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Can Georgia's (Sakartvelo) Feed-in Premium Policy Accelerate Investments in Wind and Solar Generation Technologies?

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Dissertation

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Acronyms and Figures

	Acronyms
EAEC	European Atomic Energy Community
EU	European Union
FDI	Foreign Direct Investment
FiP	Feed-in Premium
FiT	Feed-in Tariff
FX	Foreign Exchange
GNERC	Georgian National Energy and Water Supply Regulatory Commission
GoG	Government of Georgia
GSE	Georgian State Electrosystem
GWh	Gigawatt hours
IRENA	International Renewable Energy Agency
Kr	Danish Kroner
KWh	Kilowatt-hour
kW	Kilowatt
Mln	Million
MoESD	Ministry of Economy and Sustainable Development
MW	Megawatt
M^2	Square Meter
NDC	Nationally Determined Contribution
NRAP	National Renewable Energy Action Plan
PPA	Power Purchase Agreement
PPP	Public-Private Partnership
PV	Photovoltaic
RES	Renewable Energy Sources
RO	Renewable Obligation
RPS	Renewable Portfolio Standards
TGC	Tradable Green Certificate
TWh	Terawatt-hour
UN	United Nations
USc	Unites States Cent

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Introduction

The international community gathered in Paris in 2015 with a purpose: to effectively tackle climate change. State Parties representing 196 countries unanimously committed[1] to action to limit rises in global temperatures to well below 2°C, compared to pre-industrial levels, and to endeavour to limit the increase to below 1.5°C.[2] This multilateral climate action convention, organised under the auspices of the United Nations (UN), is commonly known as the "Paris Agreement".

Georgia shares that commitment. The country's government signed the Paris Agreement in 2016[3] and ratified it in 2017[4]. Under its Nationally Determined Contribution (NDC), Georgia committed to an "unconditional limiting target of 35% below 1990 level of its domestic total greenhouse gas emissions by 2030"[5] with both the transport and energy (generation and transmission) sectors each accounting for nearly half of the overall 35% reduction target.[6] With respect to transport, it is evident that clean energy would need to substitute at-scale for petroleum use, currently dominant in Georgia, for this targeted reduction to be realistic.

Two years previously, in 2014, Georgia signed the Association Agreement with the European Union, European Atomic Energy Community (EAEC) and their Member States (Association Agreement), under which it took the obligation to dynamically align its legislation to the EU '*acquis*', that is the corpus of common rights and obligations legally binding across the EU, and to integrate its market with the EU single market. One of the key elements of this Association Agreement is "the regulatory convergence in the energy sector, taking into account the need to ensure access to secure, environmentally friendly and affordable energy."[7] Hence, one of the areas of cooperation under the Association

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[1] United Nations Climate Change, 'The Paris Agreement ' (*United Nations Framework Convention on Climate Change* 2021) <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement> accessed 1 September
[2] United Nations, *Paris Agreement* (United Nations 2015), 2 (1) a
[3] Government of Georgia, *Order of the Government of Georgia on "Signing the Paris Agreement"* (2016), Translated from Georgian
[4] Government of Georgia, *Resolution of the Government of Georgia on "Approving and Enforcing the Paris Agreement"* (2017), Translated from Georgian
[5] Government of Georgia, *Georgia's Updated Nationally Determined Contribution (NDC)*, (2021), 8
[6] Ibid, 28
[7] European Union, *Association Agreement Between the European Union and the European Atomic Energy Community and their Member States, of the One Part, and Georgia, of the Other Part* (European Union 2014), 297

Agreement is developing and supporting renewable energies.[8] For this purpose, Georgia accepted the obligation to transpose EU Directives into its legal system as follows:

- Renewable Energy Directive 2009/28/EC of the European Parliament, confirmed by the European Council (Council) determination of 23 April 2009 on the promotion of the use of energy from renewable sources; and
- Directive 2009/72/EC of the European Parliament, confirmed by the determination of the Council of 13 July 2009, concerning common rules for the internal market in electricity.[9]

Under these EU Directives, Georgia is obliged to liberalise its energy market and enhance the investment environment for renewable energy sources (RES).

Later in 2017, Georgia ratified the 2016 Protocol concerning the "Accession of Georgia to the Treaty Establishing the Energy Community".[10] Since then, Georgia shares the goals and commitments of the Energy Community, among which is the aim to "foster the use of renewable energy".[11]

In part pursuant to the fulfilment of its Association Agreement commitments, the country passed the 2019 Law on Energy and Water Supply[12]. The law creates the legal framework for unbundling the transmission and distribution networks in both sectors, and for the open market at both, wholesale and retail levels. In addition, Georgia began enacting secondary legislation facilitating energy market liberalisation. The adoption of an Energy Market Model Concept [13]and respective rules in April 2020 provides a foundation for the progressive liberalisation of wholesale and retail downstream energy markets in the country.[14] Adding further momentum to this process of downstream energy liberalisation reform, in 2020 Georgia mandated a State Resolution on the Ownership Unbundling Model of the Transmission System,[15] the implementation plan for which required completion of

[8] Ibid, 298 (i)
[9] Ibid, Annex XXV
[10] Parliament of Georgia, *Resolution of the Parliament of Georgia on Accession to the Protocol Concerning the Accession of Georgia to the Treaty Establishing the Energy Community* (Parliament of Georgia 2017)
[11] The Council of the European Community, *Treaty Establishing Energy Community* (The Council of the European Community 2006), 2 (1)
[12] Parliament of Georgia, *The Law of Georgia on Energy and Water Supply* (2019)
[13] Energy Market Model Concept is a guiding document approved by the Government of Georgia, stipulating the wholesale and retail energy market models, market participants and their rights and obligations. It also provides the timeline for gradually opening the wholesale and retail electricity markets.
[14] Energy Community, *Annual Implementation Report* (Georgia, 2020), 63
[15] Government of Georgia, *Resolution of the Government of Georgia on Approving Georgia's Electricity Transmission System Operator Unbundling Plan* (2020), art. 1 (Translated from Georgian)

downstream energy unbundling by 31 December 2021.[16] In parallel, with respect of the unbundling of the country's electricity distribution system, the Georgian National Energy and Water Supply Regulatory Commission (GNERC) mandated distribution companies to broadly unbundle their operations, again in line with this overall process of downstream energy liberalisation.[17]

In December 2019, Georgia's Parliament and President approved the country's new Law on Promoting the Production and Use of Energy from Renewable Sources (Renewable Energy law), which transposes EU renewable energy law *acquis*. This law lays the groundwork for 2030 objectives to reach 35% of renewable energy in final energy consumption, implement a market-based renewable energy support scheme, and enforce the provisions from Directive 2009/28/EC. Georgia subsequently passed further secondary legislation, in July 2020, that established a Feed-in Premium (FiP) of up to 1,5 USc/kWh for plants with an installed capacity of more than 5 MW.[18] The Renewable Energy law is creating a new era for developing RES technologies in Georgia.

Developing renewable energy sources is crucial for Georgia to fulfil its commitment to the international community, as per the Paris Agreement signed by Georgia in 2016 and the Accession Agreement, that is signed in 2014. To achieve this goal, a clear, sound, transparent, and reasonable legal framework must be established, giving the investors confidence and attracting investments in renewable energy technologies. Thus, this dissertation examines the existing legal framework supporting RES development and assesses its credibility for further RES investments in Georgia. Herewith, it will evaluate the effectiveness of the newly introduced RES support scheme.

To attain the objectives of this dissertation, the author applies comparative methodology with respect to Georgia's approach to RES policy design and that of other countries, already successful in designing and efficaciously implementing such policy. At the same time, to test the viability of the supporting scheme, the author applies an interdisciplinary approach. Hence, in the following chapter, the author critically considers the characteristics of wind and solar RES, related technologies, and their investment potential in Georgia and the wider South Caucasus region, i.e. also inclusive of both Azerbaijan and Armenia. Then, Georgia's

[16] Ibid, art. 4
[17] Georgian National Energy and Water Supply Regulatory Commission, *Resolution on Approving Distribution System Operator Unbundling Rules* (2020), 5, 12
[18] Community, *Annual Implementation Report, 70*

legal and political frameworks relating to RES are discussed, including the country's renewable energy target for 2030. The author then assesses the implementation of efficacy of Georgia's FiP, specifically asking the questions: how / if FiP mitigates RES power plant exposure to market price and foreign exchange risk; and how FiP can be accessed. Subsequently, the author critically considers whether energy auctions would, if introduced, mitigate risks inherent in Georgia's existing supporting scheme for RES technologies. Finally, the main findings and recommendations of this dissertation are presented.

1. Characteristics of wind and solar technologies and their investment potential in Georgia

This chapter aims to give the reader an idea of wind and solar technologies as RES. Understanding their characteristics will contribute to the further development of this dissertation regarding the risks associated with renewable energy project financing. This chapter will also look at the renewable investment opportunities in Georgia in terms of demand and available capacity in the system.

1.1 Characteristics of wind and solar energy

Research and development for RES and associated technologies were catalysed by the oil crisis in the early 1970s. By that time, the oil price was relatively high. The outcome of this crisis appeared the RES technologies, which seemed to be cost-effective and easy to implement. Later it was realised that besides those benefits, electricity production from RES, in particular, wind and solar could, and as part of an energy transition away from polluting fossil fuels, help to alleviate world environmental and climate problems, boost the economic development of a country and ease political tensions provoked due to energy sources.[19] RES, similar to fossil fuels, are not evenly distributed worldwide. However, every country has RES available for it to generate power, assuming that it has the financial, technical and managerial wherewithal to do so. If a country wisely diversifies its range of power generation operations, then it can help de-risk the security of the energy supply. Should local procurement practices be adopted therein, it can also boost its economy and enhance regional economic development where power sector industries are established; better security of energy supply would also, all other things being equal, lead to economic growth as a result of de-risking the country as a potential business location for both domestic and foreign direct investment (FDI).

One of the main characteristics of wind and solar energy technologies is their intermittence. Since they mainly depend on sunshine and wind, which are naturally varied sources, it is hard to predict exact output, the level of which is inherently variable in line with natural

[19] Ibrahim Dincer, 'Renewable Energy and Sustainable Development: A Crucial Review' (2000) 4 Renewable and Sustainable Energy Reviews 157, 167

conditions.[20] Thus, where relied upon for a significant proportion of generated power, they create a potential imbalance in energy supply systems, alongside uncertainty for investors and financing institutions regarding cash flow. For example, to predict energy output from wind power plants for a particular hour a day, some systems use a third party to calculate wind speed and directions for each wind farm based on statistics and a weather-based model.[21] Uncertainty regarding the cash flow can be mitigated by scaling up wind farms in different areas to ensure that wind will blow at least one place and secure the cash flow. That is why it is essential to create a trustworthy legal framework and confidence for further investments.

Besides variable characteristics of the technology, it must be mentioned that initial investment in renewable energies is quite capital intensive; however, after the investment is made, its operation and maintenance costs are very low compared to fuel generation facilities. Moreover, the operational costs of the fuel-dependent power plants are high and probably will increase in the future, while for wind and solar technologies, these costs are close to zero for the life of the project.[22] Apart from this, the initial investment costs in renewable energies have been decreasing over time (Figure 1, below).

Based on the 2020 International Renewable Energy Agency (IRENA)[23] report on Renewable Power Generation Costs in 2019 as per the IRENA Auction and Power Purchase Agreements (PPA) database, new solar photovoltaics (PV) and onshore wind power that was competitively procured globally and will be commissioned in 2021 will have considerably lower costs than the worldwide weighted average for 2019. The average price of projects granted through auction/tender or a PPA for onshore wind will be $0.043/kWh[24] and $0.039/kWh for offshore wind.[25] This outcome shows how beneficial the bidding process can be to fostering competition and reaching cost-effective investments in renewable technologies.

[20] TW Thorpe, *Renewable Energy Technologies for Electricity Generation* (1993)
[21] Eric Goutard, *Renewable Energy Resources in Energy Management Systems* (IEEE 2010), 2
[22] Stanley R Bull, 'Renewable Energy Today and Tomorrow' (2001) 89 Proceedings of the IEEE 1216, 1
[23] International Renewable Energy Agency is an intergovernmental organisation that promotes the use of all forms of renewable energy and facilitates the transformation of the global energy system.
[24] All $s quoted are United States Dollars
[25] IRENA (2020), Renewable Power Generation Costs in 2019, International Renewable Energy Agency, Abu Dhabi, 37

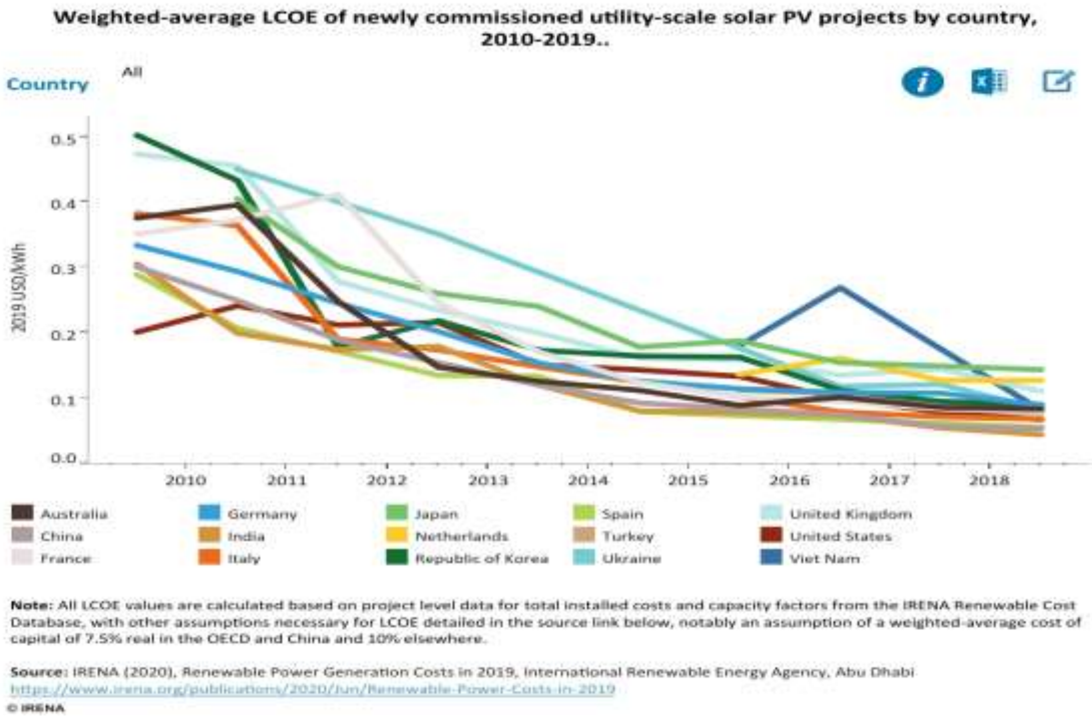

Figure 1. Weighted-average LOEC of Newly Commissioned Utility-scale Solar PV Projects by Country, 2010-2019[26]

1.2 Renewable energy investment potential in Georgia

Georgia is rich in renewable energy sources, including wind and solar. Its system can integrate the 1,330 MW installed capacity of the wind power plant in 18 different areas, with an annual 4,680 GWh generation.[27] Currently, only one wind power plant is operating in Georgia, and its share in total generated electricity, in 2020 constituted 0.8%.[28] Besides this, Georgian State Electrosystem (GSE), for the first time in the entire Caucasus region, launched Central Wind Energy Forecasting System in May 2020. The system is a crucial mechanism for facilitating the decision-making process for investing in wind energy and is one of the most significant prerequisites to increasing its investment potential in Georgia.[29]

As for the solar potential, Georgia receives much solar radiation due to its geographic position. There are 250–280 sunny days per year in most parts of the nation, with 6,000–6,780 hours of sunshine each year. Therefore, the yearly solar radiation varies from 1,250

[26] International Renewable Energy Agency, *Renewable Power Generation Costs in 2019* (2020)
[27] Ministry of Economy and Sustainable Development of Georgia, *Ten Years Plan for Developing Georgia's Transmission Grid* (Ministry of Economy and Sustainable Development 2021), 284
[28] Georgian National Energy and Water Supply Regulatory Commission, *Annual Report on 2020 Activities* (Georgian National Energy and Water Supply Regulatory Commission 2020), 36
[29] Georgian State Electrosystem, *Annual Report 2019/2020*, 2020)

to 1,800 kWh/m2 depending on the location.[30] Together with wind, the system has the potential to integrate 520 MW installed capacity of solar PV in 12 different places with 695 GWh annual generation.[31]

Besides, Georgia's energy system is highly dependent on imported electricity (Figure 2 below). Its import dependence increased due to electrification. Based on the 2011-2020 data, Georgia's energy consumption, on average, annually increases by 2.83%.[32] Today almost 100% of the Georgian population is connected to the grid. In 2020 total energy consumption constituted 12655.7 MLN.KWh[33] from where imported electricity share was 1610.07 MLN. kWh. The deficit in the system is usually filled from Turkey, Armenia, Azerbaijan or Russia.[34]

Hence, Georgia has a considerable wind and solar potential, as well as system availability that needs to be reaped, but how the incentive mechanism is supporting investments in these technologies, will be discussed in the following chapters. Before that, the next subchapter will compare Georgia's investment potential to neighbouring countries.

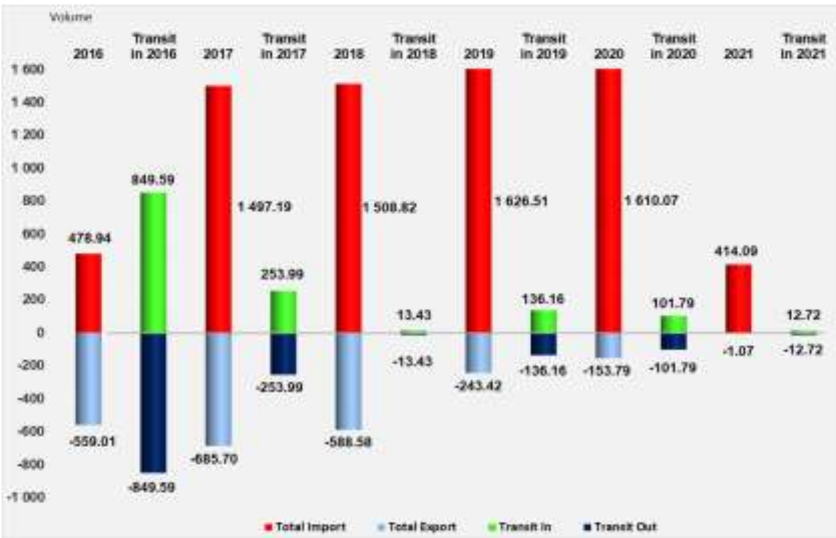

Figure 2. Georgia's Electricity Import-Export-Transit 2016-2021[35]

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[30] Ministry of Economy and Sustainable Development, *National Renewable Energy Action Plan Georgia* (Ministry of Economy and Sustainable Development 2019), 8

[31] Georgia, *Ten Years Plan for Developing Georgia's Transmission Grid, 284*

[32] Commission, *Annual Report on 2020 Activities , 36 (Translated from Georgian)*

[33] Electrisity Market Operator, 'Electricity Balacne 2020 ' (*Electriciy Market Operator* 2021)accessed 16 August

[34] Electricity Market Operator, 'Electricity Import Export Statistics 2017 -2021 (MLN. KWH)' (*Electricity Market Operator* 2021) <https://esco.ge/en/import-eksporti/by-year> accessed 16 August

[35] Electricity Market Operator, 'Import-Export-Transit 2015-2020' (*Electricity Market Operator* 2021) <https://esco.ge/en/import-eksporti/by-year> accessed 30 August

1.3 Georgia's energy investment potential in the context of the South Caucasus region

In marked contrast to other South Caucasus nations, that is Armenia and Azerbaijan, Georgia is in the process of full market liberalisation that will ensure competition for wholesale and retail market participants.

Armenia's electricity market model is fully regulated on both retail and wholesale levels in comparison to Georgia. However, Armenia plans to liberalise its energy market to increase investment and enhance the competitive market.[36] The current model of the Armenian electricity market was introduced in 2004. It is solely based on the forecasted annual amount of electricity generation and consumption, and it does not impose responsibility on market participants in the event of deviations from that amount.[37] About 42% of the final electricity consumption share comes from natural gas fuels, transported from Russia, while about 29%, comes from hydro and nuclear.[38]

Azerbaijan also plans to gradually liberalise its energy market and end this process by 2025. The Law on Electricity is drafted to achieve this goal and implement international experience to allow new, independent entities to enter the market at the competitive level.[39] Azerbaijan is a major crude oil and natural gas producer. In 2019 more than 90% of the electricity was generated from natural gas out of 26TWh. Renewables, including hydro, constituted 8% of the electricity supply in 2018.[40]

According to the pace of ongoing reforms, Georgia has the potential to attract investments in the region and become a leading renewable energy provider. However, it must enhance its policy to ensure that foreign investors will trust Georgia's policy, in order to attract and maximise FDI. This issue will be discussed in the subsequent chapter.

[36] The Government of Republic of Armenia, *Republic of Armenia Energy Sector Development Strategic Program to 2040* (The Ministry of Territorial Administration and Infrustructure 2020), 11
[37] Ibid, 11
[38] International Energy Agency, *Eastern Europe, Caucasus and Central Asia* (Energy Policies Beyond IEA Countries 2015), 15
[39] International Energy Agency, *Azerbaijan 2021 Energy Policy Review* (2021), 78
[40] International Energy Agency, *Azerbaijan Energy Profile* (2021), 5

2. Legal and Political System of Renewable Energies in Georgia

This chapter will review the legal and political system for RES development existing in Georgia that is supposed to contribute to the acceleration of investments. While discussing this system, it is essential to keep in mind that frequent policy changes may harm the investment environment of a country. It will also influence the country's reputation amongst international investors and resulting attractiveness for FDI. Thus, this chapter will briefly discuss the examples of successful policy designs and how they increased the confidence in investment in renewable energy. Afterwards, the existing legal and political system will be analysed.

2.1 Designing a robust renewable energy policy

Based on the Energy Charter Treaty[41], contracting parties are encouraged to create "stable, equitable, favourable and transparent conditions for the investor of other contracting parties" including "fair and equitable treatment".[42] Wiser and Pickle suggest that when designing policy for renewables, it is crucial to ensure that they pledge support to renewable developers by making it "long term and predictable".[43] Otherwise, an unstable policy environment will increase the cost of financing and hence value for money, thus reducing the policy's efficacy.[44] Ganzert and Vlog highlight several risk factors that can drive policy risk, "such as the economic situation, national targets or political uncertainty", besides this they believe that to avoid contributing to rising policy risk, politicians should act consistently even in sectors that are not directly related to renewable energy. Inconsistent treatment of investors in various locations may increase the risk factors, simultaneously costs and decrease the investments.[45]

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[41] The Energy Charter Treaty establishes a global framework for cooperation in the energy. Its goal is to increase energy security by operating more open and competitive energy markets while maintaining the concepts of sustainable development and energy sovereignty.

[42] Energy Charter Conference, *The Energy Charter Treaty* (Energy Charter Secretariat 1994), 10

[43] Ryan H Wiser and Steven J Pickle, 'Financing Investments in Renewable Energy: the Impacts of Policy Design' (1998) 2 Renewable and Sustainable Energy Reviews 361, 374

[44] Ibid, 384

[45] Nadine Gatzert and Nikolai Vogl, 'Evaluating Investments in Renewable Energy Under Policy Risks' (2016) 95 Energy Policy 238, 251

Although flexibility is required to adjust these schemes to the frequently changing energy market, the effectiveness of renewable energy programmes largely depends on policy stability. Investors must have confidence that once irrevocable investments have been made, the government will not take advantage of the situation by changing the laws or breaking promises.[46] Salacuse states that "States seek to influence these investment decisions through their actions, laws, regulations and policies... Thus, when a state has created certain expectations through its laws and acts that have led the investor to invest, it is generally considered unfair for the state to take subsequent actions that fundamentally deny or frustrate those expectations."[47]. Hence, to avert unfair treatment to investors and the damaged reputation of a country, the policy must be carefully designed by considering the best experience and the long-term development goal.

2.2 Renewable energy policy and law in Georgia

Together, several regulations create the whole legal system for investments in wind and solar technologies and incentivise renewable energy financing. The first and the most important regulation that the Parliament of Georgia approved in 2019 is the Renewable Energy law. The primary purpose of the law is to create legal frameworks for renewable energy sources and incentivise investment in this field. It determines the national target for renewable energy share in total final energy consumption and considers cooperation between Georgia and the contracting parties of the EAEC and any third parties regarding joint projects, supporting schemes and statistical transfer.[48]

Notably, this document is the mechanism for implementing Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (Hereinafter – The Directive).[49] The directive aims to enhance energy supply security while lowering greenhouse gas emissions by replacing fossil fuels with renewables. It establishes a more robust regulatory framework for renewable energy at

[46] Anatole Boute, 'Regulatory Stability and Renewable Energy Investment: The Case of Kazakhstan' (2020) 121 Renewable and Sustainable Energy Reviews 109673, 2
[47] Jeswald W Salacuse, *The Law of Investment Treaties* (OUP Oxford 2015), 231
[48] Parliament of Georgia, *Low of Georgia on Promoting the Generation and Consumption of Energy from Renewable Sources* (2019), Art. 1
[49] Parliament of Georgia, *Explanatory Note* (Parliament of Georgia 2019), 1

the EU level by establishing legally enforceable objectives.[50] The law reiterates the directive's requirements. To measure its long-term and stable characteristics, it must be highlighted that in the hierarchy of the legislative acts of Georgia, this document has fifth place,[51] and it can be amended by "…majority of the Members of Parliament present but at least one-third of the total number of the members of Parliament…".[52] Hence, this document is robust enough to trust it, as to make amendments to it, it must go through lengthy procedures and reach respective votes.

The following principal legal instrument in Georgia for supporting renewable energy investments was adopted in 2020, namely the following Resolution: Approving Supporting Scheme for Generation and Usage of Energy from Renewable Sources (Resolution N403),. The document offers a FiP for eight months in any given year, for ten years. The FiP was approved based on the Renewable Energy law.[53] A detailed analysis of this supporting scheme will be discussed in chapter 3. As for the robustness of this document, amendments to this resolution can be made by the decision of the government.[54] Thus it can be easily changed compared to the law. It is crucial to keep in mind that change in the government may easily influence policy and result in a change of supporting schemes, creating uncertainty for investments.[55]

The Transmission Grid Ten Years Development Plan is another vital technical document for forecasting total wind and solar integration potential into the country's transmission grid. It is approved by the Ministry of the Economy and Sustainable Development of Georgia (MoESD) in 2021,[56] and the same authority can make amendments. The Transmission System Operator develops the plan with the collaboration of GNERC and the MoESD.[57]

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[50] T Geramitoski and others, 'Implementation the Tasks of the Renewable Energy Directive 2009/28/EC in EU Members and R. Macedonia as a Country-candidate', 2

[51] Parliament of Georgia, *Organic Law of Georgia on Normative Acts* (2009), Art. 7 (3)

[52] Parliament of Georgia, *Constitution of Georgia* (1995), 45 (2); Georgia, *Organic Law of Georgia on Normative Acts , Art. 20 (6)*

[53] Government of Georgia, *Resolution of the Government of Georgia on Approving Supporting Scheme for Generation and Usage of Energy from Renewable Sources* (2020), Art, 1, 3, 5 (Translated from Geogian)

[54] Georgia, *Organic Law of Georgia on Normative Acts , 20 (6)*

[55] Stephany Griffith-Jones, Jose A Ocampo and Stephen Spratt, 'Financing Renewable Energy in Developing Countries: Mechanisms and Responsibilities' (2012), 23

[56] Georgia, *Ten Years Plan for Developing Georgia's Transmission Grid, 24 (Translated from Georgian)*

[57] Parliament of Georgia, *The Law of Georgia on Energy and Water Supply* (2019), 53, (5)

Finally, the only policy document supporting renewable energy sources development in Georgia is the Resolution of the Parliament of Georgia on Principal Directions of Country's Policy in Energy Sector, adopted in 2015. The policy aims to utilise renewable energy resources to solve the climate change problems and ensure a clean energy supply. It considers local and foreign investments as the mechanism to reach that goal. The policy stipulates that to attain this goal, the investment environment must be enhanced by creating a stable, transparent, non-discriminatory legal basis. Also, it aims to close cooperation with the neighbouring countries to connect energy markets and develop respective infrastructures.[58]

This document does not provide any responsible institution, action, target or timeframe that can help to reach set goals. A majority of the presented parliament members approve it, but no less than one-third of the members of the Parliament.[59] Thus, in regards to changes and amendments, policy documents have the same strength as the law.[60] Thus it is less likely to be changed, however, this document does not entirely serve its purpose.

Looking at the policy example of countries with high renewable energy share in final energy consumption, it is obvious that their policy and incentives are transparent, clear and goal-oriented. For example, Austria made it clear in its energy policy that until 2030 its objective is to cover 100% of total national electricity consumption from renewable energy sources. It also highlighted that this electricity would be produced from decentralised photovoltaic plants and wind power[61]. Thus, Austria gave a signal for future investment in photovoltaic and wind power generation sources. The Swedish government took the same approach when five parties in 2016 agreed that by 2040, 100% of electricity generated from renewable sources shell come from renewable sources.[62]

The Government of Georgia (GoG) is authorised to approve the support schemes for RES technologies. On the one hand, it is very flexible as it can be changed easily and will not go through extensive parliament hearings, however, these benefits can be turned into

[58] Parliament of Georgia, *The Resolution of the Parliament of Georgia on Principal Directions of Country's Policy in Energy Sector* (Parliament of Georgia 2015), 2 (b) (Translated from Georgian)
[59] Parliament of Georgia, *Reglament of the Parliament of Georgia* (Parliament of Georgia 2012), 167 (5)
[60] Georgia, *The Resolution of the Parliament of Georgia on Principal Directions of Country's Policy in Energy Sector, 1*
[61] Federal Ministry Republic of Austria, *Austrian Climate and Energy Strategy* (Federal Ministry for Sustainability and Tourism, Federal Ministry for Transport, Innovation and Technology 2018), 35
[62] Swedish Government, *Agreement on Swedish Energy Policy* (Government Offices of Sweden 2016), 1

weaknesses. Whether the investors will be willing to trust their money to the document, not adopted at least by the parliament and can be easily changed with the change of the government, will be answered over time. Certainly, this does not mean that the law should not evolve. In Parkerins-Compagniet As v. Republic of Lithuania, Arbitrations stated that it is an unquestionable right and privilege for any state to use its sovereign legislative authority. A state has the authority to create, alter, or repeal legislation at any time. At the same time, any investor is aware that the law will change over time, however, it is prohibited to act "unfairly, unreasonably or inequitable when making changes".[63] Hirshch also contends that radical regulatory changes might undermine the economic assumptions established at the investment time, resulting in significant losses for international and domestic investors. However, such significant losses do not always preclude the host state from enacting substantial regulatory reforms. The loss of the economic assumptions established at the time of the investment and the investors' returns on investment may prompt investment tribunals to investigate host state behaviour more closely.[64] Accordingly, to avoid such investigations and radical changes, politicians must ensure that designed supporting schemes or policies are predictable and trustworthy, no amendment can harm the ongoing projects, it accelerates investments, and is viable for the life of the investment.

2.3 Georgia's target for RES share of its total primary energy generation

The Renewable Energy law sets the national target for renewable energy share in total energy consumption until 2030.[65] However, the regulation does not mention the probable target after 2030 or if another target will be defined to attract investments. Moreover, it was adopted in 2019,[66] meaning that the following eight years should create incentives for investments in renewable technologies.

The share of RES in total final energy consumption must be 35% by 2030. In 2019, when the regulation was approved, this target was already 29.5%.[67] Thus only 5.5% is to be reached in nine years. Besides, Georgia also took the obligation to ensure that by 2030 10%

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[63] *Parkerings-Compagniet AS v. Republic of Lithuania* (ICSID Arbitration Case No. ARB/05/8), 332
[64] Moshe Hirsch, 'Between Fair and Equitable Treatment and Stabilization Clause:: Stable Legal Environment and Regulatory Change in International Investment Law' (2011) 12 The Journal of World Investment & Trade vii, 804
[65] Georgia, *Low of Georgia on Promoting the Generation and Consumption of Energy from Renewable Sources*
[66] Ibid
[67] Ibid, Annex 1

of energy consumption by all types of transport shell be received from renewable energy sources.[68] According to the Protocol of Georgia's accession to the Treaty Establishing Energy Community, this target must have been established from the study carried out by the Energy Community Secretariat.[69] However, under the Explanatory Note of the Renewable Energy law[70] or National Action Plan for Renewable Energy,[71] how much installed capacity is required to reach those targets is unclear. Nevertheless, based on these targets, it is evident that demand for energy generated from renewable sources will be increased.

Before going to further discussion of the target, it is crucial to highlight that the law, based on the Directive, provides a mechanism of statistical transfer.[72] This mechanism helps Georgia, the EU Member States, and the third party trade a certain amount of energy produced from renewable sources via Green Certificate.[73] This transfer is virtual, and the energy flow does not accompany it. It helps the country with abundant renewable energy sources and fruitful supporting schemes to offer surplus energy to the other EU Member States. The Member States interested in purchasing energy would have short renewable sources and non-effective supporting schemes.[74] Consequently, this mechanism also helps parties reach their target if they fail to do so.

The law stipulates "the share of energy received from renewable sources in the total final energy consumption" to reach the aforementioned target. The Explanatory Note of the law also highlights that the target is for renewable energy share in final consumption, but not in generation. To specify Georgia is not obliging itself by law to reach the 35% final renewable energy consumption share from the utilities, generating the electricity from renewable sources in the territory of Georgia. This approach has its positive and negative aspects. First, the positive effect is that if Georgia will not reach the target mentioned above from the renewable sources generated on its territory, it will make the statistical transfer and thus

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[68] Ibid, 3 (6)

[69] Energy Community, *Protocol Concerning the Accession of Georgia to the Treaty Establishing the Energy Community* (Energy Community 2016), 5

[70] Georgia, *Explanatory Note*

[71] Ministry of Economy and Sustainable Development of Georgia, *National Action Plan for Renewable Energy* (Ministry of Economy and Sustainable Development of Georgia 2019)

[72] Georgia, *Low of Georgia on Promoting the Generation and Consumption of Energy from Renewable Sources*

[73] Georgia, *Explanatory Note*

[74] Tom Howes, 'The EU's New Renewable Energy Directive (2009/28/EC)' (2010) 15 The New Climate Policies of the European Union: Internal Legislation and Climate Diplomacy 3, 132

ensure its commitment to climate goals. However if in breach of that commitment, Georgia will be obliged to make the statistical transfer from the EU Member States or the third countries, meaning that it will impact the country's economy. Second, the eight-year timeframe and unclear aspiration to increase renewable energy generation on its territory provide a vague signal for investors.

As it was already discussed, Georgia’s Renewable Energy law ensures the transposition of the Directive 2009/28/EC into Georgian legislation.[75] Under the directive, the primary goal of mandated national targets is to give investors certainty and stimulate the development of technologies that generate energy from various renewable sources.[76] However, it also provides the possibility to the EU Member States to set targets beyond the national ones.[77] Thus policymakers in Georgia should consider this freedom and set more extended targets in its policy to give confidence to investors for long-term investment opportunities and define the capacity it needs to prove its commitment.

The directive was adopted in 2009,[78] so it is essential to look at the experience of the Member States and find out how they managed to reach the target. Based on the Eurostat data, in 2018, renewable energy share in the final energy consumption increased in 21 Member States compared to the 2017 result. Among the Member States, the successors are Sweden, with 54%, meaning that more than half of its energy comes from renewable sources, Finland with 41,2%, Latvia with 40.3%, Denmark with 36.1%, and finally Austria, at 33.4%.[79]

According to the Directive, Sweden’s target for 2020 for renewable energy share in its total energy consumption was set as 49%. The base year by the directive for all Member States was taken 2005. At that moment, Sweden’s renewable energy share was 39,8%.[80] In nine

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[75] Georgia, *Regulatory Impact Assessment*
[76] European Parliament, *Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC* (2009), 14
[77] Ibid, 23
[78] Council of the European Union European Parliament, 'Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC' (*EUR-Lex,* 2009)accessed 10 August
[79] Eurostat, *Renewable Energy in the EU in 2018* (Eurostat 2020), 2
[80] Parliament, *Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC, Annex 1*

years, Sweden managed to go beyond its target by 5% and reached 54%, with total progress of about 15%. Sweden has maintained a strategy of promoting renewable energy as part of a broader policy of sustainable development and resource efficiency for many years. The goal has been to minimise its reliance on oil, increase the degree of self-sufficiency, lessen the impact of the energy sector on the environment, improve competitiveness, and promote technology and industry.[81] Based on the National Renewable Energy Action Plan (NRAP), Swedish Parliament and Government set their national target by 2020 of at least 50% of renewable energy in final energy usage. They also revised the previous target for new renewable electricity, and 17 TWh was increased to 25 TWh by 2020.[82]

Other front-runners are Finland and Austria. In 2005 Finland's renewable energy share in final energy consumption was 28,5%, and its target for 2020 was defined as 38%.[83] As we have seen, Finland was also able to go beyond its target by 3.8%. The national target for each renewable energy source was set separately. Following Climate and Energy strategy, it was expected that wind power production will increase to 6TWh by 2020. Finland introduced a feed-in tariff (FiT) to support the policy.[84] As for Austria, it also managed to reach its target through a better national framework and supporting schemes.[85] The key measures that helped Austria reach its goal were the FiTs and decreased wind and solar PV deployment costs.[86] Austria's base year indicator was 23,3%;[87] by 2008, this indicator constituted 29,0%,[88] and it had to reach 4.4% in nine years.

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[81] Regeringskansliet, *The Swedish National Action Plan for the Promotion of the Use of Renewable Energy in Accordance with Directive 2009/28/EC and the Commission Decision of 30.06.2009* (European Commission 2010), 3

[82] Ibid, 4

[83] Parliament, *Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC, Annex 1, A*

[84] Ministry of Employment and the Economy, *Finland's National Action Plan for Promoting Energy from Renewable Sources Pursuant to Directive 2009/28/EC* (European Commission 2010), 2

[85] Valentine Ataka, 'Implementation of the EU Renewable Energy Directive 2009/28/EC: A Case of Two Extremes, Austria and Malta', 20

[86] International Energy Agency, 'Austria 2020' (*International Energy Agency,* 2020) <https://www.iea.org/reports/austria-2020> accessed 8 August

[87] Parliament, *Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC, Annex 1 (A)*

[88] Familiy and Youth Federal Ministry of Economy, *National Renewable Energy Action Plan 2010 for Austria* (European Commission 2010), 4

Comparing Georgia to Sweden, Finland or Austria is unreasonable as the economic and institutional development disparity is enormous. However, it is possible and indeed desirable for Georgia to learn from the experiences and successes of these three other nations. For instance, as it was discussed above, clear and implementable energy sector forward planning is a feature of Finnish downstream energy. The country set targets for each technology and proposed to what extent should this policy increase generation for a specific technology. Sweden took a complex approach and made the final target part of sustainable development, environmental protection, technology development and resource efficiency. Besides this, its national policy set a higher target than it was obliged through the directive. Austria introduced combined support for wind and solar PV. It decreased the deployment costs with the FiT. Thus, policy-makers in Georgia should design of, and seek agreement for, a clear energy policy that specifically details expected additions to (power sector) installed capacity, by what means/ technologies, when and how. Besides this, Georgia should implement reasonable support schemes to accelerate investments. Thus the following chapter will assess the existing support schemes for wind and solar renewable energy technologies.

3. Georgia’s feed-in-premium RES investment incentives

Several instruments have been developed worldwide, especially in the EU Member States, to accelerate renewable energy investments. Respectively, a huge experience has been gained, which is an opportunity for Georgia to implement tailored renewable energy supporting mechanisms, considering their ups and downs. This chapter will provide a brief overview of the most common supporting mechanisms and their characteristics. Afterwards, the mechanism Georgia opted for will be discussed and the effectiveness of its legal framework regarding RES investment incentives will be assessed.

3.1 Brief overview of RES support schemes

One taxonomy categorises the RES support scheme as price-based and quantity-based mechanisms. The Price-based mechanisms include FiT, FiP; and fiscal mechanisms, relating to tax, whereas the quantity-based mechanism is Renewable Portfolio Standards (RPS) also known as Renewable Obligation (RO) or Tradable Green Certificates (TGCs); and energy auctions.[89]

Beatrice and Nadai characterise FiTs as a “state-backed incentive” for renewable investments, where connection to the grid is guaranteed, and the producer is not exposed to the market risk.[90] The utility has the guarantee that the electricity produced from renewable sources will be purchased at fix tariff for a fixed period to ensure the return on investment.[91] As for the FiP, Battle and others define it as guaranteed payments for RES producers on top of the market price for electricity,[92] and as a result, unlike FiTs, RES producers are dependent on the electricity market price.[93] The third price-based mechanism, the fiscal mechanisms, such may be tax incentives differ from country to

[89] C Batlle, IJ Pérez-Arriaga and P Zambrano-Barragán, 'Regulatory Design for RES-E Support Mechanisms: Learning Curves, Market Structure, and Burden-Sharing' (2012) 41 Energy Policy 212, 214

[90] Béatrice Cointe and Alain Nadaï, *Feed-in Tariffs in the European Union: Renewable Energy Policy, the Internal Electricity Market and Economic Expertise* (Springer 2018), 5

[91] David Jacobs, 'Fabulous Feed-in Tariffs' (2010) 11 Renewable Energy Focus 28, 28

[92] Batlle, Pérez-Arriaga and Zambrano-Barragán, 'Regulatory Design for RES-E Support Mechanisms: Learning Curves, Market Structure, and Burden-Sharing', 214

[93] Cointe and Nadaï, *Feed-in Tariffs in the European Union: Renewable Energy Policy, the Internal Electricity Market and Economic Expertise, 42*

technology. It may include tax exemption or tax credit for specific renewable energy technology and a certain period. Investment and financial incentives are cash support and soft loans, respectively.

With respect to the quantity-based mechanism, the RPS set quota obligations for suppliers and/or generators and consumers to ensure that part of the electricity comes from renewable sources. To prove this, the Tradable Green Certificate for each produced unit of electricity is awarded.[94] The auction is the mechanism where the government, on the one hand, sets the certain capacity it wants to procure for particular renewable technology generation, and potential investors, on the other hand, bid the price for per unit of electricity at which it is realistic to implement the project.[95]

Overall, "price-based" instruments ensure some level of remuneration, however, they provide no certainty of how much capacity will be installed in the system, "quantity-based" mechanisms, on the contrary, provides a clear picture of capacity that will be harnessed through the auction.[96]

3.2. Feed-in Premium's Characteristics

FiPs are usually granted to the local renewable energy producers in response to the amount of electricity fed into the grid. Premium is paid for per unit of electricity produced from RES on top of the market price. In order to ensure certainty, this incentive is generally granted for a period of 10 to 20 years, thus lowering the market price risk faced by the investors.[97] As for the supporting period in a year, as an example, Germany is paying a premium "…calendar months in which electricity is marketed directly…".[98]

Batlle and others believe that FiPs generally incentivise dispatchable renewable generation sources that can adjust to price signals and generate electricity when the spot market price is high. However, less dispatchable renewable energy sources, such as wind, can still be

[94] Batlle, Pérez-Arriaga and Zambrano-Barragán, 'Regulatory Design for RES-E Support Mechanisms: Learning Curves, Market Structure, and Burden-Sharing', 214
[95] International Renewable Energy Agency, *Renewable Energy Auctions* (IRENA 2015), 14
[96] Cointe and Nadaï, *Feed-in Tariffs in the European Union: Renewable Energy Policy, the Internal Electricity Market and Economic Expertise, 42*
[97] Commission Staff Working Document, *The Support of Electricity from Renewable Energy Sources* (Commission of the European Communities 2008), 5
[98] Bundestag, *Renewable Energy Act* (Bundesamt Fur Justiz 2014), 20

incentivised to trade the electricity on the spot market if it produces electricity during "the most profitable hours".[99] Schallenberg-Rodrigues and Haas, based on the comparison of Spanish FiTs and FiPs policy, conclude that a disadvantage of the FiPs may be that "it can lead to overcompensation if the electricity price rises quickly". Spain experienced this downfall from 2005-2006 when wind producers under FiPs were overcompensated due to the increased spot market price. This experience led to introducing a cap and floor system that can be considered a fair mechanism, as it reduces the risk of the low spot market price for RES producers and overcompensation for final consumers.[100]

Besides the fixed premium and the cap and floor, Klobasa and others state that the 'sliding' premium or 'Contract for Difference' is another form of premium payment. The premium is the difference between the market price and their average generating costs under this system. It is computed based on the average energy market price over a certain time to make market signals viable.[101]

3.3 Georgia's approach to FiPs and its legal framework

Resolution N403 in July 2020 has approved renewable energy supporting scheme for RES with an installed capacity of over 5MW. Under this scheme, the government is obligated to pay $0.015 for each unit produced by the renewable energy producers on top of the market prices if the market price is less than $0.055. If the difference between the market price and $0.055 is less than $0.015, then FiP is this price difference.[102] The supporting period starts from the moment of commissioning of the power plant and issuing the license. It is paid for ten years, eight months a year. May, June, July and August are left out of the scheme.[103] First, the resolution was adopted for supporting hydropower plants.[104] However, based on the latest amendments, this scheme can be applied to all renewable energy technologies,[105]

[99] Batlle, Pérez-Arriaga and Zambrano-Barragán, 'Regulatory Design for RES-E Support Mechanisms: Learning Curves, Market Structure, and Burden-Sharing', 216
[100] Julieta Schallenberg-Rodriguez and Reinhard Haas, 'Fixed Feed-in Tariff Versus Premium: A Review of the Current Spanish System' (2012) 16 Renewable and Sustainable Energy Reviews 293, 305
[101] Marian Klobasa and others, 'Market Integration of Renewable Electricity Generation—the German Market Premium Model' (2013) 24 Energy & Environment 127, 129
[102] Georgia, *Resolution of the Government of Georgia on Approving Supporting Scheme for Generation and Usage of Energy from Renewable Sources , Art. 5 (Translated from Georgian)*
[103] Ibid, Art. 4 (Translated from Georgian)
[104] Ibid
[105] Ibid, Resolution N36 on Amandments to the Resolution N403

including wind and solar.[106] In the following subparagraphs, the influence of the FiP on Wind and Solar renewable technologies will be analysed.

3.3.1 FiP and market price

According to the above-provided model of FiP, the GoG set the cap for the premium payment. The maximum premium RES supplier can access on top of the market price is $0.015 for eight months in a year. This amount decreases in line with the increase of the spot market prices and if the market price goes beyond $0.055 producer is no more eligible for the premium. If the difference between the market price and $0.055 is less than $0.015, the premium decreases. In short, the minimum premium is linked to market price, and it decreases when the price of electricity at the market is $0.04 (0.055-0.015=0.04). This model, in general, can incentivise renewable integration into the system, as in the case of zero or negative price, RES can still receive a premium and cover its costs. However, as wind and solar are less forecasted, it will be challenging for the utilities to produce electricity when the market price is high.

As already mentioned, the premium was first introduced to support hydropower plants. Later due to the amendments to the resolution, it was extended to all types of renewable energy sources, including wind and solar. Based on what data the premium of $0.0015 is calculated and if it can have the same incentivising effect for all technologies is unknown. However, as each technology's upfront and generation costs differ, theoretically the premium may lead to overcompensation or under-compensation for some technologies. For example, the global weighted-average total installed cost for onshore wind fell by about 74% from 1983 to 2020, and it constituted $1,355/kW in 2020.[107] As for the solar, this cost was $883/kW, a decrease of 13% compared to 2019.[108] On the other hand, the weighted average cost increased from $1,269/kW for the hydropower plant and reached $1,870/kW.[109]

Looking at the examples of FiP, it is important to highlight that Denmark is using feed-in premium as the mechanism to incentivise renewable energy consumption. According to the Danish model of FiP price supplement is based on the technology, capacity, grid connection

[106] Georgia, *Low of Georgia on Promoting the Generation and Consumption of Energy from Renewable Sources, Art. 2 (1,e)*
[107] International Renewable Energy Agency, *Renewable Power Generation Costs in 2020* (IRENA 2021), 55
[108] Ibid, 71
[109] Ibid, 121

time and financing mechanism. For example, for wind turbines that were connected to the grid on or after 21 February 2008, the price supplement constitutes Danish Kroner (Kr.) 0.25 per kWh for "electricity production corresponding to production for the first 22,000 hours at the installed output..".[110]

As for the solar and hydropower plants connected to the grid no later than April 2004, the price supplement constitutes Kr.0.60 per kWh, including the market price. Furthermore, the supplement is granted for 20 years, while plants connected after April 2004 receive the same supplement for ten years.[111] Germany also differentiates the support volume based on the technology, giving the advantage of supporting new technology and avoiding overcompensation for cheap technology.[112] As for Spain, FiP is only used to support investments in onshore wind power plants.[113]

Based on Resolution N403, power plants eligible for the premium must trade electricity directly on the organised electricity market – the spot market.[114] The market was established in 2019, and currently, it is under a testing regime. From September 2022, the day-ahead market will be launched.[115] Thus, it is difficult to forecast electricity prices for a specific hour of a day and provide a technology signal to investors; however, based on the electricity system balance, we can assume when the price will be higher and more profitable for the renewables to trade.

Figure 2 above shows that local production cannot meet the demand from August to April. Except for August, the eight months from September to April, the premium is granted to the RES producer. Thus, we should assume that during these months, the price of the electricity will be higher, but to what extent the premium will be paid, will be evident after launching the spot market.

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[110] The Danish Parliament, *Promotion of Renewable Energy Act* (2008), 36 (2)
[111] Ibid, 47 (2)
[112] International Renewable Energy Agency, *Renewable Energy Prospects: Germany* (A Renewable Energy Roadmap 2015), 21
[113] António Cardoso Marques, José Alberto Fuinhas and Daniela Pereira Macedo, 'The Impact of Feed-in and Capacity Policies on Electricity Generation from Renewable Energy Sources in Spain' (2019) 56 Utilities Policy 159, 162
[114] Georgia, *Resolution of the Government of Georgia on Approving Supporting Scheme for Generation and Usage of Energy from Renewable Sources , 5 (2)*
[115] Government of Georgia, *On Approving Electricity Market Model Concept* (2020), 16 (2)

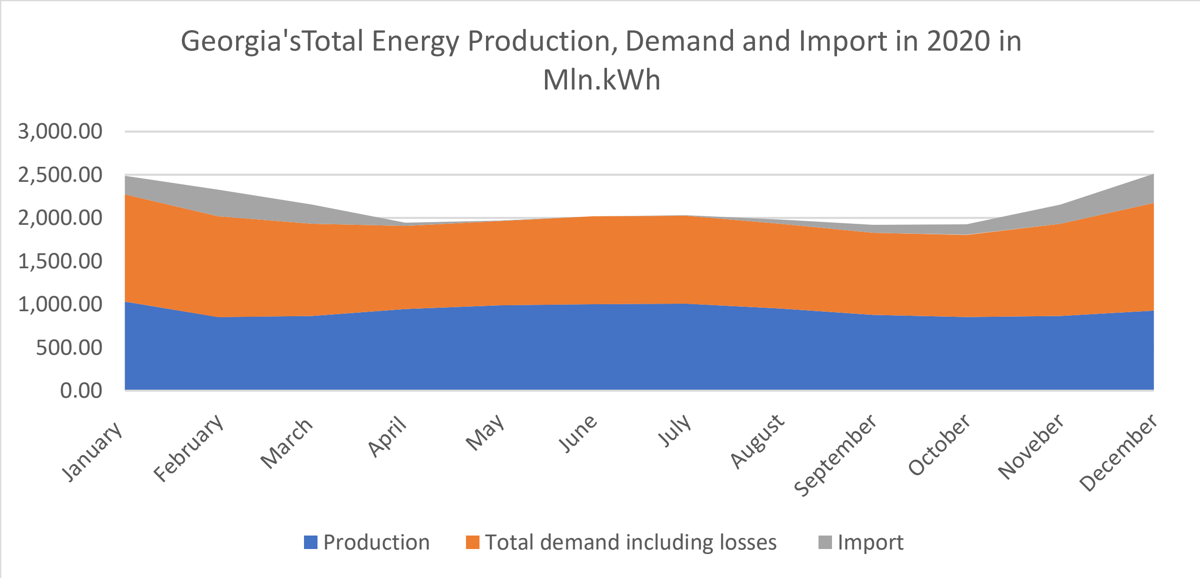

Figure 3. Georgia's Total Energy Production, Demand and Import in 2020 in Mln.kWh[116]

3.3.2 How premium payment schedule can impact RES investments

In Georgia, the national government pledges support to the RES developers for eight months in any given year for 10 years. The rationale behind this approach is that during the eight months, as the import is relatively high (Figure 3 above), hence the spot market electricity price will be high. It is challenging to predict how profitable this scheme will prove in Georgia for wind and solar technologies, as currently only one wind power plant is operating and no large-scale solar PV is deployed.[117] However, based on the existing wind power plant generation pattern (Figure 4 below), it may be observed that every month of the year, the wind power plant is producing some electricity, thus during the premium months, it will be able to access premium tariff and save market risk, if the price on the wholesale market is lower than $0.055. The same will be for the solar power plant in the above-mentioned eight months. However, looking at the hours of sunlight throughout the year (Figure 5 below), it is evident that the generation, during premium months, will not be that much, respectively income. Nevertheless, based on its generation, a large-scale solar power plant will theoretically be able to cover its market risks due to the expected high market price.

Regarding the four months, when the premium is not paid, the wind and solar renewable energy sources face market price risk. The rationale behind not paying these four months is that in May, June, July and August, Georgia has a surplus of power production and

[116] Electricity Market Operator, 'Electricity Balance 2020 ' (*Electricity Market Operator* 2020) <https://esco.ge/en/energobalansi/by-year-1/elektroenergiis-balansi-2020> accessed 25 August
[117] International Energy Agency, *Georgia 2020 Energy Policy Review* (Energy Policy Review, 2020), 73

incentivises power producers to export electricity, respectively, because of the surplus in the system the price of electricity goes down. Considering data from 2017 to 2020 (Figure 6, below), balancing electricity prices decreased from April and reached its lowest point in May. This price gradually increased in the following months. Based on the existing wind power plant generation pattern (Figure 4 below), the output of the power plant is not dramatically changing during the year; however, it faces the price risk during above mentioned months due to the possible low market price (Figure 6), the surplus of electricity in the system, and no premium to access.

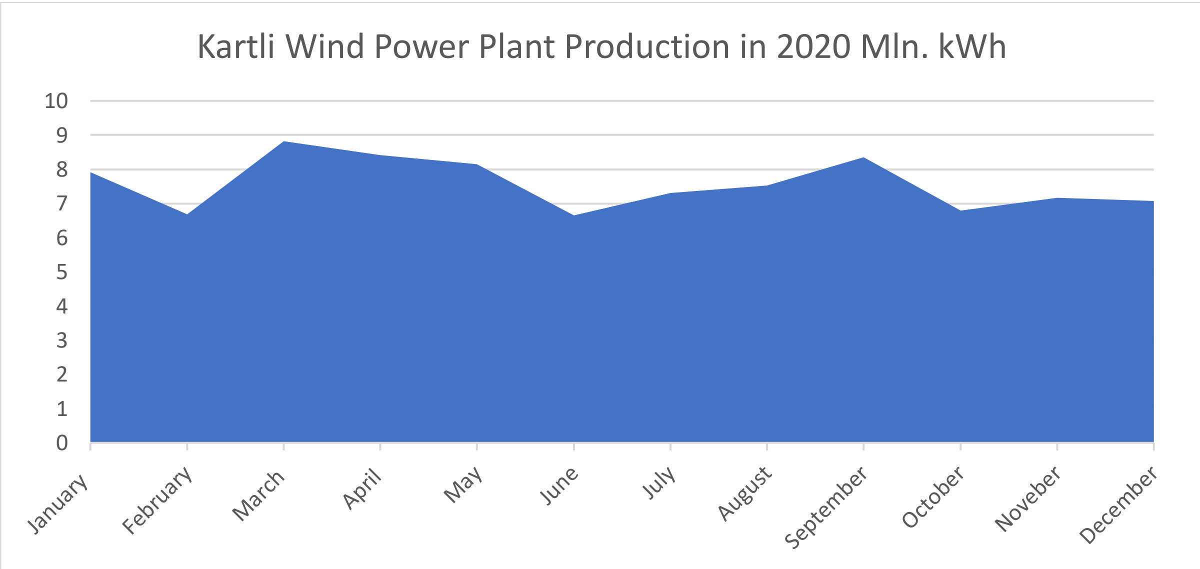

Figure 4. Kartli Wind Power Plant Production in 2020 Mln.kWh[118]

Considering the balancing electricity average price fluctuation from 2017 to 2020 (Figure 6 below), it is evident that the large-scale solar PV in May, June, July and August will be exposed to considerable, periodic, reductions in cash flow, as annually, Solar PV's output will reach the peak from June to August. To specify, based on Figure 6 below, electricity price is decreased during the four months when the premium is not paid, simultaneously the output of the solar PV is increased during the same four months. This is the period when solar PV producers in general are expecting the increased cash flow and return on investment, however, if the premium is not paid in these four months and the price of the electricity is below $0.05 it means that theoretically no support is provided for solar PVs and when planning the investments this should be considered.

[118] Operator, 'Electricity Balance 2020 '

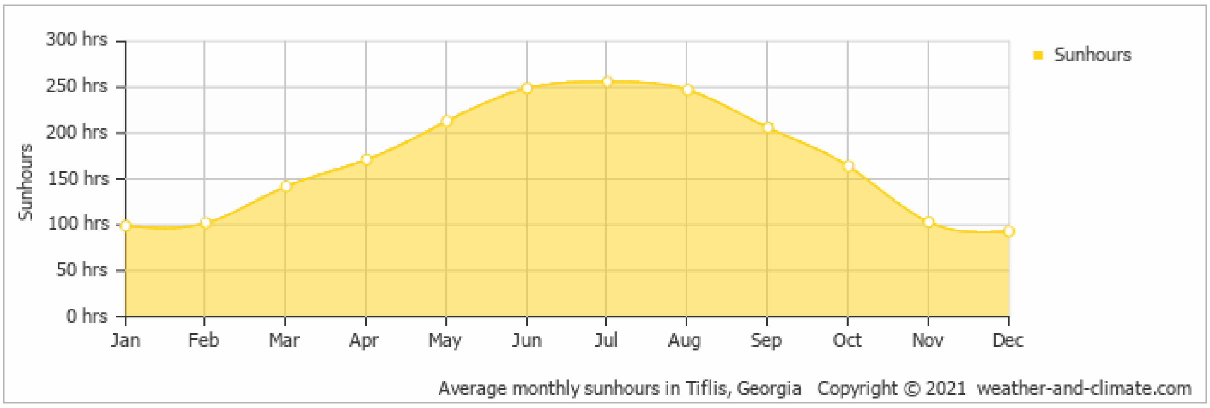

Figure 5. Average monthly hours of sunlight in Tbilisi, Georgia[119]

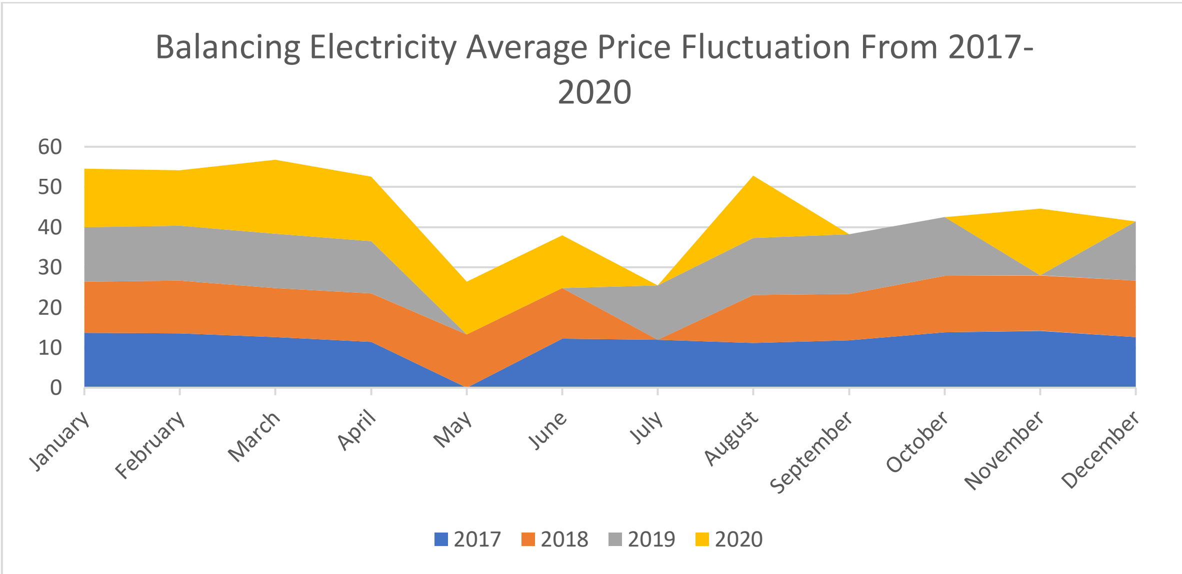

Figure 6. ESCO Balancing electricity average price fluctuation 2017-2020[120]

3.3.3 Possibility to Export Surplus Generation

It seems that the existing FiP scheme does not, in reality, cover price risk for large-scale wind and solar power plants. However, in case of surplus electricity in the system, the producers can export it to the neighbouring countries.

The export of electricity from Georgia is possible when the domestic demand is met; only after that surplus electricity can be exported to the connected neighbouring countries. Currently dispatching licensee is responsible for defining the balance of export volume and time. The entities who are willing to export electricity must apply for it, and the dispatching

[119] Weather & Climate, 'Average Monthly Hours of Sunshine in Tbilisi City ' (*Weather & Climate,* 2021) <https://weather-and-climate.com/average-monthly-hours-Sunshine,tbilisi,Georgia> accessed 29 August
[120] Electricity Market Operator, 'Balancing Electricity Price ' (*Electricity Market Operator* 2021) <https://esco.ge/en/electricity/balancing-electricity-price> accessed 29 August

licensee will define the export direction.[121] The dispatch operator is the one who should choose the electricity to be exported, and while doing this, it should give preference to the most expensive electricity.[122] Besides this, according to the Law on Renewable Energy Sources, “during the dispatch of installations generating electric power, a transmission system operator of Georgia shall give priority to the use of renewable sources insofar as the safe functioning of the electric power system of Georgia permits same…”.[123]

In short, because wind and solar total generation technologies installation costs are lower than hydropower plants (Section 3.3.1) and their operational costs are sometimes zero, it is obvious that the electricity produced from the solar and wind will be cheaper and sold at the local market in May, June, July and August. Simultaneously, wind and solar producers will not have any access to premium tariffs during these months, thus leaving producers against market price risk.

3.3.4 Foreign exchange risk: premium and market price

The goal of most businesses is to increase revenues while reducing risk. Because of the unforeseen future, flexible exchange rates are seen as hazardous by the business. When confronted with a high-risk circumstance, a corporation would usually behave in one of two ways. They will either raise prices to compensate for the high degree of risk or try to limit the number of transactions in the high-risk region to reduce their exposure.[124] Adler and Dumas are also concerned about the currency exchange risk, not because it devaluates but because its devaluation timing and magnitude are not predictable, creating uncertainties for foreign investment.[125] Because of this uncertainty, Vinter and others suggest, “Lending orthodoxy is that a lender should always lend in the currency in which his borrower’s revenue is demonstrated”.[126] Lending in the same currency will avert the investor's concerns regarding the currency fluctuation, as it will be able to receive planned cash flow. However, it is not always possible when investment is made in developing countries.

[121] Ministry of Energy of Georgia, *On Approval of Electricity (Capacity) Market Rules* (Ministry of Energy of Georgia 2006), 14.1 2 (a)
[122] Ibid, 14.1, 1 (b.a)
[123] Georgia, *Low of Georgia on Promoting the Generation and Consumption of Energy from Renewable Sources, 16 2(c)*
[124] Edward Jackson, 'Foreign Exchange Rates: Legal Aspects and the Management and Minimization of Risk Notes and Comments' (1987) 11 Md J Int'l L & Trade 49, 52
[125] Michael Adler and Bernard Dumas, 'Exposure to Currency Risk: Definition and Measurement' (1984) Financial management 41, 42
[126] Graham D. Vinter, Gareth Price and David Lee, *Project Finance : A Legal Guide* (4th edn, Sweet & Maxwell 2013), 46

Foreign exchange (FX) risk can be allocated to different project financing actors: investors, governments, or final consumers. The argument for allocating FX risk to investors is that they can hedge the risk at financial markets or diversify it by the basket of investments in various currencies. However, the derivatives market does not exist for all currencies. Two arguments can justify the allocation of the exchange risk to consumers. First, FX risk would be divided among each consumer with less burden, and second, they are the ones to bear the total cost of electricity that can lead to a cost-effective consumption pattern. The arguments for allocating the risk to the government are that it will be transferred to taxpayers and distributed the same way as the final consumers. Besides this, the government is the one that knows the direction of its policy, and finally, investors simply are not willing to take that risk, but if they do, the risk factor will be considered in the expected rate of return on relevant investment.[127]

Planning the FX risk allocation when investing in wind and solar RES technologies, and trading at the spot market in Georgia may lead to some controversy. Premium is paid in Georgian Lari, however, it is in line with the currency exchange rate set by the National Bank of Georgia on the day of issuing the invoice.[128] Invoice will be issued on clearing day, which is a market trading day.[129] Looking at this mechanism, currency risk, in the case of paying a premium is allocated by exchange rate-indexed contracts, as the currency swap is incorporated in FiP. Thus, the exchange rate is transferred to the final consumer and solves the problem for developers.[130]

However, it is crucial to look at the exchange risk when wind or solar are trading at the spot market and are not eligible for the premium. According to the Wholesale Market Rule, trading and clearing for electricity will be organised in the Georgian national currency, namely the Lari, at the spot market price.[131] Thus, if the investor has a debt in United States Dollars and is not eligible for a premium for a certain trading hour, it will face currency risk. In this case, they should either hedge the risk or accept it, which will increase the price of electricity. On

[127] Tomoko Matsukawa, Robert Sheppard and Joseph Daniel Wright, *Foreign Exchange Risk Mitigation for Power and Water Projects in Developing Countries* (World Bank Group, Energy and Mining Sector Board 2003), 3
[128] Georgia, *Resolution of the Government of Georgia on Approving Supporting Scheme for Generation and Usage of Energy from Renewable Sources , 5 (4)*
[129] Georgian National Energy and Water Supply Regulatory Commission, *On Approving Electricity Market Rules* (2020), 45 (1)
[130] Wim Verdouw, David Uzsoki and C Dominguez Ordoñez, 'Currency Risk in Project Finance' (2015) International Institute for Sustainable Development Discussion Paper, Winnipeg https://www iisd org/sites/default/files/publications/currency-risk-project-finance-discussion-paper pdf, 3
[131] Commission, *On Approving Electricity Market Rules , 4 (3)*

the other hand, if the investor is eligible for a premium, it will partially hedge its foreign exchange risk, in line with the feed-in premium granted.

Currency hedging instruments can be used to allocate currency exchange risk. Such are forward rate agreements and swaps. However, it is less likely that these mechanisms will be developed in an emerging market, relatively in small economy countries.[132] Hence, the government should consider that the actual cost of hard currency financing includes the cost of capital in hard currency and the cost of currency risk that the developer must bear.[133] Currently, Georgia does not have a market for currency hedging mechanisms that raise the risk of investment and the electricity price, as the risk will be included in the final generation costs.

3.3.5 Access to the Premium

According to Resolution N403, the premium can be accessed based on the law on Public-Private Partnership (PPP). This agreement should be arranged between the private investor, GoG and wholesale public service provider.[134] The latter is responsible for paying the premium from the fund, specially created for supporting schemes.[135]

According to the PPP, the "main provisions of a public-private partnership agreement shall include any availability payment/performance-based compensation, and/or other payments (if any) to be made to the private partner".[136] Simultaneously, the basic principles of this law are transparency, foreseeability and prohibition of discrimination.[137]

The Law on Public-Private Partnership is unclear if the above-cited main provisions are the ones that will be applied to access the renewable energy supporting schemes. The main question is if the premium will be incorporated in the agreement or refer the investor to Resolution N403. In the first case, if the premium is incorporated in the agreements, then the risk of changing the law is less concern for the investor, as this change will not retroactively influence the terms of the agreement. On the contrary, if the premium is not

[132] Vinter, Price and Lee, *Project Finance : A Legal Guide, 47*
[133] Verdouw, Uzsoki and Ordoñez, 'Currency Risk in Project Finance', 3
[134] Georgia, *Resolution of the Government of Georgia on Approving Supporting Scheme for Generation and Usage of Energy from Renewable Sources , 2 (2)*
[135] Georgia, *On Approving Electricity Market Model Concept , 11 (5)*
[136] Parliament of Georgia, *Law of Georgia on Public-Private Partnership* (2018), 21 (1,d)
[137] Ibid, 5

incorporated in the agreement and referred to Resolution N403, changes to that resolution will directly influence the investment’s cash flow. This is the policy risk that investors may be exposed and in case of worsening the terms of the administratively set premium, it will worsen the investor's cash flow.

Foreseeability and transparency could have been achieved through clear reference to the PPP law, by specifying which provisions will be applied for accessing the renewable energy supporting scheme, and also by publishing on the official webpage of the Public-Private Partnership Agency the templates of approved renewable energy supporting scheme agreement. Currently, this issue is not foreseeable by Resolution N403 or the PPP law. Therefore, to access this information, an interested party should address responsible public bodies, however, this may question the latter’s equal approach to investors.

Based on the above-discussed concerns of the Feed-in Premium scheme in regards to the wind and solar RES technology, it is obvious that this policy requires a more comprehensive approach to reach its goal. Therefore, in the following paragraph, the author will provide the experience of renewable energy auctions that can benefit Georgia to accelerate investments in Wind and Solar energy technologies.

4. Auctions as an alternative to administrative FiP

This chapter will provide a possible solution to help policymakers design the supporting scheme accelerating investments in renewable energy technologies in Georgia. The offered mechanism is renewable energy auctions that have been widely applied worldwide and helped to reach the climate change objectives. The objective of this chapter is to demonstrate how this mechanism can benefit the challenges current Georgia's FiP mechanism is facing.

4.1 Brief overview of renewable energy auctions

An auction or tender is a competitive selection procedure for procuring renewable energy or capacity. The simplest version of the auctions is as follows: the government determines the auction volume, bidders submit a price at which they are willing to implement the project, and the government rates the bids. When the auction volume is reached, ranked bids are rewarded. As a result, auctions arrange access to off-take contracts and set the price of the per-unit electricity that will be paid to the RES producer.[138]

Besides these phases, the government may differentiate auctions by technology and call bidders for technology-specific or neutral auctions, where all technologies may compete. At the same time, the government may impose specific requirements for bidders to participate in the auction, including guarantees, to ensure the on-time completion of a project. Also, the government may set the pre-qualification phase for the auction to authorise the participant. The criteria for assessing the bids may go beyond the price and volume bided and can include local content, environmental requirements, and technological specifications.[139]

In addition to the above-discussed characteristics of the auctions, policymakers should consider the timing of the auction. A short announcement may result in fewer competing parties and thus affect the competition. The same outcome will be attained if the policymakers set a short period for project realisation. Besides decreased competition, it will

[138] USAID, *Renewable Energy Auctions Toolkit: Why Choose Auctions?* (USAID 2016), 1

[139] International Renewable Energy Agency, *Renewable Energy Auctions in Developing Countries* (IRENA 2013), 11

increase the risks and simultaneously the bids. Another critical element for designing the auction is the price ceiling. The lower price ceiling can lead to ineffectiveness. On the contrary, the higher price ceiling can bring many competitors but very weak ones.[140]

Due to the absence of a post-bidding negotiation stage in a negotiated procurement, such as bilateral discussions, auctions result in greater competitive price building. Moreover, the absence of a negotiation stage in RES auctions makes project implementation, after concluding the contract, faster than in negotiated procurement. When opposed to negotiated procurement, RES auctions offer better degrees of openness in the selection process. In the procurement process, formal participation and award criteria restrict the possibility of discriminations judgement choices.[141] Thus, Del Rio and Linares consider that auctions help regulators be in the right place and avert the industry cost guess by just being public information providers.[142]

4.2 Auction types and the best approach for Georgia

There are two common ways to choose the bidder in the auctions. The descending - clock employs multi-round bids in which the auctioneer announces a price for obtaining the generated renewable power. Bidders compete for the right to supply the quantity of the product they are willing at the declared price. The auctioneer gradually reduces the price to reach the lower amount given by bidders. The price descending continues until the quantity offered equals the quantity to be purchased. In the auction's specification, the bidders know each other's bids and, in the following round, adjust their offers accordingly. [143] The alternative of the descending-cock auction is a sealed-bid auction, where information on other bids is closed, and the bidders do not know how the counterparty is reacting to it. Del Rio and Linares believe that the descending-clock auction is a mechanism to discover the price for implementing a specific project, where the sealed-bid helps prevent collusion and enhance the participation of minor participants.[144] Accordingly, both methods have benefits for enhancing fair competition and defining the premium.

[140] Pablo Del Río, 'Designing Auctions for Renewable Electricity Support. Best Practices from Around the World' (2017) 41 Energy for Sustainable Development 1, 10
[141] USAID, *Renewable Energy Auctions Toolkit: Why Choose Auctions?, 2*
[142] Pablo Del Río and Pedro Linares, 'Back to the Future? Rethinking Auctions for Renewable Electricity Support' (2014) 35 Renewable and Sustainable Energy Reviews 42
[143] Agency, *Renewable Energy Auctions in Developing Countries , 12*
[144] Del Río and Linares, 'Back to the Future? Rethinking Auctions for Renewable Electricity Support', 53

Considering the benefits of the above-discussed options, Brazil opted for hybrid auctions. First, the auction starts with the descending-clock auction and is followed by sealed-bid auctions. By implementing a hybrid auction, Brazil has benefitted from both auction systems: price discovery in the descending clock auction and no collusion between small numbers of players in the sealed-bid auction to determine the final price. In comparison to previous auction designs, the hybrid auction mechanism provides a better and faster price discovery method.[145]

A similar approach would be beneficial for Georgia for several reasons. First, the descending-clock auction may help the authorities decide the FiP based on the competitive bids. As discussed in section 3.3.1., it is not clear based on what data is the $0.015 premium set; thus, the government will set a minimum premium by letting producers bid for it. Besides this, as Georgia is an emerging market in regards to implementing wind and solar technologies, this mechanism can enhance competition between market players and give a possibility to small participants to enter the market.

4.3 Specific auctions, designed for specific purposes

Auctions may have different specifications based on the priorities of a specific country. It can be technology-specific or technology-neutral, site and project-specific. Any specification has its pros and cons, but its pros should match the country's needs, and its cons must be mitigated through different strategies.

In its Ten Years Grid Development Plan, Georgia defined several possible Wind and Solar generation development sites with appropriate capacity (Section 1.2.). Considering this, it will be beneficial to implement Site-and Project-Specific auctions for these areas. Because it reduces risks and costs for bidders, this approach has been widely utilised in countries with lower renewable penetration in the system. Under this mechanism, the auction outcome is highly predictable as the project's size, location, and technology are already defined. The benefit of the Site-and Project-Specific Auction is that bidders are not exposed to the risk of land permits, greed connection and additional infrastructure needed to be built. The auctions, such as those for solar power in the United Arabs Emirates and Morocco, have resulted in record-low costs.[146]

[145] Agency, *Renewable Energy Auctions in Developing Countries*

[146] International Renewable Energy Agency, *Renewable Energy Auctions: Status and Trends Beyond Price* 2019), 17

In contrast to the Site-and Project-Specific auction, a technology-specific auction enables a country to introduce a specific technology into the energy mix to diversify energy sources and complement each other to ensure the security of supply. Spain, Finland, Germany and Denmark have adopted renewable-exclusive auctions oriented to a specific technology.[147] It also incentivises domestic value change, participation of small actors and integration of the system.[148] Until 2010, Brazil's auctions of RES were Technology-Specific, leading to market development and price competitiveness. [149]

Considering that Georgia is an emerging market and wind and solar generation sources are not that much developed, to encourage and enhance competition, first, Site-and technology-specific auctions should be implemented, even though they take high administrative costs resources. They can contribute to market development and bring the experience in the country that can be shared to incentivise new entrants. The risks that are averted with this mechanism will help small entrants to participate in the auction. Moreover, this mechanism will lead to high competition and, therefore, fair premium. Afterwards, Georgia can move to the Technology Specific auction to lessen the administrative burden of the Site-and Project Specific auctions.

[147] Ibid,18
[148] Del Río, 'Designing Auctions for Renewable Electricity Support. Best Practices from Around the World', 7
[149] Agency, *Renewable Energy Auctions in Developing Countries , 22*

5. Conclusion

This dissertation has discussed how critical investments in renewable energies are for Georgia to reach its target and fulfil the commitment taken against the international community. Georgia has relative resource potential to attract investments in wind and solar technology. Besides this, due to the ongoing market liberalisation reform, it can become the leading site for renewable energy investment in the South Caucasus region.

Georgia took a step ahead when it adopted the law on supporting renewable energies. Determining the renewable energy share target in final energy consumption, including the transport sector, gave a clear signal to investors. However, as Georgia needs to reach the target in nine years, it must adopt a robust, long-term, clear and transparent internal renewable energy policy. To specify, it must include specific measures, timeframe and responsible bodies. Moreover, it should provide information on the required installed capacity and specific technology, based on which Georgia plans to reach its goal. Besides, Georgia should follow the experience of the discussed countries succeeding in achieving the targets established by the EU directive 2009/28/EC and set a higher target in its internal policy to incentivise investors.

Adoption of the FiP scheme is another step forward for Georgia. However, investors will always question if a change in the government will change the supporting scheme. Therefore, such a scheme must be approved with a more robust mechanism to avert its change in line with the change of the government. Simultaneously, this mechanism is vague in regards to accessing the premium and the agreement that will be signed between the parties. Thus the responsible authority must ensure that this process is foreseeable in the legislation and relevant agreement templates are approved to avoid a discriminative approach.

Apart from assessing the robustness of the renewable energy supporting policy, this dissertation has applied the FiP to wind and solar technologies based on their characteristics to check if the supporting scheme can incentivise investments in this field. At the same time, this mechanism was assessed in the case of trading renewable energies at the spot market. Due to the premium payment schedule incorporated in the resolution of the GoG, the author concludes that this mechanism will not be enough to accelerate investments in wind and solar technology. Wind and solar energy producers are not eligible for the premium in the four months of a year when the price of the electricity at the spot market will probably be low. Moreover, as the installation costs for wind and solar are different, it may lead to overcompensation or under-compensation.

This research showed that renewable energy technology procurement with the auction encouraged price decrease for wind and solar technologies and led to the cost-effective price. To avoid the problem of overcompensation or under-compensation, Georgia should introduce auctions. However, it must consider the existing experience and ensure that the timing of the announcement of the auction, price ceiling, bidding methodology, type and specification is chosen to avoid its adverse effect and help reach the specific goal. For this purpose, Georgia should opt for the hybrid auction implemented in Brazil. Its advantage is that price is set competitively. At the same time, there is less chance for collusion as bidders do not know each other's behaviour. Finally, it gives the possibility to small businesses to participate in the auction. The latter can also be ensured with the Site-and Technology-specific auction. This model reduces participation costs for interested investors but takes enormous administrative resources, as the place, permits (land, environmental impact assessment) and technology are determined by the government at the stage of announcement of the auction. However, to introduce local participants and gain experience, Georgia should first initiate hybrid Site-and Technology Specific auctions.

With the liberalisation and the introduction of the spot market from September 2022, investors who have debt in a different currency and are obliged to trade electricity at the spot market will be facing foreign exchange risk, as at the spot market, clearing is denominated in Lari. Therefore, authorities must take measures parallel to ongoing market liberalisation reform and accelerate the implementation of foreign exchange hedging mechanisms.

Bibliography

Primary Sources

Bundestag, Renewable Energy Act (Bundesamt Fur Justiz 2014)

Commission Staff Working Document, The Support of Electricity from Renewable Energy Sources (Commission of the European Communities 2008)

Energy Charter Conference, The Energy Charter Treaty (Energy Charter Secretariat 1994)

Energy Community, Protocol Concerning the Accession of Georgia to the Treaty Establishing the Energy Community (Energy Community 2016)

European Parliament, Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC (2009)

Federal Ministry of Economy Family and Youth, National Renewable Energy Action Plan 2010 for Austria (European Commission 2010)

Federal Ministry Republic of Austria, Austrian Climate and Energy Strategy (Federal Ministry for Sustainability and Tourism, Federal Ministry for Transport, Innovation and Technology 2018)

Georgian National Energy and Water Supply Regulatory Commission, On Approving Electricity Market Rules (2020) (Translated from Georgian)

Georgian National Energy and Water Supply Regulatory Commission, Resolution on Approving Distribution System Operator Unbundling Rules (2020) (Translated from Georgian)

Georgian National Energy and Water Supply Regulatory Commission, On Approving Transmission System Operator Unbundling Plan of Georgia (2020) (Translated from Georgian)

Georgian National Energy and Water Supply Regulatory Commission, Annual Report on 2020 Activities (Georgian National Energy and Water Supply Regulatory Commission 2020)

Government of Georgia, On Approving Electricity Market Model Concept (2020) (Translated from Georgian)

Government of Georgia, Resolution of the Government of Georgia on Approving Georgia's Electricity Transmission System Operator Unbundling Plan (2020)

Government of Georgia, Resolution of the Government of Georgia on Approving Supporting Scheme for Generation and Usage of Energy from Renewable Sources (2020) (Translated from Georgian)

Government of Georgia, Order of the Government of Georgia on “Signing the Paris Agreement” (2016) (Translated from Georgian)
Government of Georgia, Resolution of the Government of Georgia on “Approving and Enforcing the Paris Agreement” (2017) (Translated from Georgian)
Ministry of Economy and Sustainable Development of Georgia, National Action Plan for Renewable Energy (Ministry of Economy and Sustainable Development of Georgia 2019)
Ministry of Economy and Sustainable Development of Georgia, Ten Years Plan for Developing Georgia's Transmission Grid (Ministry of Economy and Sustainable Development 2021) (Translated from Georgian)
Ministry of Economy and Sustainable Development, National Renewable Energy Action Plan Georgia (Ministry of Economy and Sustainable Development 2019)
Ministry of Employment and the Economy, Finland's National Action Plan for Promoting Energy from Renewable Sources Pursuant to Directive 2009/28/EC (European Commission 2010)
Ministry of Energy of Georgia, On Approval of Electricity (Capacity) Market Rules (Ministry of Energy of Georgia 2006)
Parliament of Georgia Po, Low of Georgia on Promoting the Generation and Consumption of Energy from Renewable Sources (2019)
Parliament of Georgia, Constitution of Georgia (1995)
Parliament of Georgia, Explanatory Note (Parliament of Georgia 2019) (Translated from Georgian)
Parliament of Georgia, Law of Georgia on Public-Private Partnership (2018)
Parliament of Georgia, Organic Law of Georgia on Normative Acts (2009)
Parliament of Georgia, Reglament of the Parliament of Georgia (Parliament of Georgia 2012)
Parliament of Georgia, Resolution of the Parliament of Georgia on Accession to the Protocol Concerning the Accession of Georgia to the Treaty Establishing the Energy Community (Parliament of Georgia 2017)
Parliament of Georgia, The Law of Georgia on Energy and Water Supply (2019) (Translated from Georgian)
Parliament of Georgia, The Resolution of the Parliament of Georgia on Principal Directions of Country’s Policy in Energy Sector (Parliament of Georgia 2015) (Translated from Georgian)

Regeringskansliet, The Swedish National Action Plan for the Promotion of the Use of Renewable Energy in Accordance with Directive 2009/28/EC and the Commission Decision of 30.06.2009 (European Commission 2010)

Swedish Government, Agreement on Swedish Energy Policy (Government Offices of Sweden 2016)

The Council of the European Community, Treaty Establishing Energy Community (The Council of the European Community 2006)

The Danish Parliament, Promotion of Renewable Energy Act (2008)

The European Union, Association Agreement Between the European Union and the European Atomic Energy Community and their Member States, of the One Part, and Georgia, of the Other Part (European Union 2014)

The Government of Republic of Armenia, Republic of Armenia Energy Sector Development Strategic Program to 2040 (The Ministry of Territorial Administration and Infrastructure 2020)

United Nations, Paris Agreement (United Nations 2015)

Books

Cointe B and Nadaï A, Feed-in Tariffs in the European Union: Renewable Energy Policy, the Internal Electricity Market and Economic Expertise (Springer 2018)

Matsukawa T, Sheppard R and Wright JD, Foreign Exchange Risk Mitigation for Power and Water Projects in Developing Countries (World Bank Group, Energy and Mining Sector Board 2003)

Salacuse JW, The Law of Investment Treaties (OUP Oxford 2015)

Vinter GD, Price G and Lee D, Project Finance : A Legal Guide (4th edn, Sweet & Maxwell 2013)

Cases

Parkerings-Compagniet AS v. Republic of Lithuania (ICSID Arbitration Case No. ARB/05/8)

Journal Articles

Adler M and Dumas B, 'Exposure to Currency Risk: Definition and Measurement' (1984) Financial management 41

Ataka V, 'Implementation of the EU Renewable Energy Directive 2009/28/EC: A Case of Two Extremes, Austria and Malta'

Batlle C, Pérez-Arriaga IJ and Zambrano-Barragán P, 'Regulatory Design for RES-E Support Mechanisms: Learning Curves, Market Structure, and Burden-Sharing' (2012) 41 Energy Policy 212

Boute A, 'Regulatory Stability and Renewable Energy Investment: The Case of Kazakhstan' (2020) 121 Renewable and Sustainable Energy Reviews 109673

Bull SR, 'Renewable Energy Today and Tomorrow' (2001) 89 Proceedings of the IEEE 1216

Del Río P and Linares P, 'Back to the Future? Rethinking Auctions for Renewable Electricity Support' (2014) 35 Renewable and Sustainable Energy Reviews 42

Del Río P, 'Designing Auctions for Renewable Electricity Support. Best Practices from Around the World' (2017) 41 Energy for Sustainable Development 1

Dincer I, 'Renewable Energy and Sustainable Development: A Crucial Review' (2000) 4 Renewable and Sustainable Energy Reviews 157

Gatzert N and Vogl N, 'Evaluating Investments in Renewable Energy Under Policy Risks' (2016) 95 Energy Policy 238

Geramitoski T and others, 'Implementation the Tasks of the Renewable Energy Directive 2009/28/EC in EU Members and R. Macedonia as a Country-candidate'

Goutard E, Renewable Energy Resources in Energy Management Systems (IEEE 2010)

Griffith-Jones S, Ocampo JA and Spratt S, 'Financing Renewable Energy in Developing Countries: Mechanisms and Responsibilities' (2012)

Hirsch M, 'Between Fair and Equitable Treatment and Stabilization Clause:: Stable Legal Environment and Regulatory Change in International Investment Law' (2011) 12 The Journal of World Investment & Trade vii

Howes T, 'The EU's New Renewable Energy Directive (2009/28/EC)' (2010) 15 The New Climate Policies of the European Union: Internal Legislation and Climate Diplomacy 3

Jackson E, 'Foreign Exchange Rates: Legal Aspects and the Management and Minimisation of Risk Notes and Comments' (1987) 11 Md J Int'l L & Trade 49

Jacobs D, 'Fabulous Feed-in Tariffs' (2010) 11 Renewable Energy Focus 28

Klobasa M and others, 'Market Integration of Renewable Electricity Generation—the German Market Premium Model' (2013) 24 Energy & Environment 127

Marques AC, Fuinhas JA and Macedo DP, 'The Impact of Feed-in and Capacity Policies on Electricity Generation from Renewable Energy Sources in Spain' (2019) 56 Utilities Policy 159

Schallenberg-Rodriguez J and Haas R, 'Fixed Feed-in Tariff Versus Premium: A Review of the Current Spanish System' (2012) 16 Renewable and Sustainable Energy Reviews 293

USAID, Renewable Energy Auctions Toolkit: Why Choose Auctions? (USAID 2016)

Verdouw W, Uzsoki D and Ordoñez CD, 'Currency Risk in Project Finance' (2015) International Institute for Sustainable Development Discussion Paper, Winnipeg https://www.iisdorg/sites/default/files/publications/currency-risk-project-finance-discussion-paper pdf

Wiser RH and Pickle SJ, 'Financing Investments in Renewable Energy: the Impacts of Policy Design' (1998) 2 Renewable and Sustainable Energy Reviews 361

Reports

Energy Community, Annual Implementation Report (Georgia, 2020)

Eurostat, Renewable Energy in the EU in 2018 (Eurostat 2020)

Georgian State Electrosystem, Annual Report 2019/2020, 2020)

Government of Georgia, Georgia's Updated Nationally Determined Contribution (NDC), 2021)

International Energy Agency, Azerbaijan 2021 Energy Policy Review, 2021)

International Energy Agency, Azerbaijan Energy Profile 2021)

International Energy Agency, Eastern Europe, Caucasus and Central Asia (Energy Policies Beyond IEA Countries 2015)

International Energy Agency, Georgia 2020 Energy Policy Review (Energy Policy Review, 2020)

International Renewable Energy Agency, Renewable Energy Auctions in Developing Countries 2013)

International Renewable Energy Agency, Renewable Energy Auctions, 2015)

International Renewable Energy Agency, Renewable Energy Auctions: Status and Trends Beyond Price 2019)

International Renewable Energy Agency, Renewable Energy Prospects: Germany (A Renewable Energy Roadmap 2015)

International Renewable Energy Agency, Renewable Power Generation Costs in 2019, 2020)

International Renewable Energy Agency, Renewable Power Generation Costs in 2020, 2021)

Thorpe TW, Renewable Energy Technologies for Electricity Generation, 1993)

Web Sources

Electricity Market Operator, 'Balancing Electricity Price ' (Electricity Market Operator 2021) <https://esco.ge/en/electricity/balancing-electricity-price> accessed 29 August

Electricity Market Operator, 'Electricity Balance 2020 ' (Electricity Market Operator 2020) <https://esco.ge/en/energobalansi/by-year-1/elektroenergiis-balansi-2020> accessed 25 August

Electricity Market Operator, 'Electricity Import Export Statistics 2017 -2021 (MLN. KWH)' (Electricity Market Operator 2021)accessed 16 August

Electricity Market Operator, 'Import-Export-Transit 2015-2020' (Electricity Market Operator 2021) <https://esco.ge/en/import-eksporti/by-year> accessed 30 August

European Parliament and Council of the European Union, 'Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC' (EUR-Lex, 2009)accessed 10 August

International Energy Agency, 'Austria 2020' (International Energy Agency, 2020) <https://www.iea.org/reports/austria-2020> accessed 8 August

United Nations Climate Change, 'The Paris Agreement' (United Nations Framework Convention on Climate Change 2021) <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement> accessed 1 September

Weather & Climate, 'Average Monthly Hours of Sunshine in Tbilisi City ' (Weather & Climate, 2021) <https://weather-and-climate.com/average-monthly-hours-Sunshine,tbilisi,Georgia> accessed 29 August

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