

How to Undermine Ideas of Green Growth: Case of Photovoltaic Electricity Production in the Czech Republic

Jan Vávra¹

Abstract: *This paper focuses on the boom of photovoltaic electricity sector in the Czech Republic in years 2007–2010. According to the 2001 EU directive, a legislation supporting the renewable electricity production passed through the Czech parliament in 2005. It was not flexible enough to allow responsible institutions to change the guaranteed subsidies (feed-in-tariffs) significantly to react to the 2007–2009 fall of investment costs of the photovoltaic industry. As a result of this the installed output of photovoltaic power stations rose from 0,01 % of overall installed output in 2007 to 9,7 % in 2010. Legislation cut the feed-in-tariffs for new power stations strictly in 2010 and a retroactive tax was put on some of those already built.*

Implementation of the photovoltaics resulted in various problems, including the legal and socio-political issues. Its economic effectiveness is also questionable. Moreover, the problematic case led to the decrease of subsidies to other renewable sources of energy and to some extent also to the negative perception of renewables as whole. Using the data from governmental agencies and public sources of information (laws, reports, statistical sources and media) this paper aims to describe the implementation process and discuss some potential consequences of the problematic realization of the subsidies. Though the Czech case was not intentionally labelled as “green growth” policy, it is framed as a part of green growth, due to being in accordance with its strong focus on the renewable sources of energy.

Key words: Photovoltaics · Electricity · Solar · Green Growth · Green Economy · Czech Republic

JEL Classification: Q42 · Q48 · Q55

1 Introduction

After 2007–2008 financial crisis and subsequent economic recession, the idea of growth revival gained importance in many countries. The concept of “green growth” (or “green economy”) became popular among the policymakers, mainly in the supranational organizations. The term “green economy” has been already used before (see Pearce, Markandya, & Barbier, 1989; UNESCO, 2005), but it received new momentum in the time of recent economic problems. In 2008 members of Worldwatch Institute presented the green economy concept to G20 leaders. Their goal was to kickstart the global economy in more environmentally friendly way, while creating more jobs, lowering inequality and focusing on development than on growth (Gardner & Renner, 2008). One year later, the report *Rethinking the Economic Recovery: A Global Green New Deal* (Barbier, 2009) was prepared for United Nations Environmental Programme, which adopted it (UNEP, 2009) and developed it into the concept of green economy (UNEP, 2011), emphasized also at Rio+20 conference (UN, 2012). Organization for Economic Co-operation and Development prepared its own conception of green growth (OECD, 2011), as well as The World Bank (2012). Though there are some small differences in the definitions and conceptions, we can summarize the main points of the green growth/economy ideas. Green growth² merges such economic policies, which emphasize renewable sources of energy, resource and energy efficiency, decrease of environmental pressure, lower carbon dependency, while fostering economic growth, lowering inequality and decreasing poverty.³

Energy from renewable sources is one of the crucial parts of the green growth policies. This paper focuses on the case of the increase of solar electricity production (photovoltaics) in the Czech Republic. The increase of solar electricity sector in the Czech Republic was not framed by any official green growth governmental policy or conception, nevertheless it is directly in line with the ideas of green growth. I would like to present the context of increase of solar electricity production in the country and discuss some problematic issues. My research questions are: What was the legal and financial framework for the support of the solar electricity? How did the production of solar electricity increase? How were the rules applied? Some possible consequences of the implementation process and efficiency of the support-

¹ PhDr. Jan Vávra, Ph.D., University of South Bohemia in České Budějovice, Faculty of Economics, Department of Regional Management, Studentská 13, 370 05 České Budějovice, e-mail: jvavra@ef.jcu.cz

² From this point on, I use the “green growth” as a general term for these economic policies.

³ Green growth is presented as a part of sustainable development, not its substitution, however there is much criticism of its pro-growth orientation, neglecting of rebound effect, insisting on neo-liberal globalized economy, etc. (see e.g. Santarius, 2012; Cudlínová, 2014; Wanner, 2014).

ing scheme are considered in the discussion. Due to the limited space of this paper, it is rather a starting point for future more detailed analysis.

2 Methods

The paper presents results of desk study research, mostly employing the analysis and comparison of data and literature, including both primary sources (legislative documents, governmental strategies, reports of the authorities, and articles in media), some secondary literature (research papers and analyses) is also included.

3 Research results

In 2001 the EU 2001/77/EC Directive on the Promotion of Electricity Produced from Renewable Energy Sources in the Internal Electricity Market (European Parliament and Council of European Union, 2001) set the indicative target of 12% of gross domestic energy consumption from renewable sources of energy by 2010. This directive was implemented into the Czech legislation in 2005 via the 180/2005 Act on Promotion of Use of Renewable Sources (Sbírka zákonů, 2005), which established the framework for state support of renewable energy. The indicative target for gross electricity consumption from renewables was set to 8% by 2010. To promote this, the act offered 15 years period of guaranteed feed-in tariffs to reach 15 year repayment period for the producers of energy from renewable sources. The price of feed-in tariffs had to be defined by the Czech Energy Regulatory Office on annual basis and could differ for various sources of energy to reflect the investment price. Original proposal of the bill allowed Energy Regulatory Office to change the guaranteed feed-in tariff only for 10% from year to year.⁴ However, this method of state intervention was even more restricted during the legislation process and the bill was passed with only 5% possible change of feed-in-tariffs.

The producer of renewable electricity has to choose from two forms of the feed-in-tariff: guaranteed purchase price or market price plus so called Green bonus (Sbírka zákonů, 2005). In both cases, the distributor is obliged to buy the electricity from the producer (who can decide which payment scheme is better for him). In our study, we focus only on the guaranteed purchase prices (hereinafter labelled as feed-in-tariff). Table 1 shows the feed-in-tariffs for selected renewable sources of energy, according to their year of construction.

Table 1 Feed-in-tariffs of various renewable energy sources in CZK/MWh (€/MWh)

Year	Type of power station						
	SOLAR	SH	SH-N	BIO ^{##}	BIO-N	WIND	GEO
2004	7 418 (271)	1 988 (73)	-	3 210 (117)	-	3 413 (125)	4 590 (168)
2005	7 418 (271)	2 549 (93)	-	3 210 (117)	-	3 247 (119)	4 590 (168)
2006	15 565 (568)	2 549 (93)	2 831 (103)	3 210 (117)	-	2 965 (108)	4 590 (168)
2007	15 565 (568)	2 549 (93)	2 831 (103)	3 210 (117)	-	2 913 (107)	4 590 (168)
2008	15 180 (554)	2 549 (93)	2 997 (109)	-	3 580 (131)	2 841 (104)	4 590 (168)
2009	14 191 (518) [*]	2 549 (93)	2 997 (109)	-	3 580 (131)	2 591 (95)	4 590 (168)
2010	13 213 (482) [*]	2 549 (93)	3 257 (119)	-	3 580 (131)	2 425 (89)	4 590 (168)
2011	6 687 (244) ^{**}	2 549 (93)	3 184 (116)	-	3 580 (131)	2 373 (87)	4 590 (168)
2012	6 410 (234) ^{***}	2 549 (93)	3 319 (121)	-	3 580 (131)	2 321 (85)	4 590 (168)
2013	2 973 (109) [#]	2 549 (93)	3 295 (120)	-	2 773 (131)	2 162 (79)	3 356 (122)
2014	0 (0)	2 499 (91)	3 230 (118)	-	2 321 (131)	2 014 (74)	3 290 (120)

Note: Only selected types of power stations are listed. Year stands for year of construction of the power station. SOLAR = photovoltaic, SH = small hydroelectric (≤ 10 MW), SH-N = new small hydroelectric, BIO = pure biomass, BIO-N = pure biomass in new p. s., WIND = wind, GEO = geothermal. If there are one- and two-tariff prices, we use the one-tariff. When the data are missing (-), the support for such type of power station was defined in another category. Numbers are in CZK, numbers in bracket in Euro, exchange rate 1 € = 27,4 CZK.

^{*} Average of two price levels according to the output. ^{**} Average of three price levels according to the output. ^{***} Only power stations with output ≤ 30 kW are supported. [#] Average prices of the year (two output-price levels, two time periods), only power station with output ≤ 30 kW are supported. ^{##} In case of biomass, the price is average of various prices according to the biomass category.

Source: Own processing based on Energy Regulatory Office data (Energetický regulační úřad, 2013).

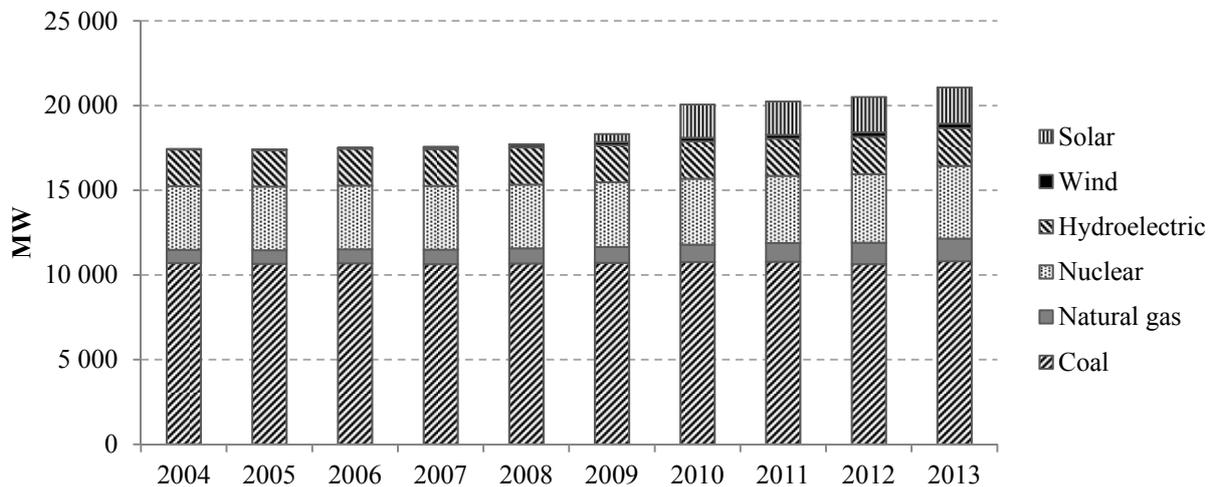
Tariffs for photovoltaic (solar) power stations were higher than any other since the enactment of the Act on renewable energy. While feed-in-tariffs for hydroelectric, biomass, wind or geothermal power station remained quite stable, tariff for solar power has doubled between 2005 and 2006, thus reaching 15 565 CZK/MWh (568 €).⁵ However, the

⁴ For example, the long-term feed-in tariff for power plant established in 2006 could not be lower for more than 10% than the feed-in tariff for power plant established in 2005. Anyway, the feed-in tariff given in the beginning is valid for the whole period of 15 years.

⁵ The conversion rate 1 € = 27,4 CZK is used in this paper.

investment costs of solar power stations have fallen rapidly in recent years (Wile, 2013), mostly due to the expansion of cheap technology from China (Feltus, 2010; Woody, 2013). In Czech conditions, the reported decrease of price of solar panels was approximately 40% in period 2007–2009 (BDO Audit, 2012). Decrease of the costs of investment and high guaranteed feed-in-tariffs caused boom of solar power industry. The installed output rose mostly in years 2009 and 2010. While in 2008 the overall installed output of solar power industry was 40 MW (0.2% of overall installed output), in 2009 it was already 465 MW (2.5%) and in 2010 the output reached 1 959 MW (9.8%). Since then, it increased only slightly to 2 132 MW (10.1%) in 2013 (Energetický regulační úřad, 2013) (see Figure 1).

Figure 1 Installed output in Czech power stations



Source: Own processing based on Energy Regulatory Office data (Energetický regulační úřad, 2014)

The increase of installed output definitely brought some environmentally positive outcomes in terms of low carbon energy. Electricity production from renewable has increased. In 2005, only 4.4% of gross domestic consumption of electricity was produced in renewable sources (78% of it hydroelectric, 18 % biomass). Five years later, in 2010, the share of renewable electricity made 8.3%, of which only 47 % was generated by hydroelectric, 26% by biomass, 10% biogas, 10% solar and 6% wind. Latest data (2013) indicate 13.2% of renewables in gross domestic electricity consumption. The overall renewable electricity consists of 29% hydroelectric, 24% biogas, 22% solar, 18% biomass and 5% wind. The installed output of solar power stations in 2013 was 2 132 MW (10.1% of overall installed output), but the production was only 2 070 GWh (2.4% of overall gross domestic production), due to the specifics of the solar power stations and natural conditions (Energetický regulační úřad, 2014).

In period 2008–2010 the investment costs of solar power stations fell rapidly, but the Energy Regulatory Office's ability to lower guaranteed feed-in-tariffs for new power station according to the decreased investment costs was limited by the law (only 5% change from year to year). Energy Regulatory Office officers started to be aware of the dynamic increase of solar power stations in 2008 and in 2009 the Office negotiated with the Government about possible measures to lower the feed-in-tariffs for new power stations. However, in 2009 no principal change of legislation was agreed, which led to highest capacity installed in 2010 (BDO Audit, 2012). Energy Regulatory Office only set newly two feed-in-tariffs, 14 234 CZK/MWh (520 €) for small power station (≤ 30 kWh), and 14 139 CZK/MWh (516 €) for large ones (> 30 kWh) (Energetický regulační úřad, 2013).

More radical legislative changes happened in year 2010. Amendment 137/2010 allowed Energy Regulatory Office to lower the feed-in-tariff by more than 5 % for the power stations with repayment period shorter than 11 years (Sbírka zákonů, 2010a). Amendment 330/2010 limited the feed-in-tariffs only for the small on-roof (or wall) power stations (≤ 30 kWh). This applied for the facilities constructed since 2011 onwards (Sbírka zákonů, 2010b). Finally, the 26% tax on electricity produced by solar power stations was introduced. Act 402/2010 imposed this tax on all of the electricity produced from 2011 to 2013 in power stations constructed in 2009 and 2010, except small on-roof (wall) power stations (≤ 30 kWh) (Sbírka zákonů, 2010c). These legislative processes led to massive drop in the feed-in-tariffs between 2010 and 2011 (see Table 1). Since 2011, only small power stations receive the guaranteed feed-in-tariffs. The subsidy for power stations constructed in second half of 2013 dropped to 3 050 CZK (111 €) for capacity ≤ 5 kWh and 2 479 CZK/MWh (90 €) for capacity 5–30 kWh (Energetický regulační úřad, 2013). From 2014 onwards, the feed-in-tariff for solar power generation was abolished (Vláda České republiky, 2013). While the new solar power stations are not supported by feed-in-tariffs, the already operating stations are still subsidized, according to the legislation valid in the year of their construction.

4 Discussion

The implementation of the subsidies for solar electricity brought some problems. The economic costs of the subsidies for the solar power stations are paid by the consumers (households, business and industry) through the price of electricity and directly from the state budget. What is very problematic in this context is the low efficiency of the subsidies. Radziwill (2012, p. 19) shows, that in 2010 the abatement costs of greenhouse gases through solar power station in reached 436 €/tonne of CO₂-eq, for geothermal energy production this was 132 €, biogas 102 €, biomass 96 €, wind 42 € and water only 36 €. The feed-in-tariff of solar electricity was 10,5 times higher in 2010 than the average market price of electricity production, while this ratio ranged between 1,9–3,9 for the rest of renewable sources of energy. Such ineffective subsidy scheme prioritizing one source of energy definitely does not represent the desired low carbon economy and green growth concept.

Another kind of problems connected to the realization of the subsidies for the solar electricity has to do with the law. Some of the cases of particular solar power plants have (almost) criminal context, including the unclear ownership of some sites, the influence of lobbyists, complaints against former Energy Regulatory Office officers, and involvement of the current ones (Česká tisková kancelář, 2013; Bardsley, 2013). Additionally, the 2010 retroactive tax “triggered threats of legal action from affected investors” (Radziwill, 2012, p. 18) and could cause future public expenditures due to lost legal cases.

There is generally lack of trust in the post-socialist countries and the problematic case of subsidies for solar electricity production did not help to increase it. On the contrary, the relationship between the business and state, public and politicians (and state officers), and public and business was negatively affected. The idea of renewable energy production was almost discredited in the Czech Republic and many politicians (especially from the liberal government being in power during 2010–2013 period) attacked the ideas of renewable energy and environmental thinking as whole (Vávra, Lapka, & Cudlínová, in press).

5 Conclusions

The case study of the feed-in-tariffs subsidies for solar electricity production in the Czech Republic serves as an example of very problematic implementation of green growth strategy. The rapid boom of solar electricity linked with inappropriate legislation and governance (one can only ask whether this was a mistake or someone’s intention) led to low economic efficiency of the subsidy scheme. While there definitely are the positive environmental outcomes (solar electricity is low carbon source of energy), the mismanaged realization and negative public and political perception can hinder future green growth strategies.

From an academic point of view, this paper is just a starting point for future research which should focus on the economic, environmental, economic-environmental, international and socio-political aspects. Possible future research questions could include some of these: How much do the subsidies really cost? What share is paid directly by the consumers and what share by state budget? Are the households, industry and state really economically harmed by the costs? How much greenhouse gas emissions were saved due to the solar electricity? Are there any negative land-use aspects of solar boom? What is the cost-efficiency of the solar electricity and the subsidies? How did other EU states manage the subsidies for solar electricity? How does public understand the ideas of renewable energy and green growth and was this understanding negatively affected by the recent events? How to implement future renewable energies more successfully in the post-socialist area? Some of these questions will be investigated in my future research.

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