447MW gas-fired power station at Whitegate in Co. Cork, augmenting its existing 210MW of wind generation and development pipeline of gas-fired peaking plants and wind farms in various locations throughout the country.

Bord Gáis Energy Organisation Overview

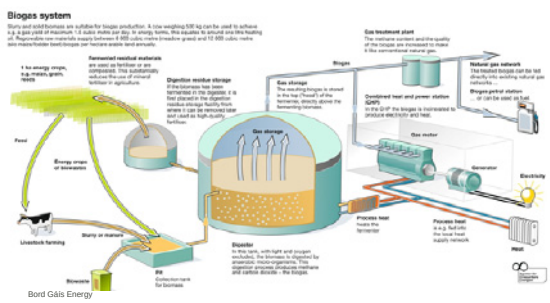
Today Bord Gáis Energy is a leading dual-fuel, all-island business with a strong and trusted brand emerging from Gael Gáis long history on the island of Ireland, it serves over 1m customers with exemplary service at competitive prices, powering energy efficiently as wholesale marketing, expanding and developing a modern fleet of energy assets to support its growth objectives.

Renewable Gas

Biomass Uses



Biogas is produced when feedstocks, such as organic wastes, and energy crops, are converted into biogas using anaerobic digestion technology



What is biogas?

- In addition to methane (CH_4), biogas can also contain
  - Water vapour, carbon dioxide (CO_2), hydrogen sulphide (H_2S), organic silicon compounds (e.g. siloxanes), ammonia (NH_3), and dust

….as well as….

  - Small amounts of hydrogen (H_2), air, i.e. oxygen (O_2) and nitrogen (N_2), biological agents, halocarbons……

Biogas/natural gas properties

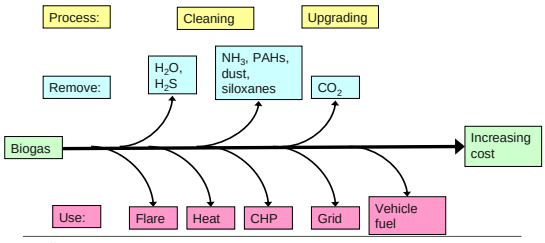
Component	Unit	Natural gas	Biogas
Methane	%	85 – 98	55 – 70
Ethane	%	0.3 – 8.2	0
Propane	%	0.01 – 2.9	0
Butane	%	0.003 – 0.6	0
Nitrogen	%	0.2 – 0.8	< 1
Carbon dioxide	%	0.5 – 2.6	30 – 45
Hydrogen sulphide	ppm	~ 1	10 – 2000+
Ammonia	ppm	0	~ 100
Net calorific value	MJ/m^3	39.2	23.3

Why clean and upgrade biogas?

- Cleaning: removes corrosive products and other components harmful to the natural gas grid, appliances or end-users
- Upgrading: removes CO_2 to increase the energy content of the gas
- Biomethane (renewable gas)
  - is biogas that has been upgraded to natural gas standard
  - is a higher value product than biogas, can be distributed via the gas grid to a large market

How much upgrading is required?

- Intended use determines level of cleaning and upgrading required



Techniques

- H_2S removal:
  - Air/O_2 dosing
  - Iron chloride dosing
  - Iron oxides or hydroxides
  - NaOH scrubbing
  - PSA (pressure swing adsorption
  - Biological filters

PSA equipment in Pucking, Austria

16 m high trickle bed bioreactor, Bruck an der Leitha, Austria

- CO_2 removal:
  - PSA/carbon molecular sieves
  - Water scrubbing/absorption/ water wash
  - Polyethylene glycol scrubbing/adsorption
  - Adsorption with chemical reaction
  - Membrane separation
  - Cryogenic separation
  - In-situ methane enrichment

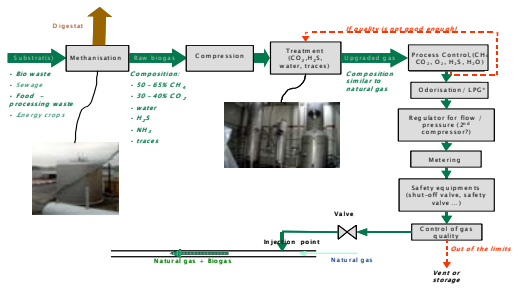
Membrane upgrading unit, Bruck an der Leitha, Austria

Other treatments

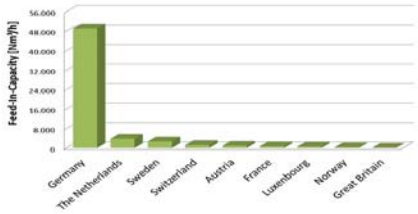
- Odorisation
  - for safety reasons to ensure leak detection
  - typical compounds: tetrahydrotiophen (THT) and mercaptans
- Compression
  - Level of compression depends on use, e.g. fast-fill/slow-fill vehicle fuel, addition to transmission/distribution grid

- Addition of propane or liquefied petroleum gas (LPG)
  - sometimes added to increase energy value and bring net calorific value and Wobbe index in line with quality specifications

Injection into the gas network may look like…

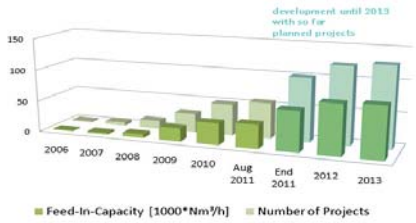


Grid Injection is happening across Europe



German Energy-Agency (dena)
January 2012

Germany is taking the lead ..



German Energy-Agency (dena)
August 2011

Didcot BtG facility

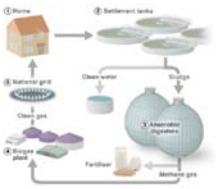
UK's first BtG Project

First gas on 3rd Oct 2010

cng services ltd

Schematic of Didcot BtG

Biomethane to Grid at Didcot



CNG Services is designer and project manager

cng services ltd

Potential for Renewable Gas in Ireland

Figures converted from PJ to mscm natural Gas equivalent (@ 36.8 MJ/m³)	Practical (mscm pa)
Agricultural Slurry	51
OFMSW	15.6
Slaughter Waste	18.6
Surplus Grass	325.7
Total	**410**
As % of total Irish gas demand	**7.5%**

- 180 co-digesters (slurry & grass
- 4 Municipal digesters
- 4 Slaughter waste digesters

Gas Network

The Cost of Producing Biomethane

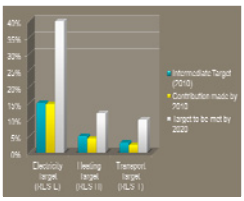
Feedstock/scenario	€/m_n^3	c/kWh
OFMSW (50,000 t/a)	0.14	1.4
Slaughter Waste (50,000 t/a)	0.73	7.3
Grass (137 ha, farm model)	0.97	9.7
Grass (137 ha, developer model)	1.10	11
Co-digest (slurry & grass)	1.23	12.3
Slurry (29,700 t/a)	1.83	18.3

The Cost of producing Biomethane, Green Gas Technologies Ltd., March 2010

Irish Renewable Targets

National Targets

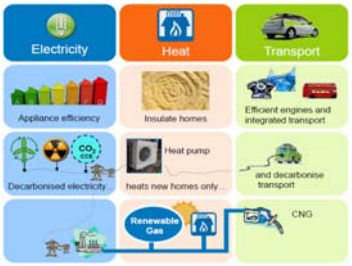
- RES-E: 40% electricity from renewable sources by 2020.
- RES-H: 12% heating from renewable sources by 2020:
  - Renewable energy accounted for 3.6% of thermal energy in 2008
  - Bio methane could deliver **60%** of this target
- RES-T: 10% renewable fuels for transport by 2020:
  - Renewable energy accounted for 1.2% of transport energy in 2008
  - Bio methane could exceed this target **(12%)**



Source: SEI EPSSU Energy in Ireland Key Statistics 2010.

Renewable Gas has a key role to play in a low carbon future for Ireland

- Simple efficiency measures across all sectors
- Decarbonised electricity fuels zero emission cars
- Decarbonise gas using renewable gas



Constraints are Surmountable

- Technical Issues
  - Gas Quality
  - Compression
  - Odorisation
  - Propane
  - Minimum Demand
- Regulatory Arrangements
  - Preferred Model for Ireland
  - Connection Arrangements
  - Tariff Arrangements
- Political Support -

Thank you

Any Questions??

The German Scene

- 7.5 GW of Solar added in 2011 – 30 GW total (Concerns regarding suitability of existing grid to accommodate further development)
- 107 Feeding Biomethane Stations into Grid (Range from 250 m3/hr to 10,000 m3/hr)
- Between 30 and 60 Biomethane plants planned for 2012
- Target:-
  - 6% Biomethane to Grid – 2020
  - 10% Biomethane to Grid – 2030
  - Less than 1% Biomethane to Grid – 2012
- 900 CNG filling stations
  - 160 comprise Biomethane 5-50%
  - 20 Pure Biomethane
  - 4 Insular Biomethane

Bloaufelden Emmertsbuhl Biogas Project

- Biogas digester installed on a former dairy farm
- Biogas originally used for CHP

The Distribution Zone

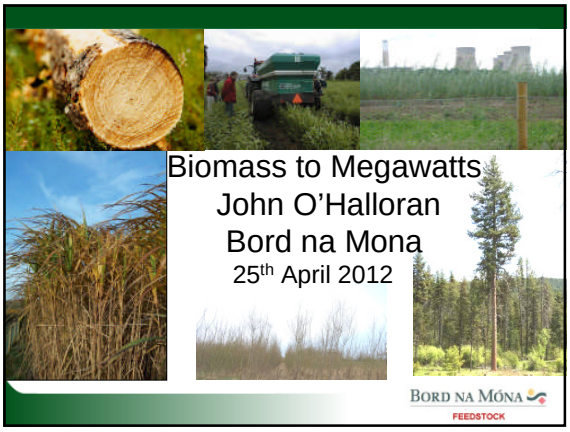
- Circa 1000 residential customers a small industrial
- 5 kM of gas mains operating circa 550 mbar
- Grid operator and energy supplier ENBW (45% state owned)

The Energy Supply

- Local Grid Heating value 10.7 kWh/m3
- Transmission Heating value 11.3 kWh/m3
- No Biomethane enrichment
- Customers volunteer to pay an additional **3 cents/kWh** for the **privilege** of burning Green Gas (Biomethane)
- Regional heating Law requires new buildings to be 20% renewables

The Biomethane Plant

- Feedstock is Maze and Silage
- No Cows in Cow shed - now Silage storage

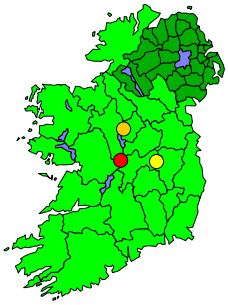


Peat-Fired Stations

3 Peat-fired Stations

- Edenderry Power (2000)
  128 MWe - BNM
- Lough Ree Power (2004)
  100 MWe - ESB
- West Offaly Power (2005)
  150 MWe - ESB

- 3 Mt milled peat – 23.7 PJ/a
- 30% co-firing – 7.1 PJ/a
- Need ≡ 1 Mt green biomass



BORD NA MÓNA
FEEDSTOCK

Irish Government Policy

White Paper, March 2007

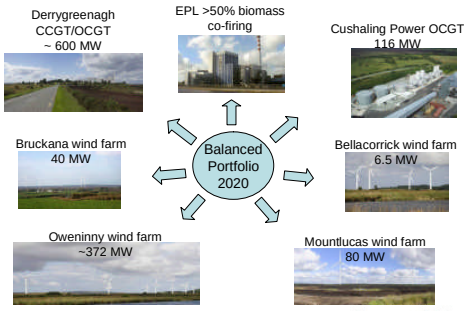
- Set a target of 30% co-firing in the 3 peat stations by 2015.

NREAP, July 2010

- Generation of 1,006 GWh from bioenergy in 2020, of which 687 GWh from solid biomass

BORD NA MÓNA FEEDSTOCK

BnM PowerGen Portfolio



BORD NA MÓNA FEEDSTOCK

Why Co-fire with Biomass

1. Co-firing is Governmental policy
2. Leads to reduced carbon intensity
3. Planning consent only to 2015 – ABP Mayo Power refusal
4. Priority dispatch as a Hybrid Plant, with >50% biomass
5. IED – lower SO_2, NO_x and dust emission limits from 2016

BORD NA MÓNA FEEDSTOCK

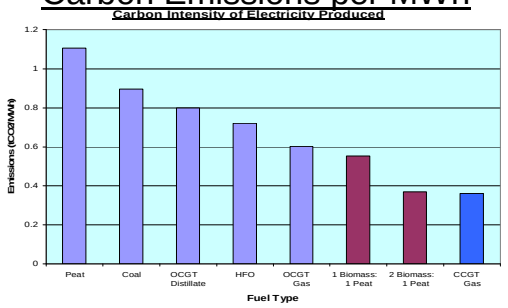
Edenderry Volumes & Specification

Biomass Required	(kt)
2008	20
2009	72
2010	110
2011	156
2012	180
2013	220
2014	260
2015	300
2020	500

Quality Specification	
Moisture	10 – 60%
Wt. Av. m.c.	>45%
Ash	<5%
Size	<40mm
Gross CV	>18 GJ/t
Chlorine	<0.1%
Ash Deform.	>1000 °C

BORD NA MÓNA FEEDSTOCK

Carbon Emissions per MWh



BORD NA MÓNA FEEDSTOCK

Suitable Biomass Types

Laboratory Tests
Handling Trials

Forest Materials
- Wood Chips
- Sawdust
- Pulpwood/Residues

Combustion and Corrosion Tests

Energy Crops
- Willow
- Miscanthus
- Black Oats

Dry Materials
- Wood Pellets
- Palm Kernel Shells
- Almond Shells
- Olive Stones

BORD NA MÓNA FEEDSTOCK

Biomass Targets 2015

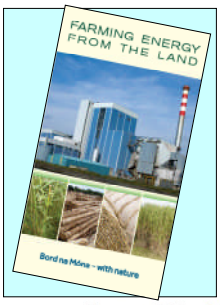
Total: 300,000 energy tonnes

Category	Biomass Type	(kt)
Energy Crops	Willow	35
	Miscanthus	15
Forest Materials	Sawmill residues	100
	Forestry thinnings	50
Dry Materials	Wood Pellets, PKS, Almond Shells, etc.	100

BORD NA MÓNA FEEDSTOCK

Bord na Móna Programme

- Long term contracts with:
  - Individuals
  - Co-ops
  - Farmer Groups
- Index linked pricing
- Low risk, sustainable return
- Biomass from the land:
  - Willow
  - Miscanthus
  - Black Oats
  - Forest Thinnings



BORD NA MÓNA FEEDSTOCK

Willow Requirements

- 100,000 ET requires 5,000 Ha of land
- Major marketing campaign to encourage farmers commenced 2011
- By spring 2012 300 Ha planted
- Poor result!!!

BORD NA MÓNA FEEDSTOCK

Why the poor take-up?

- High current farm commodity prices
- CAP reform – uncertainty
- Locking in good land for 20 years
- 'Wait and see approach' by some farmers
- **No income for 3 years!!!**

Bord na Móna FEEDSTOCK

Solution

- We need a Clear Policy statement by Government on Bioenergy crop grants over the next 5 years
- Replace indigenous peat industry with an indigenous bioenergy crop industry --- AVOID IMPORTS
- Every 100,000 tonnes of willow chip has the potential to create c.750 Irish Jobs—sustainable and long term
- Annual premium to match forestry to overcome the 3 year 'wait' for first revenue

Bord na Móna FEEDSTOCK

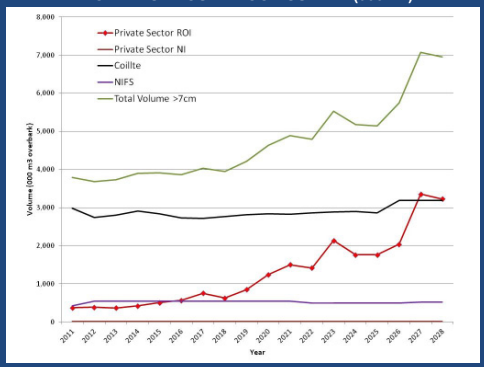
TIMBER SUPPLY AND DEMAND

GROWING THE BIOECONOMY

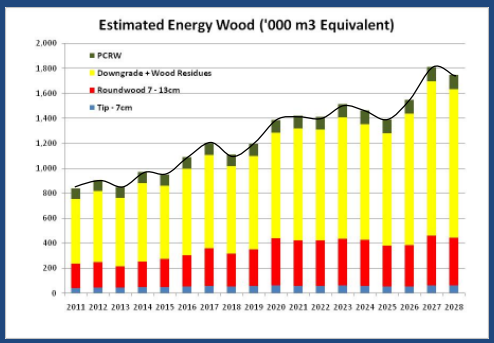
National Bioenergy Conference

Hodson Bay Hotel, Athlone
25th April 2012

FORECAST ROUNDWOOD SUPPLY (000 m³)



Potential Wood Energy Availability (ROI)



Historic Demand for Forest-based Biomass for Energy Use in the Republic of Ireland

	2008	2009	2010
	000 m³		
Firewood	171	184	199
Roundwood chipped in forest	63	53	39
Short rotation coppice (SRC)	1	4	1
Charcoal	2	2	2
Wood pellets & briquettes	82	110	121
Process heat/energy use by industry/ Co-firing	384	438	554
TOTAL	703	791	916
% use by forest products/industry/ Co-firing	55	55	60

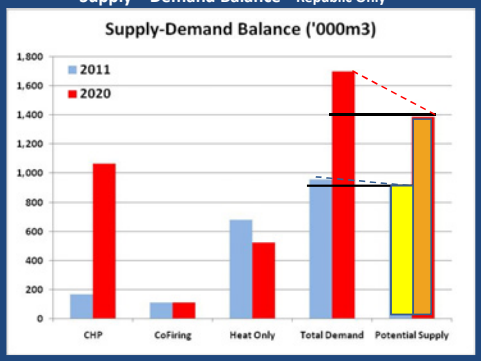
Source: Joint Wood Energy Enquiry (JWEE) 2009 – 2011

Forecast Demand for Forest-based Biomass for Energy use in Ireland

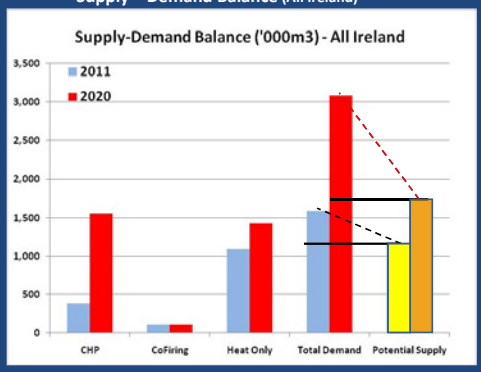
	2011	2020
	000 m³ /annum	
CHP	388	1,550
Heat only	1,092	1,425
Co-firing	109	109
TOTAL	**1,589**	**3,084**

Source: COFORD, All Ireland Roundwood Demand Forecast
2011 - 2020

Supply – Demand Balance – Republic Only



Supply – Demand Balance (All Ireland)



Challenges to Mobilising Wood Fibre Volumes

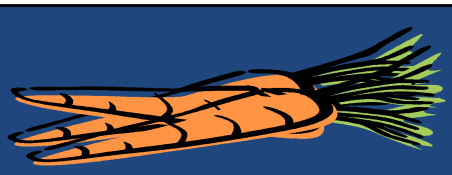
1. Owners
   a) Thin plantations
   b) Collaborate with other owners
2. Infrastructure
   a) Forest Roads
   b) Thinning Capacity
3. Supply Chain
   a) Sales Method
   b) Logistics
   c) Certification

BUT THESE ALONE WILL NOT FILL THE GAP

POSSIBLE SOLUTIONS

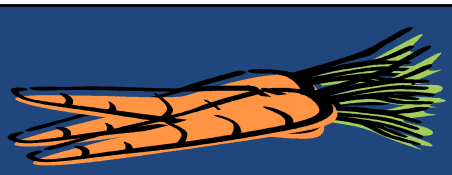
Creating a more enabling environment

Creating an increased regulatory and compliance environment



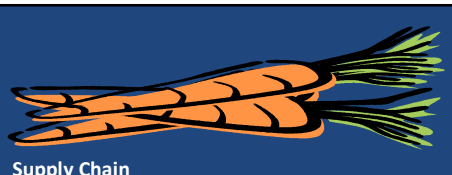
1. Owners
   a) Thin plantations
      a) Awareness + education + guidance
      b) Financial support

   b) Collaborate with other owners
      a) Support for producer /owner groups
      b) Support for collaborative initiatives



2. Infrastructure
   a) Forest Roads
      a) Priority 5-10 year roading scheme
      b) Collaboration between owners (Coillte)

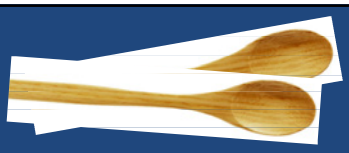
   b) Thinning Capacity
      a) Support for training of operatives
      b) Re-introduce support for thinning machines (Linkage with collaboration + producer groups)



3. Supply Chain
   a) Sales Method
      a) Confidence + Security
      b) Longer term arrangements

   b) Logistics

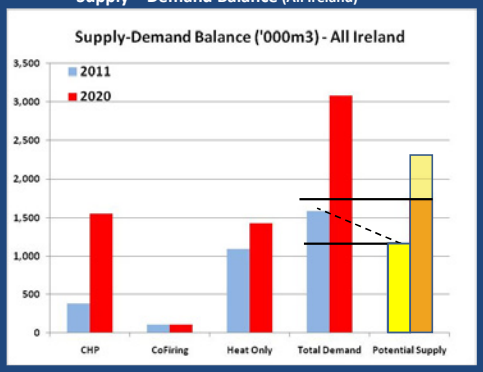
   c) Certification
      a) Awareness raising + education



1. Owners
   a) Thin plantations
      a) Tax regime
      b) Legal requirement for management (Private Forest Districts)

   b) Collaborate with other owners
      a) Legal requirement for management (Private Forest Districts)

Supply – Demand Balance (All Ireland)



REMAINING GAP

1. Harvesting Practices
   a) Process down to smaller top diameter
   b) Whole tree harvesting
   c) Bundling of clearfell residues

2. Alternative Fibre Sources
   a) Fast growing species e.g. Eucalyptus
      a) Reconfigure grant support scheme
   b) Short rotation coppice
   c) Import

3. Regulatory Framework
   a) Felling licences + Restrictions
      a) Time for Uncommon Sense

SUMMARY

a) Long term supply is increasing

b) Increasing GAP between estimated Supply & Demand

c) Forestry alone cannot fill the GAP

d) Major challenges in mobilising wood volumes

e) Range of interventions / solutions

- Carrot + Stick Approaches
- Changed practices
- Alternative Supply Sources
- Import

GROWING THE BIOECONOMY

National Bioenergy Conference

TIMBER SUPPLY AND DEMAND

THANK YOU

SUPPLYCHIP:
Investigating the potential supply of wood energy from forestry

Dr Joanne Fitzgerald

Teagasc

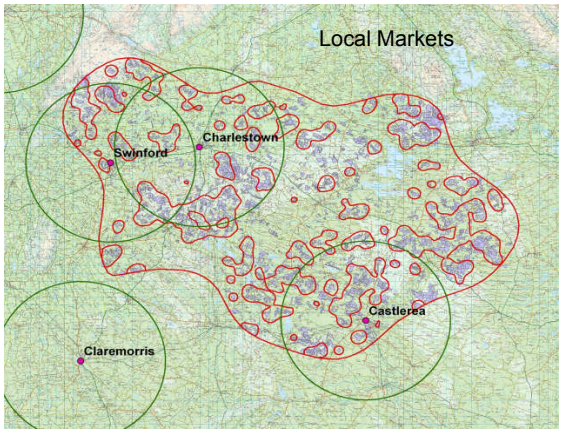
SUPPLYCHIP:
Why did this project happen?

- CLUSTER Project – identified areas of high forest density
- Demand for wood energy
- SUPPLYCHIP: uses one cluster as a case study to evaluate the potential wood energy resource.

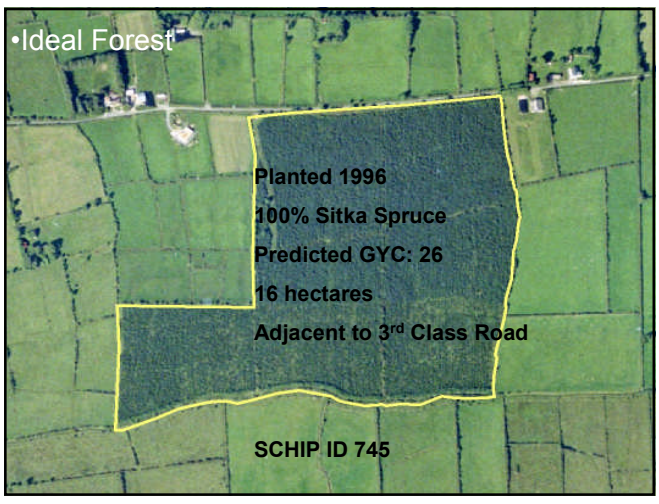
CLUSTER Identified **distinct** geographic concentrations of private forest plantations

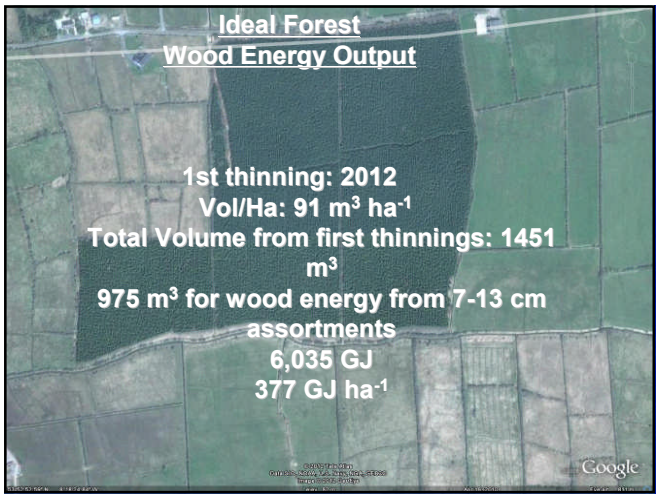
42% of Private Grant Aided Forestry occurs with Clusters
……86,000 Ha

Clusters occupy 15% of National Land Area ……1.035 M Ha



Ideal Forest





Ideal Forest

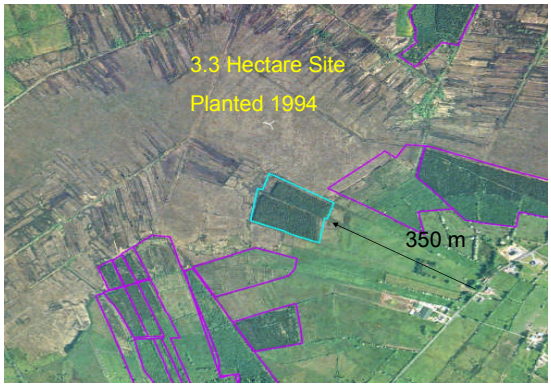
If 100% of 1st thinnings from this plantation went into wood energy:

1451 m^3

8913 GJ

= 550 GJ ha^{-1}

Reality



Limiting factors

- Not all sites are productive
- Inaccessible to machinery
- Small plantation size
- Windthrow risk
- Soil conditions

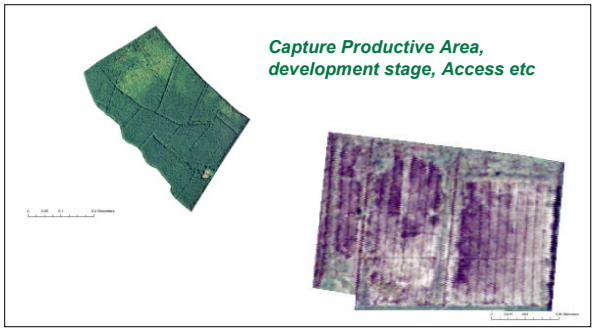
SUPPLYCHIP
Identifying Resource Potential

Developed a methodology for assessing forest resources at a local level, where no data exists.

How?

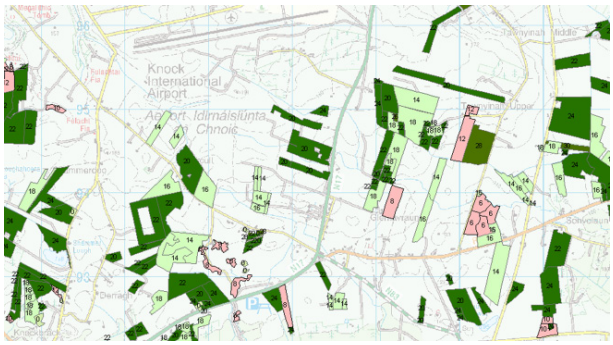
- Identify forest parameters remotely
- Aerial Photography Interpretation
- Growth and Yield Modelling (Farrelly et al. 2011)
- Forecasting
- GIS Analysis – Roading Infrastructure

Identify Forest Parameters: Aerial Photo analysis



Capture Productive Area, development stage, Access etc

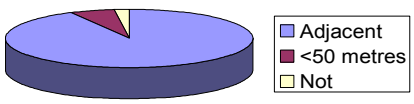
Yield Prediction – Productive Areas



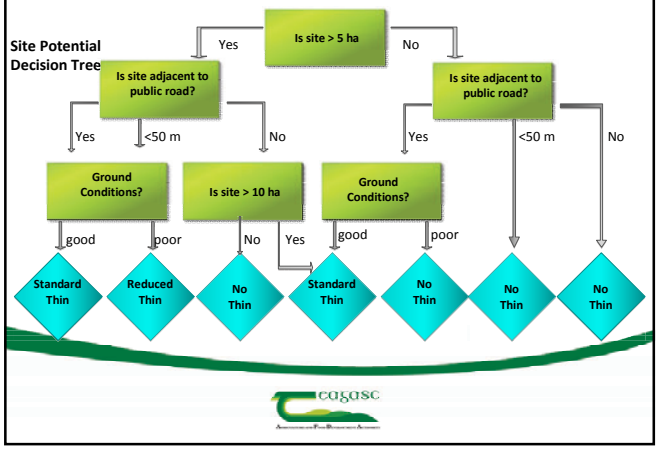
GIS Roading Analysis: Distance to Public Road

Site Potential - Road Access.

- 1. Adjacent to Public Road - 2481 stands
- 2. <50 m from public road – 115 stands
- 3. >50 m from public road – 680 stands

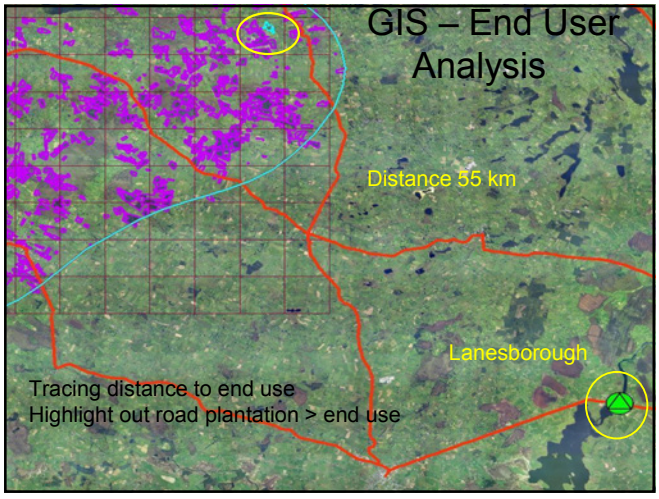


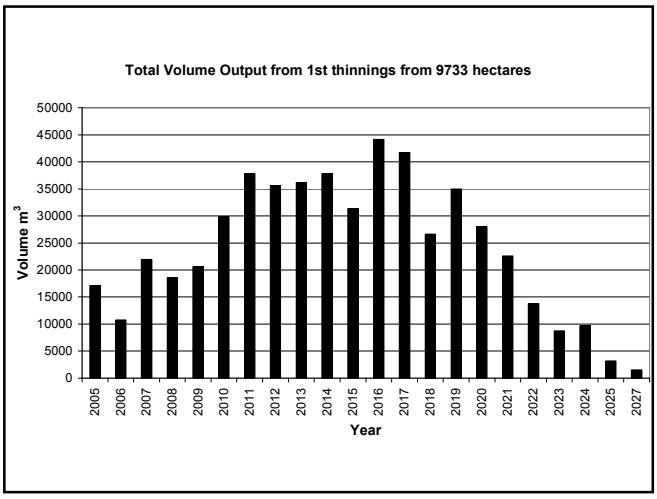
Thinning and Harvesting Analysis

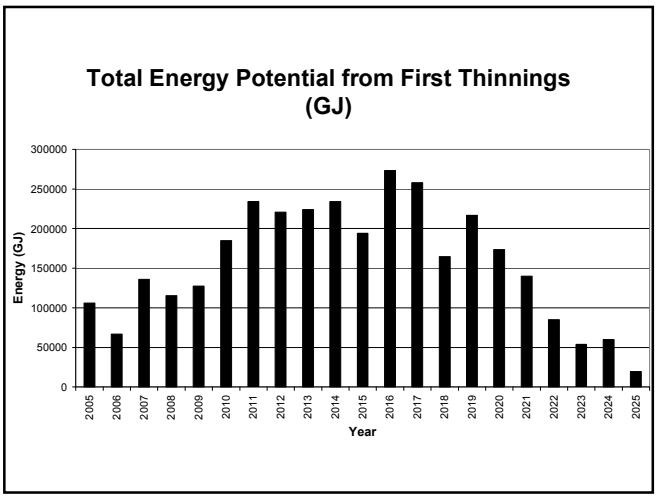


Local Level Forecasting

GIS – End User Analysis





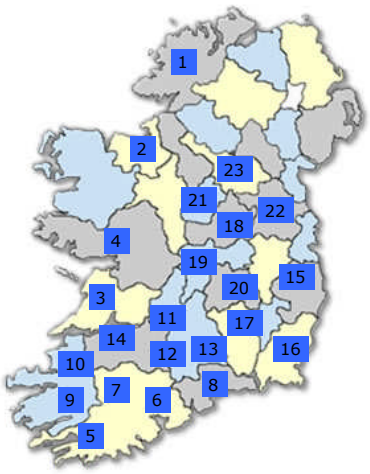


If 100% of first thinnings go for biomass this forest cluster could annually:

Fuel five 1 MWe Biomass CHP facilities

Or

Meet 1/8th of Edenderry Power's projected biomass demand for 2015.



1. Donegal Woodland Owners Society Ltd
2. Sligo/north Leitrim Forest Owner Group
3. County Clare Wood Energy Group
4. Galway Forest Producer Group
5. West Cork Forest Producer Group
6. Avondhu Blackwater Forest Owner Group
7. Duhallow Forest Owner Group
8. Waterford Forest Owner Group
9. Kerry Farm Forestry Owners Group
10. Headford Farm Forestry Group
11. Ballylanders Forest Owners
12. Limerick/Tipperary Forest Producer Group
13. South Tipperary Ash Growers Group
14. West Limerick Forest Producer Group
15. Wicklow Private Woodland Owners Group
16. Wexford Forestry Growers Association
17. Kilkenny Forest Owners Group
18. Westmeath Forestry Producer Group
19. Offaly Forestry Producer Group
20. Laois Forestry Producer Group
21. Longford Forestry Producer Group
22. Meath Forestry Producer Group
23. Cavan Forestry Producer Group

Thank You

Joanne.fitzgerald@teagasc.ie
drjbfitzgerald@gmail.com

- Find me on LinkedIn
- www.teagasc.ie/forestry

National Bioenergy Conference 2012 'Growing the Bio-economy'
Hodson Bay Hotel, Athlone, Co. Westmeath
Wednesday, 25 April 2012

LEVERAGING ADDITIONAL BIOMASS FROM THE FOREST RESOURCE

Tom Kent,
Waterford Institute of Technology
tkent@wit.ie

Wood fuel Demand & Supply

Wood fuel Demand Forecast 2020:

- 12% renewable heat generation;
- 800 MW of Combined Heat & Power (CHP) by 2020;
- 30% co-firing with biomass at the three peat-fuelled power plants.
- 3 million cubic metres wood per year (COFORD, 2011)

Where can this come from?

1. Leverage additional biomass from clearfell residues
2. Mobilise thinning in non-industrial private forests

COFORD Forest Energy Research Programme

Current wood harvesting practice in Ireland

Cut-to-length harvesting method

~ 170 Harvesters

~ 160 Forwarders

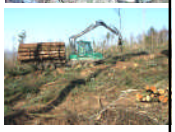
~ 380 Timber Trucks

•Capacity > 3 M m^3 roundwood/yr.

•Harvest 2011: 2.7 M m^3

•Two-thirds from clearfelling

•One third from thinnings



Clearfelling

~ 7000 - 8000 ha of clearfells per year

Roundwood:
300 – 600 m^3 volume per ha

Brash:
80 – 100 tonnes
650 – 850 GJ/ha

Stumps*:
100 – 150 tonnes
550 – 900 GJ/ha
*sources: Hakkila P. 2004, Forest Research UK, 2008

- Residues: brash & stumps,
- Potentially, > 1.5 million tonnes or 12 PJ per annum

Thinning

- 22,800 ha in 2011
- 49,400 ha in 2028 (Phillips, 2011)
- Large increase in private sector thinnings

Roundwood:30 – 60 m^3 per ha

- Only 55% of tree volume in harvestable stem
- 45% top and branches

Example 1: Overview Brash Supply Chain

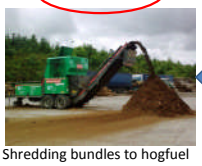
- Brash (like straw) is scattered and has low density when loose
- Brash bundles are compacted for efficient handling, transport, storage and processing
- Medite (Europe) Ltd. contracted Coillte to procure brash bundles for boiler fuel
- Coillte tendered for a harvesting contractor to produce brash bundles
- WIT carried out studies on:
  1. Fuel characteristics of brash bundles
  2. Quantification of resource
  3. Productivity of the supply chain

Source: Thomas Nordfell, 2010

Brash Supply Chain: Elements

Brash Bundler

Extracting to forest road



Shredding bundles to hogfuel

Road transportation to end-user

Brash Supply Chain: Fuel characteristics per bundle

- measurements taken from 14 trial sites
- European Solid Biofuel Standard methods used

Parameter	Unit	Mean
Volume	m^3	1.2
Weight	Tonnes	0.383
Moisture	%, total weight	51
Dry Weight	oven dry tonnes	0.188
Net Energy Content	GJ	3.1
Ash Content	%, dry weight	2.30

- High variability between individual bundles
- High moisture & ash content impacts negatively on net energy content

Brash Supply Chain: Quantification

- Total quantification of bundles produced on 14 trial sites
- 300 truck loads weighed and moisture sampled to derive delivered energy

Parameter	Unit	Totals
Total Area	ha	150
Bundled Area	ha	83
Total No. Bundles		18,807
Total Weight	tonnes	7208
Total Energy	GJ	56,747

- Bundling on only 55% of area
- Constrained by: steep terrain; wet ground; brash contaminated by soil& stones; windblown areas; illegal dumping; insufficient concentration of brash.

Brash Supply Chain: Productivity & Indicative Production Cost

Element	Bundles per SMH	Cost per Tonne	Cost per GJ
Bundler	21	€14.92	€1.84
Forwarder	45	€4.62	€0.57
Timber Truck	63 (per load)	€9.10	€1.12
Shredder	60	€9.51	€1.18
Total		€38.15	€4.71

Assumptions:

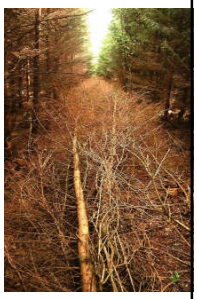
- SMH - Scheduled Machine Hour includes non-productive work time
- Bundler, Forwarder & Shredder time & production study results
- Assumed Machine Costs/SMH: Bundler €120; Forwarder €80; Shredder €180
- Trucking cost from FITPAC Model (Murphy, 2008) assumes 70km one-way distance

Brash Supply Chain : Conclusions

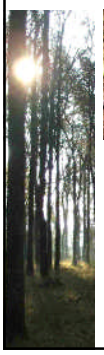
1. Simple supply chain with one new element only (John Deere bundler)
2. Integrated supply chain as site selection, timber harvesting and replanting planned around brash bundling
3. Flexible supply chain as bundles can be stored, transported and processed on-demand
4. Not necessarily cheapest solution: bundling adds substantial cost.
5. Potentially 800,000 tonnes per annum (6 PJ), more likely less than 200,000 tonnes per annum
6. Because, scale-up constrained by limited site suitability

Example 2: Whole Tree First Thinning & Chipping Overview

- Forest Energy Research Programme
- Main objective: to investigate cost-effective wood fuel supply chains from forest thinnings
- Technology Transfer programme from Denmark to Ireland
- 800,000m^3 of wood chip from first thinnings per year in Denmark
- Documented in Forest Energy Reports (www.coford.ie)

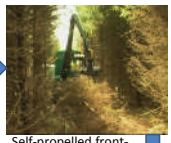


Wholetree Supply Chain: Elements

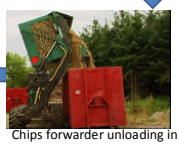


Chainsaw felling for line thinning

Feller-buncher for selective thinning



Self-propelled front-mounted chipper

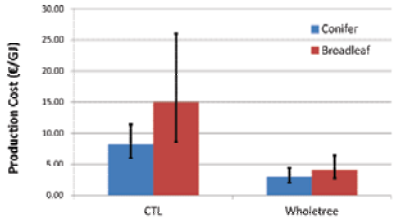


Chips forwarder unloading in containers at the forest road

Container truck for road transport

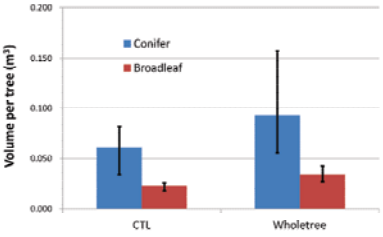
Wholetree Supply Chain: Production Cost

- based on results from eight conifer and four broadleaf sites over three years harvesting trials
- Woodchip production cost: harvesting, extraction & chipping to forest roadside
- Error bars show the range of values between trial sites



Wholetree Supply Chain: Quantification

- based on results from eight conifer and four broadleaf sites
- Mean harvested volume per thinned tree
- Error bars show the range of values between trial sites



Wholetree Supply Chain: Conclusions

1. Can be employed on any site that will support cut-to-length thinning
2. Produces more biomass at lower cost from first thinning compared to cut-to-length thinning
3. Requires new technology, not currently employed in Ireland
4. Complex logistics to co-ordinate harvesting, chipping & transport
5. Complex contracting in private sector forestry, as there are many owners & forest managers
6. Requires large energy end-user to keep system productive

Overall Conclusions

- Cut-to-length supply chain utilises 40 – 70% of the available forest biomass
- More biomass can be leveraged from Irish forests by harvesting residues, stumps and small whole trees
- Wood fuel from these sources will only be suitable for larger installations due to moisture and particle size distribution
- Forest site, soil and environment will constrain deployment and must be protected – this is the role of forest managers
- All parts of the tree have value.

Acknowledgements

1. Coillte, Medite (Europe) Ltd. & Mr. Willie Dwyer, Contractor

2. The Forest Energy Research Project is funded by:

The Department of Agriculture, Fisheries& Food, under the COFORD Forest Research Programme as part of the National Development Plan 2007-13

National Bioenergy Conference - Warming to Wood Energy

Tom Coughlan
Clare County Manager
25th April 2012

Overview

- Role of Local Authorities - why should we be involved in the development of renewable energy?
- Our Vision - what do we hope to achieve in County Clare?
- What's happening in County Clare?
- Concluding thoughts.

What do we do?

- Traditional local government services - roads, housing, planning, water, environment.
- Wider role - economic, social, cultural development - power of "general competence".

General Competence

- A local authority may take such measures, engage in such activities or do such things as it considers necessary and desirable to promote the interests of the local community - social inclusion or the social, economic, environmental, recreational, cultural, community or general development of the area.

What are we doing?
How can local authorities encourage "warming to wood energy"?

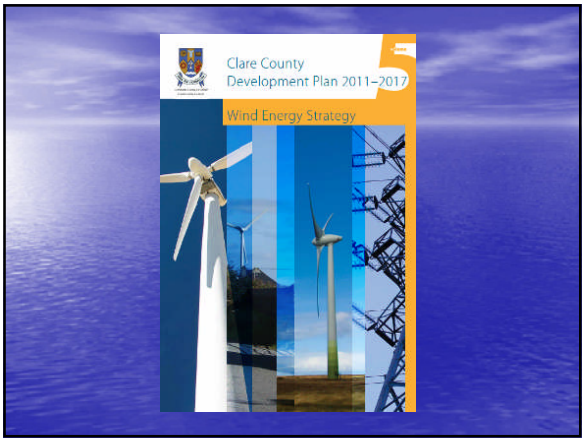
- Planning - how to make optimal use of our resources.
- Facilitating - bringing interested parties together.
- Influencing - influencing policy.
- Making it happen - direct action.

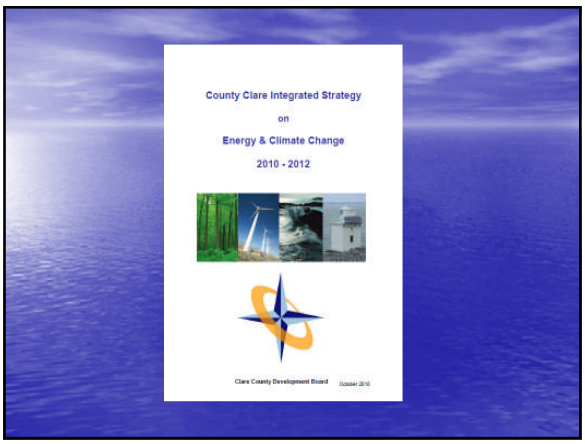
Planning

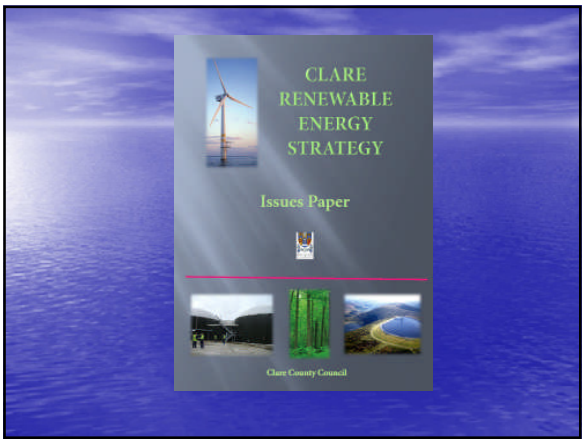
- Clare County Development Plan 2011-2017.
- Wind Energy Strategy 2011-2017.
- County Clare Integrated Strategy on Energy and Climate Change.
- Clare Renewable Energy Strategy.


Clare County Development Plan
2011–2017
Summary


Clare County Development Plan 2011-2017
Maximising Renewable Energy Resources and Developing Clean Technology


Clare County
Development Plan 2011–2017
Wind Energy Strategy





Our Vision

- County Clare, as the national leader in renewable energy regeneration, supporting energy security, efficiency, conservation and storage, and assisting in meeting Ireland's green energy targets.

Biomass - What's happening in Co. Clare?

- Commercial biomass boilers using wood chip from Clare forests - 8 commercial (1.8 MW) boilers using 1,500 tonnes of wood chip.
- County Clare has 52,000 hectares of forest - 55% privately owned. The County Clare Wood Energy Project has been organising harvesting and auctioning of wood for small forest holders.
- Co-firing wood pellet with coal at Moneypoint power station is under review.
- Combined Heat and Power (CHP) generation using biomass wood is being considered.
- Clare County Council meets 27% of its total heat needs from biomass - 90% of County Hall energy from wood chip.

Clare County Council - Heat

27% of own heat requirement presently met by biomass

Clare County Council Heat	Euro	kWh	%
HEATING OIL	€37,223	465,294	18%
KEROSENE	€4,251	53,136	2%
GAS	€70,684	1,413,680	53%
WOODCHIP	***€35,708***	***714,157***	***27%***
GRAND TOTAL	€147,866	2,646,267	100%

Clare County Hall - Heat

Clare County Hall meets 90% + of heat needs with local wood chip.

Solar thermal panels on the roof contribute to hot water needs.

540 kW wood chip boiler.

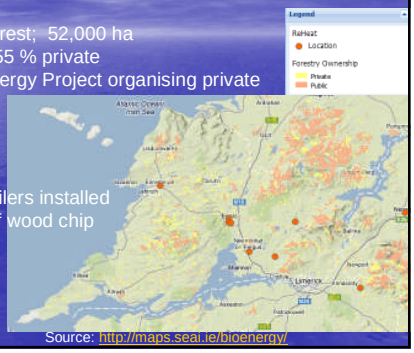
Supports 2 FTE jobs in County Clare.

Reduces CO_2 emissions by 3,000 tonnes.

Clare Supply & Demand

Supply
- Clare is 16% forest; 52,000 ha
- 45% is public; 55 % private
- Clare Wood Energy Project organising private forest

Demand
***Present** (2012)*
- 1,800 kW of boilers installed
- 1,500 tonnes of wood chip



Source: http://maps.seai.ie/bioenergy/

Combined Heat & Power Plant - Shannon

Population 9,222 (2006)

Households 3,493

Employed 8,000+

Shannon International Airport

Shannon Free Zone

Industrial Areas

Town Centre

Residential Areas

The Clare Champion

Plans afoot for €85 million power plant

The Clare Champion

Shannon in line for €85m green project

IRISHTIMES.com Wednesday, April 18, 2012

News | Sport | Business | Comment | Life | Society | Culture | Cars | Jobs

Ireland | World | Today's epaper | Generation Emigration | Video | Blogs | Galleries | Fiscal Treaty

Home » Ireland » Regional News »

Like Tweet Share 1 Print RSS Text Size: A – A

The Irish Times - Monday, April 16, 2012

Council to decide on power plant rezoning

GORDON DEEGAN

MEMBERS OF Clare County Council are to vote today on a contentious rezoning that will, if passed, pave the way for an €85 million combined heat and power plant (CHP) in Shannon.

As part of a new draft of the Shannon Local Area Plan, the council is planning to rezone a large tract of land at Stonehall, north of the Shannon Free Zone.

A private firm, Carbon Sole Industries, has already provided local briefings on its plan to construct the 60-70MW CHP in Shannon, and the rezoning is necessary for a planning application to be lodged.

The project is to generate electricity from biodegradable waste and meet a growing demand for reliable power in the region.

The rezoning requires a majority of councillors to vote in favour.

Residents of the Stonehall area have been lobbying councillors in recent days to vote against the rezoning.

According to a spokeswoman for the Concerned Residents of Stonehall and Environs, residents "are fearful for the future of their school that is fast increasing in numbers, and the added pressure the roads infrastructure will have to bear if this project goes ahead".

"Also noise levels will be a huge cause of concern, and the uncertainty concerning the possible health implications from the plant itself."

The spokeswoman said that Seán Daly of Carbon Sole Industries has assured locals that the proposed plant would not have a negative impact on local residents or would not present any health hazards.

The residents' spokeswoman said residents had a number of concerns: the height and scale of the proposed building; possible noise pollution; health implications; and safety issues in relation to traffic movement on the school road.

In this section »

- Fine Gael Senator calls for retention of Seanad
- Talks to save 70 Monaghan jobs
- Emergency department; state-of-art unit opens in Kerry
- Whiskey distillery may be Clane's new gig
- Roscrea conference director honoured

Irish Examiner

DIGITAL EDITION | PICTURE SALES | COMPETITIONS | TODAY'S DEAL

NEWS | SPORT | BUSINESS | OPINION | PROPERTY | FEA

BREAKING NEWS | TODAY'S PAPER | WORLD | FARMING | WEATHER | ARCHIVES | TE

Recommend Tweet 0

Council vote paves way for €85m power plant

By Gordon Deegan

WEDNESDAY, APRIL 18, 2012

Members of Clare County Council have paved the way for a contentious €85m combined heat and power plant for Shannon.

This follows councillors voting 17 to 12 in favour to zone 80 acres of agricultural land for green industry at Stonewall north of the Shannon Free Zone as part of the new Shannon Local Area Plan.

The councillors voted in favour of the zoning despite widespread opposition from Stonehall residents.

Conclusion

- There is a role for local authorities in the development of renewable energy.
- Integrated plans/strategies with clear targets are essential.
- Co-operation between agencies/bodies/government departments is critical.
- It will be necessary to win "hearts and minds".
- Warming to wood energy will not be easy – will be a slow burner!!!

Thank You

Notes

Notes

Contact Details:

Teagasc Crops, Environment & Land-Use Research Centre
Oak Park, Carlow
Tel: +353 (0) 59 9170200
Fax: +353 (0) 59 9182097
Email: cropsandenergy@teagasc.ie

www.teagasc.ie

NDP
National Development Plan 2007 - 2013

Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara

teagasc
Agriculture and Food Development Authority