Advisory – Valuation & Economics

Association of Large Industrial Energy Consumers

Analysis of the mechanism for exempting the electro-intensive industrial consumers from the payment of green certificates

Strictly confidential

February 2019

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Association of Large Industrial Energy Consumers (ABIEC)
February 11, 2019

Report prepared by PricewaterhouseCoopers Management Consultants SRL ("PwC") for the analysis of the mechanism for exempting the electro-intensive industrial consumers ("EI") from the payment of green certificates ("GCs")

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Dear Sir/ Dear Madam,

This analysis has been prepared for the Association of Large Industrial Energy Consumers ("ABIEC" or "The Association") in connection with the advisory services presented in the Engagement Letter no. M160/28.11.2018.

We understand that the Association may wish to provide copies of our report to different Directorate-Generals of the European Commission, Ministers of the Romanian Government and/or other public authorities (the "Recipient"). We accept the distribution, without prior signing of a Hold Harmless Letter, to the Recipient, for information purposes only. You agree that we accept no liability (including liability for negligence) to you for any consequences of disclosing the report, or giving explanations concerning the report, to the Recipient.

Current framework

The Renewable Energy Support Scheme (RES-E) significantly increased the cost of electricity for final consumers. The Government of Romania has therefore taken some measures (postponement of the trading of GCs for some existing production units and reduction of the number of GCs per MWh generated for new ones) to increase the sustainability of the contribution for the promotion of RES-E. Starting in 2015 and in accordance with the European Commission Guidelines the state aid scheme (HG 495/2014) regarding the partial exemption for large EI industrial consumers from the payment of GCs obligation according to the Law no. 220/2008, entered into force and is valid until the end of 2024.

In 2016, the Ministry of Energy conducted, with the help of an independent consultant, an impact study of the RES-E support scheme to analyse the possible options for achieving a balance between consumers and RES-E producers. The study was carried out taking into account the specific existing legislation at the time of the analysis, including the EI industrial consumers exemption period, without considering any extension to that scheme.

New legislative amendments were introduced in 2017, modifications that led to a change in the way the annual GC obligation is calculated, and the impact of the renewable energy support scheme continued to increase.

In 2018, at the initiative of several associations of renewable energy producers, there was adopted Law no. 184 which guarantees the purchase of all GCs awarded between 01.04.2017 – 31.12.2031. This will generate an important negative impact for EI industrial consumers, in the event that they will no longer be partially exempted from the payment of GCs between 01.01.2025 - 31.03.2032.

Scope of the analysis

Our analysis aims to provide a comparison analysis of the mechanism for exempting the EI industrial consumers from the payment of GCs in several potential scenarios whilst taking into account the current legislative framework as well as the analysis of the impact of green certificates extended exemption scheme on the final consumer and respectively on the producer of renewable energy.

If you require any clarification or further information, please do not hesitate to contact us.

Yours faithfully,

Sorin Petre,
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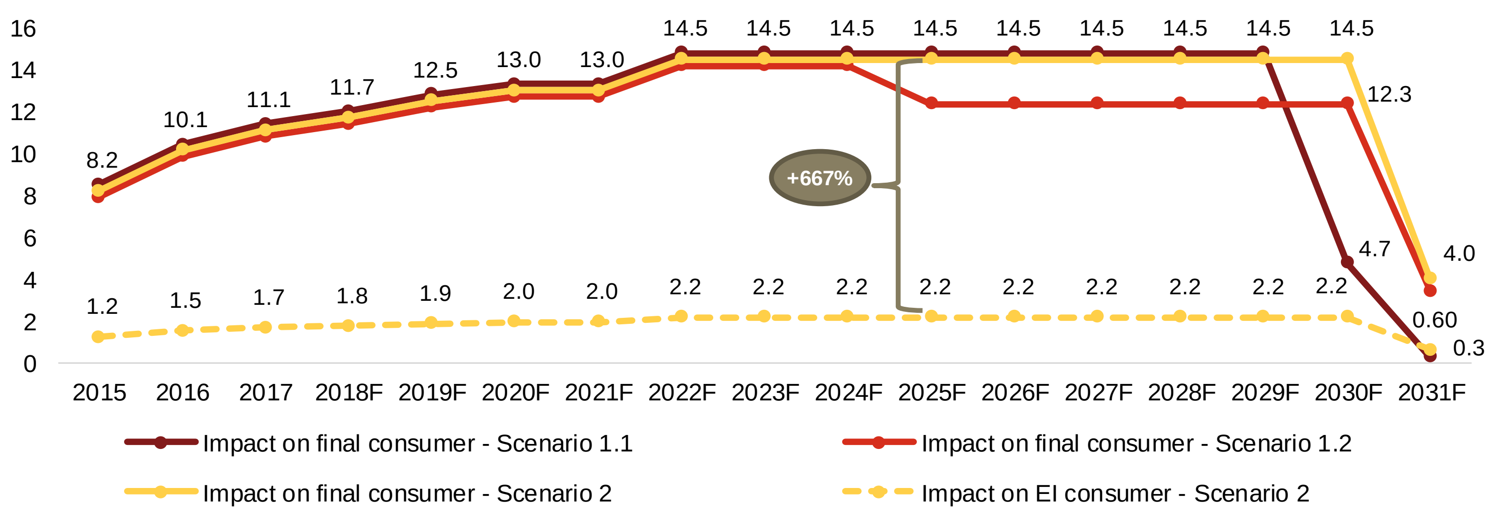
The extension of the exemption scheme for EI industrial consumers for the 2025 - 2031 period will ensure the achievement of the objectives of the current legislation for all participants in the electricity market whilst maintaining the competitiveness of large industrial operators

The extension of the GCs partial exemption scheme from the payment of GCs for EI industrial consumers for the period 2025 - 2031 is a feasible solution, as this measure **will not lead to increasing the impact** on the final consumer beyond the maximum cap of 14.5 EUR / MWh, and the **renewable energy producers will be able to sell all their green certificates** awarded for the amount of energy delivered by the end of 2031.

The PWC analysis took into account 3 possible scenarios:

- **Scenario 1.1** – exemption scheme is not extended and the impact on the final consumer is at the level established by the current legislative framework
- **Scenario 1.2** – the exemption scheme is not extended, but the impact on the final consumer is probably rescheduled from 2025 onwards
- **Scenario 2** – the exemption scheme is extended for the period 2025 - 2031 .

Impact on final consumer and EI consumer in the 3 scenarios (EUR/MWh)



Source: PwC analysis

Note: We considered that all large industrial consumers have a 85% exemption from the GC obligation (the maximum imposed by OUG 495/2014 for electro-intensities greater than 20%)

Legislative framework

This analysis was conducted to assess the impact of the support scheme for renewable energy and exemption schemes for large industrial consumers

Current legislative framework

- **The Renewable Energy Support Scheme (RES-E) significantly increased the cost of electricity for final consumers.** The Government of Romania has therefore taken some measures (postponement of the trading of GCs for some existing production units and reduction of the number of GCs per MWh generated for new ones) to increase the sustainability of the contribution for the promotion of RES-E. **Starting in 2015** and accordance with the European Commission Guidelines **the state aid scheme regarding the partial exemption for large EI industrial consumers entered into force and is valid until the end of 2024.**
- In 2016, **the Ministry of Energy conducted**, with the help of an independent consultant, **an impact study of the RES-E support scheme** to analyse the possible options for achieving a balance between consumers and RES-E producers. The study was carried out **taking into account the specific existing legislation at the time of the analysis**, including the EI industrial consumers exemption period, **without considering any extension to that scheme.**
- New legislative amendments were introduced in 2017, modifications that led to a change in the way the annual GC obligation is calculated, **and the impact of the renewable energy support scheme continued to increase.**
- In 2018, at the initiative of several associations of renewable energy producers, there **was adopted Law no. 184 which guarantees the purchase of all GCs awarded** between 01.04.2017 – 31.12.2031. This will generate an **important negative impact for EI industrial consumers between 01.01.2025 - 31.03.2032, in the event that they will no longer be partially exempted from the payment of GCs.**

Scope of the PwC analysis

- The aim of the current report is to analyse mainly:
  1. **The impact of the renewable energy support scheme on EI large industrial consumers** (see the Case Study: Alro SA), if the GCs partial exemption scheme will not be prolonged until the end of the period when GCs must be sold (01.01.2025 – 31.03.2032);
  2. **The impact the renewable energy support scheme will have on other final consumer categories**, if exception scheme will be extended – Comparison analysis with the impact of the existing state-aid scheme; and
  3. **The impact the green certificates extended exemption scheme is expected to have on producers of electricity,** beneficiaries of green certificates.

The two state-aid schemes should achieve a balance between meeting environmental objectives and minimizing the economic impact on the final consumer

The two state aid schemes must ensure a balance between the development of the renewable energy sector and maintaining the competitiveness of large industrial entities

Mechanism	Legislation	Motivation	Validity
• The support scheme for renewable energy – Current support scheme for GC	• Law 220/2008 for establishing the renewable energy production promotion system	• Attempting to reach the targets for renewable energy as a proportion of gross final consumptions set forth in the 2020 "environmental package"	• The scheme will be valid for production capacities installed by 31.12.2016 • The GC issued for these production capacities are valid and can be sold until la 31.03.2032
• Exemption scheme which ensures certain categories of end consumers are exempt from paying a part of green certificate value	• Government Decision (HG) 495/2014 which established a state aid scheme	• Romania surpassed PNAER* predictions on renewable infrastructure by 30% in 2013 • Relocation risk for electricity-intensive industries, due to rising electricity prices • Electricity-intensive industry is the largest job creator in the country	• The scheme will be applied until 31 December 2024

Current context

- The latest amendments to Law 220/2008 (Law no. 184/2018) are meant to protect renewable electrical energy producers, by fully exploiting the awarded green certificates. Although authorities have argued that maintaining a balance between consumer burden and the financial efforts of renewable energy producers is necessary, the legislation did not extend the exemption period for green certificate payments for large industrial consumers
- This new context makes it necessary to analyse the possibility of extending the exemption scheme for large energy-consuming agents for the entire lifetime of the GC acquisition obligation (31 March 2032)

The potential removal from 2025 onwards of the exemption scheme creates a 7 year and 3 month period during which electricity-intensive industry will be heavily affected, as it will have to incur the full cost of green certificates

PwC Analysis

The supply of GC is comprised primarily by GCs awarded each period and GCs from prior periods, even if the beneficiaries are no longer in the RES-E support scheme. The demand for GC is triggered by the regulated GC obligation

GC supply:

- In 2028 the support period ends for a large part of the power plants that benefit from the support scheme that promotes the production of energy from renewable sources (in 2013 2,050 MW were installed with a 15 year period to capitalize on the GCs received), which will halve the number of **GCs awarded**.
- **The number of deferred GCs** is estimated to reach 37.4 mln. during the 2013 – 2020 period. These are to be **recovered** during the 2018 – 2030 period.
- **The GC from prior periods** are recomputed annually depending on demand and supply dynamics.

GCs supply

=

GC awarded during the current period

−

GC deferred

+

GC recovery

+

GC from prior periods

GC demand:

- **The GC demand** is determined by dividing the value of GCs that energy suppliers have to purchase (ie total revenue of RES-E producers from supported GCs) at the average price of GCs, established on the centralized anonymous market, at the level of the previous year.
- When the demand for GCs is estimated to exceed the supply, the transaction price of GCs is expected to reach the maximum regulated level of EUR 35 per GC.

GCs demand

=

The number of GCs that suppliers of energy are required to purchase consistently to the renewable energy delivered to consumers, in line with legal regulations in force

Input data used in the analysis were extracted from ANRE annual reports

	Historical period		Forecasted period		
	2016	2017	2018	2030	2031
The renewable energy production that receives GCs (GWh)	**8,664**	**9,362**	**10,449**	**571**	**170**
wind	5,639	6,356	6,746	211	35
hydro	918	853	929	77	27
biomass	506	452	869	147	63
solar	1,601	1,702	1,905	136	45

The renewable energy production that receives GCs was estimated as the product of installed capacities, the number of hours in operation (8,760) and capacity factors (see the 2017 ANRE Overcompensation Report). In addition, starting with 2026 some production capacities installed before 2013, but also after 2014, will exit the 15-year GCs support scheme as it expires. Most installed capacity will exit the support scheme in 2028 (2,050 MW).

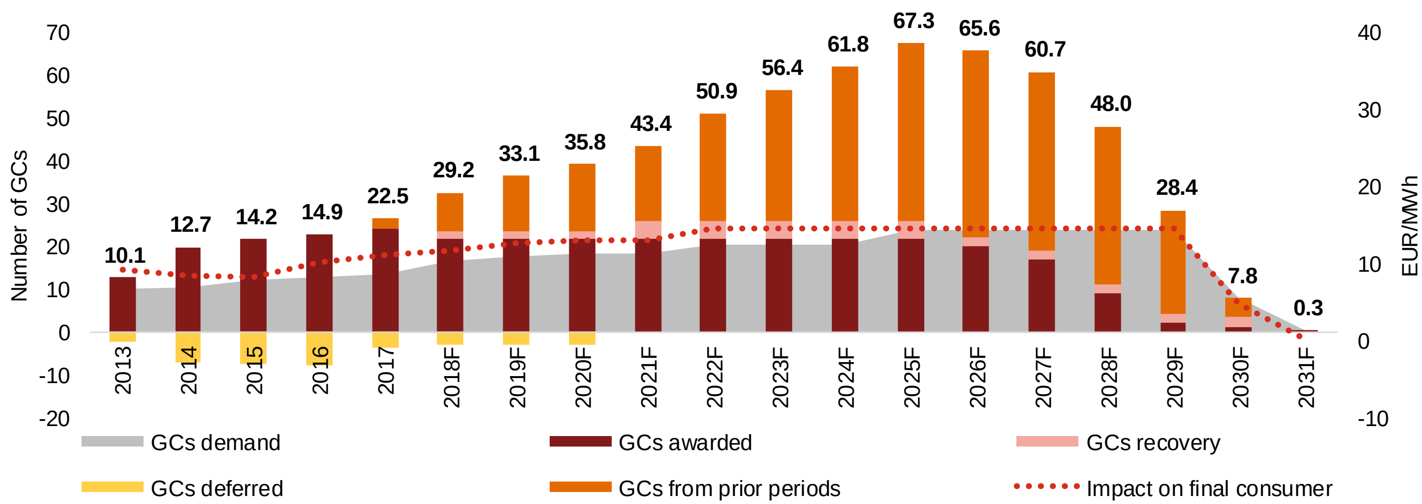
	2016	2017	2018	2030	2031
No. of GC awarded for renewable energy supplied (mln. GCs)	**22.8**	**24.1**	**21.5**	**1.0**	**0.35**
wind	10.3	11.8	6.5	0.1	0.03
hydro	2.6	2.1	2.7	0.2	0.06
biomass	0.9	0.8	1.7	0.3	0.13
solar	9.0	9.4	10.6	0.4	0.13

In Scenario 1.1 we analysed the supply and demand of GCs on the assumption that the exemption scheme is not extended and the impact on the final consumer remains at the level established by the current legislative framework

Key inputs and expected impact:

- **Between 2025 – 2029** the value of GC which suppliers of energy have to purchase increases from EUR 598 mln. in 2024 to EUR 702 mln. until 2029. This increase is due to the expiry of the state aid scheme regarding the exemption of EI industrial consumers if the **impact on the final consumer** is to be maintained at the maximum level of **EUR 14.5 per MWh** established for 2022.
- **2030** is the last year in which GC from prior periods will still exist and the first year in which the supply and demand for GC will be in equilibrium. Consequently, the **impact on the final consumer** is expected to decrease to **EUR 4.7 per MWh** because of the decrease of the estimated value of a GC which suppliers of energy have to purchase.
- In the last year of GC recovery (**2031**) the **impact** is estimated to drastically decrease to the level of **EUR 0.3 per MWh**.

Demand / supply of GCs in Scenario 1.1 (mln. GCs)

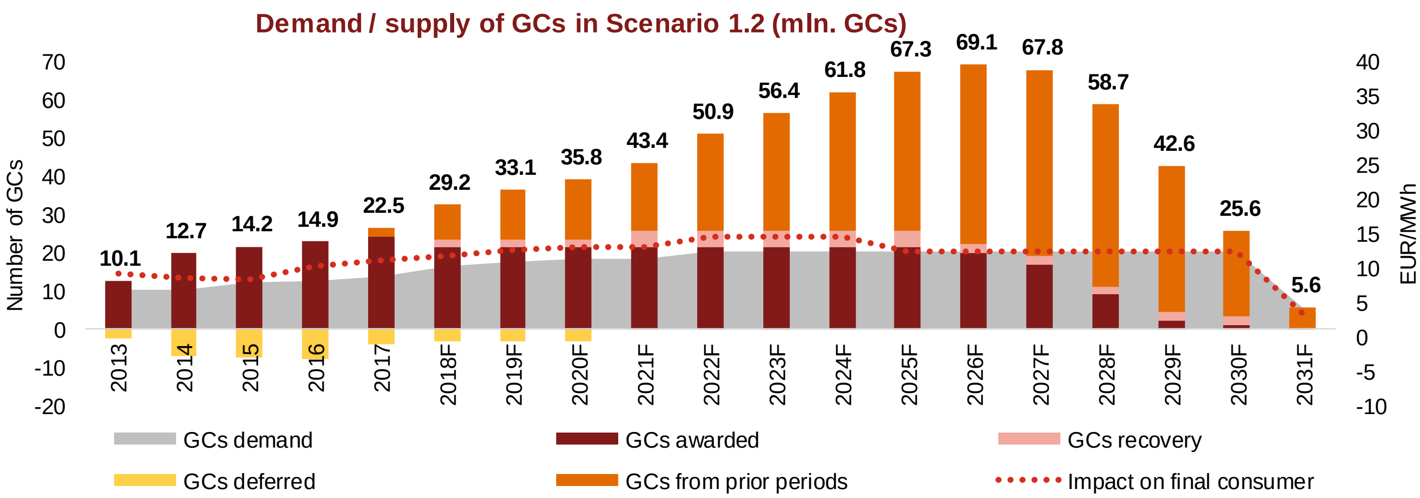


Source: PwC analysis

In Scenario 1.2 we analysed the supply and demand for GCs on the assumption that the exemption scheme is not extended, but the impact on the final consumer is rescheduled from 2025 onwards

Key inputs and expected impact:

- **Between 2025 – 2030** the value of GC which suppliers of energy have to purchase will remain constant, but the **impact on the final consumer** will slightly decrease by EUR 2.2 per MWh. This will start with the year when the exemption period ends (2025) - this compared to EUR 14.5 per MWh in Scenario 1.1, and will register **EUR 12.3 per MWh**. Such decrease (15% of EUR 14.5 per MWh or EUR 2.2 per MWh) is the component levied on the industrial consumer until 2025 for the amount of energy consumed by them.
- **2031** is the first year when the supply and demand of GC is in equilibrium. Consequently, the **impact on the final consumer** is estimated to decrease to **EUR 3.4 per MWh** because of the decrease of the value of GCs that suppliers of energy have to purchase.



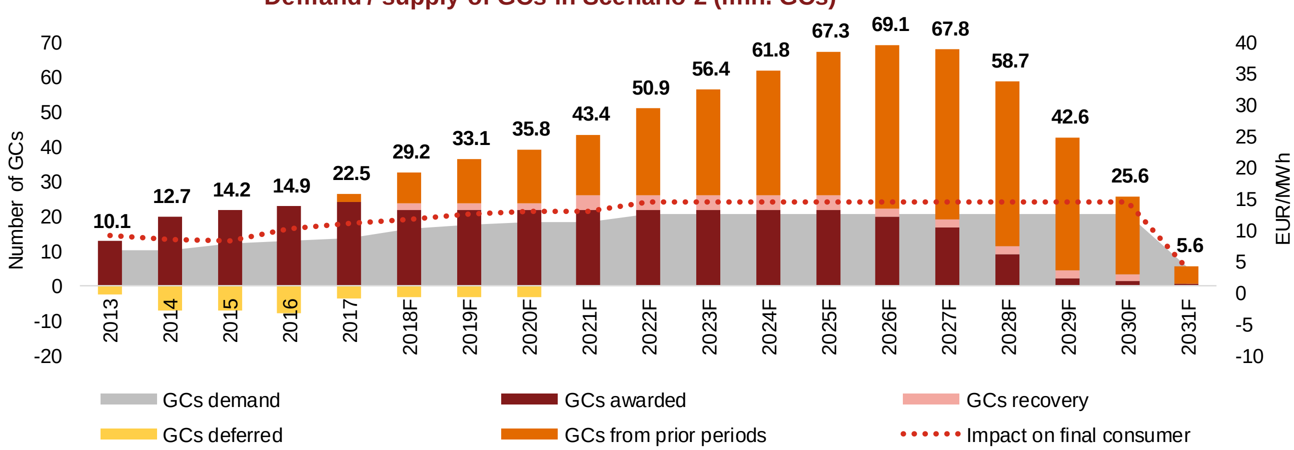
Source: PwC analysis

In Scenario 2, we analysed the supply and demand of GCs on the assumption that the exemption scheme is extended over the entire period for which the purchase of GCs is required

Key inputs and expected impact:

- **Between 2025 – 2030** the value of GC which suppliers of energy have to purchase will remain constant (the same as in Scenario 1.2 or approximately EUR 600 mln.) and the **impact on the final consumer** is expected to remain at the maximum level of **EUR 14.5 per MWh.**
- **2031** is the first year when the supply and demand of GC are equalized and last year in which GC are available. Consequently, the **impact on the final consumer** is estimated to decrease to **EUR 4.0 per MWh** because of the decrease of the value of GC that suppliers of energy have to purchase.

Demand / supply of GCs in Scenario 2 (mln. GCs)



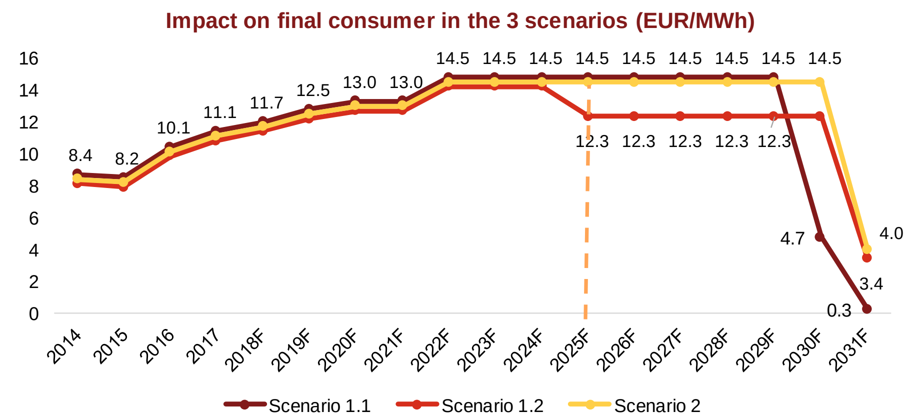
Source: PwC analysis

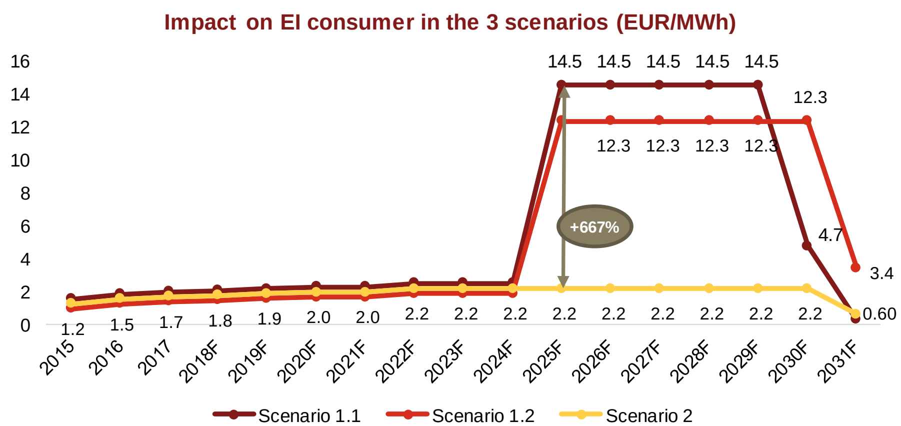
Note:
The extension of the exemption scheme **will not result in exceeding the EUR 14.5 per MWh level** on the final consumer, and **the renewable energy producers will be able to sell all their GC** in accordance to the renewable energy delivered by the end of 2031.

The extension of the exemption scheme for EI industrial consumers for the 2025 - 2031 period is an feasible solution since the 14.5 EUR/MWh maximum cap for the final consumer is not exceeded in any of the analysed scenarios

- **Scenario 1.1 –** where the exemption scheme **is not extended** and the impact on the final consumer remains at the level established by the current legislative framework
- **Scenario 1.2 –** where the exemption scheme **is not extended**, by the impact on the final consumer is probably rescheduled from 2025 onwards
- **Scenario 2 –** where the exemption scheme **is extended** over the entire period for which the purchase of GCs is required

In all 3 scenarios analyzed, the impact on the final consumer will be significantly reduced in the last year of the GCs purchase obligation (2031). In addition, even in the scenario where the exception scheme is extended until 2031, no GCs will remain unsold.





Ending the exemption scheme in 2024 would increase the impact of the GCs scheme on the energy costs of large industrial entities by 667% in 2025. Thus, the competitiveness of large energy consumers will be severely affected on the European and global markets. Therefore, costs recalibration (including those with human resources) and investment strategies will become necessary actions for defending the risk of relocation of production units

Source: PwC analysis

Note: We considered that all large industrial consumers have a 85% exemption from the GC obligation (the maximum imposed by OUG 495/2014 for electro-intensities greater than 20%)

Extending the exemption scheme for EI industrial consumers for the period 2025 - 2031 will have a minimal impact on the final household consumer bill as compared to non-extension scenarios

Assumptions:

- The final household consumer usually records an average monthly energy consumption of 100 KWh
- The difference between the final consumer impact estimated in Scenario 2 - with extension of the exemption scheme and the final consumer impact estimated in Scenarios 1.1 / 1.2 - without the extension of the exemption scheme is the additional burden sustained by a household consumer as a result of the exemption of large consumers

Conclusions:

- The household consumer will pay an additional RON 74 (EUR 15.9) in total over 2 years, compared to Scenario 1.1
- The household consumer will pay an additional RON 76 (EUR 16.3) in total over 7 years, compared to Scenario 1.2

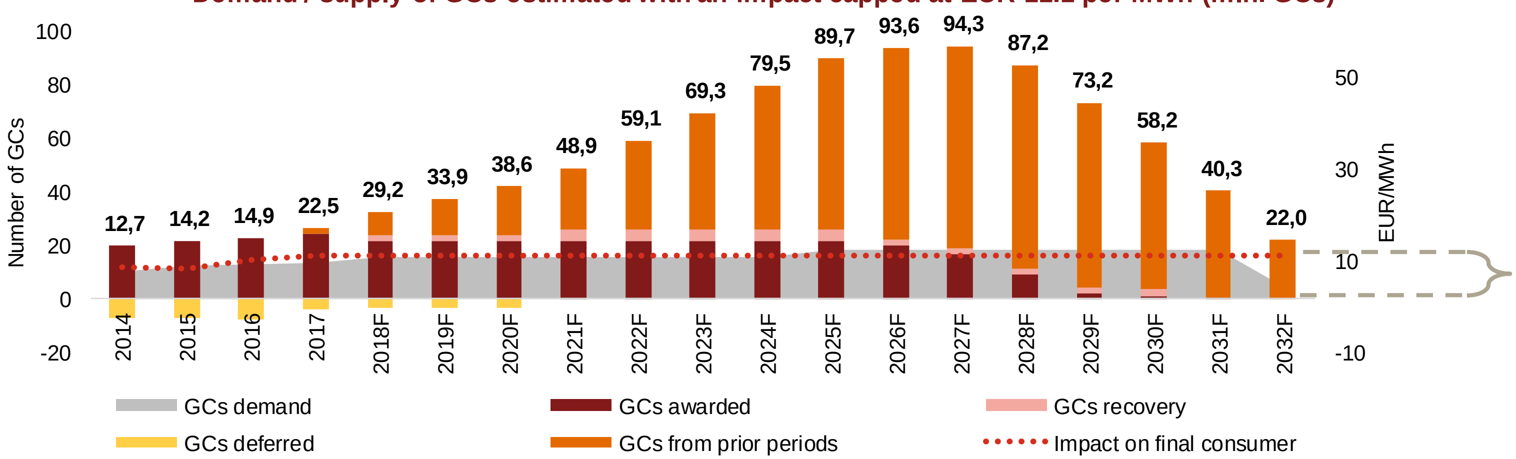
		2025	2026	2027	2028	2029	2030	2031	7 years TOTAL
Extension the exemption scheme (Scenario 2) vs. Non-extension of the exemption scheme in Scenario 1.1	EUR/MWh	-	-	-	-	-	9.8	3.7	
	RON/100KWh/ month	-	-	-	-	-	4.5	1.7	RON 74 (EUR 15.9) for 2 years
Extension the exemption scheme (Scenario 2) vs. Non-extension of the exemption scheme in Scenario 1.2	EUR/MWh	2.2	2.2	2.2	2.2	2.2	2.2	0.6	
	RON/100KWh/ month	1.0	1.0	1.0	1.0	1.0	1.0	0.3	RON 76 (EUR 16.3) for 7 years

As a result of the legislative amendments introduced in 2018 by Law 184, final consumers will have to bear an additional cost of EUR 510 mln. related to 17 million GCs that would have remained unsold from prior periods according to OUG 24/2017

In 2017, **OUG 24** was approved, capping the **average green energy impact on the final consumer up to a maximum of EUR 11.1 per MWh**. This provision was **repealed** in the following year **by Law 184/2018** which establishes an average impact on the final consumer's bill of maximum **EUR 12.5 per MWh in 2019, EUR 13.0 per MWh in 2020 and 2021 and EUR 14.5 per MWh from 2022 onwards**. Also, Law 184/2018 guarantees the sale of all green certificates estimated to be issued between 1 April 2017 and 31 December 2031.

In addition to the three base case scenarios presented above, our study analyzed the evolution of GCs supply and demand in the event that the impact on the final consumer would not exceed the cap of EUR 11.1 per MWh over the entire period of the renewable energy support scheme, according to the previous form of this support scheme. Under these circumstances, it is estimated that **at the end of March 2032 approx. 17 mln. GCs will remain unsold, representing a value of approx. EUR 510 mln.**, compared to the current legislative framework which ensures that all GCs will be sold, adding an additional cost of up to EUR 3.4 per MWh to the final consumer bill. EI industrial consumers will also bear the extra cost due to the 17 mln. GCs that can be sold in accordance with the regulations in force, both during and after the expiry of the exemption scheme.

Demand / supply of GCs estimated with an impact capped at EUR 11.1 per MWh (mln. GCs)

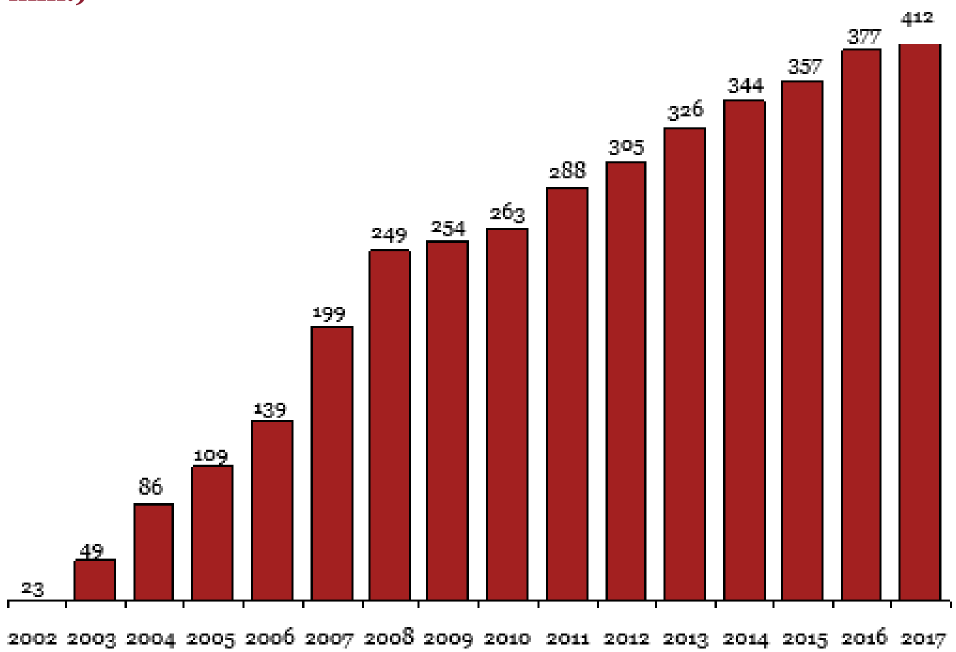


17 mln. GCs remained unsold in March 2032, representing an additional cost of approx. EUR 510 mln.

Source: PwC analysis

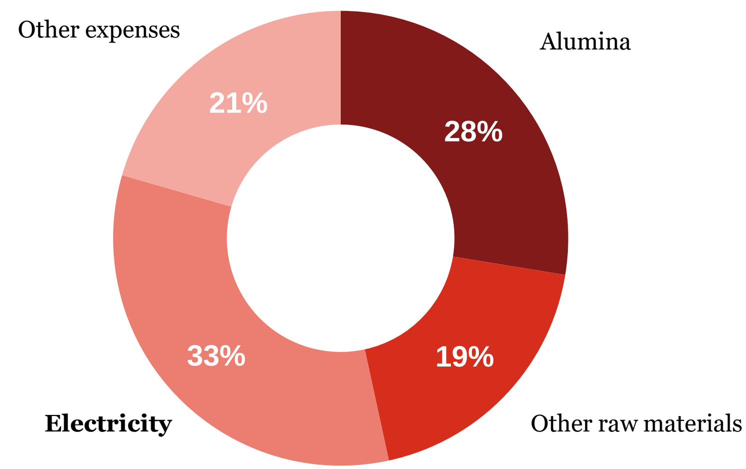
CASE STUDY - ALRO SA – the largest electricity consumer: Despite high investments in energy efficiency projects, the cost of electricity remains disproportionately high

Cumulative investments in energy and environmental efficiency projects since the acquisition of Alro SA by Vimetco Group (USD mln.)



Source: Alro SA

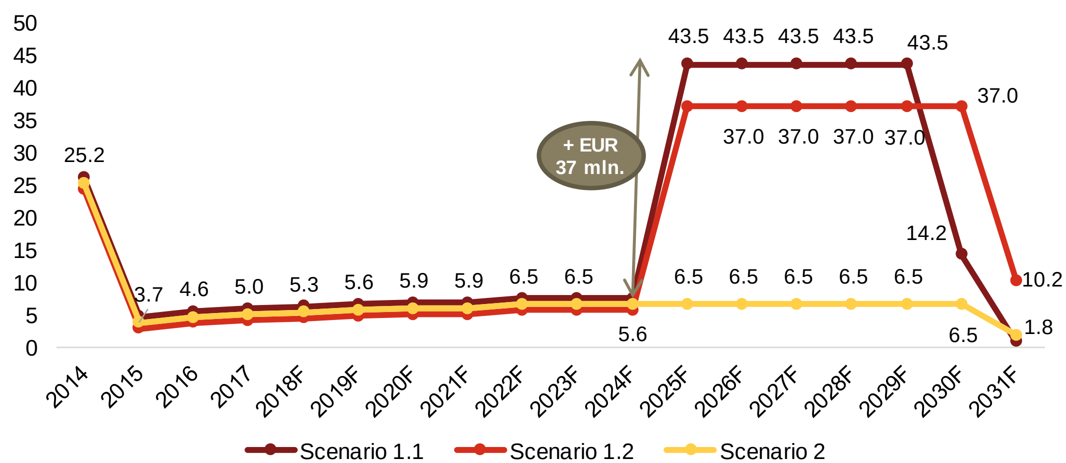
Weight of cost of goods sold components in total sales, 2017 (%)



The total investments performed by Alro SA in energy efficiency projects during the period 2002-2017 amounted to USD 412 mln. However, the company's electricity expenditure remains high, i.e. 33% of its turnover in 2017. This percentage was even higher in the past, since 2016 was the first year of full operation of the exemption scheme.

CASE STUDY - ALRO SA – the largest electricity consumer: Alro's profitability will be significantly affected starting 2025, once the exemption period will expire

GCs cost supported by Alro SA in the 3 scenarios (EUR mln.)



Source: PwC analysis, Alro SA

Assumptions:

- Alro SA's electricity consumption will remain constant at 3 TWh over the analysed period
- In 2014 Alro fully supported the cost of GCs with a major impact on the company's profitability.
- The company will bear 15% of the GC value by 2024 and 100% of GC cost starting 2025 (in Scenario 1)
- The GCs value used in the company's GCs cost estimate is the one projected in the 3 scenarios analysed above

Conclusions:

- Starting with 2025, following the completion of the GC exemption scheme, it is estimated that **Alro's cost will increase with EUR 37 mln. (or 567%).**
- The total cost incurred by Alro for the payment of GCs during the period 2015-2031 is estimated to amount to:
  - EUR 287.9 mln. in Scenario 1.1
  - EUR 287.8 mln. in Scenario 1.2
  - EUR 96.4 mln. in Scenario 2

The big industrial energy consumers sell products whose prices depend on standard products listed on international markets. Therefore, the price increases generated by domestic policies cannot be passed on through selling prices and the profitability of these companies is directly affected

Starting with 2017, GCs can no longer expire and can be traded even after the expiry date of the accreditation decision, by March 31, 2032

2014 - 2015

In 2015, the state aid scheme for partial exemption of large EI industrial customers, approved in 2014, entered into force. Also in 2014, the total allocated budget of the exemption scheme approved by the European Commission and amounted to EUR 750 mln. (for 10 years) was published.

2018

Estimated energy consumption for the forecast period (2018 - 2031) is 48,426 GWh, out of which 7,209 GWh represents the exempted consumption from the payment of GCs (the assessments are at the level of the data published by ANRE for 2017). The state aid budget used up to 2018 is estimated to amount EUR 154 mln.

2024

By the end of 2024, the exemption scheme will end its application period. The total estimated value of the state aid for the period 2015-2024 is EUR 729 mln. , with EUR 21 mln. less than the budget allocated to the scheme.

2025

Starting with 2025, EI industrial consumers will shoulder the entire support scheme burden if the exemption is not extended until the expiry date of the renewable energy scheme effects. In addition, due to the change in the way the mandatory annual GCs obligation is calculated, the impact of the RES-E scheme will increase to a maximum of EUR 14.5 per MWh starting 2022.

2031

By the end of 2031 it is expected that all GCs will be sold, even with the extending of the exemption scheme.

If the scheme is extended until 2031, the state aid budget will require an additional EUR 558 mln..

Extending the energy-intensive industries exemption scheme will not prevent renewable energy producers from fully exploiting their GCs until 2032

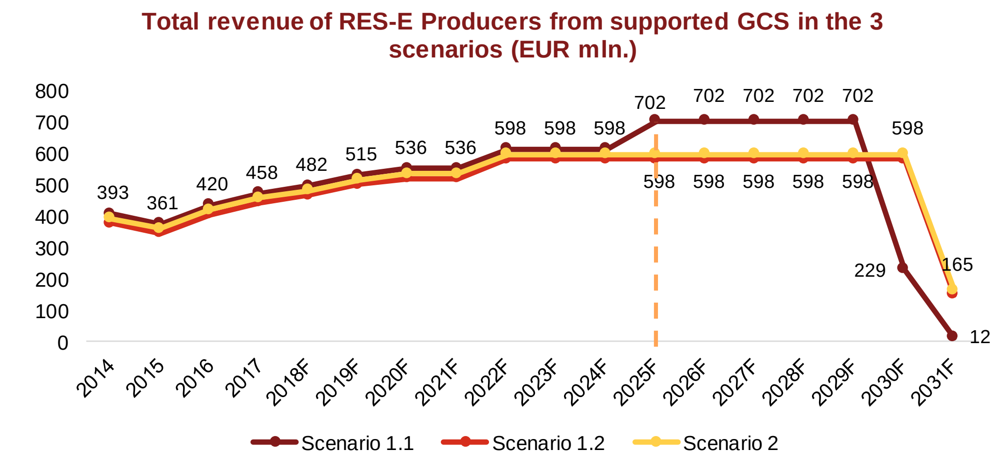
Assumptions:

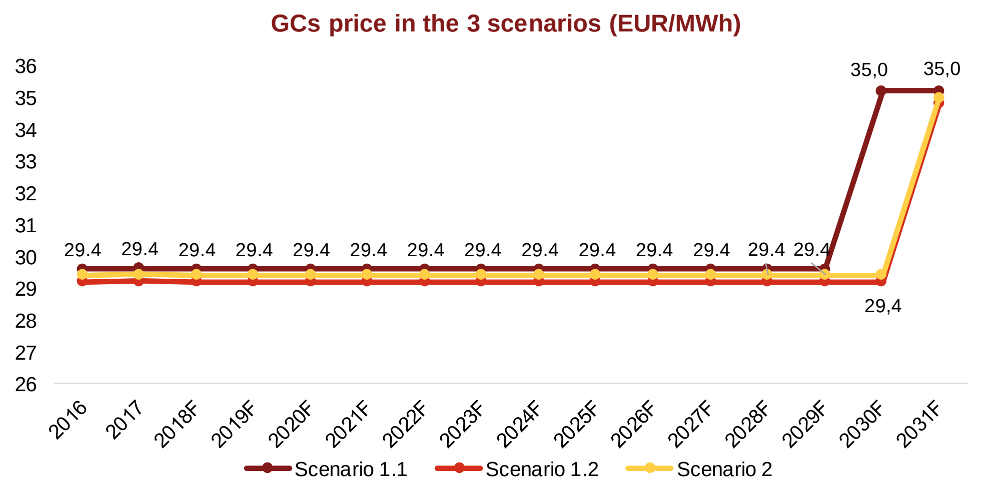
- In all 3 scenarios we considered the same amount of renewable energy generated from power plants that can qualify for the green certificate support scheme. During the forecast period, we estimated the amount of RES-E at 10.449 GWh to be constant until 2026, when production capacities whose application period of the accreditation decision has expired will gradually exit the support scheme .
- The trading price of the GCs is between 29.4 EUR (min) and 35 Eur/MWh (max) depending on the demand and supply.

Conclusion:

- The amount of revenues earned by renewable energy producers from green certificates during the forecast period (2018 - 2031) is expected to be similar in the 3 analyzed scenarios (+ 0.03% in scenario 1.1 compared to the other two scenarios). This small difference is due to the fact that in Scenario 1.1 GCs are expected to be traded at the maximum price in the last year of the bonus scheme for renewable energy (2031).

Note: Scenario 1.2 matches Scenario 2 in terms of total revenue of renewable energy producers, but also of the price at which the GCs are traded.





Source: PwC analysis

Extending the exemption scheme will ensure the completion of objectives mandated by current legislation for all energy market participants and will generate positive effects for the Romanian economy

Extending the exemption scheme for energy-intensive industries

RES-E Producers

Not affected by extending the exemption scheme

The impact of issued green certificates will not be affected by an extension of the exemption scheme.

Final consumers

Extending the exemption scheme won't lead to surpassing the cap

Final consumers will incur a green energy cost estimated at the level of the cap imposed by the regulations in force even if the exemption scheme is extended (after 2024).

Thus, after the extension of the exemption scheme, it is expected that **a household electricity consumer** with an average consumption of 100 kWh will **pay extra RON 1 per month** for renewable energy compared to the non-extension of the exemption scheme for EI consumers scenario after 2024.

Energy-intensive Final Consumers

Extending the exemption scheme for the entire lifetime of mandatory GC acquisition will ensure the viability of energy-intensive industries

Preserving the medium- and long-term competitiveness will lead to maintaining profitability margins at a level similar to comparable companies

Maintaining access to financing after the year 2019, given that banks require a sustainable 5-year business plan

Reducing the potential relocation risk of EI industrial platforms with significant positive effects for the Romanian economy

Appendices

Sources of information

Author	Title
ANRE - Department for Energy Efficiency, Renewable Sources, Cogeneration and Heat	Monitoring report on the operation of the system for the promotion of electricity produced from renewable sources in 2017
ANRE – Agency for Energy Efficiency, Renewable Sources, Cogeneration and Thermal Energy	Report on the Over-Compensation Analysis of the Green Certificates Promotion System for Renewable Energy Sources for 2017
The Ministry of Economy	Information relating to the year 2017 on the beneficiaries of the State aid scheme established by the HG. 495/2014
ANRE – Official Monitor of Romania	Order for the approval of the Methodology for setting the mandatory annual quota for the acquisition of green certificates
Official Monitor of Romania	Law no. 220/2008 of 27 October 2008 establishing the renewable energy production promotion system, in force since 23 July 2018
Official Monitor of Romania	DECISION No. 495 of 11 June 2014 for the establishment of a state aid scheme for the exemption of certain categories of final consumers from the application of Law no. 220/2008 establishing the renewable energy production promotion system, effective as of February 29, 2016
Official Monitor of Romania	OUG no. 24/2017 regarding the amending and completing of the Law no. 220/2008 establishing the system for promoting the production of energy from renewable energy sources
European Commission	RES support reduction for energy-intensive users, Bruxelles, 15.10.2014
Economic Consulting Associates	Sustainable Resource Initiative Policy Dialogue Framework Energy & Resources Window - Potential Changes to the Romanian RES Legislation, submitted to Ministry of Energy of Romania and EBRD

Glossary

Term	Definition/Meaning
ABIEC	Association of Big Industrial Energy Consumers
ANRE	National Regulatory Authority for Energy
GC	Green Certificates
EI	Energy-Intensive
RES-E	Energy from Renewable Energy Sources
EUR	European Currency
HG	Government Decision
OUG	Emergency Government Order
ECA Study	Study by Economic Consulting Associates
USD	US Dollar