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The Impact of Financial Support Mechanisms and Geopolitical Factors on the Profitability of Investments in Solar Power Plants in Slovenia

Iztok Gornjak [1,*], Filip Kokalj [2] and Niko Samec [2]

[1] Borzen, Power Market Operator, Dunajska Cesta 156, 1000 Ljubljana, Slovenia
[2] Faculty of Mechanical Engineering, University of Maribor, Smetanova Ulica 17, 2000 Maribor, Slovenia; filip.kokalj@um.si (F.K.); niko.samec@um.si (N.S.)
* Correspondence: iztok.gornjak@borzen.si

Abstract: This article examines the impact of financial support mechanisms and geopolitical factors on the profitability of investments in solar power plants within Slovenia. The European Union's energy policy prioritizes increases in renewable energy sources, aiming to reduce dependency on unstable and volatile fossil fuel markets. Solar power plants play a vital role in this transition. The energy policy framework also includes mechanisms and support systems to operate such facilities. This article analyzes electricity price trends over the past decade and addresses which support type—guaranteed purchase or operational support—has proven more profitable for investments in solar power plants up to 50 kW in Slovenia, considering economic and geopolitical influences on the electricity market. Although the global energy market has been affected by various significant events in recent years, it was found that the COVID-19 pandemic had minimal impact on the electricity market. In contrast, the onset of the conflict in Ukraine has contributed to rising electricity prices and has influenced the support dynamics essential for the development and sustainability of renewable energy systems. Analyses from the past decade indicate a higher return on investment in solar power plants when operational support mechanisms are chosen over guaranteed purchase support.

Keywords: renewable energy sources; solar power plants; support system; investment profitability factors; electricity price

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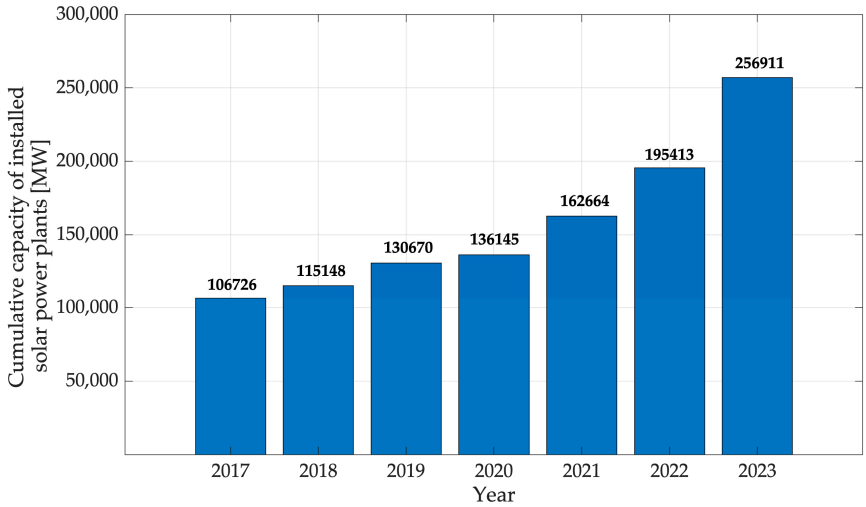
1. Introduction

The European Union's energy policy [1] places special emphasis on increasing the share of renewable energy sources, leading to a reduction in dependence on unreliable and volatile fossil fuel energy markets. Among renewable sources, solar power plants play a crucial role in reducing dependence on fossil fuels. The energy policy in EU countries also includes financial support mechanisms or support systems for the operation of such facilities and devices for electricity production from renewable sources.

The European Union and Slovenia aim to accelerate the deployment of new electricity production facilities from solar power plants or other solar energy sources from the perspective of renewable energy to contribute to the goal of decarbonization by 2050. The installed capacity of solar power plants is expected to increase from the current level of nearly 200 GW (Figure 1a) [2,3] to 320 GW by 2025, 600 GW by 2030 [4], and several TW by 2050. Slovenia recently (November 2023) surpassed 1 GW of installed capacity in solar power plants (Figure 1b) [5], representing only 0.5% of the cumulative installed solar power capacity in the European Union. However, the annual growth rate of installed solar power plants in Slovenia increased by 2.2 times in the last year compared with the European Union's annual growth rate of 1.3 times.



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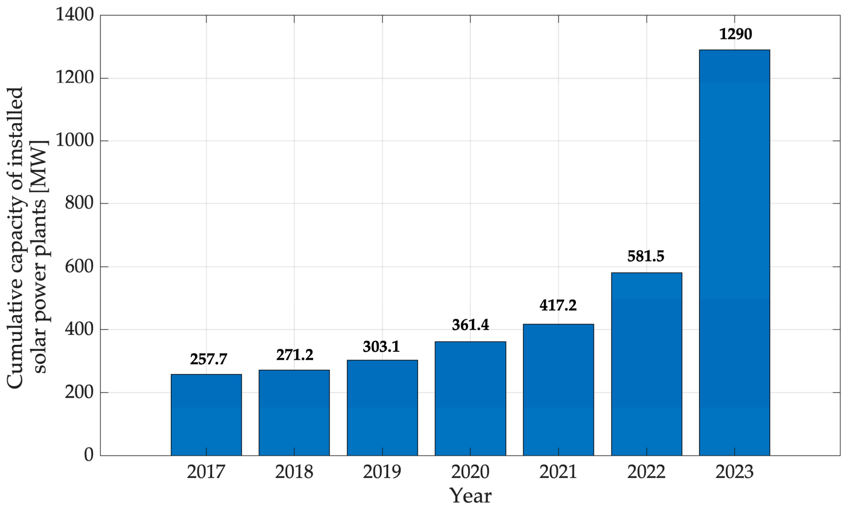

(**b**)

Figure 1. Cumulative capacity of installed photovoltaic systems from 2017 to 2023: (**a**) in the European Union [3] and (**b**) in Slovenia [4].

This raises the question of how economic changes and geopolitical tensions have affected the stability of investments in solar power plants. This paper aims to illustrate whether investors have become less adaptable during this time and whether they have still been able to achieve profitability. The purpose of this paper is to determine how market changes during times of economic instability have affected the profitability of investments and whether investors have had the opportunity to take advantage of better market conditions. Economic or financial factors significantly impact the profitability of investments in renewable energy systems. These factors depend on the movement of energy prices in sales markets that follow supply and demand, as well as various significant and unpredictable price deviations due to changing economic or geopolitical conditions. Investors do not have direct control over these factors; however, they do have the option to choose a financial support system, which is discussed in this paper.

The analysis presented in this paper aims to provide answers to the question of which type of support system (guaranteed purchase or operational support) has proven to be more profitable for investment in solar power plants up to 50 kW in Slovenia during the period from 2009 to 2024, considering the impacts of various economic and geopolitical factors.

2. Financial Support Mechanisms and Other Factors Affecting the Profitability of Investments in Solar Power Plants

The profitability of investments in solar power plants is influenced by financial support mechanisms and other factors, which will be detailed in this chapter.

The financial support system is a state aid mechanism that encourages and facilitates investments in renewable energy facilities and devices by offering higher purchase prices for electricity. These supports aim to achieve national goals regarding the share of renewable energy usage, which each EU member state must meet. In Slovenia, the management of the support system is carried out by the state-owned company Borzen [6], which is responsible for disbursing support to the producers included in the support system based on the Renewable Energy Sources Promotion Act [7].

Support is provided for renewable energy production facilities that do not exceed 10 MW of nominal installed electric power, with the exception of wind energy production facilities, for which this limit is 50 MW, and high-efficiency cogeneration production facilities, which do not exceed 20 MW of nominal electric power. In Slovenia, beneficiaries of the support scheme can choose between two types of support: guaranteed purchase (GP) of electricity or operational support (OS), also known as financial assistance for ongoing operations.

Guaranteed purchase (GP) of electricity is a type of support that offers stability and predictability for investors, as it guarantees a purchase price for the produced electricity for the entire subsidy period (up to a maximum of 15 years for renewable energy sources). Facilities with this type of support are guaranteed to balance differences between forecasted and actual production, known as deviation coverage for balance-recognized quantities delivered to the public grid.

Operational support (OS), or "financial assistance for ongoing operations", is a type of support that allows the price for produced electricity to adapt to market conditions, serving only to compensate for the difference between production costs and the market price in the open market. By choosing this type of support, investors in renewable energy facilities, such as solar power plants, are more exposed to fluctuations in electricity prices in the open market. Investors in facilities (e.g., solar power plants) must arrange the balancing of differences between forecasted and actual production themselves, or this can be managed by the electricity supplier with whom they have a contract.

In the early years of these subsidy programs, tariff rates for both GP and OS were initially high to encourage rapid growth in solar energy production. With the increasing integration of PV systems, the volume of solar electricity produced also grew, as supported by continuous improvements in PV technology and reductions in installation costs. This trend led to a gradual decrease in both GP and OS tariffs in line with the system's planned digression rate. This analysis examines whether the current tariff settings and digression rates continue to be effective and balanced as PV technology and market conditions evolve.

In Slovenia, the requirements for investors to obtain GP or OS were specifically designed to encourage investments in renewable energy sources. These conditions were established based on the size and type of the solar power plant, as well as the requirements set by Slovenian legislation and the market operator Borzen. These terms included the following key aspects: registration (overview of all technical and administrative conditions), regulatory compliance (compliance with the requirements of legislation on renewable energy sources), submission of documentation (investment plan, technical specifications, evidence of compliance with environmental and safety standards and permits for connection to the network), minimum operating time (at least 15 years) and monitoring (produced electricity).

The calculation of GP and OS is based on the methodology determined by legislation and regulations adapted to support renewable energy sources. Calculating the two support schemes includes key elements to ensure the financial sustainability of investments in renewable energy resources. GP supports revenue stability with a fixed price at which all generated electricity is purchased for a predetermined period (up to 15 years), eliminating market fluctuations risk. The GP price is determined based on the reference cost of electricity production, including fixed and variable costs. It is determined once a year, where the investor receives the same GP value for each MWh of electricity produced for the next 15 years.

OS enables the adjustment of revenues to market conditions, as the price for produced electricity changes depending on market conditions. OS is intended to cover the difference between the market price and reference production costs. It is often a riskier model, as it is exposed to market fluctuations, but it can yield higher returns at high market prices. The OS price is calculated as the difference between the reference cost of production and the market price of electricity, where the reference cost of production is calculated in the same way as for GP and the market price of electricity is based on the average of a certain reference market (e.g., HUDEX—Hungarian Electricity Exchange) and constitutes the basis for calculating the subsidy. OS, therefore, balances the difference between the market price and actual costs of electricity production, with the amount of support depending on annual market prices. Higher electricity prices mean lower OS and vice versa.

The profitability of investments is also influenced by other factors, over which investors have only partial control. However, they can increase the yield of electricity production from solar power plants with appropriate technical solutions:

- Solar Radiation: The level of solar radiation [8] at the geolocation of the buildings where solar power plants are installed, as well as the placement, architectural characteristics, and construction features of the buildings, all partially influence electricity production. Investors can enhance the output of their solar power plants by selecting an appropriate installation (orienting solar modules southward with the proper tilt) and technical solutions or technical implementations of solar power plants. Global radiation values in Slovenia are generally higher in summer than in winter. During summer, they average around 6.27 kWh/m^2 daily or about 194.44 kWh/m^2 monthly, while in winter, they are less than 0.89 kWh/m^2 daily or less than 27.78 kWh/m^2 monthly. For buildings that do not allow for the optimal positioning of solar modules, tracking systems that automatically adjust the orientation of solar modules based on the position with the highest radiation can be used. However, this type of investment is higher [9]. Technological advancements have made tracking systems for solar power plants more affordable and comparable to traditional installation methods [10].
- Air Pollution with PM10 Particles: In Slovenia, air pollution with PM10 particles is an important factor that affects electricity production and, consequently, investment profitability. PM10 air pollution reduces ground solar radiation levels and contaminates solar module surfaces [11]. Increasing attention is being given to new approaches and technological solutions to address this issue [12].
- Climate Change: Climate change increasingly impacts extreme temperature fluctuations across seasons. Higher temperatures of solar modules lead to decreased electricity production. An exceptional portion of solar energy (over 70%) is lost as thermal energy, resulting in only 22% utilization of received solar energy. Research and development in this area are yielding various innovative solutions to ensure the highest efficiency of solar power plants. Recently, an approach known as the hybrid multi-generational photovoltaic sheet has gained prominence [13]. Experimental results show that this approach can significantly reduce the thermal load on solar cells while increasing their electrical efficiency by almost 14%. Additionally, the photovoltaic sheet utilizes the acquired heat for the cogeneration of additional thermal energy and fresh water, significantly increasing the overall efficiency of solar energy utilization to 74.5%. This groundbreaking technology promises to revolutionize photovoltaic technology, offering a sustainable solution to global challenges related to energy and water.

The GP and OS systems in Slovenia essentially function as a type of Premium Feed-in-Tariff (FIT), similar to systems used in many European countries to stimulate renewable energy investment, with adjustments based on market dynamics and regional needs. For instance, Spain and Germany have implemented FIT systems that include premium tariffs tailored to market conditions, allowing renewable energy producers to benefit from additional payments that fluctuate based on electricity prices. Spain's "caps and floors" approach is particularly notable, as it prevents excessive returns by setting maximum and minimum payment limits, thus balancing incentives with financial sustainability [14]. Other researchers have highlighted similar benefits of premium tariffs in the EU context. The impact of the FIT system on renewable energy investment was examined by Alolo et al. [15], who noted that the mere presence of a FIT does not automatically lead to increased investments. Instead, specific terms within the FIT, such as tariff level, contract duration, and degression rate, are essential for effectiveness. Their findings suggest that flexible, market-linked premiums allow for higher returns without jeopardizing market stability, particularly in countries with fluctuating electricity prices. Further supporting these findings, Dijkgraaf et al. [16] explored the influence of well-structured FITs on solar photovoltaic (PV) development across OECD countries. They concluded that the effectiveness of FITs varies widely and can be up to seven times greater when policies are consistent and well designed, with factors like contract duration and tariff stability playing critical roles. This study emphasizes that FIT schemes with robust and clear structures, such as those in Spain, yield far better results than those with inconsistent or insufficiently supportive frameworks. Xydis and Vlachakis [17] further examined FIT systems in liberalized markets, focusing on Greece, where a shift toward a FIT system has introduced more competition between renewable and conventional energy sources. They argue that the FIT's variable nature, allowing payments to rise when prices are low and fall when prices are high, benefits both the market and consumers. Spain's system again serves as a benchmark, demonstrating how premium caps can reduce the burden on end-users while incentivizing renewable energy production without excessive costs.

3. Analysis of the Profitability of Investments in Solar Power Plants in Slovenia

In analyzing the profitability of investments in solar power plants in Slovenia, we based our assessment on the reference price of electricity. Figure 2 illustrates the movement of the reference price of electricity from 2009 to 2024 [18], during which we witnessed a stable energy market, with the average electricity price in Slovenia, despite the COVID-19 pandemic, amounting to 55.38 EUR/MWh. This timeframe represents the period before the start of the conflict in Ukraine, during which prices remained relatively low and stable.

Figure 2. Movement of the reference price of electricity 2009–2024 (EUR) [14].

A significant turnaround followed as the conflict in Ukraine contributed to an unprecedented rise in electricity prices on EU markets starting in February 2022, as shown in

Figure 2. The increase or spike in electricity prices was dramatic, with a percentage rise of 1016% compared with the previous average from 2009 to 2021. This extreme jump in electricity prices reflects several factors.

The so-called reference market price, calculated as the average of the closing trading prices of the product, is decisive. For Slovenia, the price movements on the Hungarian exchange HUDEX (Hungarian Financial Power Base Load Product) are decisive, specifically for the next year in EUR/MWh. The average is calculated using 40 trading days before 25 October of each reference year. For 2023, the reference market price in Slovenia was exceptionally set by the Government of the Republic of Slovenia through the Emergency Intervention Act to address high energy prices, reducing it from 512.01 EUR/MWh to 180.00 EUR/MWh (as shown with the red dot and dotted blue line in Figure 2). For the analysis of investment profitability and/or the operation of a solar power plant, the reference electricity price of 180.00 EUR/MWh was considered to calculate operational support subsidies for 2023.

Although the world has witnessed numerous global events affecting energy markets in recent years, it has been found that the COVID-19 pandemic did not significantly impact electricity prices. While Europe was "in the grip" of extraordinary energy price increases due to the conflict in Ukraine, it is interesting to note that the pandemic did not cause noticeable fluctuations in energy or electricity prices on a global scale. The COVID-19 pandemic did have a certain impact on the energy sector, but measures to control the pandemic, such as movement restrictions and business closures, caused only minor price fluctuations. Despite temporary supply chain issues and reduced energy demand, the pandemic's impact on energy price movements was minimal. In fact, the effect of the COVID-19 pandemic was more evident in the form of a slightly smaller increase in electricity prices compared with previous years. This price increase was mainly due to milder demand and production adjustments to the changed conditions.

Additionally, subsidies for renewable energy sources have adjusted due to increased electricity prices. Countries had to face the need to adapt their support policies to cope with higher electricity costs. The rise in the reference market price of electricity means a decrease in operational support and vice versa [19].

The average level of operational support from 2009 to 2022 ranged between 242.52 EUR/MWh and 366.72 EUR/MWh, as shown in Figure 3. However, the conflict in Ukraine caused a significant reduction in subsidies, which decreased by an exceptional 45% to 132.42 EUR/MWh in 2023. This reduction in operational support was directly linked to the conflict's impact on market factors affecting the calculation of subsidies for renewable energy sources, including solar power plants. Each year, the amount of OS and GP changes, meaning that a solar power plant installed in 2009 will have different OS or GP values compared with a solar power plant installed in, for example, 2010. Figure 3 presents the OS and GP values for all four solar power plants installed in 2009, 2010, 2011, and 2012.

The amount of operational support and guaranteed purchase is determined based on reference costs according to Equation (1), published in the methodology for determining the reference costs of electricity produced from renewable energy sources. These costs consist of variable and fixed reference costs.

$$\text{Reference electricity price} = \frac{(\text{Costs} - \text{Revenues})}{\text{Net produced electricity}} \quad (1)$$

where costs represent annual investment, operation, and maintenance expenses while revenues reflect electricity production based on the support scheme. Reference costs are thus defined as the sum of fixed and variable reference costs. The amount of annual operational support is the difference between the annual reference costs and the reference price of electricity while considering the size factor of the renewable energy production facility, which is 0.88 for a micro solar power plant (less than 50 kW). For solar power plants operating under the guaranteed purchase support scheme, the amount of support equals the annual reference costs.

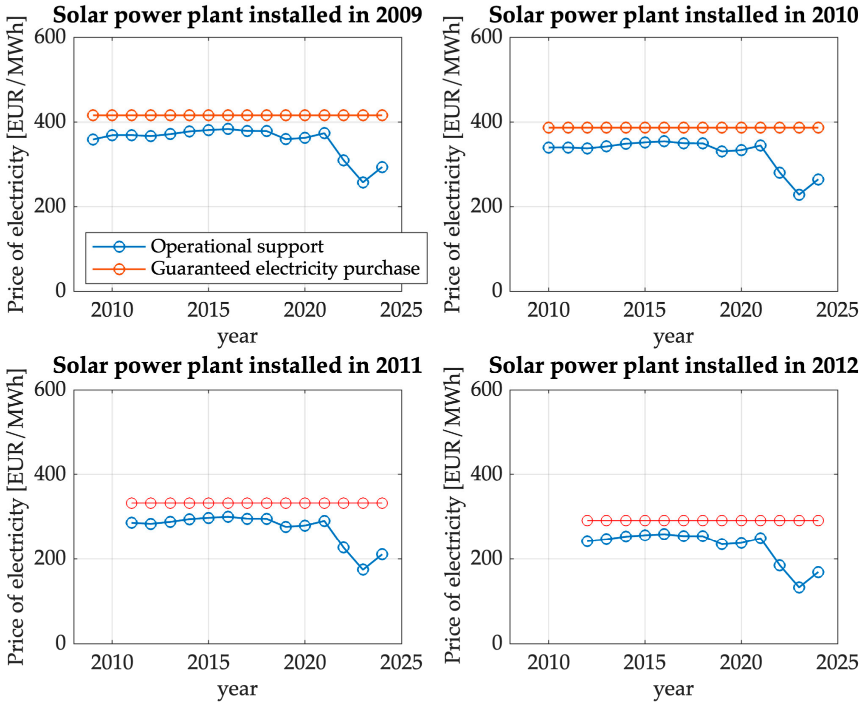

Figure 3. The amount of guaranteed purchase and operational support for solar power plants up to 50 kW in the period from 2009 to 2024 (EUR/MWh) [6].

This demonstrates that the conflict in Ukraine led to an increase in electricity prices and altered the dynamics of support mechanisms, which are crucial for the development and sustainability of renewable energy systems. Geopolitical events also influenced the market price of electricity, as shown in Figure 4. Between 2009 and 2022, the market price of electricity was 57.28 EUR/MWh, but in 2023, this price surged to 205.00 EUR/MWh, representing a 293% increase from the pre-conflict average. This drastic change in market electricity prices directly impacted subsidy beneficiaries, who could sell their electricity at higher prices during this period.

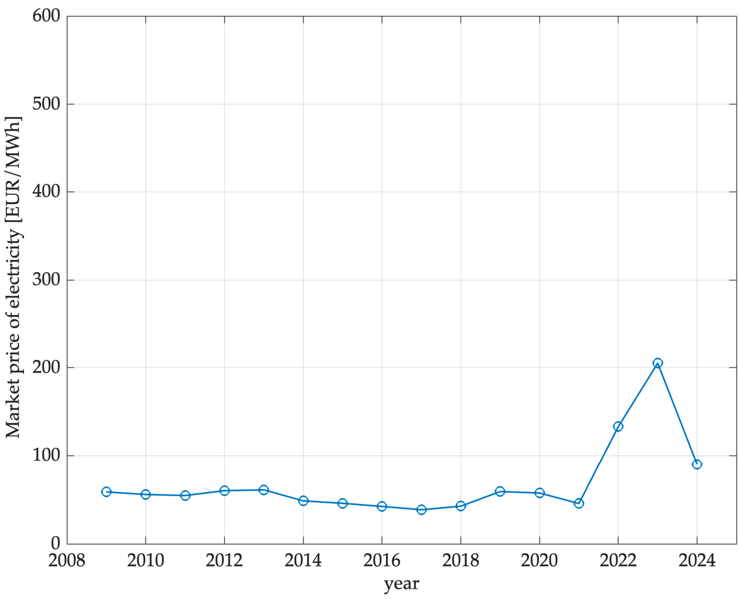

Figure 4. The market contract price for the sale of electricity (EUR/MWh) in the period from 2009 to 2024 [6].

In this analysis, the production of electricity from solar power plants, according to actual measurements from 2009 to 2024, was also crucial. The conflict in Ukraine thus had an indirect impact on the level of support, as the increase in the reference market price of electricity caused a decrease in operational support, while the higher market price increased revenues from the sale of electricity from solar power plants. Figure 5 shows the total price of sold electricity (market with support) (EUR/MWh) for all four solar power plants installed in 2009, 2010, 2011, and 2012.

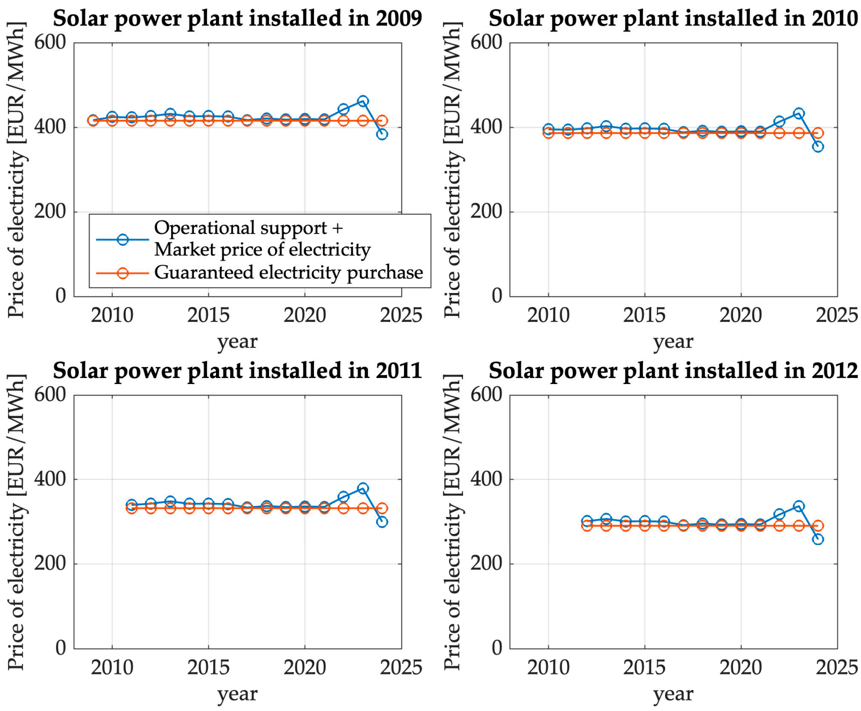

Figure 5. The total price of electricity (operational support with the market price of electricity) (EUR/MWh) in the period from 2009 to 2024.

4. Results and Discussion

The economic analysis of solar power plant electricity production included comparing the payback period and net cash flow calculations between the guaranteed purchase support and operational support for four different solar power plants with capacities of up to 50 kW. The payback period was selected as the central metric in this analysis due to its simplicity and practical relevance for stakeholders in the renewable energy sector, particularly small-to-medium-sized investors. This metric provides a direct indication of the time required to recover the initial investment, which is crucial for assessing the financial viability and risk associated with renewable energy projects. Table 1 shows the installed capacities and investment costs for four different solar power plants that were installed between 2009 and 2012.

Table 1. Installed capacities, investment costs in Slovenia, and year of installation of four different solar power plants.

	Installed Capacity	Investment Cost	Year of Installation
Solar power plant 1	49.98 kW	3500 EUR/kW	2009
Solar power plant 2	49.92 kW	3150 EUR/kW	2010
Solar power plant 3	49.86 kW	2350 EUR/kW	2011
Solar power plant 4	49.35 kW	1900 EUR/kW	2012

As can be seen from Table 1, all four solar power plants have almost the same installed capacity (about 50 kW), but each solar power plant was installed in a separate year (from 2009 to 2012). The annual electricity production for each solar power plant was directly measured for each year. This approach accounted for the variations in irradiation across seasons, ensuring that the analysis reflected precise, real-world production data. Installation costs were considered alongside maintenance expenses, insurance costs, actual electricity production, and the replacement of necessary components within the lifetime of the solar power plant. This is important because the support scheme (GP or OS) varied based on the year of installation. However, the table also provides the investment costs for each solar power plant, which is important for further economic analysis. Figure 6 and Table 2 present the payback period of solar power plants installed in 2009, 2010, 2011, and 2012 using different support schemes.

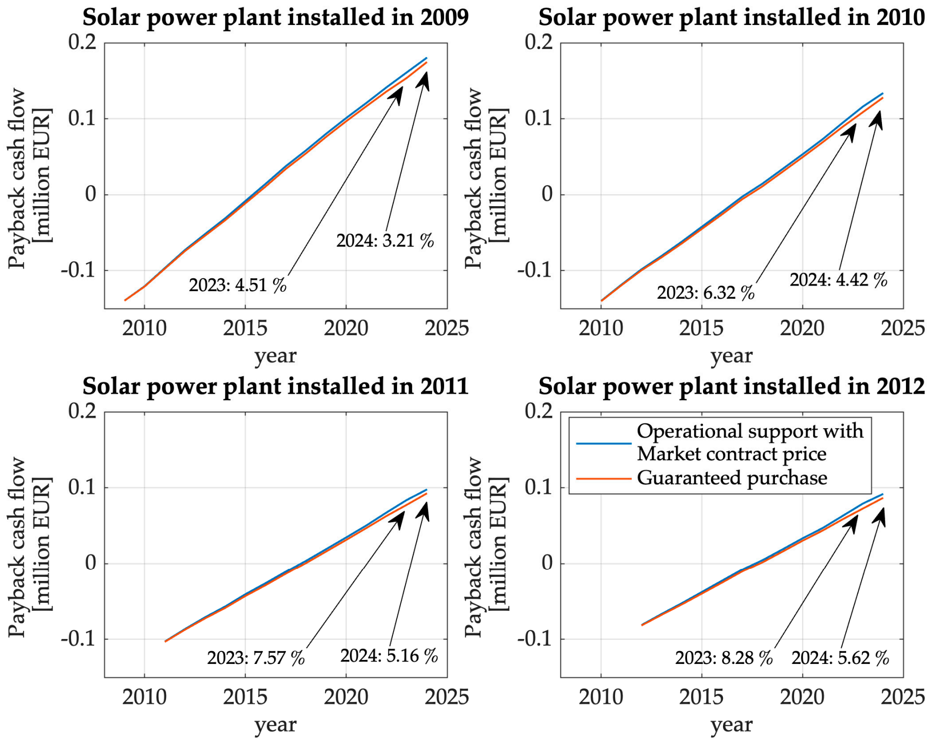

Figure 6. The payback period of solar power plants using operational support with market contract price or guaranteed purchase.

As shown in Figure 6 and Table 2, the annual return on OS was higher in all four cases of solar power plants compared with the annual return on GP support. In 2024, the annual return on OS was approximately between 3.21% and 5.62%, higher than the annual return on GP support. In 2023, the differences in annual returns were even greater, ranging between 4.51% and 8.28%. This difference can be explained by the changes of the reference price of electricity and, consequently, the market contract price of electricity, which fell from the regulated price of 180 EUR/MWh to 138.74 EUR/MWh in 2024. In the coming years, we can expect a further decrease in the reference price of electricity due to the stabilization of the electricity market. Figures 7 and 8 show the payback periods of solar power plant investments using OS and GP.

Figures 7 and 8 show that in both support schemes (OS and GP), the fastest payback period for a solar power plant investment occurred if the plant was installed in 2012 (5.7 years and 6 years, respectively). The payback period is influenced not only by the type of support chosen (OS and GP) but also by the investment cost of the solar power plant, as shown in Table 1.

Table 2. The payback period of solar power plants using operational support with market contract price or guaranteed purchase.

		Year of Installation							
		Guaranteed Purchase				Operational Support with Market Contract Price			
		2009	**2010**	**2011**	**2012**	**2009**	**2010**	**2011**	**2012**
Payback cash flow [EUR]	2009	−139.672				−139.612			
	2010	−121.004	−140.315			−120.591	−139.927		
	2011	−97.509	−119.510	−103.341		−96.692	−118.744	−103.011	
	2012	−74.265	−99.668	−87.388	−81.892	−72.888	−98.399	−86.585	−81.436
	2013	−53.915	−82.592	−72.510	−67.918	−51.810	−80.686	−71.051	−66.749
	2014	−33.582	−64.358	−58.694	−54.289	−31.015	−62.015	−56.852	−52.679
	2015	−11.302	−45.118	−43.058	−39.974	−8.201	−42.290	−40.755	−37.876
	2016	10.751	−26.024	−28.871	−25.551	14.326	−22.765	−26.196	−23.012
	2017	33.878	−6.103	−13.739	−10.783	37.534	−2.769	−10.999	−8.171
	2018	54.386	10.825	636	1.539	58.279	14.362	3.580	4.352
	2019	76.197	30.001	16.003	15.764	80.219	33.657	19.058	18.697
	2020	96.836	49.322	31.364	30.195	101.043	53.162	34.590	33.313
	2021	116.568	69.107	47.019	43.667	120.915	73.096	50.382	46.920
	2022	136.026	89.596	62.944	58.574	141.509	94.868	67.469	63.084
	2023	153.829	108.765	77.556	72.661	161.101	116.108	83.915	79.223
	2024	174.712	127.931	92.677	86.662	180.514	133.848	97.723	91.820

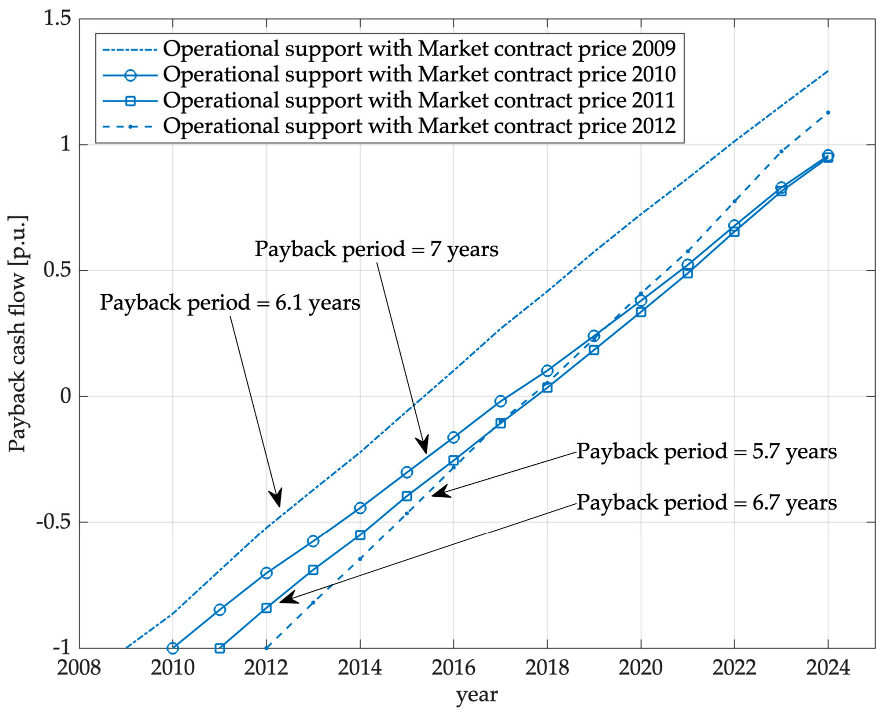

Figure 7. The payback period of solar power plants [per unit—p.u.] using operational support with the market contract price.

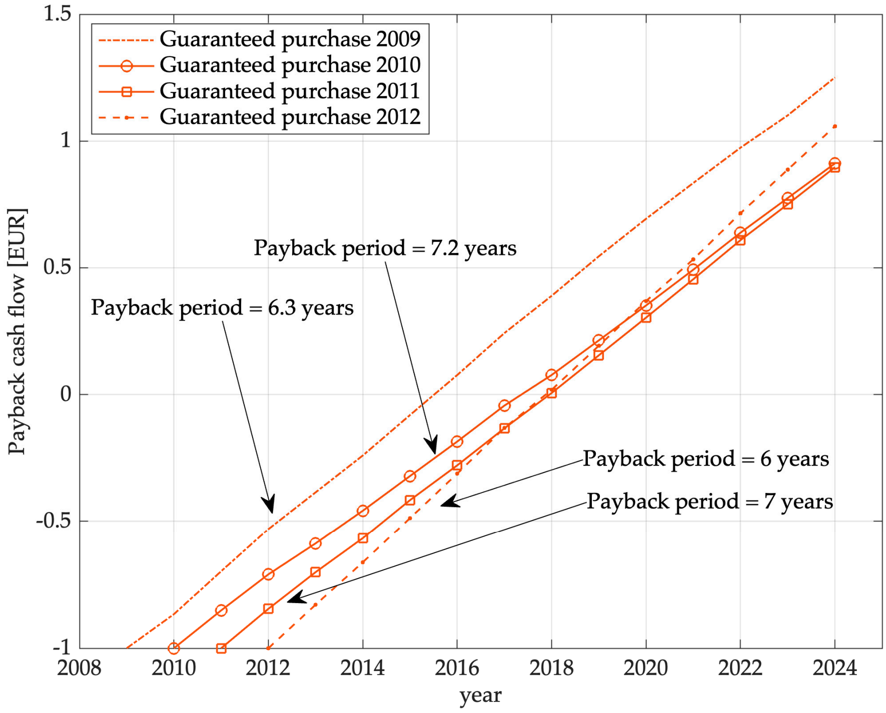

Figure 8. The payback period of solar power plants [p.u.] using guaranteed purchase.

Moreover, it is clear that the increase in the reference price of electricity and, consequently, the market contract price of electricity has steepened the payback cash flow curve when using OS. The highest profitability was achieved with a solar power plant installed in 2009 due to the exceptionally high prices of OS or GP.

Predicting electricity prices for 2025, 2026, and 2027, which are crucial for completing the 15-year financing period of support schemes, would allow us to assess which solar power plant achieves the highest financial returns after the end of the financing period. The analysis covering the period from 2009 to 2024 indicates that opting for OS over GP for this specific example of a solar power plant up to 50 kW in Slovenia was highly successful. During this period, the profitability of solar power plants with OS exceeded that of those with GP by an average of 5480 EUR (4.6%). A significant factor contributing to this financial difference was the onset of the conflict in Ukraine.

Overall, the analysis reveals that the annual return under GP remained consistent over the years, whereas the variability of the annual return under OS presented both a challenge and an opportunity for renewable energy producers. During the conflict in Ukraine, OS was particularly high, underscoring how dynamic and diverse geopolitical events on global markets can significantly impact the profitability of renewable energy facilities and devices, even with stable support.

5. Conclusions

The impact of financial support mechanisms and geopolitical factors on the profitability of investments in solar power plants in Slovenia is a complex and multifaceted issue. In analyzing the profitability of solar power plant investments in Slovenia from 2009 to 2024, we found that various factors play a significant role. The choice between GP and OS is crucial. The GP system provides stability with fixed purchase prices, ensuring predictable returns for up to 15 years. Conversely, the OS system allows prices to adjust according to market conditions, potentially yielding higher returns and exposing investors to price fluctuations. Furthermore, the findings reveal that the digression in GP and OS tariffs has played an essential role in aligning subsidy rates with the evolving PV market. While early tariffs were intentionally set high to stimulate initial investments, subsequent rate reductions reflect improvements in PV technology, lower investment costs, and increased production efficiency.

This distinction raises important questions regarding the adequacy of both models in maintaining balanced compensation. GP provides stability but lacks responsiveness to ongoing market changes, potentially becoming less attractive as PV technology and market dynamics advance. Conversely, OS's adaptability to market prices has recently provided higher returns due to elevated energy prices, raising concerns about over-rewarding PV investments. Ensuring that tariffs remain aligned with market conditions and sustainable support goals is crucial to preserving the system's long-term viability and fairness.

The period analyzed included significant global events such as the COVID-19 pandemic and the conflict in Ukraine. While the pandemic had minimal impact on electricity prices, geopolitical developments related to Ukraine contributed to a significant increase in market prices, with prices reaching 512 EUR/MWh before regulation to 180 EUR/MWh in 2023. This increase decreased OS but boosted revenues from electricity sales. The analysis shows that the OS system has been more profitable than the GP system, with returns exceeding those of the GP system by an average of 5480 EUR (4,6%) over the period. Generally, GP tends to be more profitable in stable energy markets, where fixed purchase prices provide predictable and secure returns over time without exposure to market volatility. On the other hand, OS has shown specific advantages in Slovenia due to recent increases in market prices. These elevated prices on the energy exchange have enabled OS to yield higher returns than GP, as the OS model directly benefits from rising market rates. For GP to surpass OS in profitability under current conditions, the market would need to stabilize with relatively low and predictable prices, minimizing the advantage that OS gains from market fluctuations. Additionally, adjusting the fixed tariff rate for GP in line with inflation or including a variable component linked to market benchmarks could enhance its competitiveness in more dynamic markets. This would give GP flexibility to respond to changing market conditions, potentially improving its profitability relative to OS.

Predicting future electricity prices for 2025–2027 is essential for assessing long-term profitability. The stabilization of the market could lead to decreased reference prices, impacting OS levels. Understanding these trends will help investors make informed decisions.

In conclusion, the choice of financial support mechanisms, market conditions, and geopolitical events significantly influence the profitability of solar power investments. OS has proven effective in promoting the growth and development of solar power plants up to 50 kW in Slovenia, particularly in the context of recent market dynamics. This analysis highlights the role of flexible support mechanisms in encouraging investment decisions that maximize solar power profitability. However, it is essential to assess whether these earnings are economically justified and balanced with the sustainability of the support system. Our evaluation includes considering whether the OS model provides fair compensation or potentially results in excessive profits, given the associated risks. Furthermore, this analysis raises important questions about the long-term sustainability of the OS model. Ensuring that returns remain balanced without overcompensating investors is crucial for the durability of the support framework. A more in-depth examination of profit levels relative to market dynamics and investor risks would help maintain a fair and sustainable system, aligning investor incentives with broader economic goals.

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