



## Module 4f

### Examples of developing a national biomass energy strategy

### Germany, Sweden and Malaysia as examples

## Outline

- > Approach
- > Focus
  - Policy objectives
  - Strategies to implementation
- > European Union
- > Germany
- > Sweden
- > Malaysia



## Approach

- >An overview of the policies that stimulate the use of biomass for energy
- >(Elements from) policies that might be applicable for different countries

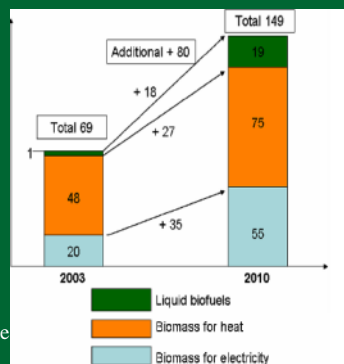
slide 3/21

Training course on Renewable Energy



## European Union – policy objectives

- > 1997 White paper for a Community strategy and action plan on renewable energy (COM(97)599)
  - Share renewables in primary energy from 7% in 1997 to 12% in 2010
  - Bioenergy supply from 45 Mtoe in 1995 to 135 Mtoe in 2010
  - Bioelectricity supply from 23 TWh in 1995 to 230 TWh in 2010
- > 2006 Biomass action plan  
(In Mtoe)



slide 4/21

Training course on Renewable



## European Union – strategy (1)

- > Direct financial support to be arranged by member countries
- > R&D support
  - Fifth Framework programme 1998-2002 – 140 mln for biomass
  - Sixth Framework programme 2002-2006
  - Seventh Framework programme 2007-2013
- > Awareness raising
  - For instance biomass movies
- > Development of standards
  - For instance composition biodiesel
- > Legislation - directives

slide 5/21

Training course on Renewable Energy



## European Union – strategy (2)

- > Renewable Energy Sources Directive (RES-EL)
  - Member states have to increase share of renewable electricity
  - Different targets for each state
- > EU Emission trading Scheme (ETS)
  - Limits the emission of CO<sub>2</sub>, biomass can be an alternative
  - Important market for CERs (CDM) and ERUs (JI)
- > Biofuels Directive
  - Share of biofuels (biodiesel, bio-ethanol etc.) should increase to 2 % in 2007 and 5.75% in 2010
- > Waste incineration and Landfill Directives
  - Prohibit landfill of organic waste on the long term
  - Promote incineration with energy recovery

slide 6/21

Training course on Renewable Energy



## Germany – policy objectives

- > Policy objectives
  - Efficiency
  - Security of supply
  - Environmental sustainability
- > Renewable energy targets
  - Share of renewables in primary energy consumption 4.2% in 2010
    - 2005: already share of 4.6%
  - Expansion of renewable to 50% in 2050
  - Renewable electricity 12.5% in 2010 and 20% in 2020
- > EU Kyoto target
  - Germany agreed 21% greenhouse gas emission reduction in 2008-2012 compared to 1990 levels

slide 7/21

Training course on Renewable Energy



## Germany – strategy

- > Ecotax - Additional tax on fossil fuels for heating
  - Mineral oil: 0.2 ct/kWh<sub>th</sub>
  - Natural gas: 0.37 ct/kWh<sub>th</sub>
  - Electricity for heating: 2.05 ct/kWh
  - Part of yield used to fund renewable energy programme
- > VAT reduction
  - Reduced VAT of 7% for biofuels instead of 16%
- > Renewable Energy Sources Act (EEG)
  - Feed-in tariffs for renewable electricity
  - Priority connection and purchase of renewable electricity
  - Bonus for CHP, innovative and small systems

slide 8/21

Training course on Renewable Energy



## Germany – strategy (cont'd)

Base payment rates	Eurocent/kWh
Up to 150 kW	11.5
Up to 500 kW	9.9
Up to 5 MW	8.9
Up to 20 MW	8.4
Bonuses	
Biomass bonus until 0.5 MW	6
Biomass bonus 0,5-5 MW	4 (for wood: 2.5)
Innovative technology	2
Combined heat and power (cogeneration)	2

Note: For new plants the base payment is reduced each year by 1.5% starting 1.1.2005

slide 9/21

Training course on Renewable Energy



## Germany – strategy (cont'd)

### > Market Incentive Programme (MAP)

- Grants and loans with generous terms (long-term, low-interest)
- For instance pellet and wood chip heating equipment
- Table: MAP funding for biomass plants 2002- June 2004

Biomass technology	Budget allocated	Average support level *)
Heating systems <100 kW <sub>th</sub>	20.0 M€	10%
Heating systems > 100 kW <sub>th</sub>	8.2 M€	14%
Biogas plants	10.0 M€	6.6%
Total for biomass plants	38.2 M€	

\*) : As a percentage of the total investment costs

slide 10/21

Training course on Renewable Energy



## Germany – strategy (cont'd)

- > Research, development and demonstration
  - 27 mln Euro in 2005-2008 for biofuels
- > Mineral oil tax exemption for biofuels (Euro ct/litre):

Year	Vegetable oil	Biodiesel
Aug 2006	0	9
2007	0	9
2008	10	15
2009	18	21
2010	26	27
2011	33	33
2012	45	45

slide 11/21

Training course on Renewable Energy



## Sweden – policy objectives

- > Policy objectives
  - Independent from fossil fuels by 2020
- > Swedish commission on Oil Independence
  - 15-20% more forest growth
  - 300,000 – 500,000 ha energy crops and trees
  - 12-14 TWh biofuel needed to replace petrol and diesel
  - New heating plants should be CHP

slide 12/21

Training course on Renewable Energy



## Sweden Strategy

- > Fossil fuels are heavily taxed, biomass not
  - Taxes on CO<sub>2</sub>, Sulphur, NO<sub>x</sub> emissions
  - Energy tax

	Energy tax	CO <sub>2</sub> tax	Sulphur tax	Total tax	Tax öm/kWh
<b>FUELS</b>					
Gas oil, SEK/m <sup>3</sup> , (< 0.05% sulphur)	735	2 609	-	3 344	33.6
Bunker oil, SEK/m <sup>3</sup> , (0.4% sulphur)	735	2 609	106	3 452	32.6
Coal, SEK/tonne, (0.5% sulphur)	313	2 270	150	2 733	36.2
LPG, SEK/tonne	144	2 744	-	2 888	22.6
Natural gas, SEK/1000 m <sup>3</sup>	238	1 954	-	2 192	21.9
Unrefined tall oil, SEK/m <sup>3</sup>	3 344	-	-	3 344	34.1
Past, SEK/tonne, 45% moisture (0.3% sulphur)	-	-	60	60	1.84
<b>MOTOR FUELS</b>					
Petrol, unleaded, emc. class 1, SEK/l	2.8	2.1	-	5.0	54.8
Diesel fuel, emc. class 1, SEK/l	1.0	2.6	-	3.6	36.6
Natural gas/methane, SEK/m <sup>3</sup>	-	1.1	-	1.1	11.1
LPG, SEK/kg	-	1.4	-	1.4	10.6
<b>ELECTRICITY USE</b>					
Electricity, northern Sweden, öm/kWh	19.4	-	-	19.4	19.4
Electricity, rest of Sweden, öm/kWh	25.4	-	-	25.4	25.4
<b>ELECTRICITY, GAS, HEAT OR WATER SUPPLY</b>					
Northern Sweden, öm/kWh	19.4	-	-	19.4	19.4
Rest of Sweden, öm/kWh	22.8	-	-	22.8	22.8
<b>ELECTRIC BOILERS, &gt; 2 MW, 1/11-21/3</b>					
Electricity, northern Sweden, öm/kWh	21.8	-	-	21.8	21.8
Electricity, rest of Sweden, öm/kWh	25.4	-	-	25.4	25.4
<b>INDUSTRY</b>					
Electricity, industrial processes, öm/kWh	0.5	-	-	0.5	0.5

Training course on Renewable Energy



slide 13/21

## Sweden – strategy (cont'd)

- > Renewable Electricity Certificate system (Elcert)
  - Increase in renewable electricity from 10.4% 2005 to 16.9% 2010
  - Introduction of tradable renewable electricity certificates
  - Companies that produce more renewable electricity than needed sell certificates to companies that have shortage of renewable electricity
  - Government sets minimum (floor) and maximum (penalty) price
- > Klimp - Climate investment programme
  - Grants for investments a.o. in biofuel based district heating plants & replacing oil fired boilers for wood pellet boiler
- > Tax reduction households purchasing pellet boiler

Training course on Renewable Energy



slide 14/21

## Sweden – strategy (con't)

- > Various R&D support programmes
- > Promoting biomass transport fuels
  - Exemption from CO2 and energy tax (2004-2009)
  - Subsidy for motor fuels from landfill gas
  - Rules for local authorities to buy environmentally sound vehicles – discussed in European Commission
- > Promoting the establishment of energy crops
  - Tests with per ha subsidies for energy crops

slide 15/21

Training course on Renewable Energy



## Malaysia – policy objectives

- > Vision for energy sector for 2020
  - Access to secure and high quality for everybody
  - Minimize negative effects on the environment
- > Five-fuel diversification Strategy in 8th Malaysia plan 2001-2005
  - Biomass, biogas, MSW, solar PV and mini hydro as fifth fuel
  - Small Renewable Energy Programme (SREP) since 2001
- > National biofuel Policy - 2005
  - Biodiesel production to support palm oil prices
  - 5% blending of palm oil with diesel- 500 ktonnes of palm oil

slide 16/21

Training course on Renewable Energy



## Malaysia – strategy

- > Small Renewable Energy Programme
  - Promote construction and expansion of ren power plants
  - Connection tot the grid
  - Selling electricity to national utility under a 21 year licence agreement
  - Max 10 MWe



slide 17/21

Training course on Renewable Energy



## Malaysia – strategy

- > Biomass Power Generation and Cogeneration Project
  - Reduce GHG by biomass CHP & utilise biomass residues
  - Phase 1: Technical assistance to remove primary barriers
    - Information services & awareness enhancement
    - Policy studies & capacity building
    - Financial assistance for biomass energy projects
    - Demonstration schemes
    - Biomass energy technology development
  - Phase 2: Innovative loan/grant mechanism, 3.8% GHG reduction by end of 2008
  - Financed by Government, UNDP/GEF and private sector



slide 18/21

Training course on Renewable Energy



## Malaysia – strategy

- > Tax incentives for renewables
  - 5 year 100% tax reduction on statutory income
  - 10 year 100% tax exemption for Pioneer Status projects
- > Malaysia Electricity Supply Industry Trust Account
  - Each utility puts 1% of annual revenue to fund, to be used to assist government projects and studies for rural electrification, energy efficiency and renewables
  - Projects under BioGen programme can get 80% of project costs for demonstration projects
- > No production incentive available for renewable electricity like in Sweden and Germany

slide 19/21

Training course on Renewable Energy



## Summary

	Germany	Sweden	Malaysia
Targets			
• Renewable energy	4.6% in 2010	Independent in 2020	Diversification
• Renewable electricity	12.5% in 2010	60% in 2010	5% in 2005
• Transport fuels	5.75% in 2010	5.75% in 2010	5% palm oil in diesel
• Kyoto (2008-2012)	21% reduction	+4%	CDM
Incentives			
Biomass electricity production	Feed in tariffs	CO2 tax exemption Energy tax exemption Green certificates	-
Biomass heat production	Ecotax fossils CHP feed in tariff Tax reduction vegoil	CO2 tax reduction Energy tax exemption Tax exemption vegoil	-
Biofuel production	Tax reduction	Tax exemption	
Investment support	6.6-14% grants Soft loans	Tax reduction households Replacement subsidy	BioGen grants Profit tax exemptions
R&D support	Yes	Yes	Limited

slide 20/21

Training course on Renewable Energy



## Conclusions

- > Germany and Sweden successful in bioenergy, but thanks to heavy government support
- > Comparison Malaysia with Germany and Sweden
  - electricity production support is necessary in addition to investment subsidies
- > Every country has different system and different history, even in EU many systems exist
  - tailor made solution for Iran is needed



slide 21/21

Training course on Renewable Energy

