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Evaluating the Polish White Certificate Scheme

Jan Rosenow
Tadeusz Skoczkowski
Arkadiusz Węglarz
Wojciech Stańczyk

Warsaw University of Technology

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Presentation Outline

- Energy Efficiency Acts (2011 and 2016)
- White Certificate System (WCS) Overview
- WCS results
- Lesson learnt
- Recommendations

Energy Efficiency Acts

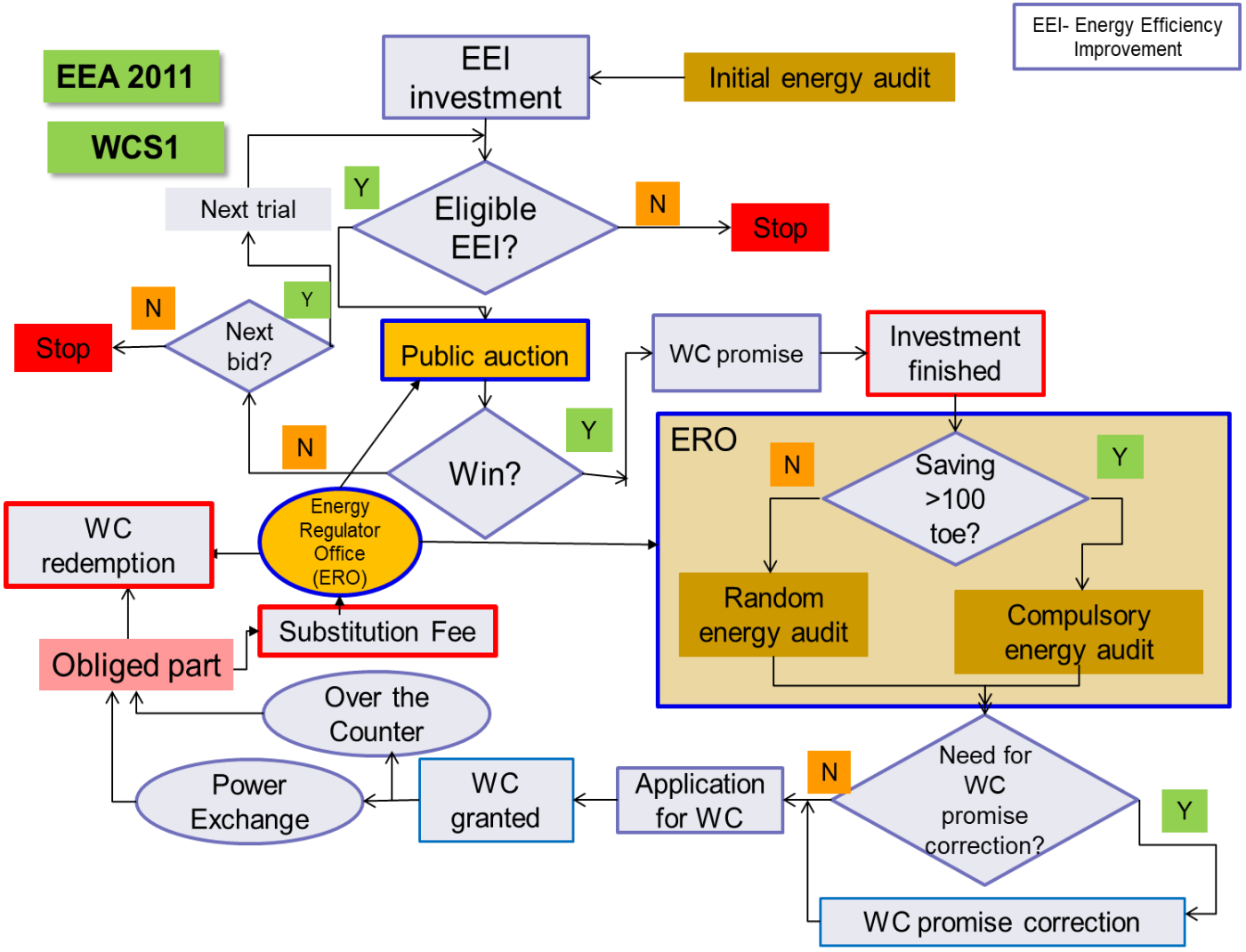
- **Directive 2012/27/EU - Energy Efficiency Directive** (EED), requires each Member States (MS) to set up energy efficiency obligation (EEO) scheme or alternative policy measures;
- In Poland the EEO was implemented in the form of the **White Certificates System (WCS).** The system was introduced into the Polish legal system by the Energy Efficiency Act of April 15, 2011 (EEA1) as a market based mechanism favouring enhancement of energy efficiency measures;
- WCS1 was in operation since 1 January 2013. Envisaged to end 31 March 2016;
- On 29 December 2015 EEA1 extended till 31 March 2017;
- WCS1 was **radically revised** by new EEA2 of May 20, 2016 which introduced WCS2 (since 1 October 2016)

New Energy Efficiency Act (2016)

EEA 2016

- WC will be granted only for planned energy efficiency investments or finished after the 1st January 2014;
  - Auctioning system removed; continuous and permanent call for energy saving investment introduced;
    - WC will be granted to everyone who implements energy efficiency measure;
- The value of WC is determined in final energy;
- EU ETS installations are covered by the scheme;
  - EU ETS included and eligible
- EEA includes provisions which gradually will phase out the possibility to pay the substitution fee instead of carrying out the energy efficiency investments;
  - eligibility of paying substitution fee will be steadily limited, i.e. 30% in 2016; 20% in 2017; 10% in 2018
  - substitution fee will be increased by 50% in 2017; then by 5% annually
  - possibility to meet the obligation by paying a substitution fee has been limited only to situation when there is not enough WC in the market; the value of substitution fee has been significantly increased;

Simplified flowchart of WCS1

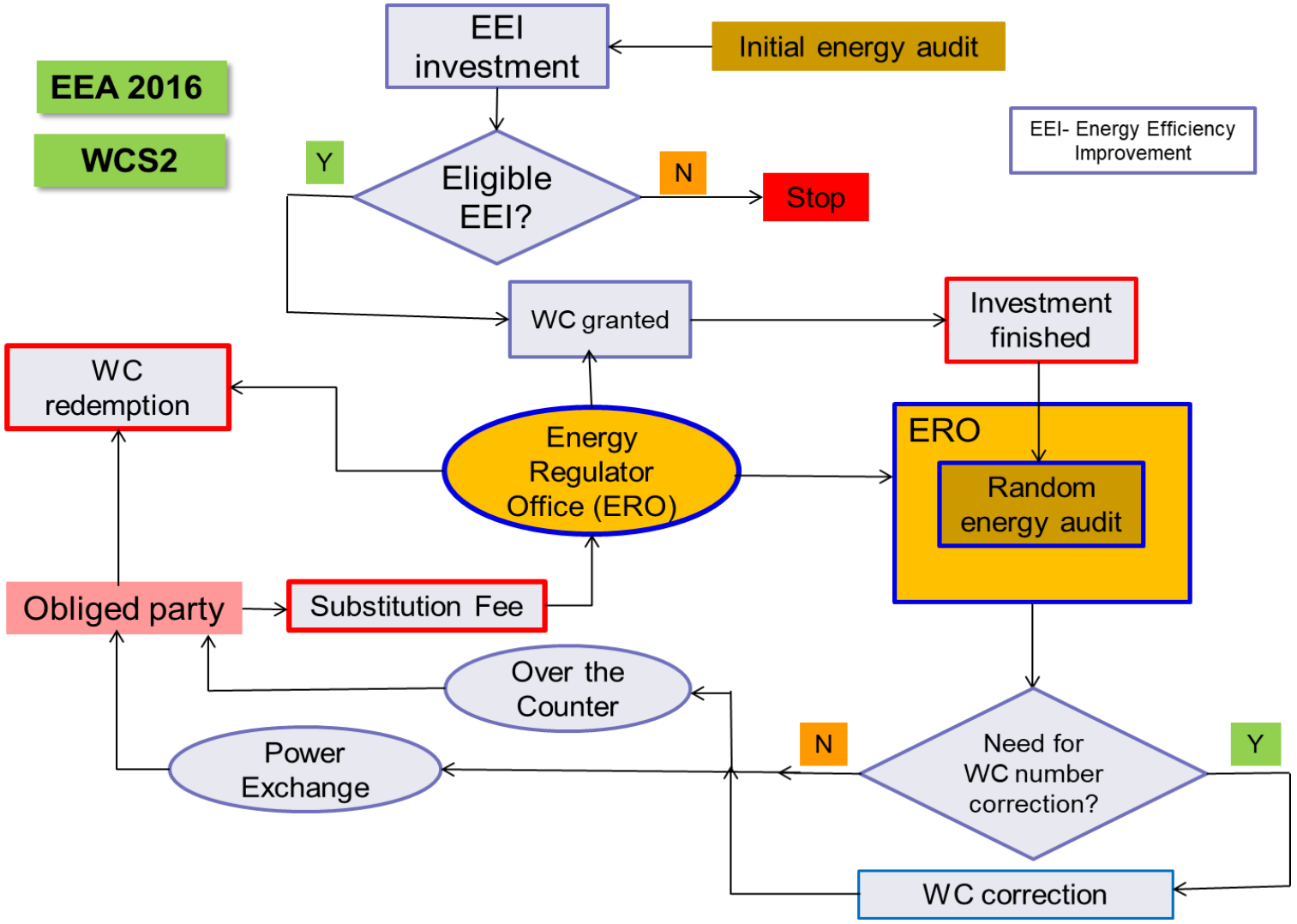


Reasons for redesign

Necessity to implement EED into Polish law

- formal procedure of application for WC is very complicated and confusing; high business risk
- no possibility to correct formal mistakes in the process of application;
- short time after the announcement of the tender to the day of submitting complete applications (30 days);
- long procedure of evaluating and granting certificates;
- exclusion from the tender projects implemented in installations covered by the ETS;
- WCS insufficiently contributed to development of energy services market, e.g. ESCO, energy audits

Simplified flowchart of WCS2



Energy saving calculation

EEA 2011

EEA 2016

- Energy efficiency audits may use different methodologies:
  - A pure calculation approach based on e.g. analytical, numerical engineering methods, mathematical modelling and computer simulations, in cases where these methods are verified and commonly regarded as sufficiently accurate and reliable,
  - Measurement approach supported by analytical calculations,
  - Combination of the two above.

There are two main methods of calculation of savings :

- Simplified energy efficiency audits for deemed savings projects.
- Energy efficiency balance audit, i.e. making energy balance of the whole machine, equipment, process or building in which the energy improvement measure has been done.

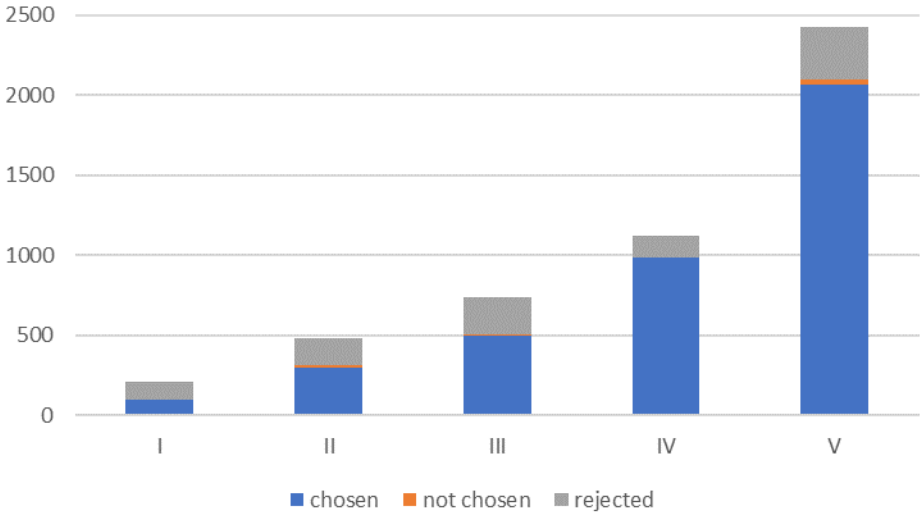
Audits shall contain a description of possible types and variants of energy efficiency improvements accompanied by cost effectiveness analysis and estimation of energy savings possible to achieve.

Comparison of the both Polish White Certificate Systems

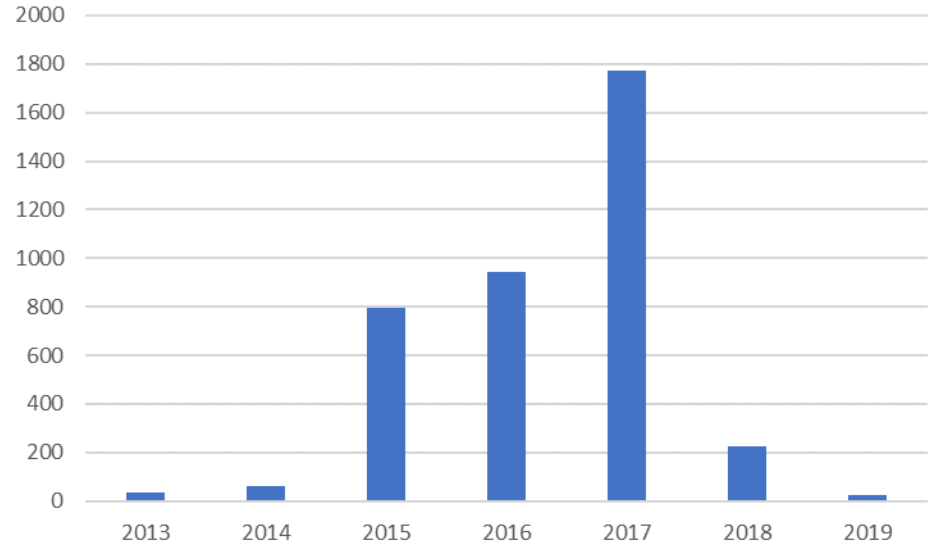
Issue	First period	Second period
Time period	Start: 1 January 2013. End: envisaged to end 31 March 2016 and followed by transition period until 31 March 2017	Start: 1 October 2016 End: unlimited
Method of allocation of WCs	WC allocated through public auctions only to the winners	WC granted to all investors on request
Energy savings target metric	Primary energy	Final energy
Trading	Possible (bilateral and vertical)	Possible (bilateral and vertical)
Obligated parties	Energy suppliers (power, natural gas, heat)	Energy suppliers (power, natural gas, heat)
Minimum project size	10 toe/y saving	10 toe/y saving
Target	Energy savings equivalent to 1.5% annual revenues	Energy savings equivalent to 1.5% of final energy annually traded
Exemptions	Transport, energy intensive industries	Transport, energy intensive industries
Type of investments	WC granted for completed projects only	WC granted for planned projects only
Energy efficiency audits	Obligatory (ex-ante and ex-post) Carried out independently	Obligatory (ex-ante and ex-post) Carried out independently
Banking and borrowing	None	Banking of savings
Measurement method Check of compliance	Metered and deemed savings M&V loosely described Investments giving annual savings ≤100 toe/a - random check ordered by ERO Investments giving annual savings >100 toe/a - obligatory energy audit	Metered and deemed savings M&V loosely described Random check by ERO
Buy-out mechanism	Unlimited possibility to fulfilling obligation by paying buy-out price	Limited and steadily diminishing option to use buy-out mechanism
Buy-out price	Fixed buy-out price	Buy-out price increases by 5% per year
Penalty for not compliance	Yes	Yes

Groups of projects granted with WCs in WSC1 and WCS2

Type of projects	Description (examples)	Comments
Electric power sector	Modernisation of the power grid, reactive power and replacement of transformers	• conversion factor from primary to final energy is set in the EEAs (currently 2.5 - previously 3) • average saving is 149 toe, the median is 44.6 toe • electricity projects were mostly carried out in Pomerania (the main distribution network operator received 93 certificates in 2018)
District heating networks	Insulation of district heating networks, modernization of heat substations, replacement of group heat substations with individual heat substations	• overall effect of primary energy savings is 96.7 ktoe • low average conversion factors due to share of biomass in the fuel mix
Thermomodernization	Renovation and reconstruction of buildings - insulation of walls, replacement of door and window joinery, skylights, modernization of hot water system, central heating	• lowest conversion factors as most savings non-electric • largest share of certificates issued • largest number of certificates went to the Silesian Province, where they were used to support the reduction of low emissions
Heat sources	Modernisation of boiler plants, boilers, fuel conversion in heating installations	• share of heat sources of total energy savings is small, but the average energy saving is above average compared to other groups • large number of final energy savings certificates equal to 0, which, according to the rules of the second period, will exclude them from being awarded white certificates
Lighting	Replacement of light elements with LED technology	• conversion factor is the same for all projects (electricity) • number of certificates issued after the inception of the second period decreased most drastically
Drives	Modernization of electric drives for compressors, pumps, cranes	• two possible conversion factor values (for electricity, e.g. inverters or thermal - compressors) • most of the certificates relate to the replacement of the drive of electric motors by inverter systems with high investment cost
Industrial processes	Modernisation of specialist technological processes, heat recovery, internal needs, insulation of plant pipelines, refrigeration installations	• diverse measures (heat, machines, energy conversion) hence varying conversion factors • highest primary energy savings



Number of applications submitted for granting White Certificates in the successive auctions (URE, 2019)



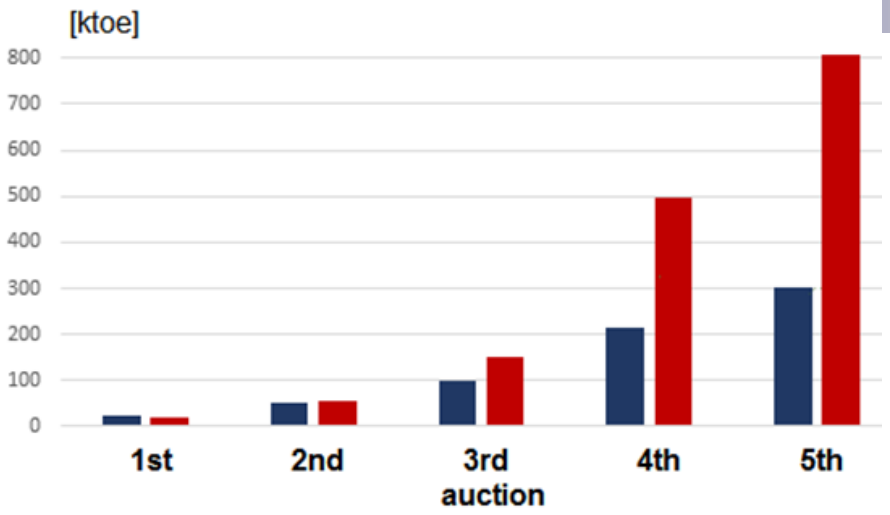
Number of White Certificates granted each year from the first period

Auction Number	Auction Announcement Date	Auction Close Date
1.	31 December 2012	29 August 2013
1.	27 December 2013	29 October 2014
1.	19 December 2014	21 September 2015
1.	29 December 2015	5 July 2016
1.	21 September 2016	20 July 2017

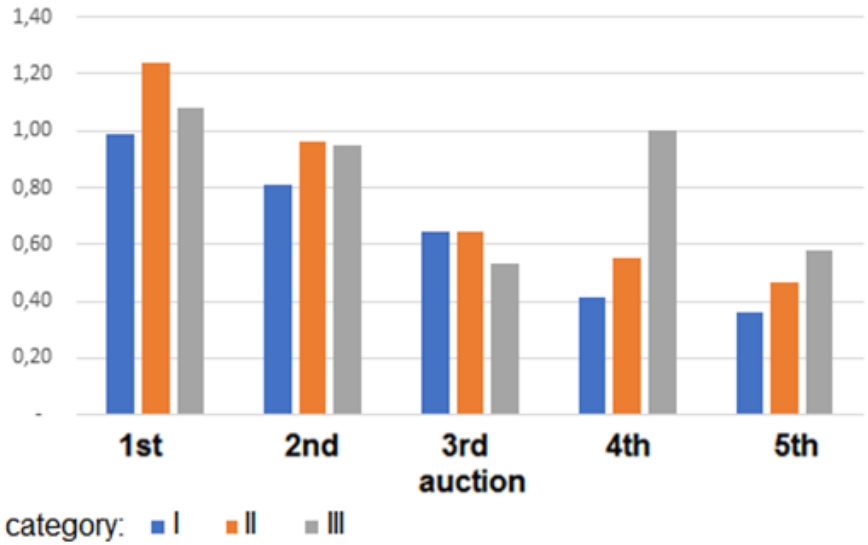
Categories of energy efficiency improvement projects

EEA 2011

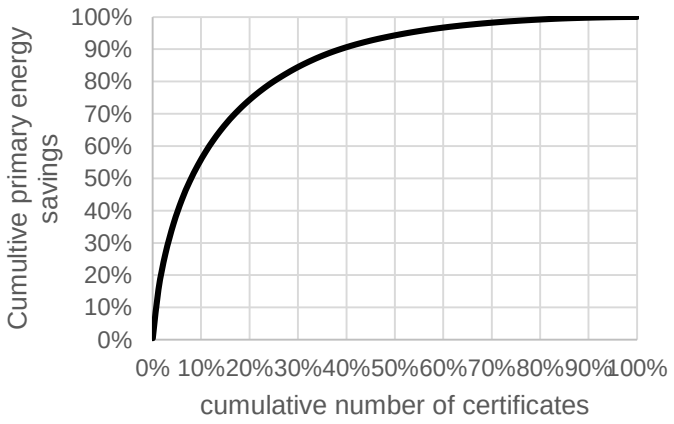
I. increasing energy savings by final consumers
   I. min 80% of all WC in a tender
II. increasing energy savings in companies' equipment for own use
   I. max 10% of all WC in a tender
III. reducing losses of electricity, heat or natural gas in transmission and/or distribution
   - max 10% of all WC in a tender



Declared energy savings of primary energy savings and nominal value of WCs issued in the first period



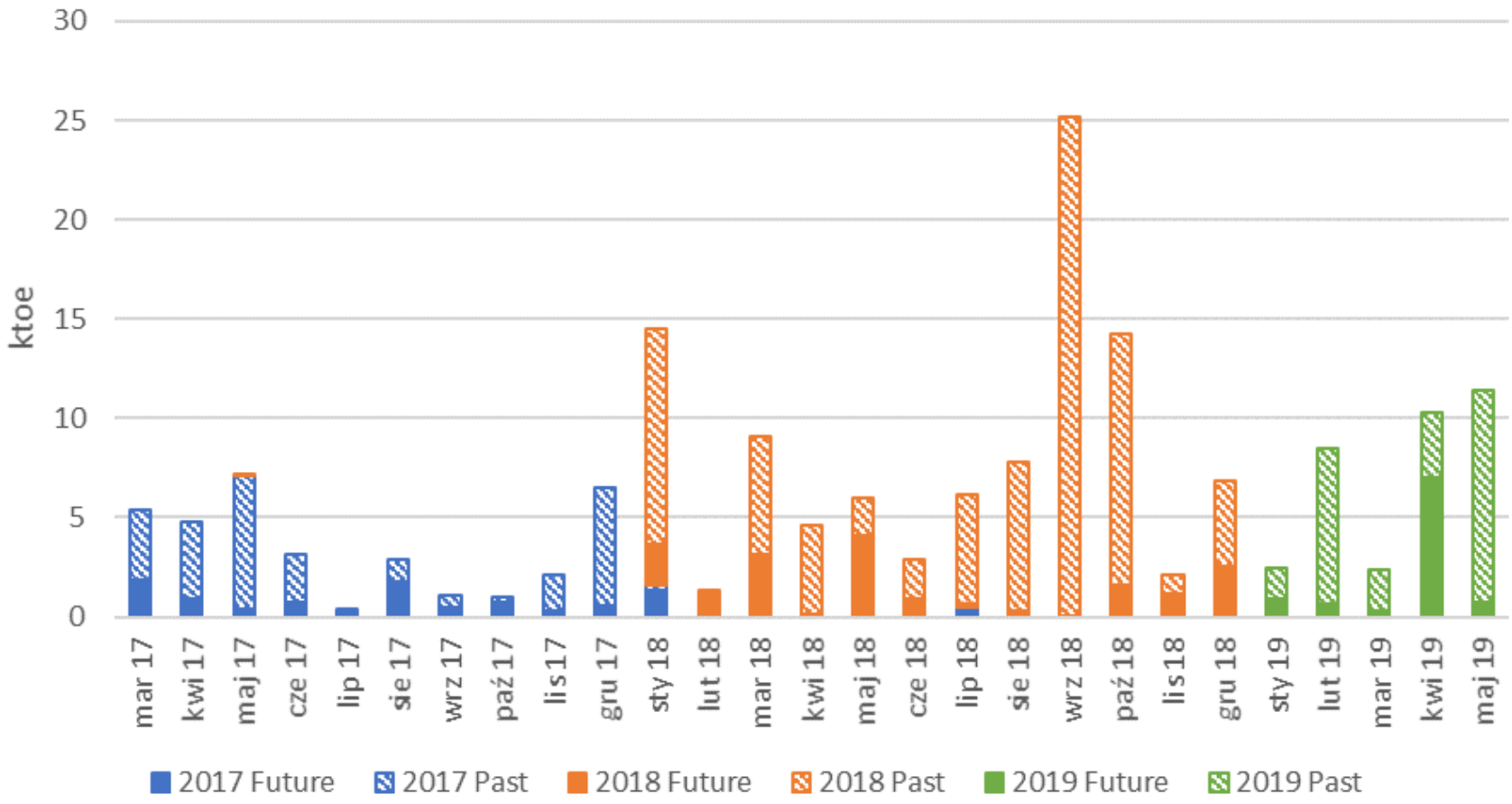
Average ω-coefficient per auction per category



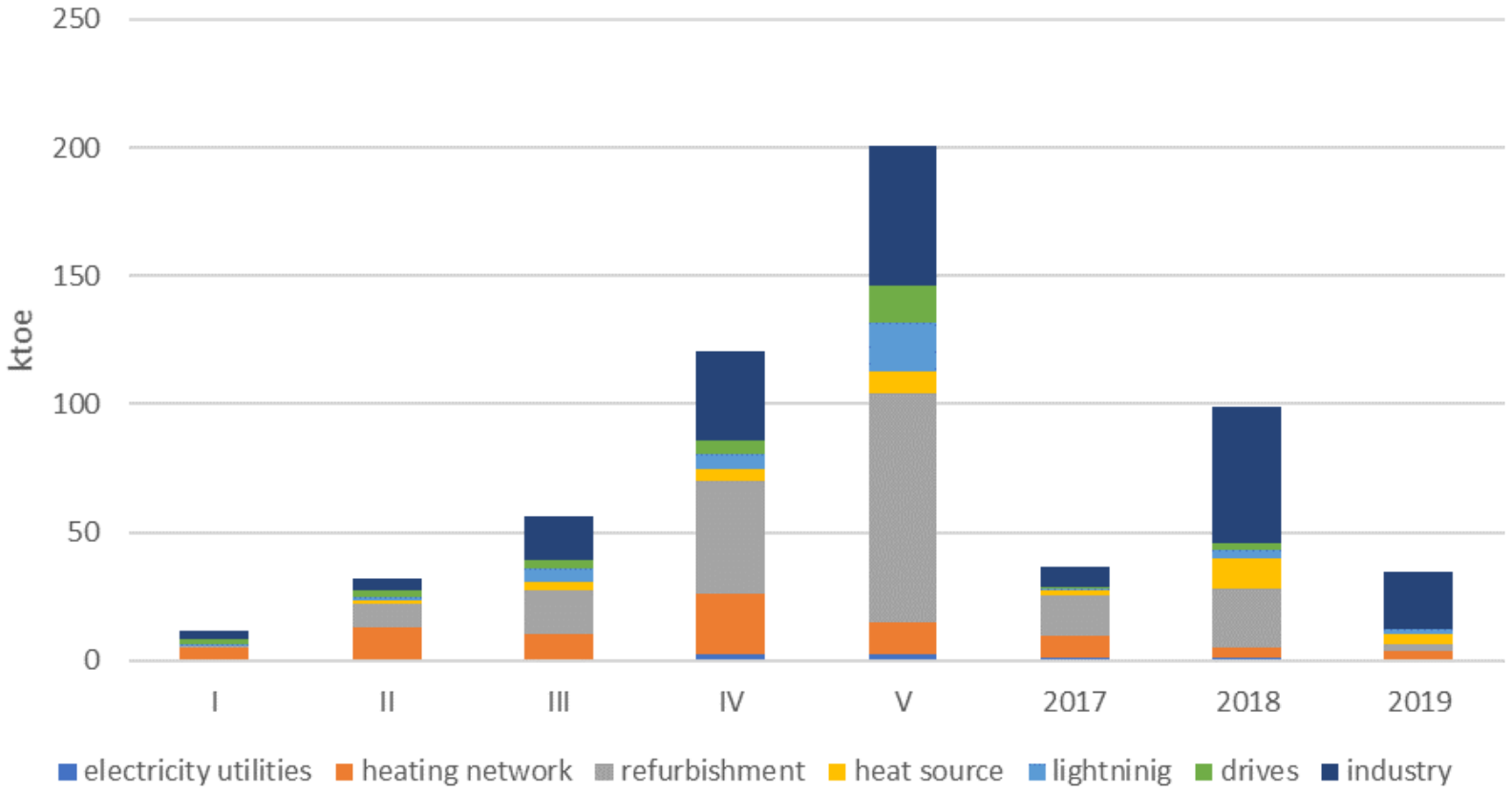
”ω” was defined as the ratio of the average annual amount of energy saved as a result of implementing a measure to the value of WCs which the company participating in a tender wished to obtain.

Relation between cumulative primary energy saving and number of certificates

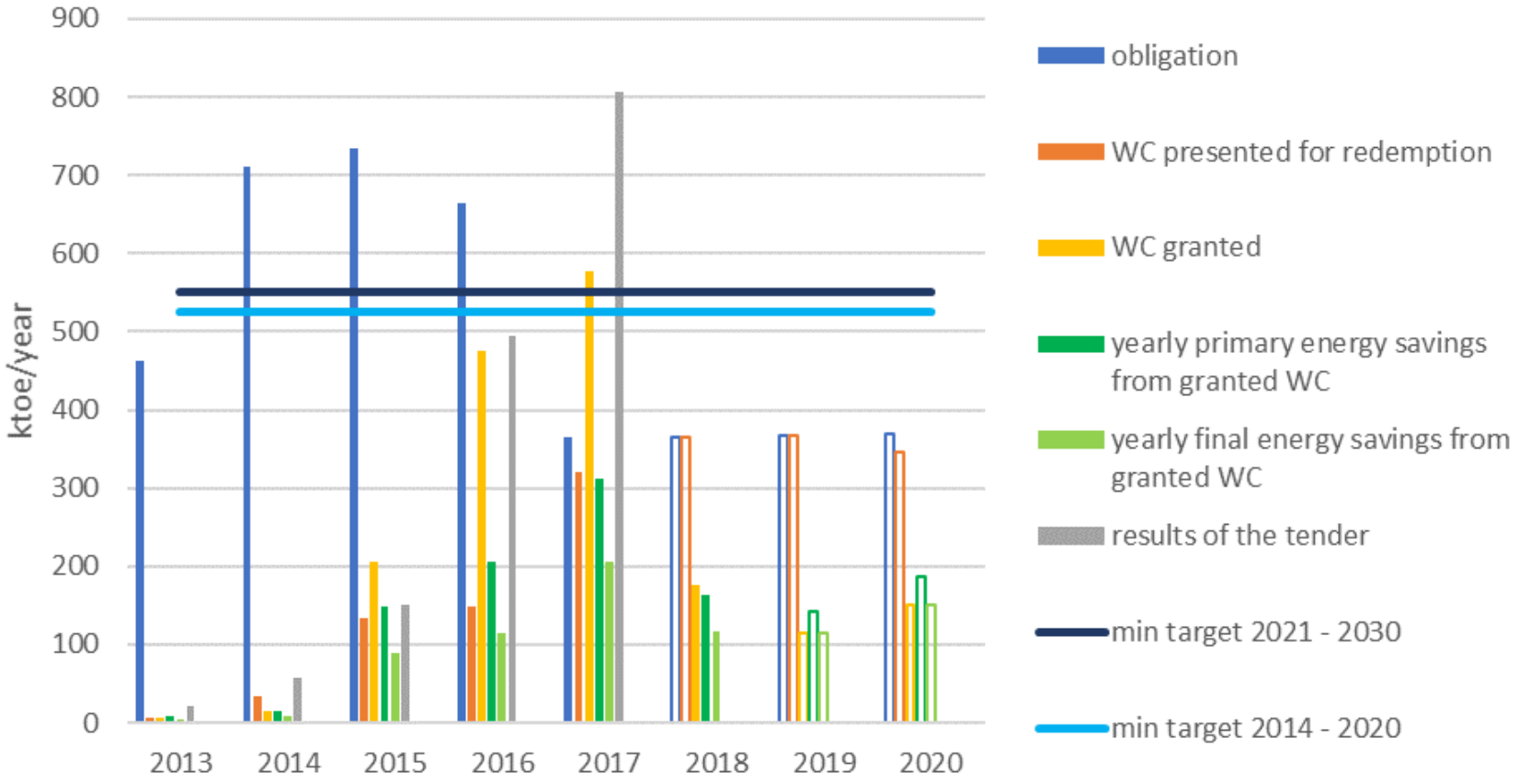
Final energy savings of certificates granted for past and future projects in the second period



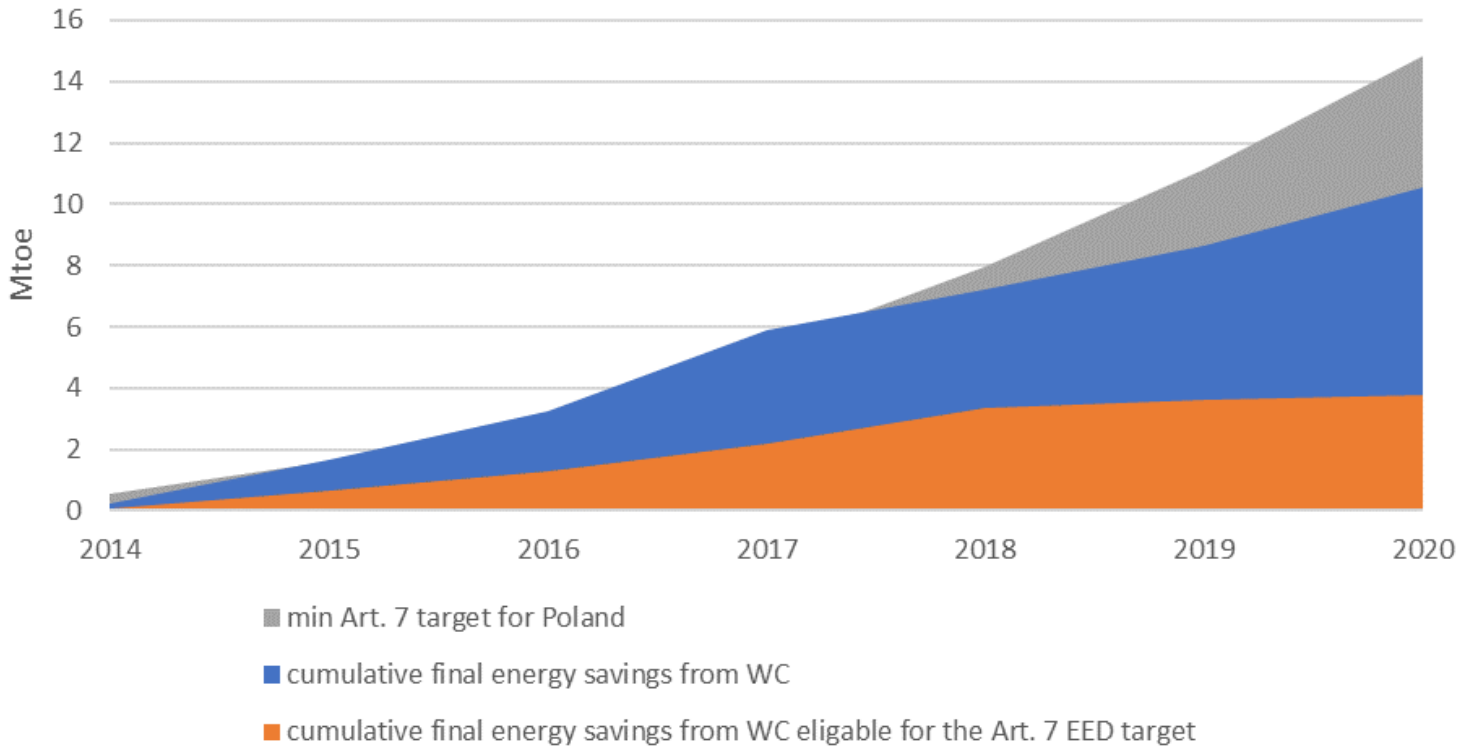
Final energy savings



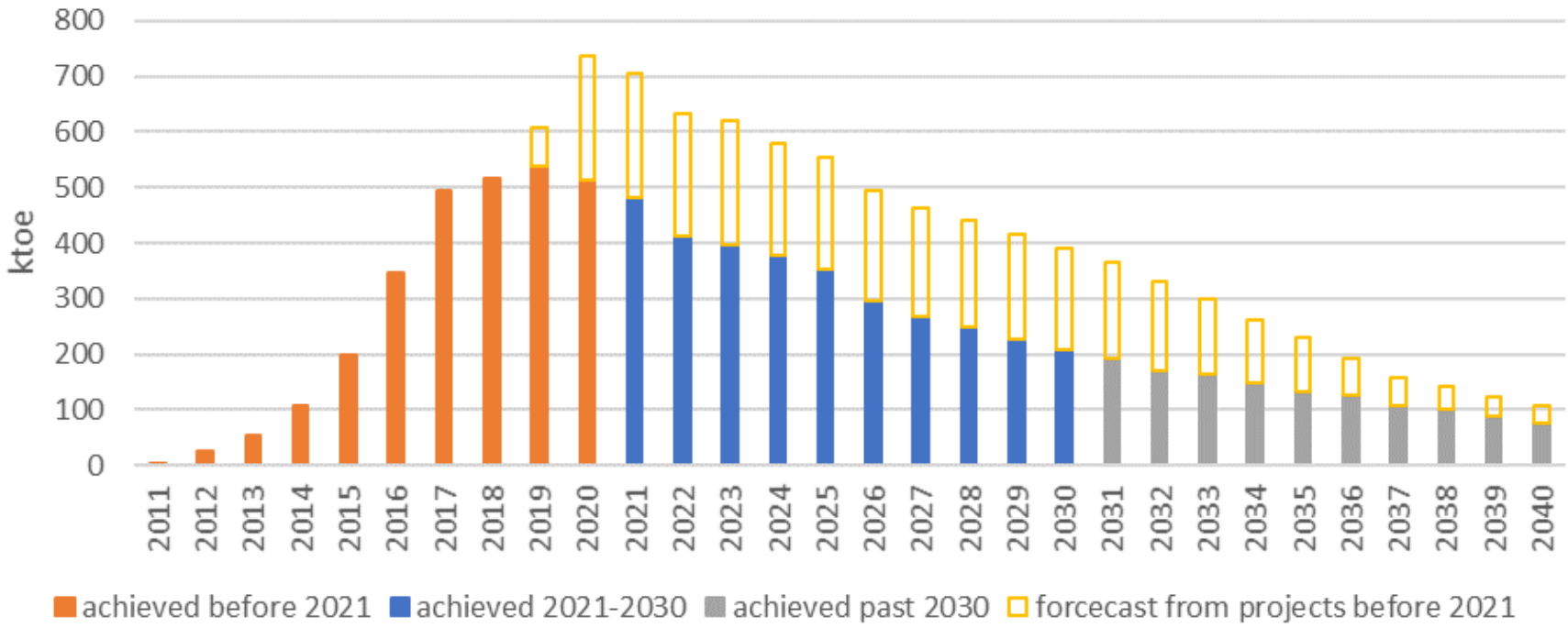
Comparison of the historical results of the EEO in different years with a forecast up to 2020



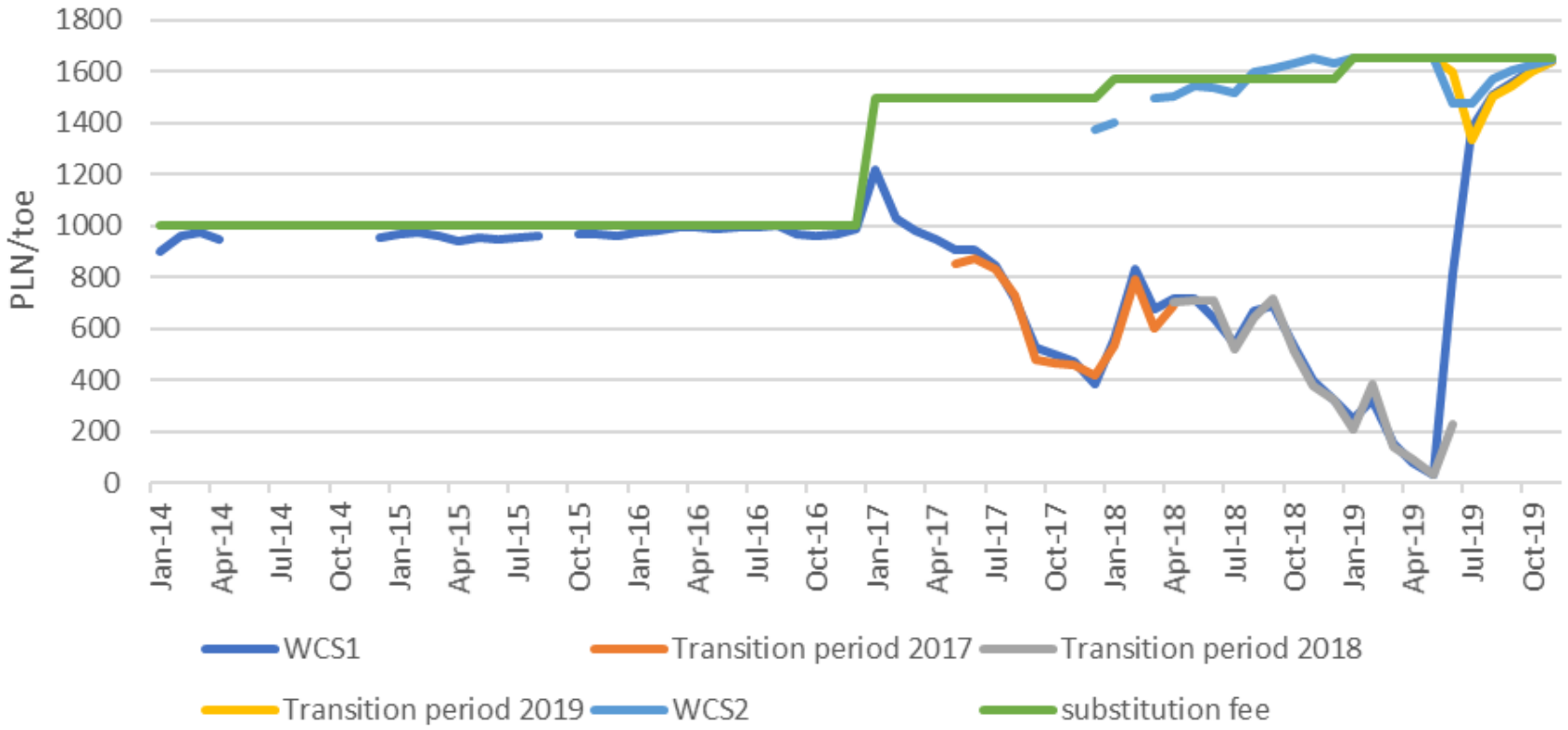
Forecast of cumulative final energy savings from WCS1 and WCS2 with projection until 2020



Cumulative final energy savings achieved each year



Average price of certificates from WCS1, WCS2 and in transition periods in PLN/toe



Improvements made

- Reducing the complexity for market actors involved in delivering the programme makes it easier for companies to obtain WCs and for obligated parties to deliver on their targets.
- Disallowing projects already carried out from being funded through the EEO lowers the risk of non-additional savings and free-ridership.
- Switching to the metric of final energy savings significantly reduces the opportunities for using renewable energy technologies for the purpose of delivering energy savings.

Areas of concern

- The monitoring and verification regime appears to rely on self-declared energy savings by companies obtaining WCs. By definition, this provides an incentive to overclaim energy savings in order to receive a higher share of subsidies for energy efficiency measures. It is unclear whether ERO performs rigorous ex-post monitoring and verification of projects for which WCs have been obtained.
- There is no official specification of lifetimes and the observation that some projects claim lifetimes of up to 76 years indicates the importance of more rigorous treatment of lifetimes.
- There is a lack of independent evidence-based evaluations of the EEO. Experience in other jurisdictions has shown that independent evaluations and a high degree of transparency are prerequisites for a well-functioning scheme delivering savings in line with targets.
- Requirements to prove additionality need to be established to ensure that free-ridership is minimised and the EEO does not only support energy efficiency measures that would happen anyway.

Recommendations

- ensure that the obligated parties meet their targets through enforcement and the use of penalties as appropriate;
- introduce much stricter requirements for ex-post monitoring and verification moving away from self-reported savings and using realistic assumptions for lifetimes; and
- introduce additional policies for delivering new savings.

- An overall recommendation is also to increase the transparency of the EEO, making data easily accessible, and involving a wide range of stakeholders in the evaluation and delivery of the EEO. More transparency ultimately results in more robust programmes that deliver more savings.

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Thank you for your attention!

Tadeusz Skoczkowski

Paris, 10.12.2019

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