

Hemp

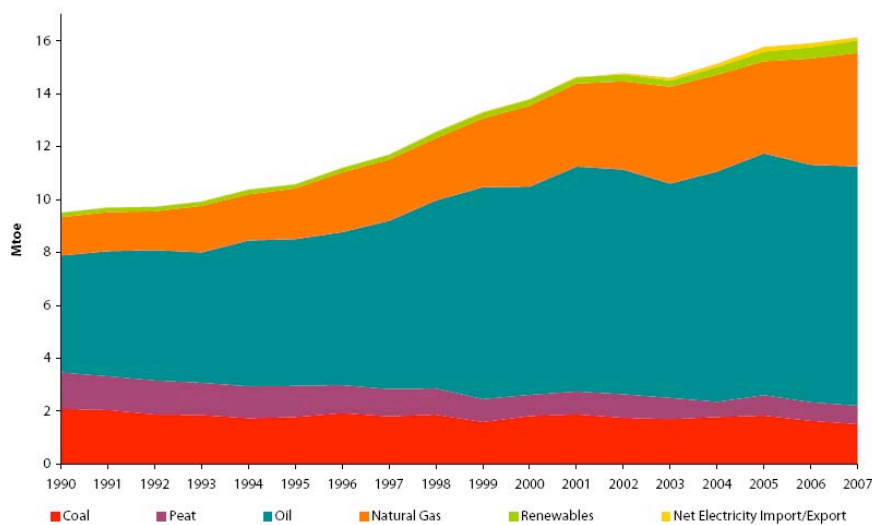
A Bioenergy Crop for Ireland

27/5/09

EIHA Conference



Ireland: Energy Use

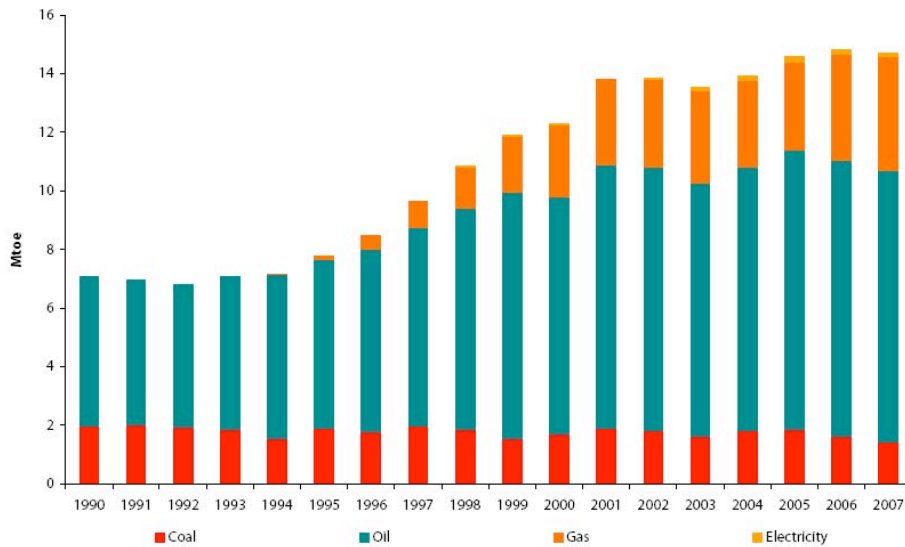


27/5/09

EIHA Conference



Imported Energy



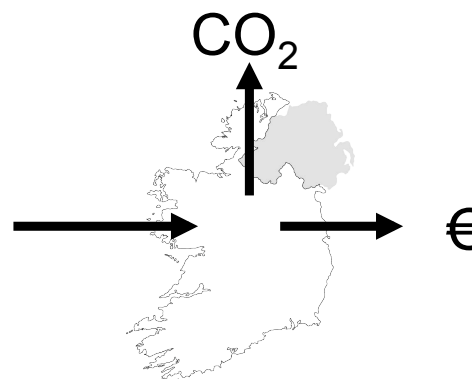
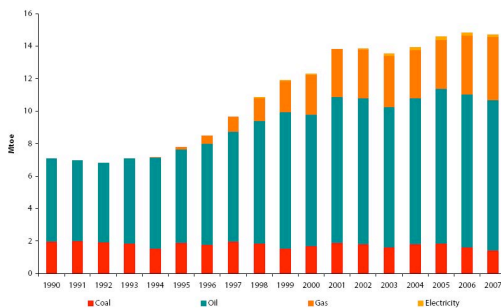
>90% of energy use

27/5/09

EIHA Conference



Imported Energy

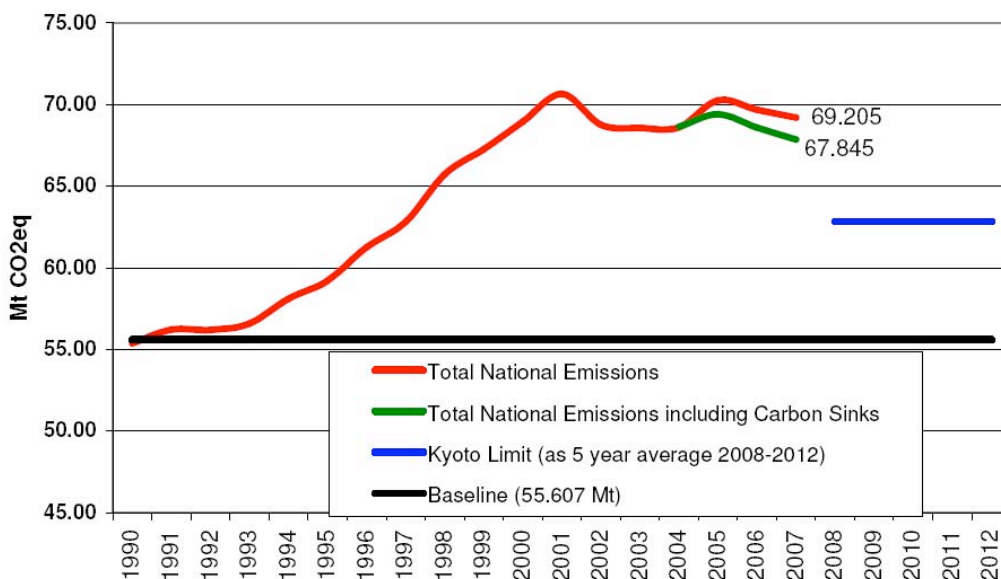


27/5/09

EIHA Conference



Ireland: GHG emissions

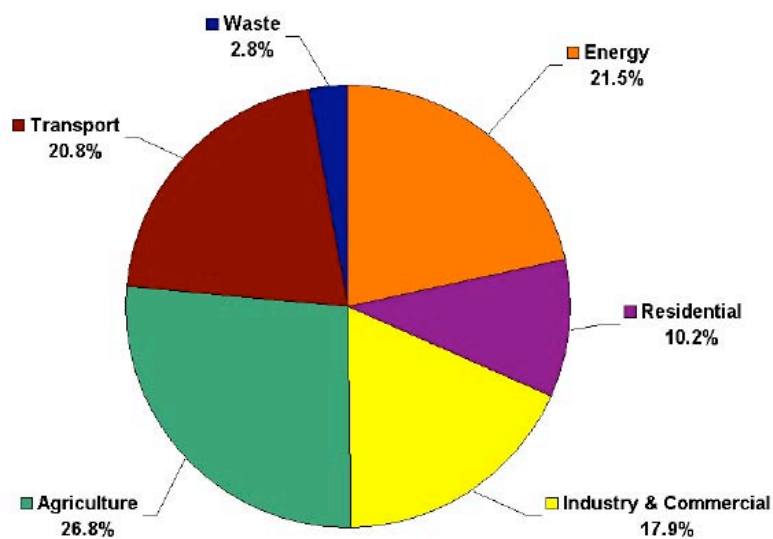


27/5/09

EIHA Conference



Ireland: GHG emissions

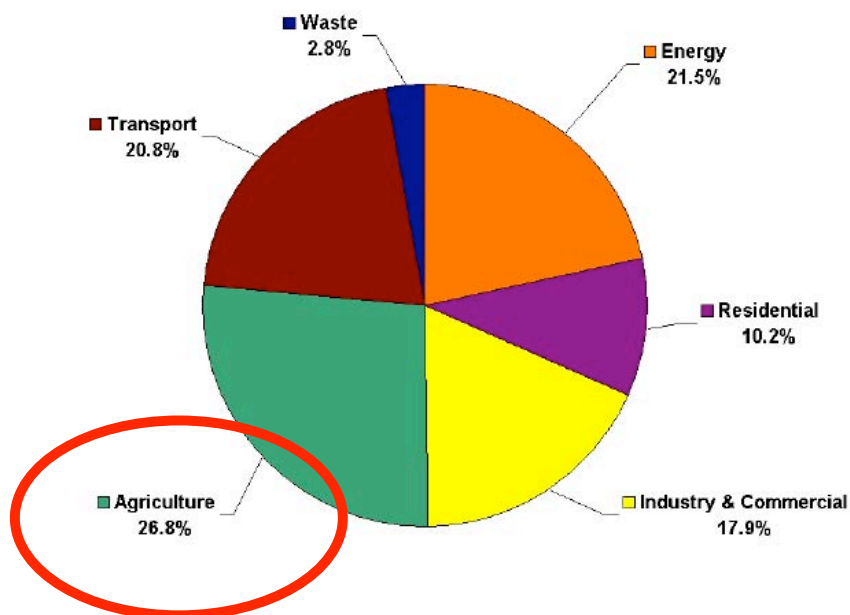


27/5/09

EIHA Conference



Ireland: GHG emissions



27/5/09

EIHA Conference



Heat and Electricity

- **Government Targets**
- 33% of Renewable Electricity by 2020
 - 30% Biomass Co-firing in Peat burning power stations
 - Promotion of biomass fuelled CHP
- 5% of renewable heat by 2010
- 10% of renewable heat by 2020



27/5/09

EIHA Conference



Co-firing Options

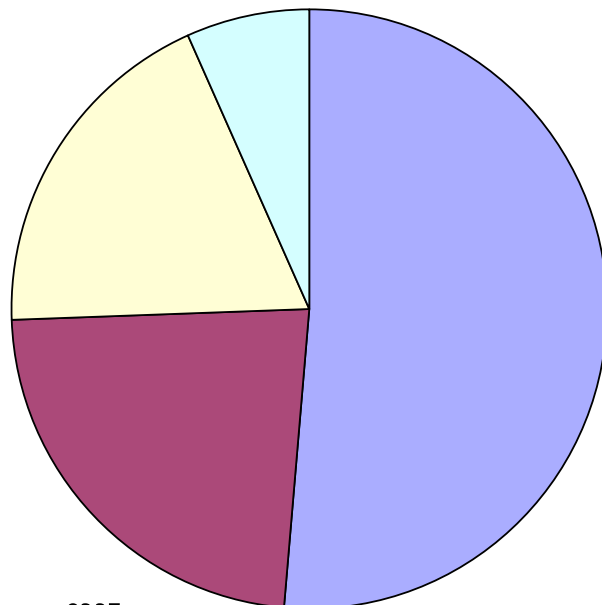


27/5/09

EIHA Conference



Ireland: Agriculture 2007



- Beef
- Dairying
- Sheep
- Tillage

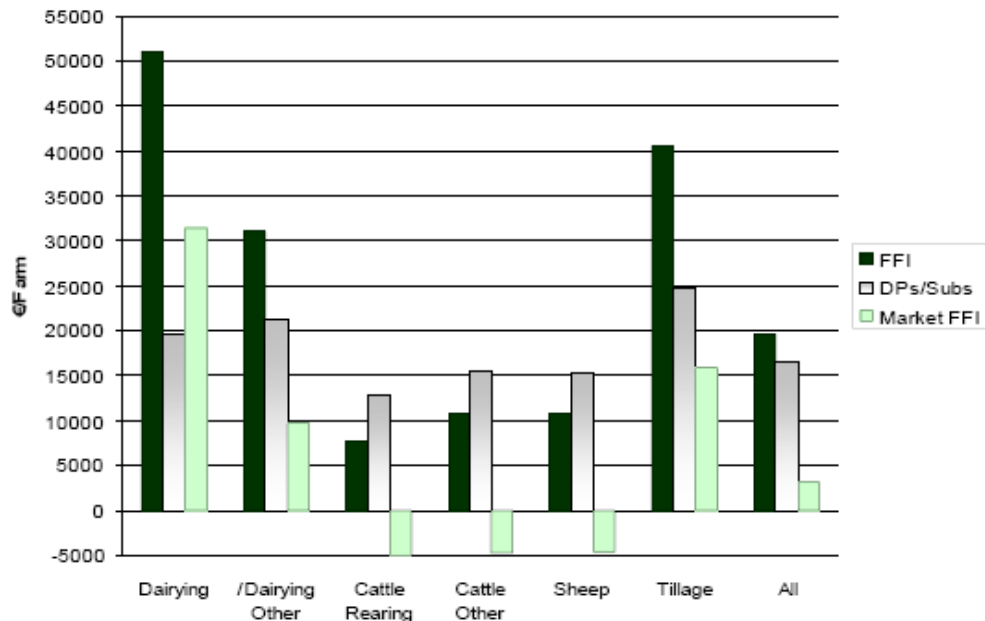
National Farm Survey 2007

27/5/09

EIHA Conference



Making Money from Farming?



27/5/09

EIHA Conference



Energy Crops in Ireland

- Miscanthus and willow supported by establishment grants
- 3200ha of Miscanthus and 500ha willow at present
- But!!
 - High establishment costs
 - 5-7 years before a return
 - Land tied up for 20 years
 - Establishment problems with Miscanthus

27/5/09

EIHA Conference



Is there a role for Hemp as an energy crop?

27/5/09

EIHA Conference



Strategy for study?

1. An analysis of how Hemp will grow in Ireland
2. Life Cycle Analysis of Hemp compared to other agricultural activities
3. Life Cycle Analysis of the use of Hemp in electricity generation

27/5/09

EIHA Conference



Will Hemp Grow in Ireland?

- No history of Hemp cultivation
- But trials show that it grows very well
- Stem yields >10t/ha
- No serious disease problems
- 140ha sown during 2008

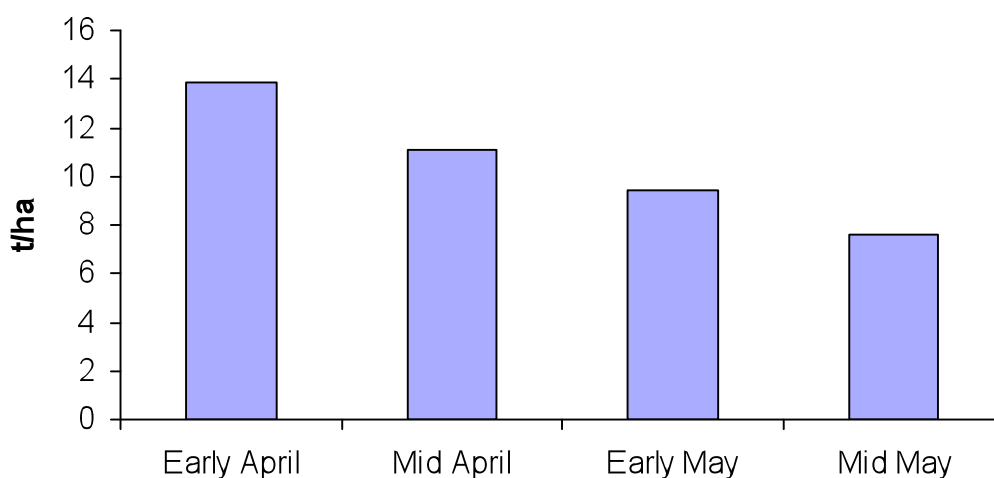
27/5/09

EIHA Conference



Sowing Date

Sowing Date knockbeg 1998-99



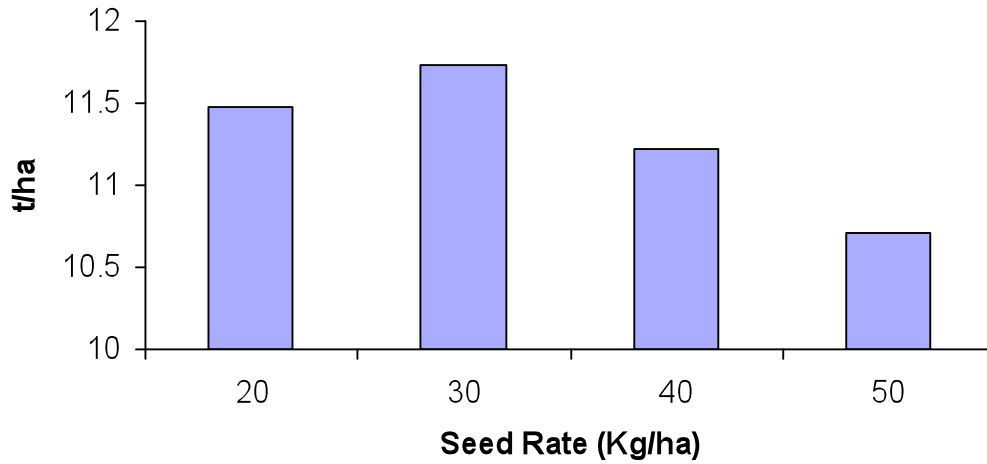
27/5/09

EIHA Conference



Seeding Rate

Seed Rate Knockbeg 1997-1999

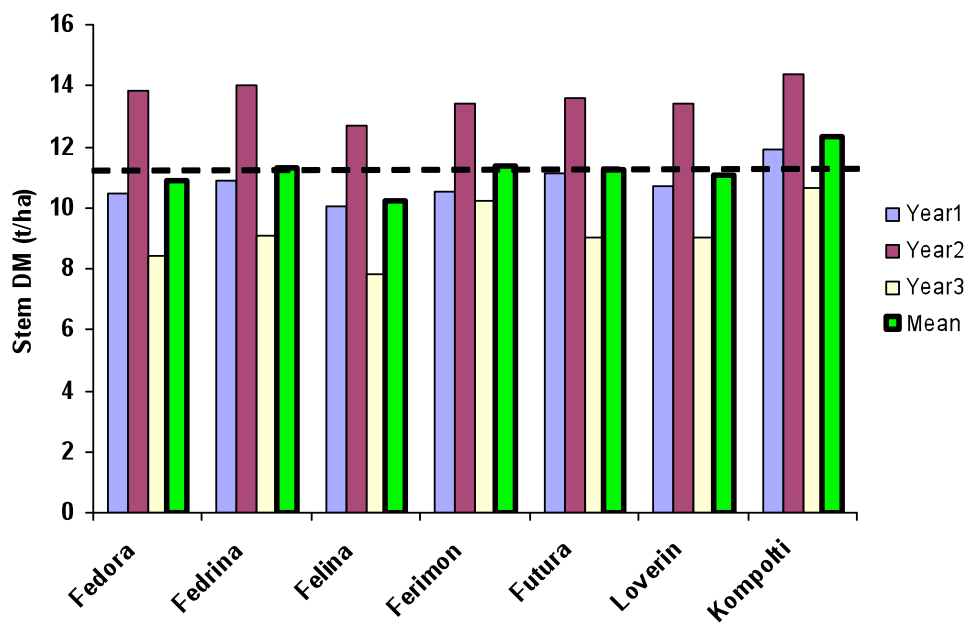


27/5/09

EIHA Conference



Stem Yields



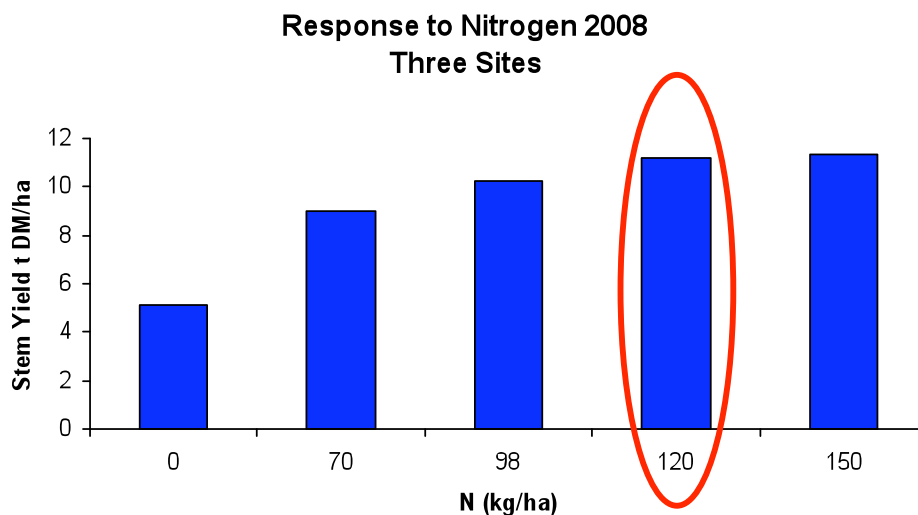
27/5/09

EIHA Conference



2008 Trials

Three varieties (Ferimon, Felina, Futura)
Three sites (Grassland, heavy and light arable)



27/5/09

EIHA Conference



Life Cycle Analysis

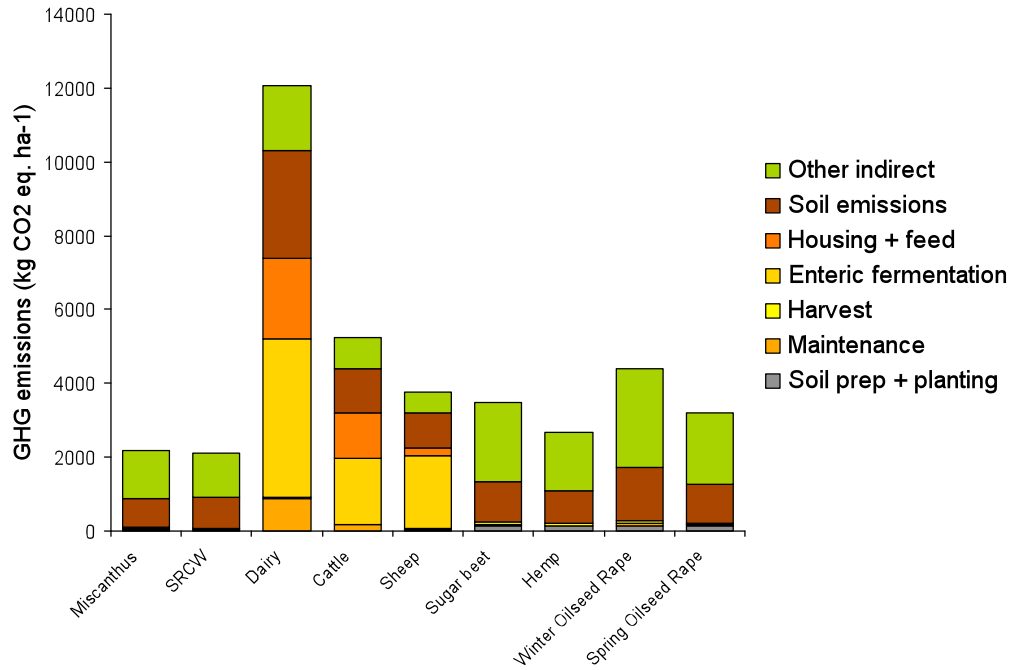
- Direct Energy
 - Sowing/ Maintenance/ Harvesting
- Indirect Energy
 - Fertilizer/ Pesticide/ Feed concentrates
- Plant & Soil Processes
 - N₂O emissions
- Enteric Fermentation

27/5/09

EIHA Conference



IRISH AGRICULTURE -LCA

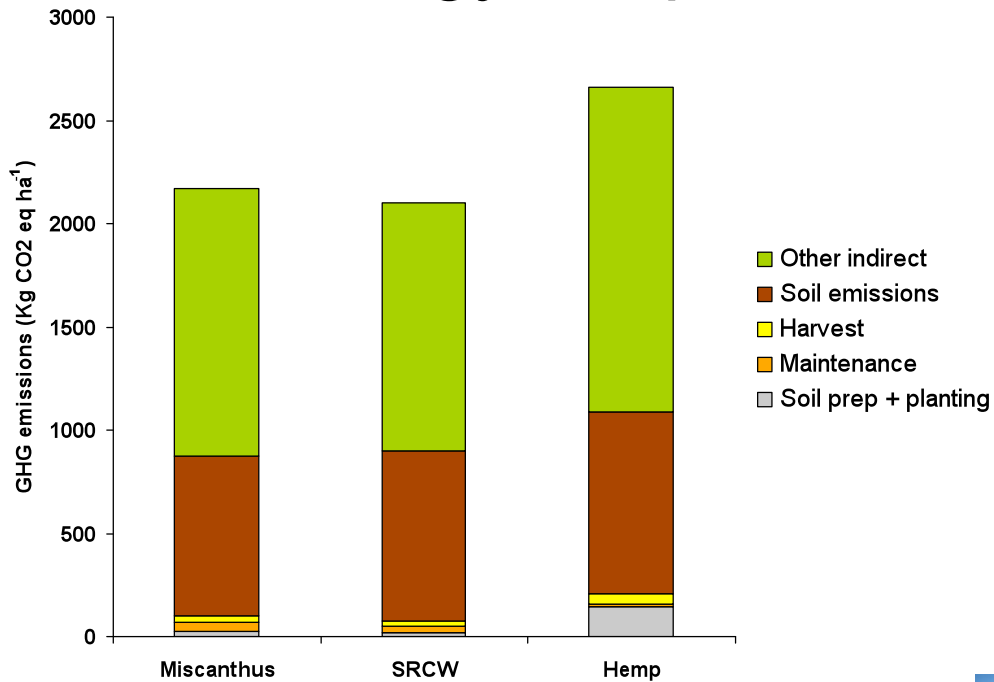


27/5/09

EIHA Conference



Energy Crops



27/5/09

EIHA Conference



Life Cycle Analysis

- Cultivation
- Transport
- Construction
- Combustion



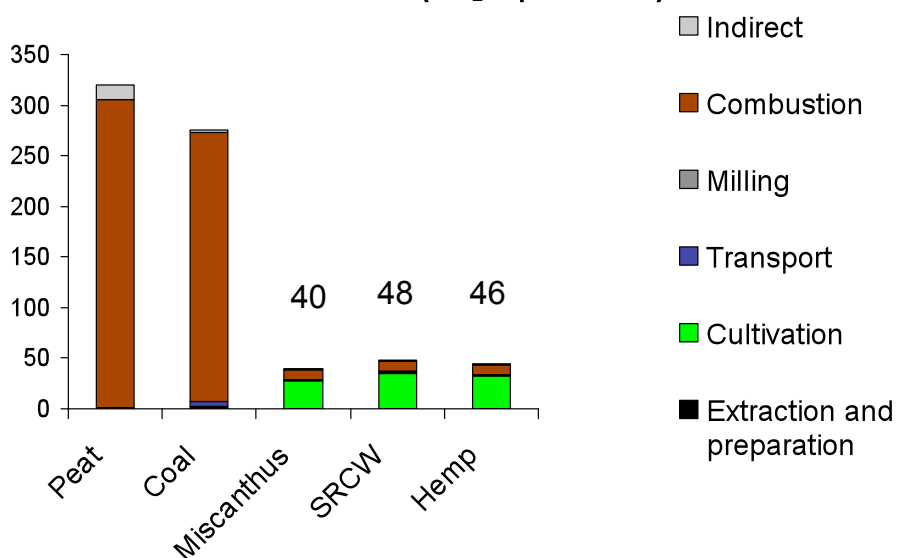
27/5/09

EIHA Conference



Electricity Co-firing

GHG emissions (CO₂ eq GJ⁻¹ elec)

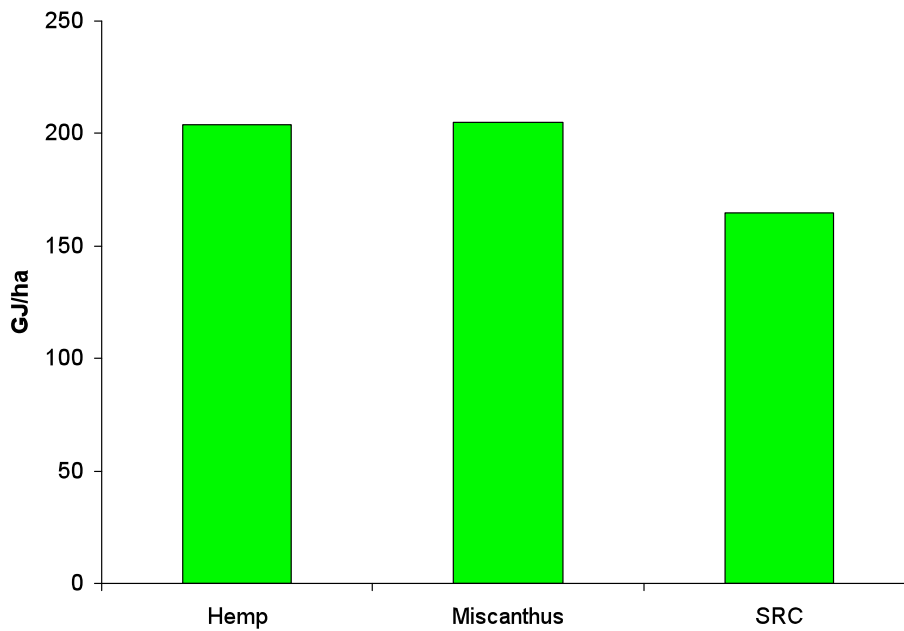


27/5/09

EIHA Conference



Average Energy Yield



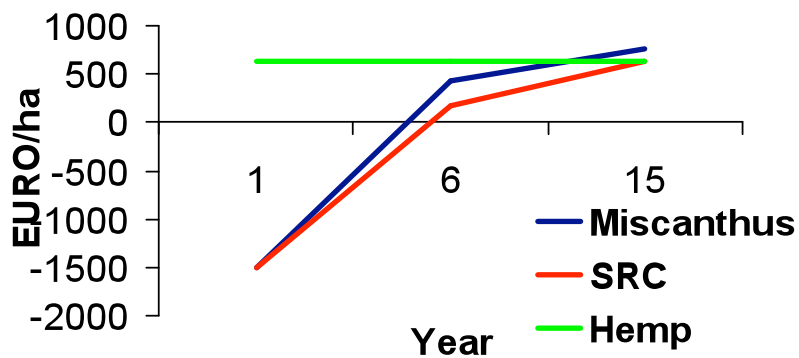
27/5/09

EIHA Conference



Economics

Discounted Margins



Rice (2008) J. Ind. Hemp

27/5/09

EIHA Conference



What's Next?

- Hemp for the heat market
- Incorporated into pellets
- Combusted in small boilers



27/5/09

EIHA Conference



Conclusions

- Hemp cultivation results in lower GHG emissions compared to other crops
- Co-firing hemp with coal and peat can substantially reduce GHG emissions from fossil fuel combustion
- GHG emissions from electricity generated from hemp are comparable with other energy crops
- The cultivation of hemp in Ireland can provide a useful break crop, a feedstock for renewable energy and a valuable tool for reducing national GHG emissions

27/5/09

EIHA Conference



Thank You
For Your attention

27/5/09

EIHA Conference

