

Gasum energy tax study
Background report

23.1.2015

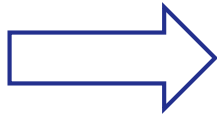
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1. Introduction to gas taxation issues

Natural gas taxes in Finland have risen 7-fold since 2010

- Drastic increase of energy taxes in Finland in 2010 to compensate fiscal needs
- Steepest increases in natural gas taxation, 7-fold from level in 2010
- Coal prices and EUA prices have decreased



- Utilities with opportunity to choose between both coal and natural gas increasingly favour the use of coal
- Consequent higher CO₂ emissions
- Elimination of coal usage seems increasingly difficult

- Current CO₂ taxation in Finland based on € 44/tn CO₂, very high in European comparison



- Urgent need to revisit natural gas taxation
- Further increases in CO₂ tax do not solve the issue
- Need to operate within EU energy taxation framework

2. EU directives and boundaries for taxation

Currently valid EU norms for energy taxation

- Excise Tax Directive 2008/118/EC
 - Wraps together excise taxes on tobacco, alcohol and energy products (2003/96/EC)
- Current Fuel/Electricity Tax Directive 2003/96/EC
 - Well outdated directive setting minimum levels of fuel/electricity taxation
 - Natural gas for heating uses
 - 0,15 €/0,3 € (business/non-business) /GJ of gross calorific value
 - Electricity
 - 0,5 €/1 € (business /non-business) / MWh
- EU proposal to renew Fuel and Electricity Tax Directive in 2011 to follow and reach 20/20/10 objectives by 2020
 - Proposal still being debated – latest debate in the summer 2014
 - Now more urgent matters on EU agenda including ”energy union” and freshly set objectives for 2030 (October 2014)
- Fuels used for electricity generation remains tax-free within EU

Summary of proposed amendment to EU Fuel/Electricity Tax Directive in 2011 (COM(2011)169)

- Intended fuel neutral, i.e. would not differentiate between energy sources
- Introduced "general energy consumption taxation" and "CO₂-related taxation" for each fuel, to be determined at national level (subject to EU level minima)
- Intended to avoid overlaps with ETS trading (Emissions Trading Directive 2003/87/EC), so that new proposed CO₂ taxes would only apply to non-ETS sector
- Tax credit schemes in member countries allowed for sectors susceptible to carbon leakage
- As before, the directive proposal would not apply to peat fuel
- No EU-wide standard tax proposal for biofuels

Summary of proposed amendment to EU Fuel/Electricity Tax Directive in 2011 (COM(2011)169), contd.

- National CO₂ tax should be based on minimum of € 20/ tn CO₂
- National energy taxes should be based on minimum of € 0,54 /MWh for both natural gas and coal used for purposes other than motor transport
- New proposed directive would not distinguish between "business use" and "non-business use" as did the old directive
- But again, this proposal to renew the energy tax directive was not approved by member countries
- The original proposal is now outdated because of lower ETS prices;
- Finland included the proposed directive in its new law in 2010 prior to its formal approval, and the proposed directive remains not approved
- Finland set the energy tax and CO₂ tax at levels that well exceeded the minima set forth in the proposal to amend the directive

Finnish fuel/electricity tax reform from 2010

- Takes into account part of the structure of the renewal proposal by Commission in 2011
- KELA contribution for employers - € 830 million - abolished in 2010 - > fiscal need to increase energy taxes by € 730 million
- To avoid double CO₂ regulation of CHP production, the CO₂ tax of fuels used in CHP production would be reduced by 50% - no exception for ETS sectors
- Gradual increase in natural gas taxes 2011-2015
- Energy taxes were increased on fiscal basis, and there were concerns about the competitiveness of district heat vs. individual boilers when a lot of energy taxes were allocated to fuels to generate public revenue
- Basis of energy consumption tax was the level of tax on light fuel oil

Finnish fuel/electricity tax reform from 2010, contd.

- In 2010, new levels of CO₂ tax in Finland were calculated on the basis of € 30/tn CO₂ instead of € 20/tn CO₂ required in the draft directive of 2011
 - Whole reform of energy tax in 2010 based on this high value of CO₂
- Increases in taxation of natural gas to be implemented stepwise 2011-2015
- CO₂ tax increases to € 44/tn CO₂ effective Jan 1st, 2015
- In Finland, there is a double regulatory effect on CO₂ tax for CHP: 50% of CO₂ value at € 44/tn CO₂ + the actual quoted value of CO₂ € 6/tn CO₂ = € 28 tn/CO₂
- Energy intensive users of natural gas can obtain a tax refund according to energy tax refund system, but this does not apply to district heat
- Even after tax refund for CHP use, natural gas was not competitive vs. biomass and peat

Outcome of the Finnish energy and fuel tax reform of 2010

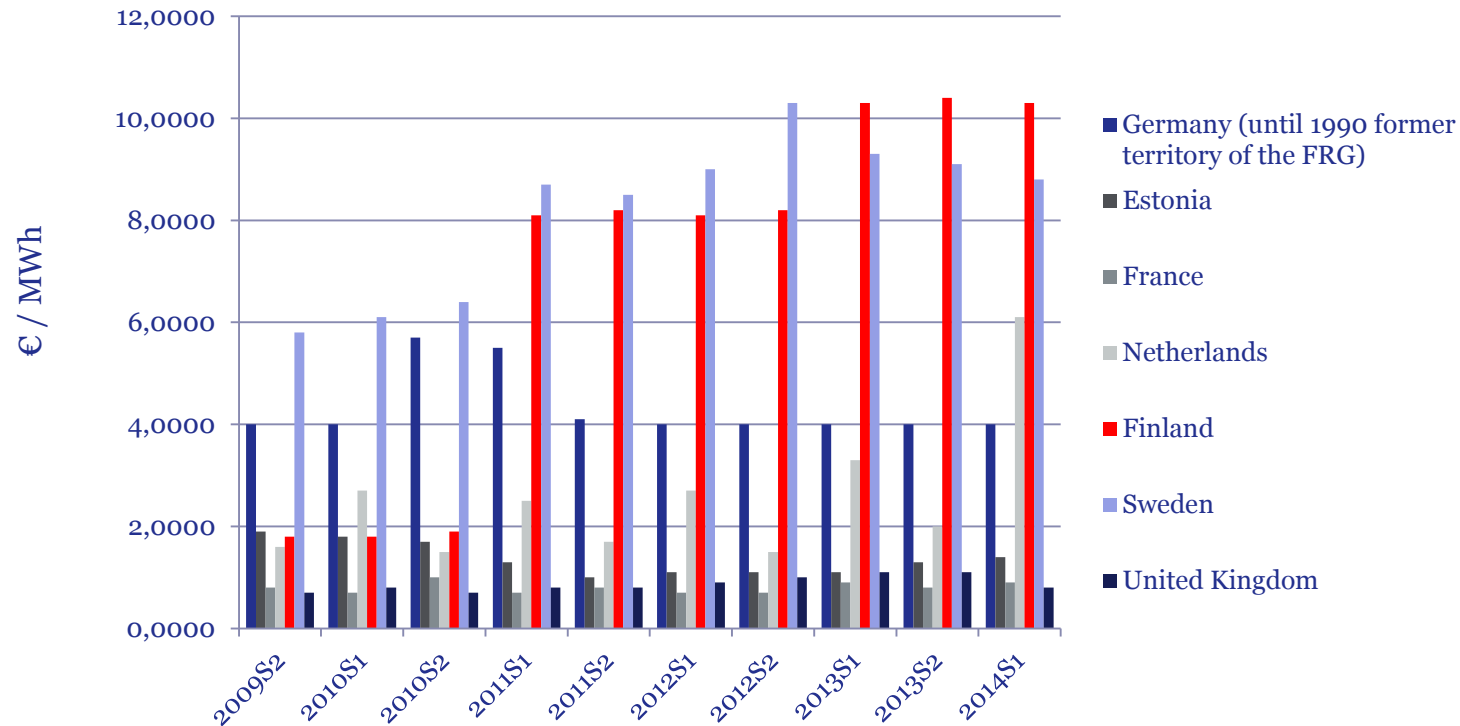
- After the design of the energy tax reform in 2010, coal prices (€ 14/ tn - > € 8/tn) and EUA prices (€ 20/tn CO₂ - > € 6/tn CO₂) have declined
- These price declines have favoured coal over natural gas
- Coal consumption within greater Helsinki has increased from 35% in 2010 to 45% in 2013, natural gas usage declined from 61% in 2010 to 52% 2013

Latest proposals by Commission on the amendment of Energy Tax Directive, discussed in summer 2014

- Acknowledges that EUA prices have declined, now minimum for CO₂ tax set according to € 4 /tn CO₂ for heating fuels (at € 12 /tn CO₂ for motor fuels)
- Minimum for energy tax component set at 0,72€/MWh for heating fuels (€ 9,35/MWh for motor fuels)
- Gradually increasing minimum tax levels from 2016 up to 2028
- Discussions ongoing...

3. Comparison of natural taxation in selected EU countries

Since 2010, Finnish taxes on natural gas are higher than in comparable countries **



**effective (i.e. not recoverable according to national recovery systems) taxes on natural gas in consumption band I4 in Eurostat statistics (28 GWh/a ... 280 GWh/a)

Tax levels in Finland 2014 without security of supply fee

Natural Gas	€/GJ	€/MWh	€/t
Propellant use	3,18	11,45	
Industrial/Commercial use	3,18	11,45	
Heating business use	3,18	11,45	
Heating non business use	3,18	11,45	
2015->	3,52	12,67	
Coal			
Heating business use	5,2	18,72	132,60
Heating non business use	5,2	18,72	132,60

- CO₂ tax for fuels used in combined heat and electricity production is lowered by 50%
- Tax recovery scheme for energy intensive industries, but not for CHP use in district heating
- Further increases agreed for 2015 : natural gas € 15,4 /MWh, coal € 21,8 /MWh

Tax levels in Sweden in 2014

	€/GJ	€/MWh	€/t
Natural Gas			
Propellant use	5,36	19,30	
Industrial/Commercial use	2,79	10,04	
Heating business use	2,79	10,04	
Heating non business use	9,31	33,52	
Heating business use Emission trading industry	0,78	2,81	
Coal			
Heating business use	4,05	14,58	103,28
Heating non business use	13,49	48,56	344,00
Heating business use Emission trading industry	0,76	2,74	19,38

- Sweden has excise taxes in fuels for nitrogen, sulphur, energy and carbon
- For manufacturing processes within the emission trading scheme
 - no CO₂-tax is applied
 - the energy tax rate amount to SEK 6,77 (EUR 0,78) per gigajoule for Gas and (EUR 0,76) for coal.
 - Generous tax recovery system for industry

Tax levels in the Netherlands in 2014

Natural Gas	€/GJ	€/MWh	€/t
0-170 000	5,39	19,40	
170 000-1000000	1,27	4,57	
1000000-10000000	0,46	1,66	
>10000000	0,33	1,19	
Coal			
Heating business use	0,53		13,52
Heating non business use	0,53		13,52

- Netherlands has a retail gas network and the high taxation at the low consumption levels is targeted for private and small customer base
- Stepwise taxation is not included in the new proposal directive, which favours national tax recovery schemes for industry susceptible for carbon leakage

Tax levels in Great Britain (Climate Change Levy) in 2014

	€/GJ	€/MWh	€/t
Natural Gas			
Propellant use	6,59	23,72	
Industrial/Commercial use	0,65	2,35	
Heating business use	0,65	2,35	
Heating non business use	0	0,00	
Coal			
Heating business use	0,72	2,61	18,45
Heating non business use	0	0	

- CCL (Climate Change Levy) is charged on the business use of energy and is designed to encourage businesses to become more energy efficient and thereby reduce greenhouse gas emissions
- CHP, green energy, private customers, charities etc. are excluded from the levy
 - Heating costs are a socially sensitive issue with old and less energy efficient housing stock, gas for heating has also VAT rate of 5%
- For energy intensive users, CCL is refunded in deductions in labor social cost

Tax levels in France in 2014

Natural Gas	€/GJ	€/MWh	€/t
Propellant use	0,39	1,40	
Industrial/Commercial use	n.a.		
Heating business use	0,39	1,40	
Heating non business use	0		
Coal			
Heating business use	0,33		8,42
Heating non business use	0		0,00

- If half of the fuel is renewable the VAT % is reduced to 5,5 % from 20 %
- Generally low level of taxation

Tax levels in Estonia in 2014

Natural Gas	€/GJ	€/MWh	€/t
Propellant use			
Industrial/Commercial use			
Heating business use	0,7	2,52	
Heating non business use	0,7	2,52	
Coal			
Heating business use	0,3	1,08	7,65
Heating non business use	0,3	1,08	7,65

- Energy taxation in Estonia is relatively low
- Almost all use of shale gas is protected from taxation by its use as fuel for electricity generation

Tax levels in Germany in 2014

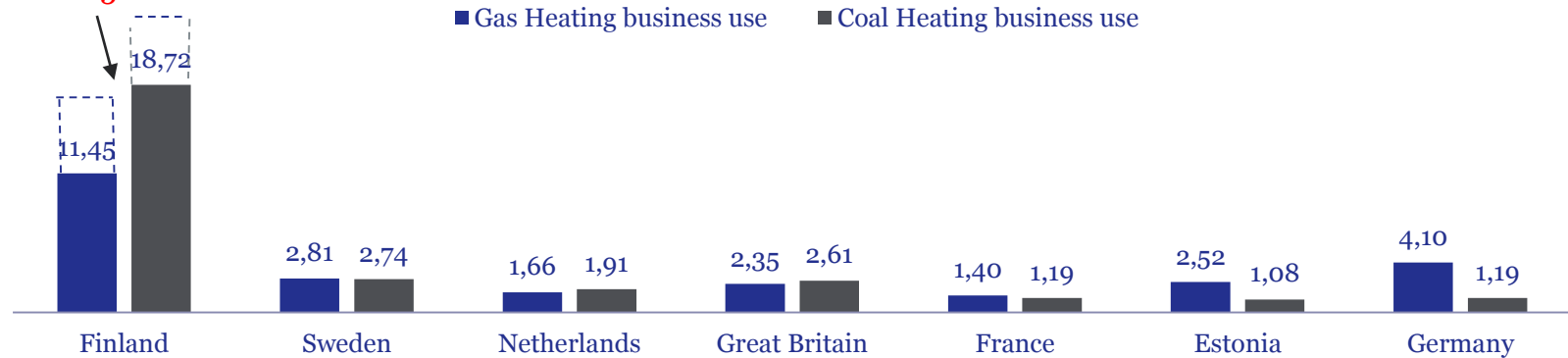
Natural Gas	€/GJ	€/MWh	€/t
Propellant use	3,86	13,90	
Industrial/Commercial use	3,86	13,90	
Heating business use	1,14	4,10	
Heating non business use	1,53	5,51	
Coal			
Heating business use	0,33	1,19	8,42
Heating non business use	0,33	1,19	8,42

- If overall efficiency in CHP district heating is over 70 %, it is possible to get tax recoveries from fuel taxes
 - Intended to favour CHP plants over individual house heating
- If corporations make an agreement of CO₂ reductions with government, they can deduct energy taxes from their employer costs (up to 95%)
- Note the decline in natural gas taxation in Germany over the last few years (slide 10)

Excise duty comparison before national tax recovery systems in 2014

Further increases
for 2015

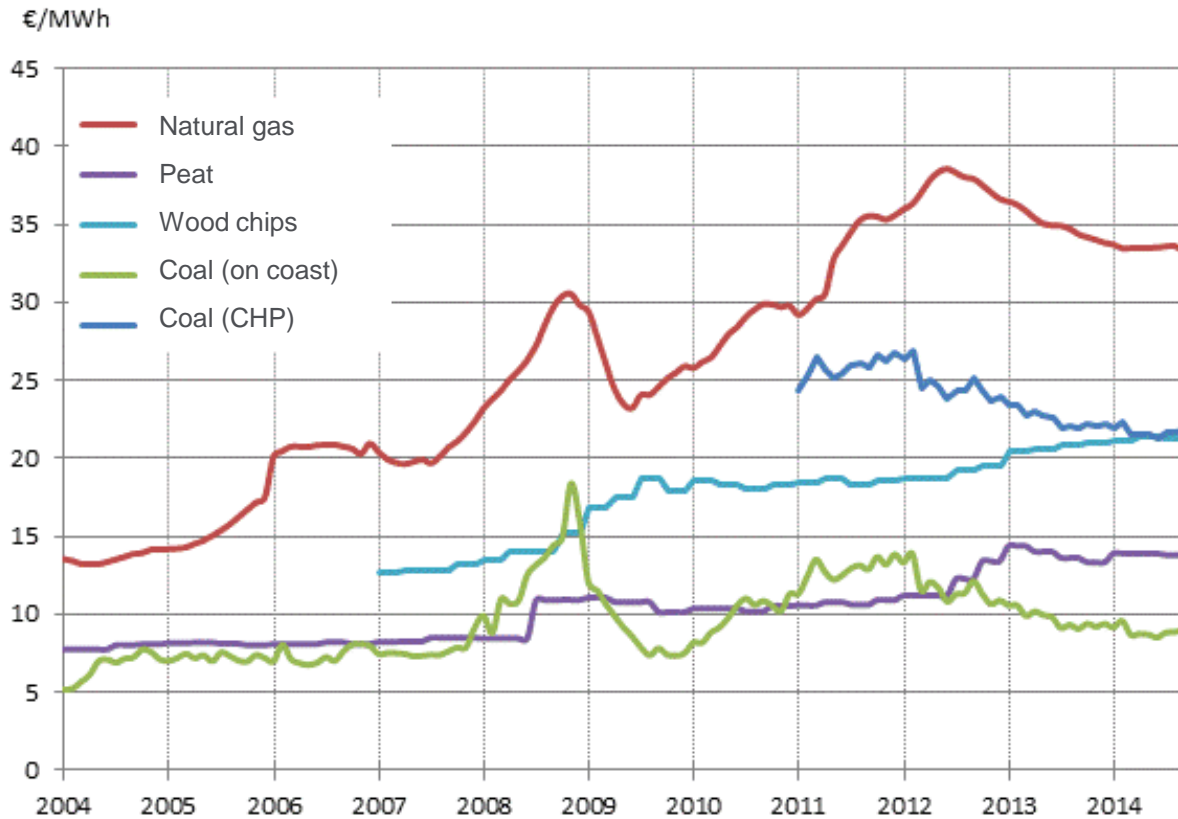
Excise duty €/MWh



- In taxation of heating fuels, Finland is on a level of its own
- Finland has even agreed further increases for 2015: natural gas to € 15,4 /MWh, coal to € 21,6 /MWh

4. Competitiveness of natural gas in Finland

Tax-free prices of power plant fuels for electricity generation 12/2014 in Finland – the difference in base prices for coal and natural gas is significant



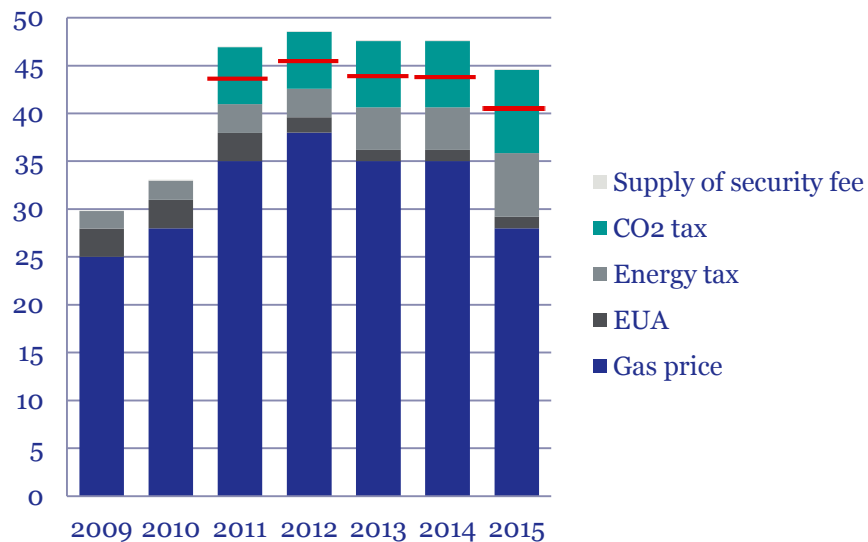
Finnish taxes on natural gas and coal in fuel are "fuel neutral" as required by the directive proposal from 2011 (without tax recovery)

	Natural gas Energy tax €/MWh	Natural gas CO2 tax €/MWh	Natural gas Supply of Security Fee €/ MWh	Natural gas Total €/MWh	Coal Energy tax €/MWh	Coal CO2 tax €/MWh	Coal Supply of Security Fee €/MWh	Coal Total €/MWh
2009	1,8	-	0,1	1,9	7	-	0,2	7,2
2010	2,0	-	0,1	2,1	7	-	0,2	7,2
2011	3,0	5,9	0,1	9,0	7,7	10,2	0,2	18,1
2012	3,0	5,9	0,1	9,0	7,7	10,2	0,2	18,1
2013	4,5	6,9	0,1	11,5	6,7	11,9	0,2	18,7
2014	4,5	6,9	0,1	11,5	6,7	11,9	0,2	18,7
2015	6,7	8,71	0,1	15,4	6,7	15	0,2	21,8
EU *** minimum for heating	0,7	0,8	-	1,5	0,7	1,4	-	2,1

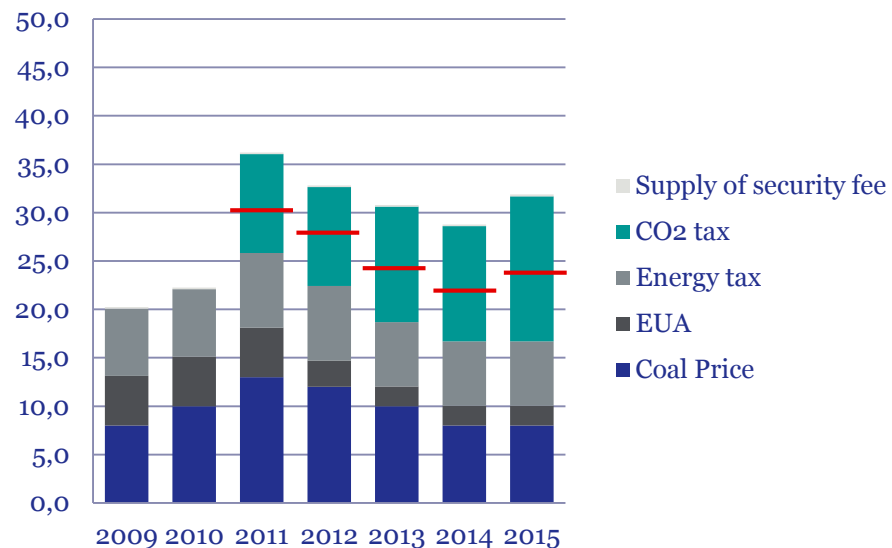
****Based on latest proposal for changes in the directive circulated by the presidency 30 April 2014, to be applicable from 2016 onwards for heating fuels

Finnish total costs of coal and natural gas /MWh for taxable purposes

Gas price €/MWh



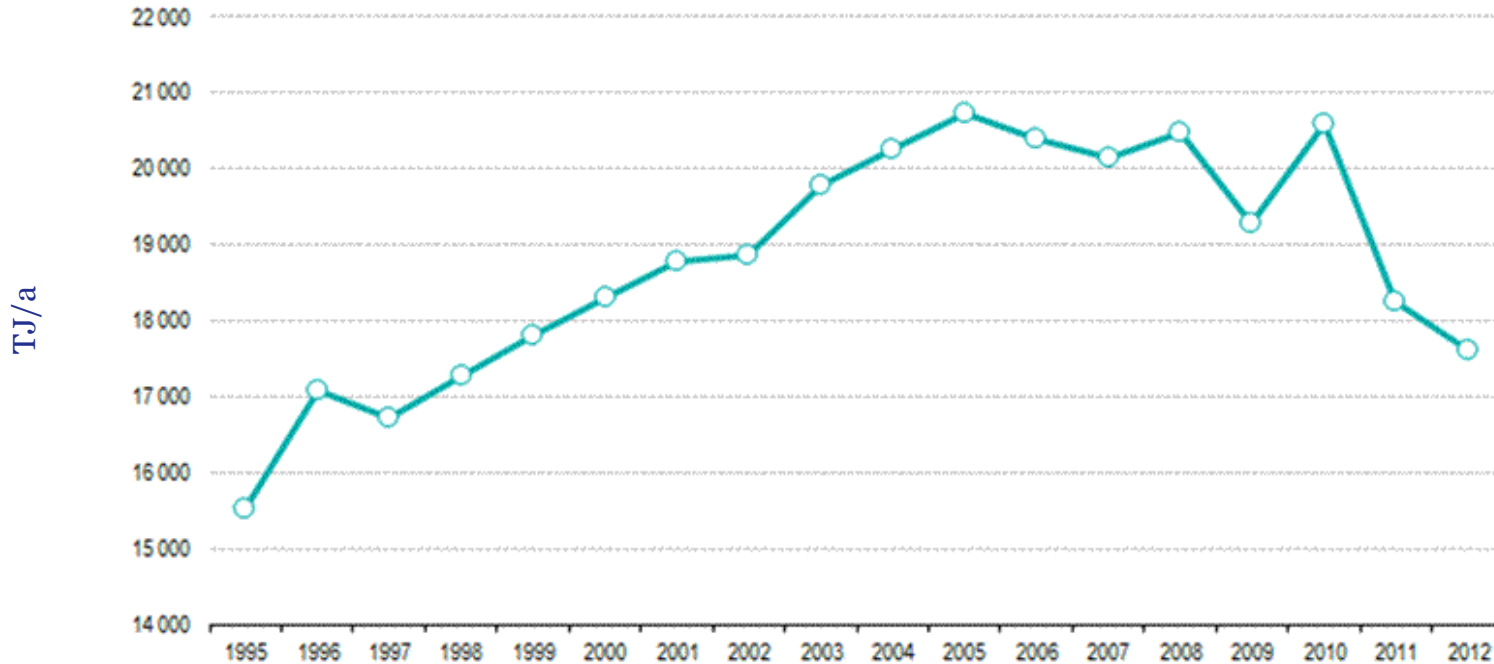
Coal price €/MWh



— = CO2 tax level after 50% reduction for CHP use

Source: Statistics Finland, Finnish Customs

European natural gas demand has declined during the last decade, mostly due to climate subsidies and high cost of natural gas

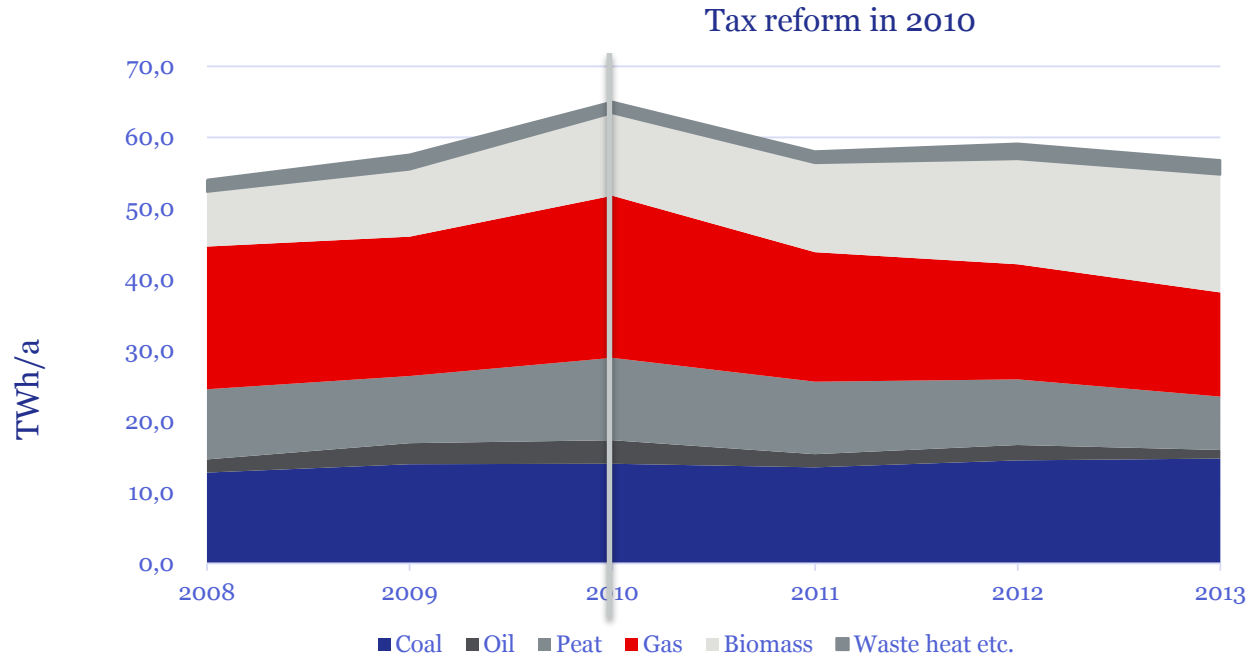


Provisional data for 2012

(¹) Due to confidential data, Bulgaria is not included in the EU-27 aggregate for reference years 2011 and 2012.

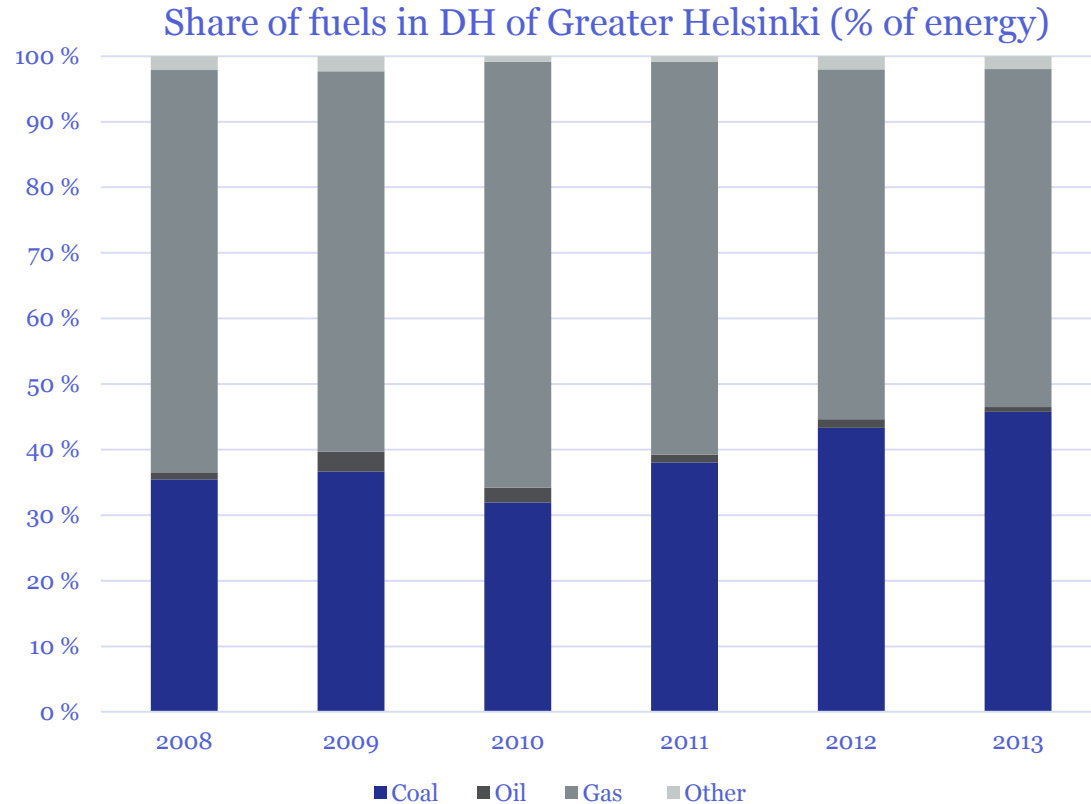
Source data: nrg_103m, nrg_124m, nrg_134m

Fuels used in district heating in Finland



- Tax reform has increased the use of biomass as intended, as new biomass based power plants are constructed
- The use of natural gas use has decreased significantly
- The use of coal has increased about 3% pa since 2008
- The use of coal is very resilient to tax increases because coal and EUA prices have decreased since 2010

Use of natural gas and coal in the district heating of Helsinki



- The share of coal in district heating of Greater Helsinki has actually increased from 35% to 45%
- The share of natural gas has decreased from 61% to 52%

5. Ideas for changes in natural gas taxation

Ideas for changes of natural gas taxation

NATIONAL IDEAS FOR THE SHORT TERM

1. More intensive energy tax return system for energy intensive customers (compare to Sweden)
2. Changing the 50% rule of relief on CO₂ tax on fuels used in CHP production, probably to fixed tax relief $x \text{ €/MWh}$ would be better
 - It is not fair that the more CO₂ is emitted, the more one gets relief on CO₂ tax
 - Tax relief for the use of coal is higher than for natural gas
3. Stepwise taxation based on the amount of natural gas consumed
 - Favouring large customers as in the Netherlands
4. New tax on sulphur and nitrogen emissions from fossil fuels
 - This is an older tax form from Sweden, but may be superfluous on the normative regulation in the new IE Directive, and biomass and forest industry would need to be excluded

Ideas for changes of natural gas taxation, contd.

5. Tax reduction based on overall efficiency of gas-fired power plant or electricity efficiency
 - As in Germany where the limit for total efficiency is 70% to receive tax credits
6. Generally lower CO₂ tax and energy tax levels
7. More efficient energy tax recovery also for DH-CHPs

LONG TERM IDEAS FOR EU LEVEL

8. Creating a tax system for condensing power generation at EU level (taxing condensing heat)

6. Recommendations and calculation examples

Current fiscal situation does not promote tax reductions for energy tax structures of proposed energy tax directive need to be followed

- Government budget deficit estimated 2,6% of GDP for 2014
- New cabinet needs to adjust public finances towards prudent public spending and economic growth
 - Tax cuts more likely in sectors affecting external competitiveness directly through labour costs
 - General tax reduction for energy products unlikely
- Politically achievable solutions for energy taxes depend on the composition of future government coalition
- Proposed changes must be expected to be neutral for public tax revenue
- The new tax regime must remain compliant with proposed changes to energy tax directive

Recommended proposal for improving the position of natural gas

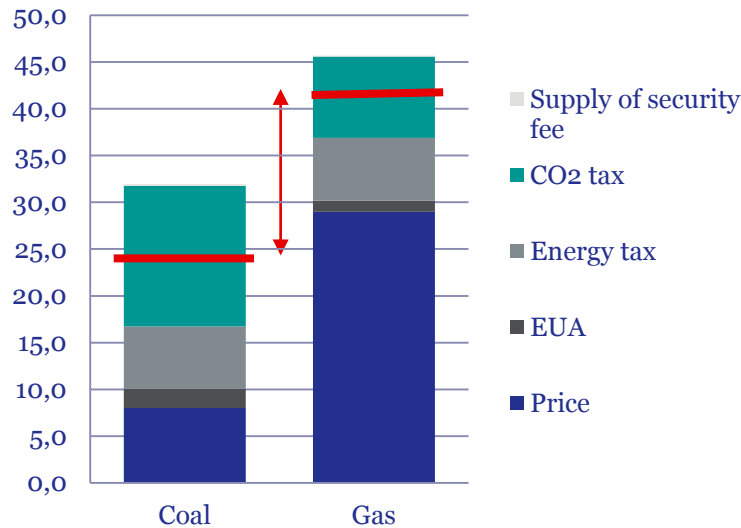
- Changing the rule for 50% tax recovery for CO₂ tax in CHP production
- **Proposed change: stepwise, fixed recovery of the CO₂ tax according power to heat ratio (“P/H”) of CHP power plant**
 - This change would give precedence to gas fired CHP power plants that generate electricity most efficiently in district heating and industrial use
 - E.g. P/H = 0,45 (coal) - > recovery € 2/MWh, P/H = 0,95 (gas) -> recovery € 7/MWh
 - Would eliminate the rule of ”most CO₂ recovery for fuels that emit the most CO₂”
 - CO₂ tax for natural gas would remain above the level of minimum EU level
 - Would recognize the lower SO_x, NO_x and particle emissions of natural gas
 - Power-to-heat ratios proposed above are based on Energy Efficiency Directive (2012/27/EU)
- Proposed change in the ”50% rule” is expected to be fiscally relatively neutral
 - CO₂ tax level of coal would remain higher and these fuels can replace each other in most consumption areas
- Would not jeopardise future investments in biomass

Expected change in competitive position of natural gas and coal after recommended tax change (expected 2015 fuel price level)

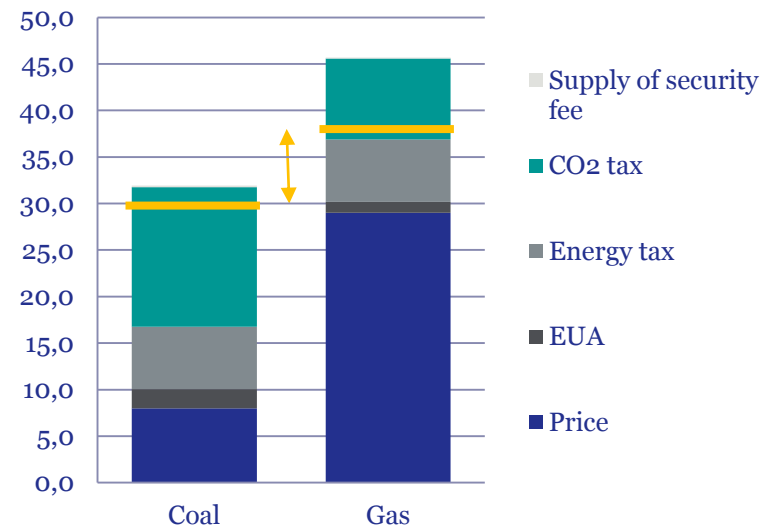
Current situation with 50% refund from CO₂ tax in CHP use for both fuels

Expected competitive position after proposed change in CO₂ tax

Price €/MWh



Price €/MWh



- After current rule of 50% recovery of CO₂ tax for fuel used in a CHP
- After proposed stepwise recovery of CO₂ tax for fuel used in a CHP

The tax change would not significantly affect the fiscal revenues

TAX REVENUE IN CURRENT SITUATION, € million

	energy tax	CO2 tax	total
Coal in CHP production	80	90	170
Natural gas in CHP production	80	52	131
Coal in heat-only boilers	4	9	14
Natural gas in heat-only boilers	19	25	45
Total tax revenue	183	176	359

TAX REVENUE IN PROPOSED NEW SITUATION

	energy tax	CO2 tax	total
Coal in CHP production	80	155	235
Natural gas in CHP production	80	20	100
Coal in heat-only boilers	4	9	14
Natural gas in heat-only boilers	19	25	45
Total tax revenue	183	210	393

- Assumed tax revenues based on usage of coal and natural gas in Finnish district heating in 2013
- Tax rates for year 2015 applied
- Tax changes will change some coal usage to natural gas, but this effect is not included
- After proposed tax changes, the fiscal effect is assumed to be neutral

Other options for change

- Stepwise taxation favouring larger consumers of natural gas
 - May be contrary to proposals to renew the energy tax directive
- Lowering the general level of taxation
 - May be fiscally unattractive in current political climate
 - Would also benefit coal

Appendix: power-to-heat ratio in Energy Efficiency Directive

- Power-to-heat ratio equals the the ratio between electricity from cogeneration and useful heat when operating in full cogeneration mode
- If measured power-to heat-ratio is not known, the following may be used as approximations according to the Energy Efficiency Directive
- Power-to-heat ratio is mstly based on thermodynamic characteristics of a CHP plant

Type of the unit	Power-to-heat ratio
Combined cycle gas turbine with heat recovery	0,95
Steam backpressure turbine	0,45
Steam condensing extraction turbine	0,45
Gas turbine with heat recovery	0,55
Internal combustion engine	0,75

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