

European Policy Barriers to Bioenergy

This presentation will:

- Explain the study
- Share the Results
- Feedback from you

The Study:

Evaluate policy instruments used to promote bioenergy;

- Are they effective?
- Why?
- Why not?

For what purpose?

- To identify success/failure.
- To ensure a successful promotion of bioenergy for the future.
- To guide new bioenergy markets.

US...

- Identified Policy Instruments
- Analysed their effectiveness
- Suggested why or why not they have been effective

YOU...

- Give us your own hypotheses.
- Contribute and further our analyses.
- First hand experience on which policy instruments are needed.

The Study

Background

Bioenergy is being promoted EU-wide as a way of helping to address climate change.

Policy Instruments

- Used to support policy or regulation.
- Used to help control, regulate or impede behaviour in markets.

Policy instruments aims:

- Impede the use of fossil fuels
- Promote renewable sources of electricity

Policy Instruments aims:

- Remove Externalities

Examples of Policy Instruments for Renewable Energy

Deregulation

Opening up of electricity markets that were previously a monopoly.

Regulation

The market is controlled by laws or limits, which aim to ban or control the behaviour of markets.

Fixed Prices/ Premiums

Also known as Feed in Tariffs

A guaranteed price is paid for renewable electricity, normally at a higher tariff.

Taxation

- A regulated sum deducted from a polluting activity.
- Taxes can be adjusted- increased, decreased, or made exempt, in order to control market behaviour.

Green Certificates

Also known as Pollution Licenses

Suppliers must hold a given % of certificates. Certificates are awarded for renewable electricity, and can be earned, traded or a penalty paid.

Investment Subsidies

Also known as grants

Financial aids to assist
development of renewable
energy projects.

Uniqueness of Biomass at Policy level

Unique at policy level:

- It is not a free resource.
- Derived from many sources.
- Support needed at different stages of the biomass chain.
- It holds heat/ transport potential.

Countries analysed

- Germany
- Italy
- Sweden
- United Kingdom

The Analysis

Germany

1991	1992-2002	1998	1999	2000	2002	2004
Fixed Prices (FP)	Grants	FP altered	Eco Tax Reform	FP Revised	FP extended	FP extended

in MW	1990	1995	1999	2000	2001	2002	2003	2004	2003/04
Wood, Wood waste	0	79	1120	1014	190	285	500	810	62.00%
Municipal Waste	550	509	555	585	585	585	585	585	0.00%
Biogas	229	229	287	345	560	580	599	654	4.30%
Biomass Total	779	817	1962	1944	1335	1450	1684	2049	18.80%

Policy instruments - Germany

- Fixed Prices: Obligated utilities to buy renewable electricity at a rate 65-80% of the average electricity price.
- FP Altered: Cap
- Tax Reform: Taxes ↑
- FP Revised: Grid operators to buy electricity at decreasing tariffs.
- FP Extended: Premiums for CHP.

Implementation - Germany

- Wood/wood wastes ↑ since 1990.
- More or less sustained growth up to 2000.
- From 2002 onwards, mostly growth.

Italy

1991	1991	1992	1999	2000	2000	2001
Deregulation	Grants	Fixed Prices	Carbon Tax	Grants	Tax Credits	Green Certificates

in MW	1990	1995	1999	2000	2001	2002	2003	2004	2003/04
Wood, Wood waste	4	68	180	180	180	155	383	503	31.30%
Municipal Waste	46	79	168	219	222	224	446	511	14.60%
Biogas	41	21	141	179	198	224	257	268	4.30%
Biomass Total	91	168	489	578	600	603	1086	1282	18.80%

Policy instruments - Italy

- Fixed prices from 1992-1996.
- Tax credits for those connected to a biomass fuelled district heating grid.

Implementation - Italy

- Installations increasing since 1990.
- Lack of activity for wood/wood wastes between 1999-2001.
- Rise in installations beyond 2001/2002.
- Significant rises in 2003/4.

Sweden

1991	1991	1997	2000	2003	2004	2004
Carbon Tax	Energy Tax	Grants	Tax Increase	Green Certificates	Tax for Home/ Services	Reduced CHP Tax

in MW	1990	1995	1999	2000	2001	2002	2003	2004	2003/04
Wood, Wood waste	1200	1200	1490	1490	1778	1670	1670	1670	0.00%
Municipal Waste	30	76	77	77	171	170	170	264	53.30%
Biogas	0	0	18	18	19	20	20	20	0.00%
Biomass Total	1230	1276	1585	1585	1968	1860	1860	1954	5.00%

Policy instruments - Sweden

- Carbon tax: levied on all fuels except for peat and biomass. Not levied for production of electricity. Taxes on fuels for heat, excepting biofuels.
- Households and services: pay tax on electricity.
- CHP: no energy tax + a lower tax for heating.

Implementation - Sweden

- Growth beyond 1995.
- Decrease in wood/ wood wastes from 2001.
- Patches of inactivity between 2001-2004.

United Kingdom

1989	1998	2001	2002	2002
Deregulation	Grants	Carbon Tax	Green Certificates	Grants

in MW	1990	1995	1999	2000	2001	2002	2003	2004	2003/04
Wood, Wood waste	0	0	84	133	133	144	163	163	0.00%
Municipal Waste	38	112	227	184	189	203	217	223	2.80%
Biogas	91	199	434	468	503	535	676	790	16.90%
Biomass Total	129	479	745	785	825	882	1056	1176	11.40%

Policy instruments - UK

- Carbon Tax: Levy taken from electricity from fossil fuel sources.

Implementation - UK

- Industry increase in 1999.
- Increase in wood/ wood wastes from 1999-2000.
- Rise in installations from 2002.
- Increase in municipal waste and biogas in 2004.

Biofuels

Germany

Sales of Biodiesel

1999	Tax Exemption
2002	Investment Subsidies
2004	Tax Exemption

Year	1999	2003	2004
Sales of Biodiesel	130 kton	800 kton	1050 kton
Sales of Pure Plant Oil		5kton	5kton
Sales of Bioethanol			65kton

Source: University of Stuttgart

Tax Exemption 1999: Increasing Eco tax on fossil fuel diesel- biodiesel exempt.

Tax Exemption 2004: Biofuels blended with mineral oils now enjoy full exemption until 2009.

Italy

2000	Tax Relief	Year	1990/00	2000/01	2001/02	2002/03	2003/04
2001	Tax Relief Extended	Consumption tons (1000s)	70	120	174	270	310
2005	Tax Relief Reduced						

Source: SeedQuest

Tax Relief 2000: Reduced tax available for 125000 tons of biodiesel.

Tax Relief 2001: 300,000 tonnes of biodiesel from 2001-04 enjoy relief.

Sweden

2002	Tax Relief
2002-2008	Tax Reduction
2004	Tax Exemption

Year	2002-03	2003-04
Utilisation of Biodiesel & Bioethanol	Almost doubled	Almost doubled

Source: Energy Research Centre of the Netherlands

Tax Relief 2002: For pilot projects

Tax Reduction 2002-08: Reduced tax when purchasing biofuel based cars.

Tax Exemption 2004: Biomass based vehicles exempt from carbon & energy taxes.

2003: biofuels account 1.3% transport sector.

2004: biofuels account for 2.4% transport sector

United Kingdom

2002	Tax Exemption
2002	Tax Break
2005	Tax Exemption

Year	2002 (from July)	2003	2004	2005 (Jan- May)
Biodiesel sold (mn litres)	2.7	19.5	21	10

Source: Energy Centre of the Netherlands

Tax Exemption 2002: Partial exemption for biodiesel and bioethanol from Hydrocarbon oil duties.

Tax Break 2002: Value added tax on biofuels abated from 17.5% to 5%.

Tax Exemption 2005: From duty tax for bioethanol on imports.

In 5 groups

- Identify patterns in Bioenergy implementation.
- Suggest where you think policy instruments have played a part.

Analysis

- When has the amount of bioenergy installations increased?
- When has it decreased?
- Was this increase/ decrease dramatic?
- When has there been a lack of activity?

Conclusions - Germany

Steady wood/wood waste increase esp 2002/4 – result of 2002 renewable energy law (improved incentives)

2002/3 and 2003/4 – no explanation for sharp increase – needs a closer look

MSW constant

Biogas increasing 2000/1 – first issue of renewable energy law

Biomass market started 1981 – subsidies since then – perhaps need to look further back

Heat is basis for bioenergy market in most countries – need to take this into account as well

Conclusions - Germany

- Wood/wood wastes installations increased from 0 in 1990, to 79MW in 1995 after the introduction of fixed prices in 1991. Drop in installations after 2000, the year fixed prices were altered.
- Increase in biomass penetration after 2000, thanks to revision of fixed prices and taxation.
- Wood/wood wastes increased between 2002-2004, partly thanks to investment subsidies between 1999-2002.
- General increase from 2002, thanks to new fixed prices.

Conclusions - Italy

Combination of different consecutive measures led to growth in later years

Opening up of market critical – instant effect

Increase in generating capacity limit played a part but not sure how big

Green certificates seem to be working but time will tell

Grants were substantial (2000) and played a significant role

Conclusions - Italy

- Obligation effective, deregulated market in 1991, all biomass increased in subsequent years.
- Installations increased when fixed prices introduced from 91MW in 1990 to 168MW in 1995.
- Inactivity of wood/wood wastes between 1999-2001, no new instruments in place between 1992-1999. Fixed prices ended in 1996. Continuity of support needed.
- Beyond 2001/02 installations increased, thanks to combination of carbon tax in 1991 and green certificates in 2001.
- Increase in 2003 and 2004 from green certificates in 2001. Holds promise.

Conclusions - Sweden

Sweden unique – multiple layers of tax (VAT, energy, CO2) therefore tax incentives particularly effective

Short term technology assisted by deregulation but advanced technology hampered

Must look at heat for Sweden – district heating & domestic

CO2 tax very effective for heat & district heating still increasing because of this

Must look at pool price for Swedish electricity market sometimes will not run biomass plant because revenue too low – therefore look at GWh not GW

Black liquor development separate and not
policy instruments as much as industrial

Conclusions - Sweden

- Tax in 2001 was effective but only once the market was liberalised in 1996.
- Investment subsidies supported bioenergy, withdrawal of grants in 2002 has halted further development.
- Needs support; between 1997-2003 no new instruments caused wood/wood waste to dwindle.

Conclusions - UK

Conclusions - UK

- Obligation showed promise, no wood/wood waste MW in 1989, but 133MW by 2001.
- Jump of wood/ wood waste from 84MW in 1999 to 133 in 2000 linked to grants.
- Increase in 2003/04 linked to tax, but mainly NFFO installations.
- 2004 increase, thanks to green certificates. Earlier developments linked to eligibility of co-firing.

Conclusions - Biofuels

Instruments are effective – you get what you pay for e.g. Germany

Italy now has a cap on quantities exempted

Some of UK biodiesel may be exported to elsewhere where there is a more attractive tax regime

Incentives for biofuel cars may not be successful as car can then be used with conventional fuel

Effective on member state level, but on macro level (EU) need a European level tax exemption/obligation to prevent movement between countries

Conclusions - biofuels

- Germany: Rendering biofuels exempt from taxation has helped stimulate growth.
- Italy: The generous tax relief combined with a high taxation on fossil fuels triggered development.
- Sweden: Biofuels share increased thanks to series of tax exemptions, and making biomass fuelled cars more economical for the consumer.
- UK: Reduction of Value Added Tax paid on biofuels significantly helped.

General Conclusion

- Continuity of policy instruments is critical in supporting any bioenergy industry.
- Taxation has a degree of effectiveness, but needs the presence of another stronger mechanism
- For taxation alone to be effective it needs to be high, increased incrementally and long term.
- Fixed prices are a prime way to kick-start a bioenergy industry. To sustain activity, premiums for bioenergy need to be generous to take account of capital and fuel supply costs.

General Conclusions

- Policy instruments should be used to guide investment in the country's preferred form(s) of bioenergy, i.e. electricity, CHP and/ or co-firing.
- Trading certificates generate investment in bioenergy, however the degree of investment will depend on the obligation and if it is weighted to favour bioenergy.
- Investment subsidies help at initial stages and temporarily reduce costs, but fail to attract long term investment.
- However, for countries lacking in biomass fuel supply investment subsidies are an important means to encourage and support the growth of biomass.

Thank you for
listening