

Ptak, Michał

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# Incentives to promote the development of renewable energy in Poland

**Michał PTAK**  
**University of Economics in Wrocław, Poland**

**Abstract:** The aim of this paper is to analyse the support scheme to promote electricity from renewable sources in Poland. The first part of the paper presents advantages and disadvantages of different instruments which can be used to promote investments in renewable energy projects. These include feed-in tariffs, fixed premiums, green certificates and tender systems. The second part includes an analysis of the instruments used in Poland to support renewable energy. Attention is also paid to the new support scheme included in the draft of the act on Renewable Energy Sources.

**Keywords:** renewable energy, energy policy, green certificates

## 1. Introduction

The development of renewable energy arises from the need to ensure energy security and to mitigate climate change. In order to promote renewable energy governments provide different support schemes. It can be assumed that such mechanisms are essential to meet renewable energy targets including the 2020 EU target (20 percent share of renewable energy by 2020). Therefore, the policy instruments should be carefully designed.

The aim of this paper is to analyse the current support scheme to promote electricity from renewable sources in Poland. The scheme is to be significantly reformed and partly replaced by the other mechanism. The new support scheme is included in the draft of the act on Renewable Energy Sources.

The starting point of the paper is a brief theoretical analysis of advantages and disadvantages of different instruments which can be used to promote investments in renewable energy projects.

## 2. Support instruments for renewable energy

Incentives to promote electricity from renewable sources are measures used to make a renewable energy competitive on the energy market (Micheli, 2012: 86). Renewable electricity support schemes can be grouped into two categories: price-based and quantity-based approaches. In former mechanisms the price paid to the electricity producers is determined by the governmental entity and the quantity of electricity is set by the market (Wizelius, 2007: 140). Quantity-oriented instruments require obliged parties (eg. renewable electricity plants or retail suppliers) to generate or buy a given amount of renewable energy power (Kuik and Fuss, 2011: 39-40).

Table 1 describes in detail main renewable electricity support schemes.

**Table 1. Main support schemes for renewable energy**

Support scheme	Characteristics	Advantages	Disadvantages
Price-based instruments			
Feed-in tariffs	Renewable energy producers are given a guaranteed price (a fixed tariff) per unit of green power. Electricity grid operators or suppliers are obliged to buy energy at this price. The price is higher than the price of electricity from fossil fuels in order to compensate for the higher cost of using renewable resources for producing energy. The tariff is guaranteed for a fixed period of time (for example 20 years) depending on the renewable technology.	<ul style="list-style-type: none"> <li>• Feed-in tariffs provide price certainty and stable, long-term income flows for producers.</li> <li>• Incentives can be differentiated among various types of renewable energy sources. Hence, not only cheapest technologies can be developed.</li> <li>• Fixed tariffs encourage steady development of small and medium-sized producers.</li> </ul>	<ul style="list-style-type: none"> <li>• The price is not determined by the market but instead fixed by the government.</li> <li>• Investors will not have strong incentive to reduce generation costs when prices are not adjusted to technology developments.</li> </ul>
Fixed premium systems	Premium payment scheme is a variant of the feed-in tariff model. Under this scheme, producers receive a premium in addition to the market electricity price.	<ul style="list-style-type: none"> <li>• Price signals are delivered by the market and producers optimise their production.</li> <li>• Premiums induce competition on the energy market.</li> </ul>	<ul style="list-style-type: none"> <li>• The exact price is unknown for producers.</li> <li>• Premiums should also be adjusted over time.</li> </ul>

Support scheme	Characteristics	Advantages	Disadvantages
<b>Quantity-based instruments</b>			
Quota obligations, tradable certificate systems	The government specifies a minimum amount (share) of electricity sold on the market that should be made from renewable resources. The obligation may be accompanied by certificates which are given to producers for each MWh of electricity generated from a renewable energy resource. Obligated parties are required to buy a certain number of certificates in order to meet the target. Green certificates can be traded on a market. Under the scheme, renewable generators receive revenues from sales of renewable electricity and certificates.	<ul style="list-style-type: none"> <li>• Certainty about the future quota or share of renewable electricity.</li> </ul>	<ul style="list-style-type: none"> <li>• The exact price is unknown for producers.</li> <li>• The system is complex and involves high transaction costs.</li> </ul>
Tender or auction systems	Renewable energy investors submit bids for running specific projects. The winning bidders are awarded contracts and get a fixed price for electricity generated (as in feed-in tariff system).	<ul style="list-style-type: none"> <li>• The support is provided in a cost-effective manner.</li> </ul>	<ul style="list-style-type: none"> <li>• Tenders favour large-sized projects.</li> <li>• Auction mechanism is complex and involves high transaction costs.</li> </ul>

Source: Baietti et al., 2012: 99; Bökenkamp et al., 2010: 188-189; Chiaroni et al., 2014: 349; Deichmann and Zhang, 2013: 210; Erdoğan and Karaca, 2014: 72; Fischer and Preonas, 2010: 5; Holm, 2013: 148; Howes, 2010: 121; Jordan-Korte, 2011: 66; Mendonca, 2007: 13-14; Micheli, 2012: 87; Nordic Council of Ministers, 2007: 23-24; The Stationery Office, 2008: 34.

The main support instrument in the European Union is the feed-in tariff scheme. Such instrument has been adopted in 19 out of 27 Member States. Feed-in tariffs are considered a successful mechanism to promote investments in renewable energy projects (Chalvatzis, 2011: 167). Only a few countries have implemented quantity-based instruments to stimulate the use of green energy. For example, tender systems have been used in France, Ireland and United Kingdom (European Commission, 2013).

There are also other direct instruments used to promote renewable electricity in the EU member states. These include inter alia exemptions from energy taxes, loans and subsidies.

## 2.1. Certificates of origin

Certificates of origin prove that electricity has been generated in a renewable energy source. They are issued by a President of the Energy Regulatory Office (ERO) to producers of

electricity from renewable energy sources<sup>1</sup>. Property rights arising from certificates of origin are traded on the Polish Power Exchange which maintains the register of certificates.

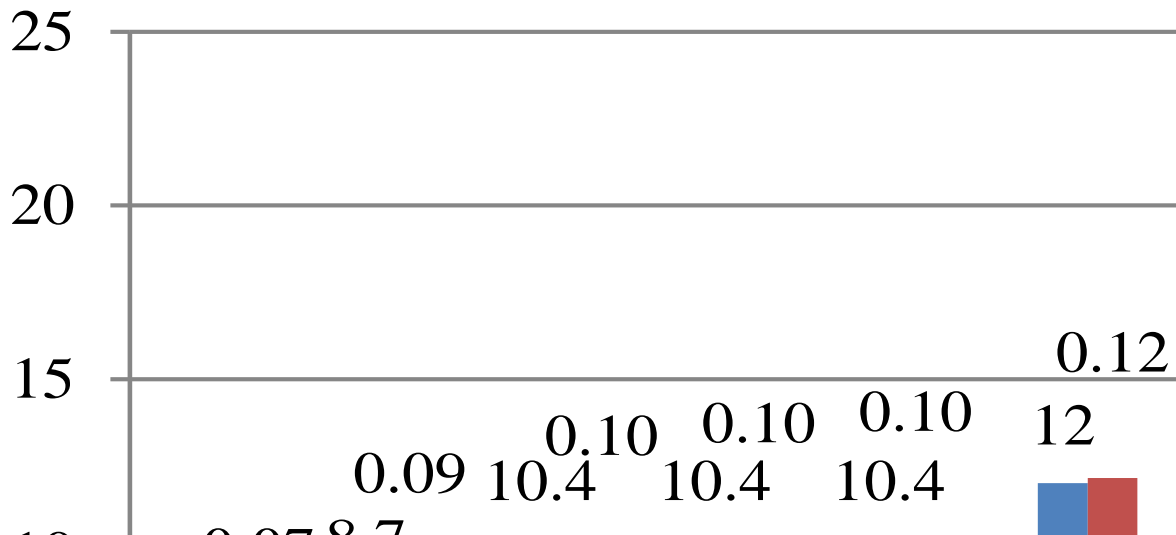
Energy suppliers are required to provide a certain share of electricity from renewable source (Ustawa Prawo energetyczne, 1997). They can fulfil the requirement in one of two ways:

- buy certificates of origin (on the Power Exchange) and submit them to the President of the ERO for redemption, or
- pay a substitution (compensation) fee.

The failure to comply with the requirement incurs a financial penalty.

As of 2012 a minimum share of renewable energy that energy enterprises has to provide increases by 1 percent annually (Fig. 1).

**Figure 1. Share of electricity from renewable sources in Poland and a minimum quota of renewable electricity, %**



Source: Rozporządzenie Ministra Gospodarki, 2006; Rozporządzenie Ministra Gospodarki, 2012; PSEW, 2014.

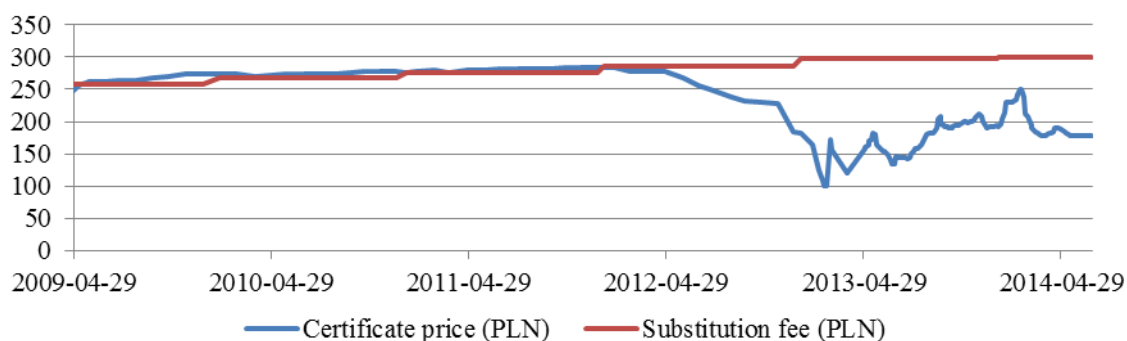
Price of certificates is established by the market (however its upper limit is to some extent determined by the rate of substitution fee<sup>2</sup>). Fig. 2 shows that the price slowly rose in the years from 2009 to 2011. From 2012, the price started to decrease and in February 2013 it reached the lowest level ever (about 100 PLN per 1 MWh). The general reason was an excessive amount of

<sup>1</sup> The President of Energy Regulatory Office is a state administration agency and is responsible for regulating activities in the fuel and energy sector.

<sup>2</sup> The rate of the substitution fee is indexed to inflation.

certificates of origin on the market. Currently, there are no policy instruments designed to deal with an oversupply of certificates.

**Figure 2. Prices of certificates of origin and the rate of substitution fee in Poland, PLN per 1 MWh**



Source: own elaboration based on: Polish Power Exchange, 2014; Urząd Regulacji Energetyki, 2008; Urząd Regulacji Energetyki, 2009; Urząd Regulacji Energetyki, 2010; Urząd Regulacji Energetyki, 2011; Urząd Regulacji Energetyki, 2012; Urząd Regulacji Energetyki, 2013; Urząd Regulacji Energetyki, 2014.

The oversupply of certificates has already appeared in 2011. In that year production of renewable electricity exceeded 13 TWh and the demand for certificates was about 12.5 TWh (Flakowicz, 2013). The relatively high level of renewable electricity production was driven by rapid development of co-firing of biomass with coal in power plants. It should be also noted that in 2011 the required minimum share of electricity from renewable sources was the same as in the 2010-2011 (Kancelaria Prezesa Rady Ministrów, 2014). Furthermore, according to some views energy companies were not interested in buying certificates and preferred to pay substitution fee than to redeem certificates (despite the lower price of certificates compared to the rate of substitution fee) (Unia Producentów i Pracodawców Przemysłu Biogazowego, 2013). It can be assumed that these activities attempted to decrease the price of certificates and restrict competition in the market (Najder, 2013).

The draft of the act on Renewable Energy Sources provides that installations that started to generate electricity before the act enters into force may continue to participate in the certificate system. However, the level of support for some energy sources is to be changed. In order to stabilize prices of certificates support for the co-firing of biomass with coal will be reduced to 0.5 certificate for 1 MWh. Moreover, there will be no certificates for electricity generated in hydroelectric power plants with a capacity of over 5 MW. This means that there will be no

support for several major hydroelectric plants, which are responsible for the production of two-thirds of hydropower in Poland. Those hydroelectric power plants are already paid off and don't need a financial support.

New renewable energy plants will be covered by the auction system. The draft of the act on Renewable Energy Sources provides that auctions are to be held once a year. Sixty days before the first auction takes place, Minister of Economy announces a maximum price at which renewable electricity may be sold in a given calendar year (so called reference price). Bidder with the lowest price wins the auction.

The new law introduces also a mechanism to avoid the oversupply of certificates. In the case where the weighted average price of property rights arising from certificates will be lower than 75% of a substitution fee for a period of at least 3 months energy companies will have to fulfil the requirement to provide renewable electricity only through the purchase of certificates.

## **2.2. Tax incentives**

Tax incentives to promote the use of renewable energy in Poland include agricultural tax relief and excise duty exemption for electricity generated using renewable energy sources. There are also some exemptions for energy enterprises from fees related to renewable energy sources.

Agricultural tax is levied on agricultural land with the exception of land used for non-agricultural business purposes. According to the provisions of Article 13 paragraph 1 of the Act on Agricultural Tax taxpayers are entitled to the investment allowance deduction on their expenses for the purchase and installation of natural energy equipment used for production purposes. Natural energy sources include wind, biogas, solar and hydro. Taxpayers can benefit from the agricultural tax relief if certain conditions are met. These include inter alia:

- the tax deduction may not exceed 25% of investment expenditures,
- expenses have not been met out of public funds (even partially),
- the tax relief in respect of the investment cannot be used for more than 15 years.

The 15 year period is considered too short because farmers lose the right to the allowance before the limit of 25% of capital expenditures is exhausted. The reason is that the level of agricultural tax is usually very low compared to capital investments in renewable energy installations (for example biogas plants) (Błażejewska, 2010: 110-111).

According to the Article 15(1)(b) of the Directive 2003/96/EC Member States may apply total or partial tax exemptions or reductions to renewable electricity from solar, wind and geothermal sources or generated from biomass (Directive, 2003). In Poland electricity generated using renewable energy sources is fully exempted from the excise duty (Ustawa o podatku akcyzowym, 2008). In order to benefit from this tax exemption, a company must have a document confirming the redemption of the certificate of origin. In practice, the energy from renewable sources produced by large companies and introduced into the network has only benefitted from the exemption. Microinstallations did not get certificates of origin, and thus – could not redeem them and obtain the document which is a basis for exemption from excise duty (Parulski, 2010: 250).

The draft of the act on Renewable Energy Sources eliminates tax exemptions for energy that will be auctioning and for other energy eliminated from green certificate system. Thus, electricity from large hydro plants will be no longer exempt from excise duty. There is a concern that government would lose substantial tax revenue otherwise. It should be noted that tax exemption for electricity produced from renewable energy sources leads to revenue losses for the government. In 2012 the loss was 225 million PLN and accounted for 0.37% of excise duty revenues (Ministerstwo Finansów, 2014).

In Poland enterprises producing electricity from renewable energy sources with a capacity up to 5 MW are exempted from some fees (for obtaining certificates of origin, for licence to generate electricity from renewable sources, for the registration of certificates of origin). Such facilities are also subject to reduced grid connection fees. Microinstallations are fully exempted from the fees related to connection to the electricity grid.

### **2.3. Subsidies for renewable energy production**

Renewable energy projects can be financed from both public and private sources.

In Poland sources of public funding include National Fund for Environmental Protection and Water Management. The support is sometimes provided through the cooperation with voivodship (regional) funds for environmental protection and water management or commercial banks.



The National Fund’s funding is partly financed by substitution fees and financial penalties. However, they do not provide a stable source of revenues for the fund. As Table 2 demonstrates, there was a decrease of revenues in 2012 and 2013. The reason was that the share of energy from renewable sources exceeded the mandatory targets (Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodnej, 2014). Moreover, some firms are more interested now in buying certificates of origin (PAP, 2013).

**Table 2. Revenues and expenditures of the National Fund for Environmental Protection and Water Management in Poland related to renewable energy sources, million PLN**

Specification	2009	2010	2011	2012	2013
Revenues from substitution fees and financial penalties	796.1	739.8	880.1	470.5	43.6
substitution fees	791.1	716.4	872.8	468.0	33.2
financial penalties	5.0	23.4	7.3	2.5	10.4
Financing for air and climate protection	194.9	179.6	205.3	760.3	693.9
Redeemable financing	82.1	71.6	135.9	267.0	290.3
Non-redeemable financing	112.9	108.0	69.4	493.4	403.7

Source: Główny Urząd Statystyczny, 2008: 489, 504; Główny Urząd Statystyczny, 2009: 460, 470; Główny Urząd Statystyczny, 2010: 487-488, 497-498; Główny Urząd Statystyczny, 2011: 454, 464-465; Główny Urząd Statystyczny, 2012: 479, 489-490; Główny Urząd Statystyczny, 2013: 467, 477-478; Główny Urząd Statystyczny, 2014: 477, 487-488.

In recent years National Fund for Environmental Protection and Water Management introduced several interesting programmes to support investments in renewable energy. These include the Prosument Programme and the Bocian (Stork) Programme used for financing the development of distributed generation based on small-scale, micropower devices.

In Poland the production of electricity from renewable resources is also supported by European Union funds via operational programmes such as Operational Programme “Infrastructure and Environment” and regional operational programmes. The former is managed at the state level and supports more-large projects related to renewable energy. Other green energy investments are financed through 16 regional programmes<sup>3</sup>.

The evaluation studies suggest that there are many barriers to renewable energy investments financed from operational programmes. These include uncertainty of legislation and governmental regulations affecting the energy sector and the decline in prices of certificates.

<sup>3</sup> In 2007–2013 programming period energy projects worth more than 20 million PLN were financed through “Infrastructure and Environment” Programme. Other projects were financed through regional programmes. In the current programming period (2014-2020) the division (so called demarcation line) is based on installed capacity.

Investors pointed out that there is a need to stabilize the certificate system and to introduce the act on Renewable Energy Sources (PSDB, 2014; Ministerstwo Gospodarki and Agrotec 2013).

In 2007–2013 programming period investors benefited from non-repayable forms of assistance. Grants will also be provided in the current programming period (2014-2020). However, projects of some of the regional operational programmes involve the use of repayable financial instruments to promote renewable energy (Urząd Marszałkowski Województwa Podkarpackiego w Rzeszowie, 2014; Urząd Marszałkowski Województwa Mazowieckiego w Warszawie, 2014). The evaluation studies suggest that the use of financial instruments (eg. loans) enhances financial efficiency (Ministerstwo Gospodarki and Ecorys Polska Sp. z o.o., 2012). On the other side, it can discourage some investors to invest in the renewable energy sector.

It should be noted that the private funding for renewable energy projects in Poland is provided by several banks. These include Bank Ochrony Środowiska and Bank Gospodarki Żywnościowej.

#### **2.4. A guaranteed price for energy generated in microinstallations**

The Energy Law contains provisions which are intended to promote the development of microinstallations and distributed generation. According to the provisions of Article 9u of the Energy Law production and sale of electricity generated in microinstallations by individuals is not considered an economic activity (Ustawa Prawo energetyczne, 1997). However, the price of this electricity is only 80% of the previous year's average price of electricity sold in competitive market. Some experts consider the latter provision the kind of “negative” feed-in-tariff because it sets the electricity price below the wholesale electricity price (Rybski, 2014). According to some views, the constitutionality of such a mechanism can be questioned. Moreover, it does not stimulate the small-scale energy producers to use the energy for their own needs (Rybski, 2014).

It should be noted, that the draft of the act on Renewable Energy Sources contains the same provision with respect to the price for energy generated in microinstallations.

### 3. Concluding remarks

Development of renewable energy sector in Poland heavily depends on the support scheme and on behaviour of agents participating in the energy market.

The current scheme is mainly based on quantity-based instruments which are rarely used in European countries. Such systems are rather complex and may involve high transactions costs. Another disadvantage of the quota obligations is that such mechanisms do not provide a revenue guarantee for producers. This is the case in Poland where the certificate price has been subject to high volatility. Price uncertainty may seriously affect investment in renewable energy projects. Furthermore, it is sometimes assumed that some companies aim to distort competition in a market for energy.

The situation on the energy market also affects the revenues of National Fund for Environmental Protection and Water Management. It should be noted that revenues from the substitution fees and financial penalties are partly earmarked for programs promoting renewable energy projects.

The draft on Renewable Energy Sources introduces a mechanism to reduce the risk of market disruption caused by the oversupply of green certificates. It also introduces a support scheme based on auctions. However, it can be assumed that the new system will not be ideal since it can favour large-sized projects. Moreover, it has some shortcomings of the current system (in particular lower price for energy from microinstallations).

From the perspective of investors there is need for a stable and predictable support scheme in Poland. The scheme should also stimulate the development of distributed generation.

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## ***Mechanizmy wspierania rozwoju odnawialnych źródeł energii w Polsce***

### ***Streszczenie***

Celem artykułu jest analiza funkcjonującego w Polsce systemu wspierania wytwarzania energii elektrycznej w odnawialnych źródłach. W pierwszej części opracowania omówione zostały zalety i wady różnych instrumentów zachęcających do rozwoju energetyki odnawialnej, takich jak taryfy i dopłaty gwarantowane, zielone certyfikaty oraz systemy aukcyjne. Druga część artykułu zawiera analizę instrumentów stosowanych obecnie w Polsce. Szczególną uwagę zwrócono na propozycję zmian tych instrumentów zawartą w projekcie ustawy o odnawialnych źródłach energii.

***Słowa kluczowe:*** energetyka odnawialna, polityka energetyczna, zielone certyfikaty