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## Russia Renewable Energy Program

# Russia's New Capacity-based Renewable Energy Support Scheme

An analysis of Decree No. 449

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# Introduction

On 28 May 2013, the Government of the Russian Federation adopted Decree No. 449 on the Mechanism for the Promotion of Renewable Energy on the Wholesale Electricity and Capacity Market. This long-awaited legislation is a significant step towards the creation of a regulatory framework designed to promote clean energy production in Russia. Since 1999, support for the use of renewable energy sources for electricity production (RES-E) has been the subject of much debate in the Russian Federation. The legal and technical challenges and, more importantly, the political sensitivity of price increases in the energy sector have blocked previous attempts to develop a level playing field for alternative modes of electricity production.

Decree No. 449 integrates support for RES-E into the capacity market. This is a very different approach to that applied in most of the existing support mechanisms in other countries, where RES-E is promoted on the basis of the electricity output (MWh) rather than the installed capacity (MW or MW per month) of renewable energy installations. The cornerstone of the new capacity scheme is the “Agreement for the Supply of Capacity”, which will allow renewable energy investors to benefit from regulated capacity prices for a period of 15 years.

Promoting RES-E through the capacity market is a way for the Russian authorities to overcome some of the legal and technical challenges faced by previous support initiatives and, importantly, to control the costs of renewable energy. This approach fits well with the specific regulatory architecture of the Russian wholesale electricity market, which comprises both an energy and capacity segment. However, put in perspective of world renewable energy support practices, supporting RES-E through capacity markets is a unique and untested approach. Supporting RES-E through capacity markets presents challenges to the existing regulatory framework, not least because the Russian capacity market rewards power plants for their ability to produce electricity on demand, an ability often lacking in renewable energy generation facilities due to the variability of their supply.

This report introduces Russia’s new capacity-based scheme and examines how the Russian authorities have integrated the variability of renewable energy sources into the regulation of capacity supply. The central question underlying this analysis is whether, with Decree No. 449, the Russian authorities have created a regulatory framework that will incentivize investment in renewable energy projects in Russia.

Besides the procedure and criteria for the selection of renewable energy investment projects, this report will focus on the rights and obligations of renewable energy investors under Agreements for the Supply of Capacity. It will examine the mechanisms that the Russian Government has developed to minimize the short-term impact of RES-E on end-user electricity prices whilst at the same time stimulating the development of a domestic renewable energy manufacturing industry. Looking at the situation from mainly a regulatory perspective, this analysis will highlight the risk of legal uncertainty affecting the business case for renewable energy investors under the capacity-based scheme.

## The history of the scheme: from “premium” to “capacity-based” support

In November 2007, the Federal Electricity Law<sup>1</sup> – the legal architecture governing the Russian electricity market – was amended to provide a legal basis for the support of RES-E through a scheme under which a premium was added to the wholesale electricity price. This scheme was never implemented because of alleged legal and technical problems and concerns regarding the impact that this support scheme might have on consumer prices<sup>2</sup>. In 2011, the Federal Electricity Law was amended to introduce an additional support mechanism: the promotion of RES-E through the capacity market. This scheme aims to ensure the financial viability of RES-E investments by concluding “Agreements for the Sale/Purchase (Supply) of Capacity” with renewable energy project developers. Decree No. 449 of 28 May 2013 on the Mechanism for the Promotion of Renewable Energy on the Wholesale Electricity and Capacity Market further develops the legal basis for the capacity scheme. As will be highlighted below, further regulatory intervention by the Government, the Market Council (the regulator of the Russian wholesale market) and the Ministry for Industry is needed to finalize the implementation of the scheme.

The mechanism for concluding Agreements for the Supply of Capacity is similar to the contractual scheme developed to finance investments in strategic power plants in the context of the privatization of the former quasi-monopolist RAO UES. To ensure the financing of the investment program of RAO UES, investors that purchased generation assets in the context of the privatization of this company signed long-term capacity supply agreements (“DPM” in Russian) for remuneration of capacity (availability) at regulated prices.

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<sup>1</sup> Federal Law “On Electricity” No. FZ-35 of 26 March, 2003.

<sup>2</sup> See IFC, *Renewable Energy Policy in Russia: Waking the Green Giant* (IFC, 2011), available at [http://www1.ifc.org/wps/wcm/connect/region\\_ext\\_content/regions/europe+middle+east+and+north+africa/ifc+in+europe+and+central+asia/publications/renewable+energy+policy+in+russia+-waking+the+green+giant](http://www1.ifc.org/wps/wcm/connect/region_ext_content/regions/europe+middle+east+and+north+africa/ifc+in+europe+and+central+asia/publications/renewable+energy+policy+in+russia+-waking+the+green+giant), accessed on 14 June 2013. On the concern of price increases related to RES development, see also IEA, *World Energy Outlook* (2011), p. 326.

# The capacity-based renewable energy support scheme: a new and untested approach

The Russian capacity-based approach to the support of RES-E significantly differs from the schemes established for promotion of renewable energy in most countries around the world. Support of RES-E (e.g. through feed-in tariff, premium, green certificate or tendering schemes) is usually linked to the electricity output (production) of RES-E generating facilities (expressed in MWh). In contrast, the Russian capacity scheme is linked to capacity supply (i.e. the availability of power plants to produce electricity (expressed in MW or MWmonth)).

Besides the fact that this approach is new and therefore largely unknown to investors, it raises specific regulatory challenges related to the volatility of the output of wind energy, solar PV and small hydropower plants. How can operators of variable renewable energy generating facilities demonstrate the readiness of their installations to produce electricity? This issue is of key importance given that capacity remuneration in Russia depends on the extent to which power plants meet all the requirements relating to their ability to produce electricity on demand. In cases where power plants fail to meet availability requirements, capacity remuneration will be reduced by the application of certain coefficients. The challenges related to the availability of variable renewable energy installations for electricity production and the answer proposed by the Russian authorities are explored below along with other key issues, such as capacity pricing and the selection of renewable energy investment projects eligible for the conclusion of Agreements for the Supply of Capacity.

## The concept of “Agreement for the Supply of RES Capacity”

The Federal Electricity Law<sup>3</sup> charges the Government of the Russian Federation with the task of developing the main conditions governing the Agreements for the Supply of Capacity to be signed by renewable energy project developers. According to this Law, key contractual conditions are to be regulated by the Government. These include the price of RES capacity and the duration of capacity supply. Agreements for the Supply of RES Capacity are thus long-term contracts that establish the right for renewable energy investors

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<sup>3</sup> Art 32, para 2.

to benefit from regulated prices determined by reference to the installed capacity of their installations. Anchored in the Russian capacity market, these agreements oblige renewable energy investors to comply with the regulation of capacity supply (e.g. assessment of availability to produce electricity) under the Wholesale Market Rules (the regulatory architecture governing the Russian wholesale market). Given the difficulty for variable renewable energy generating facilities to guarantee their hour-by-hour availability to produce electricity, Decree No. 449 establishes specific capacity rules for RES.

Agreements for the Supply of Capacity are concluded between renewable energy investors and wholesale market consumers through the Centre for Financial Settlement, which acts as an intermediary. The Administrator of the Trading System (the operator of the wholesale market trading platform), the Market Council (the regulator of the wholesale market) and the System Operator also participate in this process.

Importantly, according to the Federal Electricity Law, the Government must develop the contractual conditions governing RES capacity supply while taking into account the requirement to achieve the national strategic target for the development of RES-E in Russia (4.5 % of electricity produced and consumed in 2020, according to Resolution No. 1-r of the Government of the Russian Federation). This implies that the price of RES capacity, the duration of RES capacity supply and the regulation of RES capacity supply (i.e. the requirement to be available to generate electricity) should facilitate the achievement of the 4.5 % target. More recent official documents refer to a 2.5 % target by 2020<sup>4</sup>, but no amendment in this sense has been introduced to Resolution 1-r.

With Decree No. 449 on the Mechanism for the Promotion of Renewable Energy on the Wholesale Electricity and Capacity Market, the Government amended the Wholesale Market Rules in order to integrate Agreements for the Supply of RES Capacity into the wholesale market architecture. This Decree establishes rules for the selection of renewable energy projects, capacity supply by variable renewable energy installations and capacity pricing.

## Selection of investment projects

### Objective and timing

Decree No. 449 tasks the Administrator of the Trading System with organizing a competitive selection of renewable energy investment projects each year and for each type of renewable energy covered by the scheme (i.e. wind, solar PV and small hydropower). The developers of the selected projects will then be entitled to sign Agreements for the Supply of RES Capacity. The object of this competitive process is to select projects up to a certain maximum amount of MW installed renewable energy capacity for each year. By limiting the amount of renewable energy projects covered by the scheme, Decree No. 449 aims to minimize the costs of this support policy and thus the impact on end user electricity prices. As will be seen below, the Government also aims to limit the price impact of the capacity scheme by introducing limits on the capital costs of renewable energy projects.

The Government of the Russian Federation determines targets for the level of installed wind, solar PV and small hydropower capacity that should be commissioned each year up to 2020. In contrast to tendering schemes in other countries (e.g. tenders for offshore wind energy in the UK and France), the choice of location of renewable energy projects is left to investors. There is one geographical limit: Decree No. 449 applies to projects located in the price zones of the Russian wholesale market (i.e. parts of the Russian territory where electricity is traded at free market prices). The capacity-based scheme does not apply to renewable energy in isolated regions and non-price zones of the wholesale market.

By basing the target on installed capacity (MW), Decree No. 449 adopts a different approach to the existing 4.5 % renewable energy target that is calculated on the basis of the amount of electricity produced and consumed (MWh) in Russia. It must be noted that the Federal Electricity Law mandates the Government with the task of determining renewable energy targets on the basis of electricity consumption and production (MWh)

<sup>4</sup> Resolution of the Government of the Russian Federation No. 512-r of 3 April 2013 "On Approving the State Program for Energy Efficiency and the Development of the Energy Sector".

not installed capacity (MW). The new approach to the calculation of the target (based on installed capacity rather than electricity production) highlights the risk of “steel-in-the-ground” associated with the promotion of renewable energy through capacity payments – a risk that to an important extent has been addressed in Decree No. 449 by linking capacity remuneration to the achievement of minimum production requirements (i.e. capacity factors)<sup>5</sup>.

The Resolution of the Government of the Russian Federation No. 861-r of 28 May 2013 establishes the following limits for renewable energy installed capacity in 2014 – 2020<sup>6</sup>:

MW per type of RES	2014	2015	2016	2017	2018	2019	2020	Total
<b>Wind</b>	100	250	250	500	750	750	1 000	3600
<b>Solar</b>	120	140	200	250	270	270	270	1520
<b>Small hydro</b>	18	26	124	124	141	159	159	751
<b>Total</b>	238	416	574	874	1 161	1 179	1 429	5 871

According to Decree No. 449, the first competitive selection will take place before 30 September 2013<sup>7</sup>. Capacity supply (i.e. the commissioning of the selected renewable energy projects) can start in the year following the competitive selection process or in the period up to three years after selection. Investors can therefore submit bids for projects to be commissioned up to three years after the selection process. This represents a risk to newcomers: depending on the amount and type of bids submitted, the scheme could rapidly become overcrowded, thereby limiting the prospects of being able to benefit from support for a three year period.

## Scope

Decree No. 449 limits support under the capacity-based scheme to solar energy, wind and small-hydro-power – a much narrower scope than the definition of “renewable energy sources” under Article 3 of the Federal Electricity Law. Moreover, being anchored in the wholesale market, the capacity scheme is limited to renewable energy generating facilities with an installed capacity equal to or exceeding 5 MW – the minimum limit for participation in the wholesale market<sup>8</sup>. As said above, the scheme does not apply to the non-price zones of the wholesale market and to isolated regions.

In addition, to be eligible for support, renewable energy generating facilities need to be “qualified” (i.e. certified) by the Market Council in accordance with Government Decree No. 426 of the Qualification of RES Installations. Qualification takes place after construction, connection to the network and commissioning of renewable energy installations and is accordingly not directly relevant at the project selection stage. Nevertheless, the fact that renewable energy generating facilities must be qualified to benefit from support under the capacity scheme can indirectly affect the scope of participants in the competitive selection. Indeed, Decree No. 426 limits qualification to installations that are included in the Scheme for the Location of RES Installations adopted by the Ministry of Energy<sup>9</sup>. Although not mandatory under Decree No. 449, prospective renewable energy investors should, for the sake of investment certainty, seek to be included on the Ministry’s Scheme for the Location of RES Installations before participating in the competitive selection process for renewable energy projects<sup>10</sup>.

<sup>5</sup> On this risk, see also IFC, *Financing Renewable Energy Investments in Russia: Legal Challenges and Opportunities* (IFC, 2012), p. 8, available at [http://www1.ifc.org/wps/wcm/connect/region\\_ext\\_content/regions/europe+middle+east+and+north+africa/ifc+in+europe+and+central+asia/publications/financing+renewable+energy+investments+in+russia+-+legal+challenges+and+opportunities](http://www1.ifc.org/wps/wcm/connect/region_ext_content/regions/europe+middle+east+and+north+africa/ifc+in+europe+and+central+asia/publications/financing+renewable+energy+investments+in+russia+-+legal+challenges+and+opportunities), accessed on 14 June 2013. See also Anatole Boute, “Promoting Renewable Energy through Capacity Markets: An Analysis of the Russian Support Scheme” (2012) 46 *Energy Policy*, p. 68.

<sup>6</sup> It must be noted that Resolution No. 861-r introduces a certain level of uncertainty concerning the scope of application of these limits. It is not absolutely clear from the formulation of Resolution No. 861-r that these limits apply only to renewable energy installations on the wholesale market, i.e. it can be questioned if these limits also cover renewable energy generating facilities that operate on the retail market. Importantly, Decree 449 explicitly mandates the Government to determine targets of installed renewable energy capacity on the wholesale market.

<sup>7</sup> ATS has published information on the competitive selection of investment projects for capacity supply in 2014, 2015, 2016 and 2017. Available at <http://www.atsenergo.ru/vie/otborinfo/>.

<sup>8</sup> It should be noted that, with certain exceptions, installations equal to or above 25 MW must participate in the wholesale market. Generating facilities with an installed capacity between 5 and 25 MW can choose between the retail market and the wholesale market.

<sup>9</sup> Order of the Ministry of Energy No. 316 of 29 July 2011 “On Approving the Scheme for the Location of RES Installations”.

<sup>10</sup> It should be noted that according to Art 32, para 1 of the Federal Electricity Law, the mandatory sale and purchase of capacity includes installations that have been selected by the Government of the Russian Federation. Approval of investment projects by the Government is a key element of the conclusion

## Bids

The bids that project developers submit to participate in the competitive selection of projects must contain the following information:

- the identity of the project participants;
- the designation of the specific project and proposed RES generating facility;
- the location of the proposed generating facility;
- the type of renewable energy technology;
- the projected installed capacity;
- reference to the provisional supply points on the wholesale market calculation model;
- the proposed starting date of capacity supply;
- the planned capital costs (including connection costs) expressed in rubles per Kw installed capacity;
- the planned local content; and
- the guarantees to secure the implementation of the project.

## The selection process and selection criteria

The Administrator of the Trading System (ATS) is responsible for the selection of renewable energy investment projects. The selection process is spread over two rounds. In the first round, ATS selects projects which meet the requirements for the participation in the scheme. Those which fail to meet the requirements for participation in the scheme are rejected at that stage. The projects selected then proceed to the second round where ATS determines which of those projects will be invited to sign Agreements for RES Capacity Supply. This second selection takes place based on the proposed capital costs; projects are selected up to the maximum per year.

The whole selection process will now be examined in more detail.

### A. Preliminary selection

ATS conducts a preliminary selection process to determine which investment projects meet the requirements for participation in the main selection process. The requirements for participation in the scheme are as follows:

1) *Registration as provisional supplier to the wholesale market*: Participation in the scheme is limited to wholesale market players. This limits the scope of the scheme to installations with an installed capacity of 5 MW or above. The competitive selection of renewable energy investment projects logically takes place before the construction of the renewable energy generating facilities. To participate in this competitive selection process, project developers must register their investment projects as “provisional suppliers”<sup>11</sup> to the wholesale market. The requirement of registration as provisional supplier can be explained by the fact that the competitive process selects investment projects, i.e. projects that have not yet been constructed and commissioned. It can, however, restrict the scope of the support scheme. By limiting participation in the competitive selection to installations registered as provisional supply points, Decree No. 449 excludes existing installations from this process. This is not an issue at the moment given the absence of large-scale renewable energy projects in Russia. However, this might be an issue in the future. According to this requirement, installations under 25 MW but above 5 MW, which have opted for support in the retail market<sup>12</sup>, cannot switch to support under the capacity-based scheme. The requirement of registration as “provisional supplier” could also be an issue for the first competitive selection of projects due to take place before September 2013. It could be a challenge for project developers to fulfil all procedural requirements and register their projects in time.

of Agreements for the Supply of Capacity relating to the investment programs to which private investors committed when purchasing assets from the former quasi-monopolist RAO UES.

<sup>11</sup> “Provisional supply points” (условные группы точек поставки). On the registration procedure as “provisional supply point”, see Agreement for Accession to the Wholesale Market Trading System on the Procedure to Obtain the Status of Wholesale Market Participants available at <http://www.np-sr.ru/contract/joining/marketnorem/currentedition/index.htm?ssFolderId=104>, accessed on 14 June 2013.

<sup>12</sup> I.e. the scheme of priority compensation of network losses with RES-E purchased at regulated prices. On this scheme, see IFC, Regional Renewable Energy Tariffs in Russia (forthcoming). See also Anatole Boute, “Renewable Energy Federalism in Russia: Regions as New Actors for the Promotion of Clean Energy” (2013) Journal of Environmental Law available at <http://jel.oxfordjournals.org/content/early/2013/05/30/jel.eqt005.short>, accessed on 14 June 2013.

2) *Limits to the capital costs of renewable energy investment projects:* Renewable energy investment projects cannot exceed capital cost limits set by the Government for each type of renewable energy source and for each year up to 2020. Capital costs include installation investment costs and costs related to connection to the grid. The Government has adopted the following limits expressed in rubles/Kw:

Type of RES	2014	2015	2016	2017	2018	2019	2020
Solar	116 451	114 122	111 839	109 602	107 410	105 262	103 157
Wind	65 762	65 696	65 630	65 565	65 499	65 434	65 368
Small hydro	146 000	146 000	146 000	146 000	146 000	146 000	146 000

Decree No. 449 requires the Ministry of Energy to inform the Government of the development of average capital costs of renewable energy investments on a yearly basis. This seems to indicate possible regulatory intervention by the Government to reduce capital cost limits to reflect these developments. In the absence of clear transition periods, possible changes to capital cost limits could affect the investment predictability of the capacity scheme.

Decree No. 449 also introduces standard operating costs for each type of renewable energy generation. As will be discussed below, these standard costs are relevant for the determination of capacity payments. Decree No. 449 establishes the following operating costs for 2012, to be indexed for the following years:

Renewable energy source	Fixed operating cost
<b>Solar energy</b>	170 000 rub/MW month
<b>Wind energy</b>	118 000 rub/MW month
<b>Hydropower</b>	100 000 rub/MW month

Operating costs are fixed; in the context of the selection process, projects developers do not compete on the basis of operating costs, only on the basis of capital costs.

When set against the effective electricity price across different levels with the running electricity price spanning 3 RUB / kWh to 7 RUB / kWh, these operating costs will produce the following figures:

		Capacity		Monthly OpEx, k		Annual OpEx, k		OpEx as % of Revenues ( under different effective electricity prices )				
	MW	factor	MWh	RUB / MW	in a year	RUB / MW		3.0 RUB/kWh	4.0 RUB/kWh	5.0 RUB/kWh	6.0 RUB/kWh	7.0 RUB/kWh
Solar	1.0	14%	1,226	170	x 12	= 2,040		0.55	0.42	0.33	0.28	0.24
Wind	1.0	27%	2,365	118	x 12	= 1,416		0.20	0.15	0.12	0.10	0.09
Small Hydr	1.0	38%	3,329	100	x 12	= 1,200		0.12	0.09	0.07	0.06	0.05

Taking into account the relative costs of solar, wind and small hydropower<sup>13</sup>, these figures suggest the new scheme places solar power generation in a more favorable position than wind energy and small hydropower.

3) *Local content requirements:* Investment projects must guarantee the use of equipment that has been, at least partly, produced or assembled in Russia. The Government must adopt local content targets for each type of renewable energy generation up to 2020. Decree No. 449 sets out in detail how each individual component of a renewable energy generating facility contributes to achieving the local content target (expressed as a percentage of the total target). The Government established the following figures in Resolution No. 861-r:

<sup>13</sup> See National Renewable Energy Laboratory, Distributed Generation Energy Technology Operations and Maintenance Costs (July 2012 update), available at [http://www.nrel.gov/analysis/tech\\_cost\\_om\\_dg.html](http://www.nrel.gov/analysis/tech_cost_om_dg.html).

Renewable energy source	Commissioning year	Local content requirement (target)
<b>Wind energy</b>	2014	35%
	2015	55%
	2016 to 2017	65%
	2018 to 2020	65%
<b>Solar energy</b>	2014 to 2015	50%
	2016 to 2020	70%
<b>Small hydropower</b>	2014 to 2015	20%
	2016 to 2017	45%
	2018 to 2020	65%

Annex 1 of the present report provides an overview of manufactures of renewable energy equipment active or planning to be active in Russia.

Following the recent decision of the Appellate Body in the Ontario Feed-in Tariff case, it is doubtful that this approach is WTO compatible<sup>14</sup>.

4) *Bank guarantee*: Project developers must ensure they fulfill their commitments by providing financial guarantees.

5) *Contracts*: Project developers must have signed the necessary contracts. This includes all contracts related to access to the wholesale electricity market (Agreement for Accession to the Wholesale Market Trading System) and registration as provisional supply point<sup>15</sup>.

## B. Second selection round

During the second round of the selection process, the Administrator of the Trading System selects a number of investment projects. ATS may select up to the maximum number which is determined by reference to the amount of installed capacity necessary to achieve the additional RES capacity target for the type of RES which is set by the Government on an annual basis. A separate competitive selection process is organized for each type of RES. Successful projects are included in the Register of Selected RES Projects, which contains all projects which meet the requirements to enter Agreements for Capacity Supply.

If the projects selected in the preliminary round do not exceed the maximum amount of installed capacity set by the Government for each type of RES, ATS includes all these projects in the Register of Selected RES Projects. If the number of projects selected in the preliminary round exceeds the capacity limit set by the Government for each type of RES, ATS selects the projects with the lowest capital cost. Importantly, capital cost of renewable energy investment projects – as submitted in bids – is the only selection criterion taken into account in the second selection round. ATS cannot take into account other potentially relevant criteria, such as the capacity factor of the investment project, a project's ability to contribute towards ensuring supply-demand adequacy in energy deficit regions or its ability to integrate into the network. The capacity factor of renewable energy projects only plays a role regarding the calculation of the price of capacity<sup>16</sup>.

There is a risk that, if only a limited number of project developers participate in the competitive selection process, prices may be artificially inflated to the maximum limit set for capital costs. This risk is important given the strict local content requirements and the limited number of producers of renewable energy equipment in Russia.

<sup>14</sup> Dispute DS426 Canada — Measures Relating to the Feed-in Tariff Program, Decision of the Appellate Body of 6 May 2013.

<sup>15</sup> See reference 11 above.

<sup>16</sup> See below.

# Obligations of renewable energy investors under Agreements for RES Capacity Supply

Project developers who sign Agreements for Capacity Supply commit to constructing and commissioning the installations concerned within a certain period of time. These installations, once built, connected to the grid and commissioned, must be qualified in accordance with the procedure established in Decree No. 426 on the Qualification of RES Installations. Moreover, the operators of these installations must comply with the specific RES-related capacity supply requirements of the Wholesale Market Rules. By entering Agreements for Capacity Supply, renewable energy investors also commit to produce a certain minimum amount of electricity every year (capacity factor).

## Qualification of renewable energy generating facilities

Qualification is a cornerstone of the Russian approach to the support of renewable energy. Support under the Federal Electricity Law is dependent on the qualification of renewable energy generating facilities by the Market Council. However, gaining qualification can be challenging<sup>17</sup>. So far, only a very limited number of renewable energy installations have successfully passed the qualification procedure. There is a risk that the duration of the qualification procedure (and possible delays in this process) could prevent renewable energy investors from respecting the deadline for RES capacity supply to which they committed in Agreements for Capacity Supply.

Importantly, Decree No. 449 introduces local content indicators into Decree No. 426 on the Qualification of RES Installations. Following these amendments, the Market Council is now required to take into account the level of local equipment used when certifying renewable energy installations. Depending on the percentage of local content, renewable energy installations will be classified under specific categories<sup>18</sup>. This classification is important because, as will be discussed below, the percentage of local content influences the level of remuneration. It is important to note that a certain degree of unpredictability has been introduced by the local content classification of renewable energy installations required by Decree No. 449. It requires the Market Council to unilaterally amend the classification of renewable energy installations in the event that the Government changes its local content policy. Given the link between local content classification and remuneration, this represents a significant risk of regulatory uncertainty for investors.

Further regulatory intervention is required to implement the local content policy of Decree No. 449: the Ministry of Industry and Trade is required to adopt a procedure to certify the percentage of local content in all renewable energy generating facilities. Certification of local content takes place after the construction of renewable energy generating facilities. The Ministry could therefore in theory adopt this regulation after the first competitive selection of projects. However, uncertainty regarding these procedures could affect investors' confidence in the scheme.

## Capacity supply by variable renewable energy installations: assessment of availability to produce

According to the general regulation of capacity supply under the Wholesale Market Rules, capacity supply is based on the "availability" or "readiness" of power plants to produce electricity. Following the existing capacity supply rules, power plants are considered "available" or "ready" to produce electricity when the System Operator confirms that the installations can contribute to frequency regulation and the supply of reactive energy. Power producers must guarantee that their installations can implement the dispatching

<sup>17</sup> See IFC, *Financing Renewable Energy Investments in Russia* (2012), p. 11; IFC, *Regional Renewable Energy Tariffs in Russia* (forthcoming).

<sup>18</sup> These categories are: under 50 %, between 50-70 % and above 70 % for solar energy; under 35 %, between 35-55 %, between 55-65 %, above 65 % for wind; under 20%, between 20-45 %, between 45-65 %, above 65 % for small hydropower.

orders of the System Operator, which may set a minimum hourly rate of supply and / or require changes to the rate of electricity production to maintain the system in balance. These requirements present a challenge for variable renewable energy installations.

The output of renewable energy generating facilities is often determined by such external factors as solar irradiance, wind patterns, and water flow. These external factors prevent renewable energy facilities from controlling their output in the same way as thermal facilities. As a result, renewable energy generating facilities can often struggle to react to the demands of the system. Decree No. 449 therefore amends the Wholesale Market Rules by exempting renewable energy installations from the existing dispatchability/maneuverability requirements. Instead, the operators of renewable energy installations need to guarantee the readiness of their installations to interrupt supply of electricity in response to an order of the System Operator (curtailment of operations)<sup>19</sup>. If renewable energy producers fail to meet this requirement, their capacity remuneration will be significantly reduced for the month during which they failed to interrupt supply when the System Operator ordered them to do so.

These amendments are extremely important for variable renewable energy generating facilities. They make it possible for these installations to participate in capacity supply without being penalized for their variable production patterns. However, exempting renewable energy generating facilities from most of the availability requirements may lead to the risk of “steel-in-the-ground”. Indeed, capacity-based support mechanisms have in the past led to reduced efficiency of the constructed turbines, with investors focusing on installed capacity (“steel-in-the-ground”) rather than energy production<sup>20</sup>. This contradicts one of the main objectives of renewable energy policy which is to decarbonize electricity production and improve energy security by replacing fossil fuels with renewable energy sources. Decree No. 449, to an important extent, addresses the risk of “steel-in-the-ground” by reducing the capacity remuneration of renewable energy generating facilities that fail to produce a certain minimum amount of electricity per year, expressed as a capacity factor for each type of RES. The minimum capacity factors that renewable energy installations need to meet over a year are:

Type of RES	Capacity factor
<b>Solar energy</b>	0.14
<b>Wind</b>	0.27
<b>Hydropower</b>	0.38

Moreover, renewable energy installations receive revenues for the electricity they sell on the wholesale market and are therefore incentivized to produce electricity.

One remaining obstacle for renewable energy investors arises from the “attestation” of renewable energy installations. In accordance with the Wholesale Market Rules, capacity supply firstly requires the attestation of producing installations, i.e. the certification that the installations concerned comply with the technical parameters that govern their exploitation (including the technical conditions set in the Agreements for the Supply of Capacity). Attestation requires installations to be “tested” by the System Operator. Decree No. 449 does not explicitly exempt renewable energy installations from this attestation requirement. This could potentially be a challenge for wind, solar energy PV and small hydropower given their dependence on and the relative unpredictability of natural external factors.

<sup>19</sup> Decree No. 449 does not clarify whether this curtailment requirement applies only to situations of power system emergency and unusual systems.

<sup>20</sup> D de Jager & M Rathmann, *Policy Instrument Design to Reduce Financing Costs in Renewable Energy Technology Projects* (Ecofys, 2008) available at [http://www.ecofys.com/files/files/report\\_policy\\_instrument\\_design\\_to\\_reduce\\_financing\\_costs\\_in\\_renewable\\_energy\\_technology\\_pro.pdf](http://www.ecofys.com/files/files/report_policy_instrument_design_to_reduce_financing_costs_in_renewable_energy_technology_pro.pdf), accessed on 14 June 2013; D Arora, *Indian Renewable Energy Status Report Background Report for DIREC* (National Renewable Energy Laboratory, 2010) available at [www.nrel.gov/docs/fy11osti/48948.pdf](http://www.nrel.gov/docs/fy11osti/48948.pdf), accessed on 14 June 2013.

# Rights of investors: remuneration of capacity at regulated tariffs

## Duration

Decree No. 449 sets the duration of Agreements for the Supply of RES Capacity at 15 years. This means that for a period of 15 years, the capacity of these installations will be remunerated at a preferential price. In contrast, the thermal installations covered by traditional Agreements for Capacity Supply (“DPM” in Russian) only benefit from regulated capacity prices for a period of 10 years.

Renewable energy investors have the right to unilaterally opt-out of the agreement to supply capacity at regulated prices and instead opt for the competitive segment of the capacity market, provided they inform the counterparty following the appropriate procedure.

## Capacity price formation

Capacity prices are paid on a monthly basis. Prices are regulated: ATS is required to determine the capacity price for each individual renewable energy installation following the method set out in Decree No. 449. It must however be noted that prices are calculated based on bid capital costs that investors submitted for participation in the competitive selection of renewable energy projects. Capacity prices are determined on the basis of the following three main steps: (1) ATS determines the total revenues that renewable energy investors require to recover their operating and investment costs; (2) ATS determines the share of costs to be recovered with capacity prices, taking into account expected revenues on the electricity market; and (3) ATS calculates capacity prices by applying this share of costs to the total costs of renewable energy investments, adapted to the amount of electricity effectively produced and the level of local content.

Firstly, ATS must determine the total amount of revenues (i.e. revenues for both electricity sales and capacity supply) that renewable energy investors require in order to recover the investment and operating costs of the renewable energy installation concerned<sup>21</sup>. Importantly, the language of Decree No. 449 implies a right for renewable energy investors under the capacity scheme to receive sufficient revenues to recover their costs. This right is in line with the general principle of Russian tariff law according to which energy tariffs must be economically well founded and should not force operators of energy generating facilities to operate at a loss<sup>22</sup>. According to Decree No. 449, investment costs are determined on the basis of the bids that investors submitted for participation in the competitive selection of renewable energy projects minus government subsidies (e.g. subsidies for the compensation of network connection costs for installations under 25 MW)<sup>23</sup>. Decree No. 449 indirectly provides investors with the right to recover the investment costs set out in their bids, together with a certain return on investment, as well as standard operating costs. Operating costs are regulated/fixed (see table above). Capacity prices are calculated based on these fixed operating costs. Investors could thus try to maximize revenues by controlling the operating costs of their projects. Decree No. 449 establishes a “Return on Investment” (ROI) at 14 percent for renewable energy projects selected before the end of 2014 and 12 percent for investments made after January 1st 2015. Return on Investment for a given year will be adjusted to the evolution of long-term state bond yield, which is 8.5 percent as a benchmark.

Secondly, ATS must determine the share of costs that will be covered through capacity prices. Capacity prices only cover part of the costs of the renewable energy installations. Revenues that renewable energy installations receive for the electricity they produce and sell on the wholesale market cover the remaining costs. This approach is in line with the organization of the Russian electricity market which has an energy market (day-ahead and intra-day) where power plants are remunerated for the electricity they produce

<sup>21</sup> The determination of these gross prices is close to the concept under Russian tariff law of “required gross revenues” – or the total amount of revenues necessary to ensure the operation of energy investments during a certain period of price regulation.

<sup>22</sup> See I A Leont’ev, *Kommentarii k Federal’nomu Zakonu ot 14 Aprelia 1995 goda No. 41-FZ ‘O Gosudarstvennom Regulirovanii Tarifov na Elektricheskuiu i Teplovuiu Energiu v Rossiiskoi Federatsii’* (2007), p. 15 available at [www.consultant.ru](http://www.consultant.ru), accessed via Konsul’tantPlus on 1 September 2012.

<sup>23</sup> See Draft Rules for the Distribution of Federal Subsidies for the Compensation of Network Connection Costs for Renewable Energy Installations with an Installed Capacity not Exceeding 25 MW available at <http://minenergo.gov.ru/documents/razrabotka/>.

(MWh) and a capacity market where power plants are remunerated for their availability to produce electricity (MWmonth). Following the philosophy of the Russian electricity market reform, capacity prices are supposed to cover most capital and maintenance costs and electricity prices are supposed to cover operating costs. According to Decree No. 449, the share of costs compensated through capacity prices is calculated by dividing the expected profits of RES-E sold on the wholesale market by the requisite gross revenues of renewable energy investments. The expected profits of the sale of electricity are calculated by reference to fixed capacity factors (outlined above), forecasts of wholesale electricity market prices<sup>24</sup> and fixed costs for electricity production (1 rub/MWh for solar and wind energy; 10 rub/MWh for hydropower).

Lastly, ATS calculates capacity prices by applying the share of capacity-related costs (step 2) with the total cost of the renewable energy investment (step 1). Importantly, Decree No. 449 introduces a system of coefficients to stimulate electricity production and penalize installations that fail to meet the levels of local content set by the Government. As regards local content, a reduction coefficient of 0.35 is applied to the capital costs of solar installations that fail to achieve the prescribed level of local content. Lower reduction coefficients of 0.45 are applied to wind and hydropower installations that do not comply with the local content target. The more stringent local content policy which applies to solar energy generation facilities is also reflected in the local content targets mentioned above. This can be explained by the fact that producers of solar equipment are starting to develop manufacturing plants in Russia. Moreover, Decree No. 449 introduces coefficients related to electricity production: reduction coefficients apply where operators of renewable energy installations have failed, in the preceding year, to produce electricity in accordance with the capacity factors outlined above. Reduction coefficients only apply in cases where renewable energy installations produce below the capacity factor. There are no penalties or incentives for electricity production in excess of the capacity factor, besides of course higher revenues from electricity sales on the wholesale market. It must also be noted that capacity prices take into account profits that installations will receive over their lifetime, i.e. not just over the period of 15 years.

The Market Council must further develop the specific formulae to be used for the regulation of capacity prices. The picture for investors is accordingly not entirely clear yet. However, the fact that Decree No. 449 refers to the right of investors to recover their investment and operating costs, together with a certain return, must be welcomed as an important investment guarantee.

## Demand side: who pays for RES?

### Electricity buyers on the wholesale market

The financing of RES under the capacity scheme will be conducted on the basis of similar principles to the financing of the thermal, hydro and nuclear assets that are covered by traditional Agreements for Capacity Supply (DPM). This means that every energy buyer, as part of its capacity purchase obligations on the wholesale market, will have to contract a certain percentage of RES capacity in proportion to its peak electricity demand. Article 21, paragraph 2 of the Federal Electricity Law provides the legal basis for the introduction of RES purchase obligations. According to this provision, the Government shall fix minimum amounts of electricity produced from RES that buyers must purchase on the wholesale market.

### Priority of RES capacity supply

To facilitate RES capacity supply to consumers, Decree No. 449 introduces RES in the priority order for capacity supply. This means that, when determining what installations are used to meet the capacity purchase obligations of consumers, renewable energy capacity must be selected before installations that participate on the free (non-regulated) capacity market. Decree No. 449 places renewable energy installations in the fourth order of priority: renewable energy capacity must be selected after installations that are part of the technical capacity reserve, installations covered by traditional DPM agreements (including nuclear and hydropower plants) and strategic installations that are subject to mandatory electricity production requirements.

<sup>24</sup> Price forecasts are made for the nodes where the renewable energy installations are located.

Decree No. 449 does not, however, extend to electricity production: there is no priority of dispatch of the electricity produced from RES in Russia, only priority of selection in the capacity market. The absence of priority dispatch for RES-E could, to some extent, affect the participation of variable renewable energy installations in the electricity market and thus, under certain circumstances, affect their revenues from electricity sales.

## Conclusion

Decree No. 449 on the Mechanism for the Promotion of Renewable Energy on the Wholesale Electricity and Capacity Market is an important step in the creation of a functioning regulatory framework for RES-E in Russia. It establishes a regulatory framework that intends to make renewable energy investments financially viable. Decree No. 449 creates a specific revenue stream for renewable energy investments that should, at least for a certain number of renewable energy projects, level the playing field with thermal electricity production.

By promoting RES-E through the capacity market, Russia opts for a novel approach to the support of RES-E. It departs from the existing approaches to the support of RES-E adopted in other countries where RES-E incentives are based on the electricity output of RES-E installations. From an investor's perspective, the use of a new, unproven approach could increase transaction costs. Nevertheless, from an institutional economic perspective, developing an original regulatory approach unique to Russia could increase compliance with this approach. The way regulations "fit with the underlying domestic institutions" can considerably influence their application by domestic institutions<sup>25</sup>. Russia's capacity-based support scheme is anchored in the very specific regulatory architecture of the Russian electricity and capacity market. This institutional fit is therefore expected to increase the chances of compliance with this new approach to the support of RES-E through the capacity market.

The main challenge facing the promotion of RES-E through capacity markets relates to the fact that variable renewable energy generating facilities cannot easily guarantee their availability to produce electricity. Decree No. 449 aims to overcome this difficulty by establishing a specific regime for capacity supply by renewable energy generating facilities. Importantly, this specific regime applies to renewable energy generating facilities in general, not just projects covered by long term regulated Agreements for RES Capacity Supply. Decree No. 449 thus integrates variable RES in the regulatory architecture governing the Russian capacity market. At the same time, it introduces financial incentives for renewable energy installations to produce a minimum amount of electricity thereby limiting the risk of "steel-in-the-ground" that has affected renewable energy support schemes based on installed capacity in other countries.

Decree No. 449 introduces safeguards to contain the costs of the renewable energy policy and to overcome the political sensitivity of short term price increases in the energy sector. It firstly caps the amount of installed capacity that can be supported under the capacity-based scheme. Secondly, investment and operating costs are required to remain within regulated limits. Lastly, the competitive selection of renewable energy investment projects could bring investors to reduce prices.

Paradoxically, the local content policy under Decree No. 449 will increase the cost of the renewable energy policy. Indeed, project developers will be required to use a certain percent of national technology, even if cheaper and more efficient foreign alternatives are available. Moreover, local content requirements could limit the pool of investors interested in submitting bids to the competitive selection of renewable energy projects thereby reducing the positive impact that competition could have on the cost of the support scheme. Besides this impact on costs, a question hangs over the competence of introducing a local content requirement from a WTO law perspective.

<sup>25</sup> J-P Bonardi, S Urbiztondo & B Quélin, "The Political Economy of International Regulatory Convergence in Public Utilities" (2007) available at [www.aaep.org.ar/anales/works/works2007/bonardi.pdf](http://www.aaep.org.ar/anales/works/works2007/bonardi.pdf), accessed on 14 June 2013.

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Decree No. 449 establishes complex formulae for the calculation of capacity prices. The complexity of these formulae, having regard to the novelty of the support scheme, will not contribute to investors' perceptions of the regulatory predictability and certainty of the scheme – an issue of key concern for the investment community in the renewable energy sector<sup>26</sup>. This risk of regulatory uncertainty is reinforced by the fact that the method for calculating capacity prices under Decree No. 449 requires further finetuning by the Market Council. However, despite these concerns, Decree No. 449 sends an important message to the investment community by indirectly recognizing the right of investors to recover the investment costs submitted in their renewable energy project bids.

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<sup>26</sup> Commission, "White Paper for a Community Strategy and Action Plan on Renewable Sources of Energy" (Communication) COM (1997) 599 final, p. 7; Letter from Institutional Investors Group on Climate Change to Mr. Zapatero on the Proposed Retroactive Reduction of 661 Tariff for Existing Investments (23 June 2010) available at [http://www.iigcc.org/\\_data/assets/pdf\\_file/0010/1009/IIGCC-letter-to-Spanish-government.pdf](http://www.iigcc.org/_data/assets/pdf_file/0010/1009/IIGCC-letter-to-Spanish-government.pdf), accessed on 4 March 2012; D Finon and Y Perez, "The Social Efficiency of Instruments of Promotion of Renewable Energies: A Transaction-cost Perspective" (2007) *Ecological Economics* 62, p. 83.



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