Sweden's tax model approach for implementation of Article 7- EED1 and EED2

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Yeasmin Sayeed, Ph.D

Economist and policy analyst

Swedish Energy Agency

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The starting point - Annex V

Credit shall only be given for energy savings from taxation measures exceeding the minimum levels of taxation applicable to fuels as required in Directive 2003/96/EC (Energy tax) or in Directive 2006/112/EC (Value-added tax)

Recent and representative official data on price elasticities shall be used for calculation of the impact.

Sweden’s approach to energy efficiency

To address market imperfections and energy efficiency goals Sweden applies different *complementary* policy instruments

- The foundation for Swedish energy efficiency policy is the tax on energy and CO2 emissions and EU-ETS as general economic instruments (price signals are the core policies). These policy instruments are complemented with
- -Energy performance regulations

  -Informative instruments

  -RD&D, including technology deployment

  -The mix is needed

  -We currently have over 10 specific policies for energy efficiency

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Energy and carbon taxes

- Energy taxes introduced in 1950's
- A CO_2 tax was introduced in 1992
- Since 1991 a central policy tool in energy and climate policy
- Taxation of energy use *and* emissions of CO_2
  - an energy tax targets excessive use of any energy while a CO_2 tax favours energy causing less or no emissions of CO_2
- Adjusted yearly with Consumer Price Index (CPI)
- Adjustment is made with GDP growth annually
- Increased several times, changes are made regularly;

Energy and carbon taxes

- The general level of the CO_2 tax has been increased several times and is currently 1.14 SEK/kg CO_2
  - 1998-2020 petrol and diesel taxes up 10% and13 % respectively. In line with climate targets
  - 1998-2020 electricity taxes up 16 %
  - 2018 petrol and diesel taxes adjusted (introducing of reduction obligation scheme)
  - Industry has many tax exemptions – alternative energy policies are used Trend of reducing exemptions

Sweden's approach for Article 7

- Energy use becomes more expensive as a result of energy and carbon taxes
- Tax induced price increases incentivise energy efficiency measures
- However, when these price signals (higher taxes) might not be sufficient then complementary policy instruments are adopted
- High possibility for double counting to occur if the saved energy due to different policy instruments are added up together

Motivation behind the tax model approach

- To avoid double counting, effects of all policy instruments combined are calculated as if effects from taxes only – conservative
- Swedish energy efficiency policy is based on increasing prices through different general economic instruments.
- Efficient price signals lead to different measures for energy efficiency
- Low cost and administration for calculations
- Most in line with our policy approach for energy efficiency
  - Taxes are the core instrument
- We report all energy efficiency policies

Calculating effects of different policy instruments

- Taxes: top-down
- Regulations, informative instruments etceteras: bottom-up

Challenges:

- Combining top-down and bottom-up calculations
- Avoid double counting

An overview of our current tax method for EED1 and EED2

- Counterfactual analysis: What if MS would lower tax levels to EU minimum tax levels
  - energy taxes
  - VAT
  - $\Delta P=(p+ET_{MS})\ VAT_{MS} - (p+ET_{EU})\ VAT_{EU}$
- Energy saving that might be accounted for is the savings due to price differences between Sweden and EU minimum tax levels including VAT.
- In a simplified form:

- Energy saving = price elasticty(Swedish tax level – EU min. tax level)* final energy consumption*

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Relevant indicators and parameters

- **Elasticity**: measures comumers' responsiveness as a result of price (tax) changes
  - Short term model (dynamic). Direct effects. Tax differences between two years. Usually means using short term elasticities
  - In time the short run elasticity will converge into the long run elasticity. Usually the effects increase over time
  - A tax change will give new actions up until a new steady state is reached
  - Price signals are maintained by upgrading CPI
  - Long term model (steady state model). Effects are estimated for long time periods. Usually using long term elasticities
- A tax model makes no assumptions regarding type of measures, lifetimes etc

New price elasticities for residential and transport sectors in Sweden

- **New price elasticities (data 1975-2017) were** estimated for residential and transport sectros for EED2 calculations
- **”Dynamic” models for Housing** (electr.) **and Transport** (petrol, diesel)

elasticities	L. R.	S.R.
Res & serv	-.52	-0.11

A 10 percent increase in price will cause 5.2 percent decrease in energy consumption in the long run

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Elasticities for Petrol and Diesel

	L. R.		S. R:	
	Petrol	Diesel	Petrol	Diesel
Petrol	-1.15	0.51	-0.31	0,000
Diesel	0.68	-0.51	0.014	-0.04

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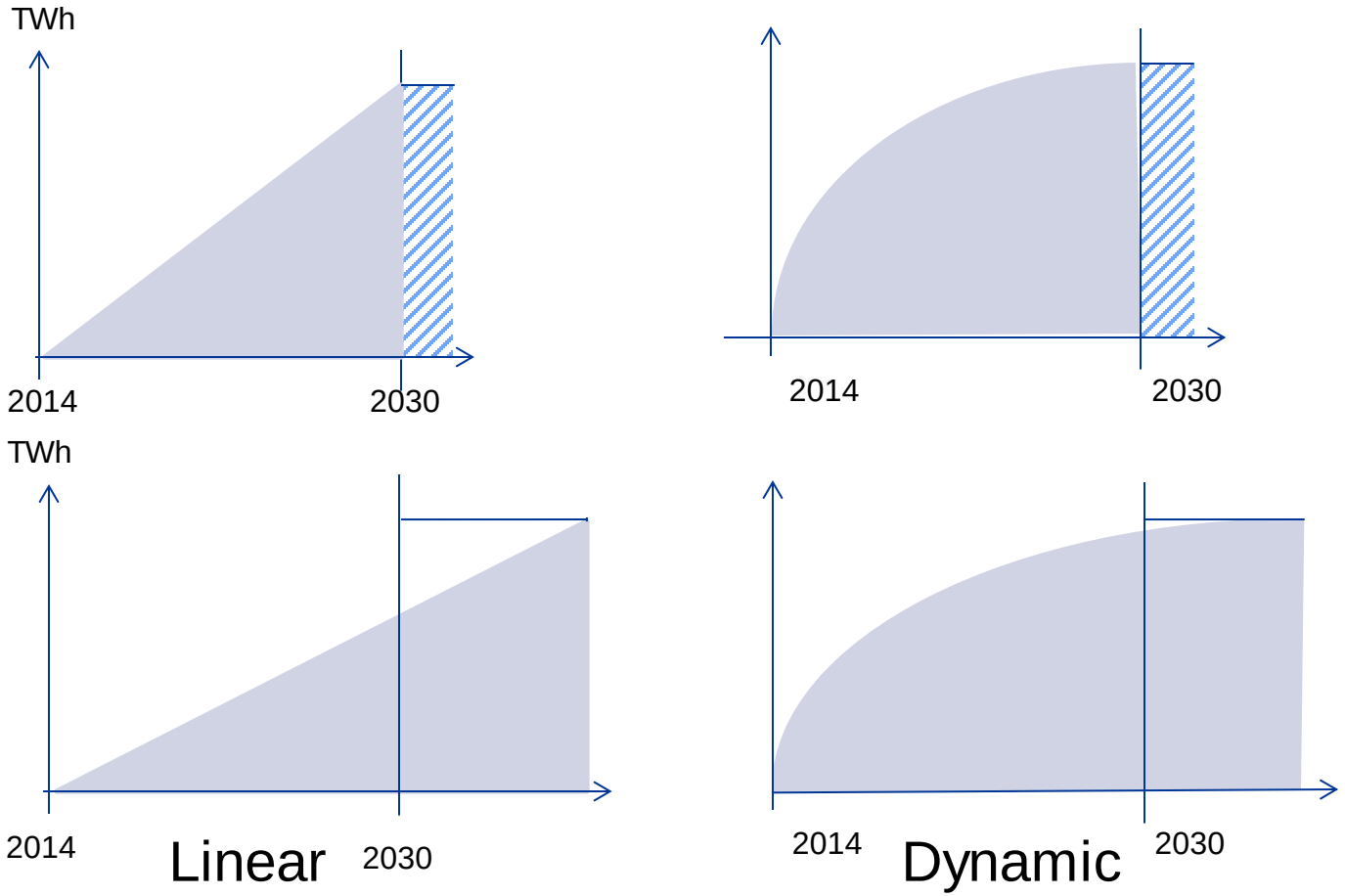
How to use price elasticities when calculating cumulative effects?

- Model effects dynamically, as far as possible, accounting for short and long term elasticities and cross elasticities
- Effect is increasing each year, and cumulates, until full effect is reached
- If dynamic modelling not possible, use ”linear” increase anually, assuming:
  - short term effects
  - when full effect is reached

Paths to full effect



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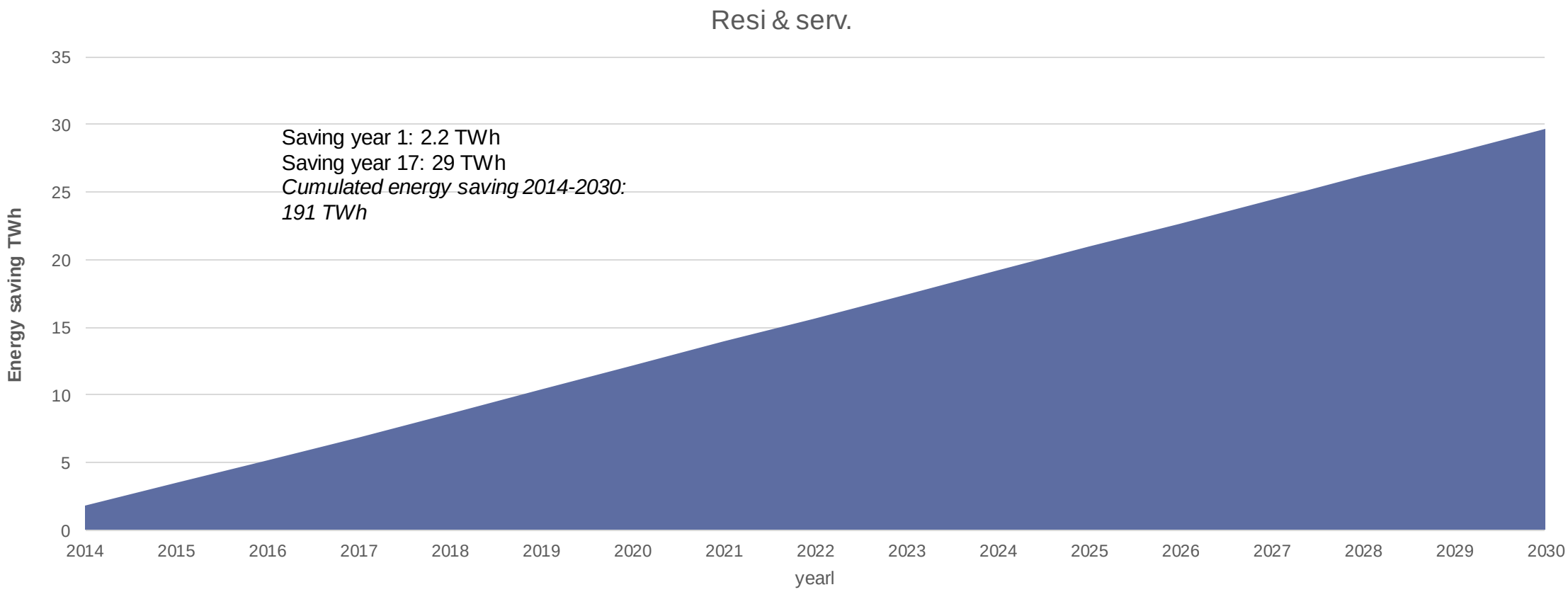
Simulations steps

- Start 2014 (steady state). Real energy end use, prices, taxes & VAT
- A fictive tax & VAT reduction to EU minimum levels
- Counterfactual levels of energy end use are calculated by multiplying with relevant short and/or long term elasticities
- For 2018-2030 forecasted energy prices, taxes & VAT are used to estimate energy end use
- End 2030. ”Full” effect = simply when to stop counting. Not a new steady state

Indicative results: Residential and services



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Indicative results: Energy savings and gap to obligation

	2014-2030	2014-2020	2021-2030	EED1-oblig	GAP EED1	EED2-oblig	GAP EED2
Res. & serv	195,1	79,8	115,3				
Transports	82,0	36,3	45,7				
Total	277,2	116,2	161,0	106	10	165	-4

For EED, we do not consider industry and agricultural sectors, VAT in both sectors, updated data, some assumptions regarding forecasts and simplification of method
- Tax differences compared to EU min levels are about +40-50 % for transport fuels and electricity for non-commercial use.
- VAT on total energy price varies, but often 25 %. Higher than EU min. often 15%

To summarize

- Our best choice for implementation of Article 7
  - Calculations are in line with requirements and vice versa
  - Taxes are the core in our broad policy mix for energy efficiency
- Low calculation costs and administration compared to using bottom up policies

Previous Experience

- Intensive work with estimations and simulations
- Networking with energy demand modelling experts
- Expertise requiring data analysis software

Thank you for your attention

Yeasmin Sayeed

Economist and policy analyst
Swedish Energy Agency
(Energimyndigheten)

yeasmin.sayeed@energimyndigheten.se

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