

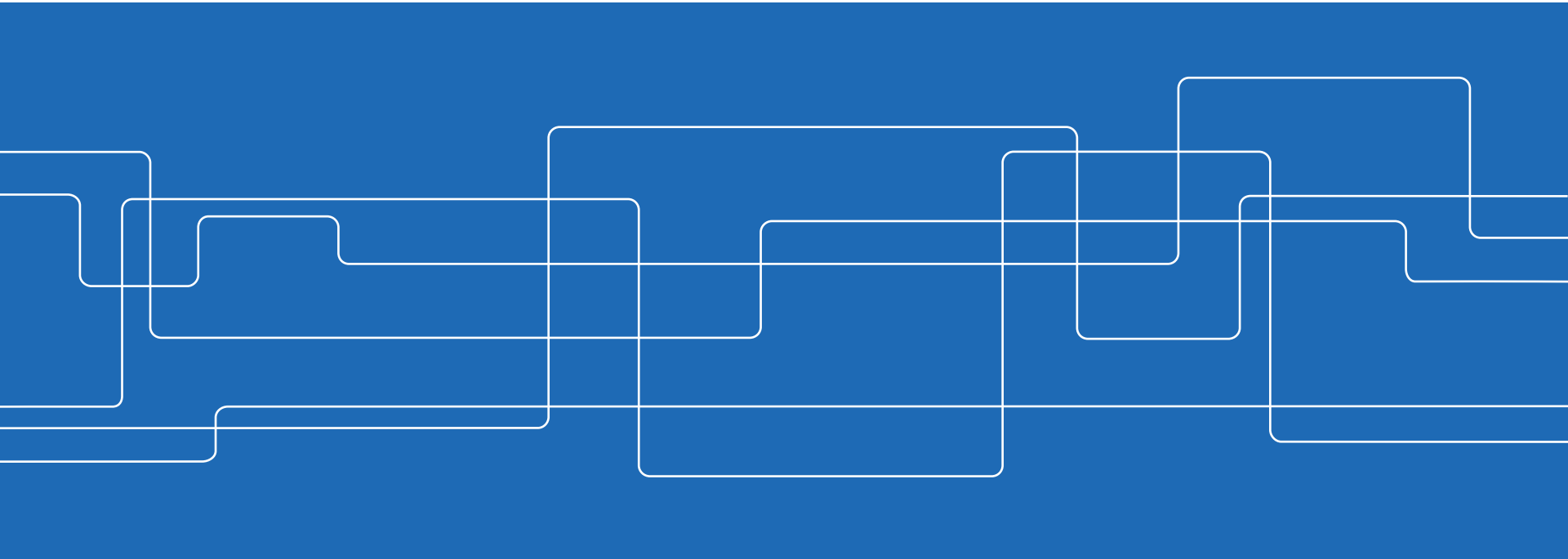


# Potential energy efficiency improvements in Swedish energy intensive industries using an Energy Efficiency Obligation Scheme

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# Swedish policies for industrial energy efficiency

- Sweden decided to use increased taxation and voluntary agreements for reaching EED targets and **not** an EEOS
- Swedish Energy Agency estimates cumulative energy savings of 15.36 TWh/year until 2020 (**11.99 TWh/year** for EU ETS sectors)
- Method for energy savings calculation is questioned (linear model used)
- Previous studies calculated that energy savings of **17.5 TWh/year** needed to reach 2020 targets for industry



## Program for Improving Energy Efficiency (PFE)

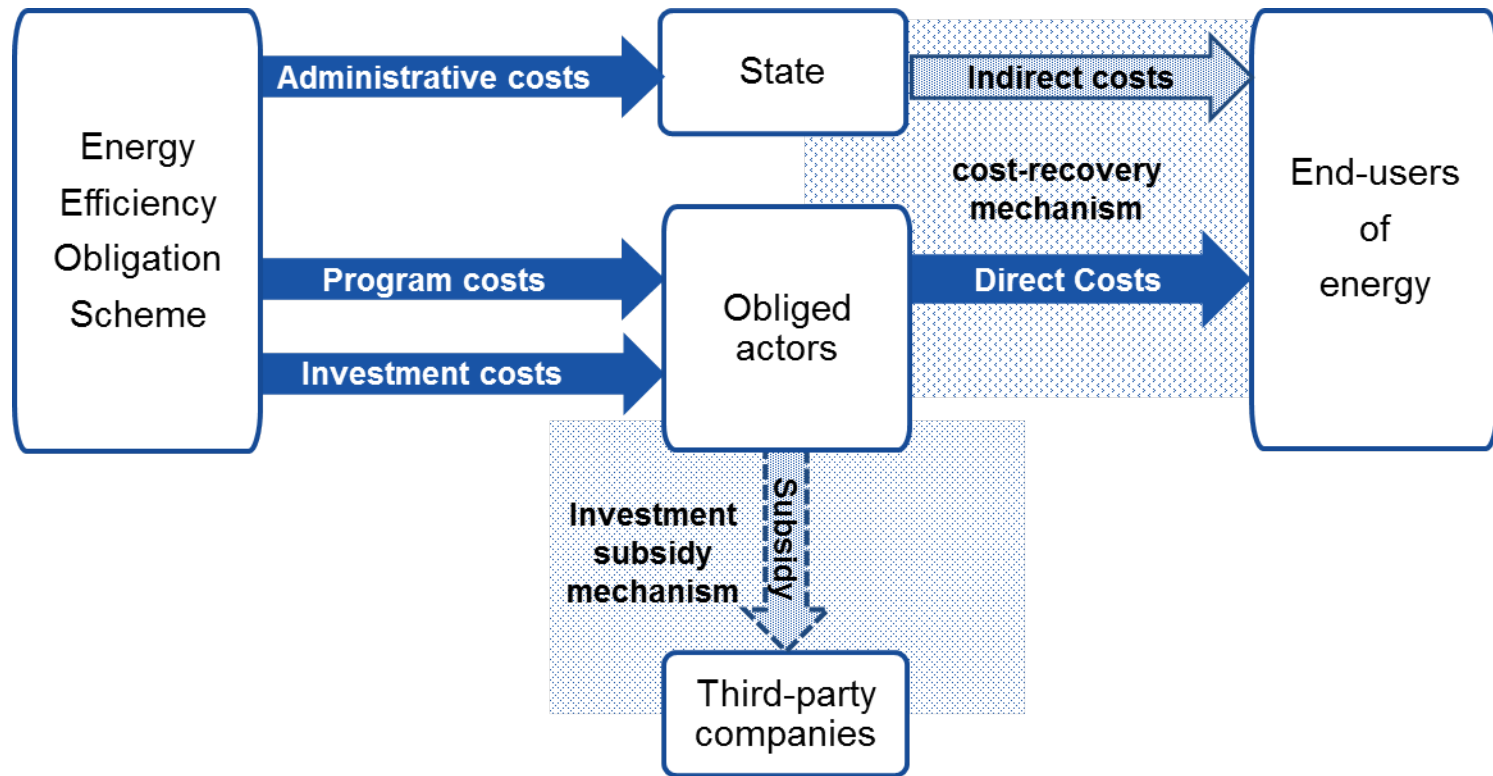
- Tax exemptions for participating energy intensive industries delivering electricity savings
- New PFE will include more energy carriers – **incentives yet unclear** (tax exemptions against EU regulation)
- National Audit Office report: doubtful whether PFE has contributed to significant energy savings
- **”Low-hanging fruits”** have been reached, voluntary agreement not challenging enough for the industries

# Is the energy savings potential fully exploited?

Industrial sector	Cumulative energy savings potential by 2020 (TWh/year)	
Iron and Steel	1.45	
Non-ferrous metals	0.27	
Chemicals	0.57	
Non-metallic mineral products	0.24	
Pulp and paper	13.90	current instruments
<b>Total</b>	<b>16.43</b>	<b>11.99 TWh/year</b>

*based on secondary data from Fraunhofer ISI (2009) and Eurostat (2013)*

# Energy Efficiency Obligation Scheme (EEOS)



# EEOS and barriers to energy efficiency

Barrier to energy efficiency	Definition	EEOS potential impact
<b>Lack of information to companies and financing institutions</b>	<p><u>Companies:</u> Lack of awareness, perceived investment risks and unclear benefits.</p> <p><u>Financing Institutions:</u> Lack of experience, time and resources for financing investments.</p>	<p>Increased awareness. Stimulation of energy market.</p> <p>Consultant services fostered by public entities and obligated actors.</p>
<b>Long marketing cycles of energy efficiency investments</b>	Slow access to commercially viable financing, scarce investment-ready projects.	Sharing technical knowledge, lower administration costs in EEOS.
<b>High upfront costs</b>	Large initial capital requirements.	<p>Risk allocation between public entities and companies.</p> <p>Mobilization of funds.</p> <p>Third Party Access (TPA).</p>



# EEOS: experiences from EU Member States

- EEOS cost-effective in Denmark, France, and Italy
- Investment costs have **short payback periods**
- Danish EEOS particularly successful among industries
- Specific instruments for encouraging energy savings in industries—**awareness** (consultant services, subsidies etc.)
- Industrial energy savings **attractive**: large energy efficiency improvements with reduced administration costs.

# Policy pathways for industrial energy efficiency

## Path 1: Improved existing instruments

- current Swedish plan
- PFE improved to achieve EU targets

## Path 2: Improved existing and market-based instruments

- combined voluntary agreements - EEOS
- small-scale EEOS can be formed (facilitated by EED)
- evaluation mid-way to 2020

## Path 3: Regulatory and market-based instruments

- EEOS implemented full-scale
- industries act as third parties of the scheme
- incentives remove financial barriers

## Path 4: Broad energy efficiency instruments implementation

- synergies between multiple instruments
- EEOS, energy management, ECO-labeling, energy efficiency funds, financing support scheme



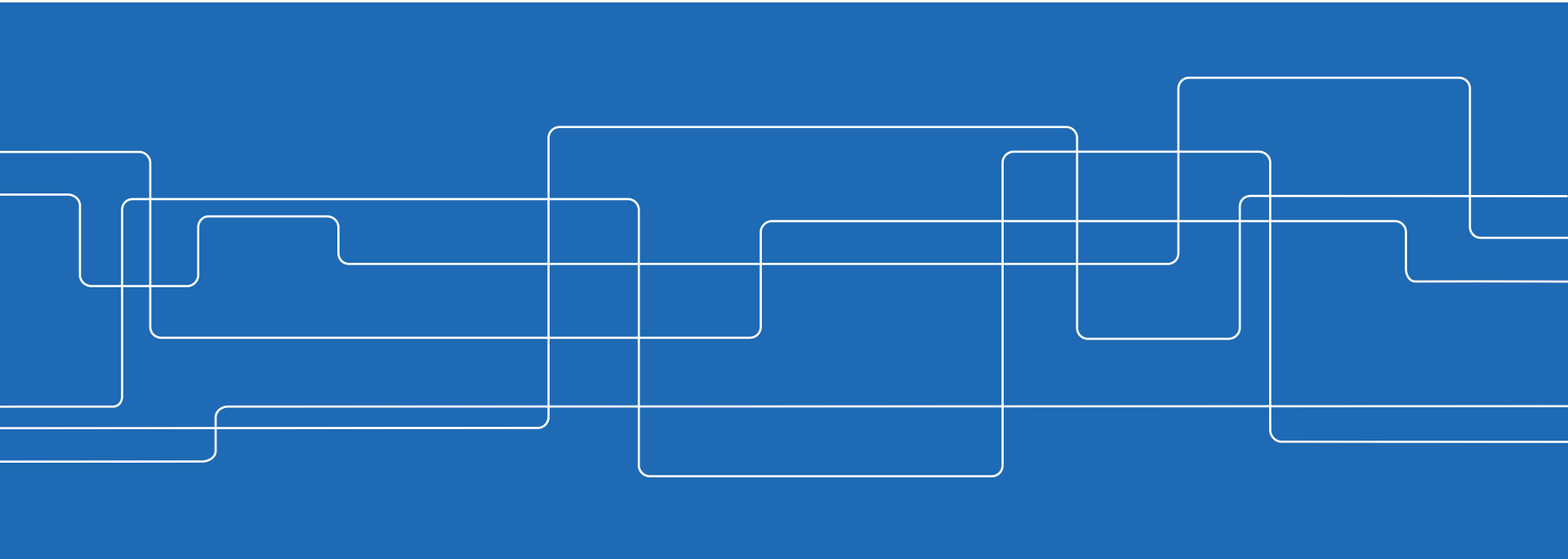


# Concluding remarks

- Industrial energy savings potential not fully exploited by current policy instruments in Sweden
- An EEOS could **tighten** the energy savings commitment and **stimulate** the energy services market
- Short-term policies result in large investment risk – need of a **long-term energy efficiency strategy** for low energy costs and global competitiveness
- Swedish industries request **coupling of energy, climate, and growth targets**



# Supplementary Information





# Future Work

- In-depth analysis of pathways to industrial energy efficiency for Sweden (costs and benefits)
- Evaluation of the EEOS effect within pathways
- Multi-criteria approach ( potential energy savings and their environmental effect, economic efficiency, technical changes)
- Legal, financial and social driving factors to industrial energy efficiency



# Energy efficiency targets and challenges

- European Commission: the 2020 goal of 20% reduction of primary energy use **will not be reached** because the energy efficiency targets are not binding.
- The **Energy Efficiency Directive (EED)** can push toward energy efficiency improvements across Member States.
- Major challenge for policymakers is **combining economic growth with changes of the energy market**, particularly for the industrial sector.
- Industries and national authorities are hesitant in adopting more aggressive measures for industrial energy efficiency (***energy efficiency gap***).



# The new PFE – discussed incentives

- Increased electricity tax for non-participating companies (Swedish Energy Agency's proposal)
- Investment grants – reduced payback times (complicated regulatory framework)
- Support for energy audits
- Government loans with lower interest rate / longer terms (against EU regulation)
- Reduction of social security contributions for employees (highly unlikely to happen but discussed)

# Sweden's Plan for EED Article 7 implementation

**Table 8.** Annual and cumulative energy savings in the industrial sector

Year	EU ETS			Non-EU ETS		
	$\Delta$ energy TWh/year	$\Delta$ energy %	$\Delta$ energy TWh Cumulative	$\Delta$ energy TWh/year	$\Delta$ energy %	$\Delta$ energy TWh Cumulative
2014	0.43	0.6	0.43	0.049	0.2	0.049
2015	0.86	1.3	1.29	0.098	0.4	0.15
2016	1.28	1.9	2.57	0.15	0.6	0.29
2017	1.71	2.5	4.28	0.20	0.8	0.49
2018	2.14	3.2	6.42	0.24	1.1	0.73
2019	2.57	3.8	8.99	0.29	1.3	1.03
<b>2020</b>	<b>3.00</b>	<b>4.5</b>	<b>11.99</b>	<b>0.34</b>	<b>1.5</b>	<b>1.37</b>

*Ministry of Enterprise Energy and Communications, 2013.  
Plan for implementation of Article 7 of the Energy Efficiency Directive.*