Final report

RusTREC

Renewable energy certificates as instrument to monitor and stimulate renewable energy development in Russia

Contract 012012

of the Specific Support Action of the European Commission (FP6-2002-INCO-Russia_NIS-SSA-4-SSA)

RusT REC contract 012012

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1 Introduction

This Final Report will focus on the events and activities after the First Reporting Period, so from 1 September 2006 to 15 April 2007, describing also the general development of the first period, as far as needed to understand this document.

The project results are better than foreseen. As the establishment of a green certificate system (the final aim) in Russia is a complex political and market process, depending on the will of much more groups than the Russian RusTREC partners, this could not be guaranteed in the project period. So, the project process was aimed at providing the assistance to the establishment of the green certificate system.

The project success consists mainly in:

- **Creating the How To.** The creation of the green certificates concept for Russia, workable in the national conditions and receiving reasonable support from all parties;
- **Legal implementation**. Embedding its basic points in the Draft Federal Law on RES support, which was submitted to the Parliament (Duma);
- **The people**. Creating a considerable Russian group of participants and interested actors, among which the Federal Hydrogenerating Company "HydroOGK" (Russian RE leader and writer of the Draft Federal Law on RES support) and Nonprofit Partnership "Administrator of Trade System"(established as National IB in the Draft Federal Law on RES support), both are under the National Electricity Company RAO "UES of Russia" (RAO UES);
- **Highlighting innovations**. Some features are not so well known in the sector of Green Certification, but interesting in Russia, like the relationship to Carbon Credits and Heat Certification. These can become interesting also in other countries, so it can be expected that this exploration can place Russia on the front line of Green Certification, for some aspects.
- **Harmonisation with EU**. Keeping close contacts with RECS International and creating a "zero version" of the Domain Protocol, according RECS, for Russia. This contributed to integration with the EU (defining the Domain Protocol is a considerable effort, which we will see again in the recommendations).

Some deviations from the Work Programme were necessary in order to dedicate the needed efforts to the opportunities that were given by the receptive legislation and the market. This will be described in this document.

2 Activities

2.1 Work Programme and how it was performed

This chapter indicates the activities that were carried on during the last reporting period. Some of the results are integrated in this context, but longer passages are left to chapter 3 (Results).

2.1.1 Inception & training

The Inception & training has been extensively described in the first Progress (Inception) Report. In the Final Report we can add that this led to the recognition and active participation of the Government and the market, so that it gave the results as mentioned in the five points of the Introduction.

2.1.2 Dissemination

2.1.2.1 Task 1. Web site

The web site has been updated to contain **much** material from the project itself and materials of third parties, like RECS, Russian stakeholders in the establishment process of the green certificate system, etc.

The home page of the RusTREC web site.

The site address is now www.etaflorence.it/RusTREC, in order to sustain it into also after the project, until the time that Russian stakeholders might be interested to transfer & develop it more (for example if another proposal for Green Certification would be approved).

2.1.2.2 Task 2. Advisory board, Steering Committee and National Team

As said in the Progress Report, the Deliverable "Advisory board" was renamed to "National Team", as this is the name that is given to this function by RECS.

Moreover, the three persons of the Steering Committee did not only have management functions (according to the work description of "Steering Committee" in WP1) but worked also much for dissemination (and not limited to).
So, the National Team, according to the recommendations of RECS, was established. These persons represent all functions in a green certificate system: market users as well as the representatives of the system itself (Issuing Body, presumed by the Draft Federal Law on RES support) and designers of the national regulations. Therefore, it corresponds to the function of an Advisory board: to represent several groups from the society as providers of feed back but also as dissemination channels to those groups.
Some examples are:

- HydroOGK (Mr. A. Kopylov was writer of the Federal Draft Law for renewable energy);
- The Energy Trading Platform, which will be the Issuing Body, is represented by Nonprofit Partnership "Administrator of Trade System" under RAO UES (ATS), Mr. Egor Grinkevich, Head of Department of the New Businesses. ATS also helped with the newly established project experiment to develop a "zero" version of the Russian RECS/AIM Domain Protocol.

The "zero version" of the Domain Protocol was written by, Mr. Anatoly Kopylov of the HydroOGK; Mr. Egor Grinkevich (Trade System) and Ms Irina Zerchaninova (partner 5).
The Domain Protocol is the official document of a country that defines the national green certificate system and is in harmony with the Principles and Rules of Operation (PRO). The PRO is the minimum set of rules that is the (international) base for all Domain Protocols.

Also a User Group, representing Independent Power Producers (IPP) was formed and the above mentioned Mr A. Kopylov (being head of the department of RAO UES, which develops several kinds of renewable energy) was one of the main channels to these groups.

So, in this way the informative functions (in two directions), mentioned in the contract was guaranteed.

2.1.2.3 Task 3. Press, Governmental and business periodicals

The RusTREC initiative was disseminated to many high level organisations in politics and in the market. This was done through a brochure, meetings and also through direct articles in there periodicals.
Three of these official information resources are (they will be given in the Annex):

- **Kompany "Factor Media"**, this is a media company that worked much on information providing around Government events. This company published the joint article of the RusTREC consortium on their site, see below a short fraction.
  http://factor-media.ru/index.php?option=com_content&task=view&id=55&Itemid=7

- **Interview of Sergey Mikhailov, Deputy Director of the Department of Fuel and Energy Complex of the Ministry of Industry and Energy of the Russian Federation**, given in the paper "Industrial Growth Weekly" and published on the web-site of the Ministry, 6 March 2007. It is an official interview where he informed about the Draft Law on RES support, meaning the role of green certificates in it. Again, a short fragment in the text box below:

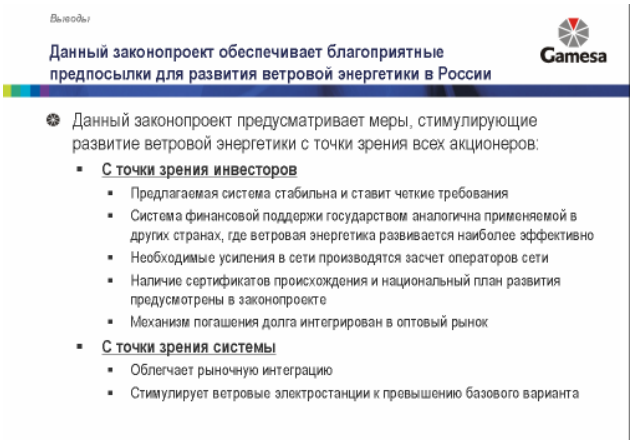
> В малой гидроэнергетике мы на передовых рубежах
>
> Интервью заместителя директора департамента ТЭК Сергея Михайлова газете «Еженедельник промышленного роста»
>
> 6 марта 2007
>
> **Сергей Алексеевич, как складывается ситуация в области возобновляемых источников энергии в нашей стране и какова государственная политика в этом направлении?**
>
> — На сегодня этот вопрос крайне важен, в том числе в связи с реализацией Энергостратегии ….

- **Article in EnergoRynok**
  On the web site of this Journal for the Electrical Market (http://www.e-m.ru/archive/arhiveer.asp?mid=22007) is a reference to the issue of this Journal, where partner IDI (Irina Zerchaninova) and our cooperator from HydroOGK (RAO UES) are the authors. It mentions the efforts, already from 2004, to support the renewable energy sector with legislation, and it shows how timely the support from the European Commission came, resulting in the addition of Green Certificates to this legislation.

ВИЭ: механизм "зеленых" сертификатов
Зерчанинова Ирина - Заведующая информационно-аналитическим отделом Института промышленного развития "Информэлектро", руководитель российского проекта "ГРИНТАЙ"
Копылов Анатолий - Советник председателя правления ОАО "ГидроОГК", канд. экон. Наук

Согласно прогнозу Европейского совета по возобновляемой энергетике, к 2040 г. доля ВИЭ в мировом энергобалансе составит от 27 до 50%6. Для России было бы нерациональным оставаться в стороне от данной тенденции, так как страна располагает значительными ресурсами - природными и технологическими8. В 2004 г. РАО «ЕЭС России» выступило с инициативой законопроекта Федерального закона «О поддержке использования возобновляемых источников энергии». В рамках сопутствующих процессов возникает естественный интерес к механизмам поддержки использования ВИЭ, применяемым за рубежом. В их ряду выделяется механизм «зеленых» сертификатов.

- The next example shows **how the Draft Law is known by international market players**, like Gamesa (Spanish wind power industry). It is the conclusion of the experts from EBRD to estimate the Draft Law by the example of wind energy. It was presented on 21 May 2007 in Moscow. It contains also many references to the Green Certificates as part of this Law: only the page with conclusions are given here (see subpoint 4 of point 1).



2.1.2.4 Task 4. Sponsorships in Russia and W-European countries to finance Pilot Projects.

EUBIA and ETA submitted a proposal to INTAS (http://www.intas.be), and obtained a contract for the research on cheap hydrogen (1800 Euro/ton) from biomass, through pelletisation, carbonisation, steam reforming and shift reforming (INTAS Project Ref. Nr. 05-1000005-7745). The obtained hydrogen must be filtered for use in fuel cells, but is expected to be a viable (at least for the fuel) source for cogeneration. EUBIA is the coordinator and it is running from January 2007. Cogeneration is much supported by Russia and related to WP 6 of RusTREC (heat certificates). Another joint initiative of EUBIA and ETA was the promotion, in the Framework Agreement between the Federal Agency on Science and Innovations of the Ministry of Education and Science of the Russian Federation and the European Biomass Industry Association (EUBIA), of technology transfer from EU to the RF. In particular, an innovative pelletising technology was presented to the Rybinsk Instrument Making Plant in order to establish a licence for production. The technology is interesting because it can lower the cost of pellets so that it is a more accessible for the Russian

market. In this way, also in regions far of the grid (13 million people live in such regions), cogeneration can become feasible with local biomass resources and suitable generators. Such generators can work together with pelletisers: the latter produces fuel for the former, which again power (with electricity) the latter. In this way, one pelletiser can form a group with 10 generators, for example. Several politicians and entrepreneurs have shown obvious interest in this scheme.
For these generators, several technologies were promoted to Russian market parties. For example, EUBIA member Martezo with a gasifier + cogen unit of 70 to 900 kW was presented, on the 14 Biomass Conference in Paris, during the RusTREC kick off meeting, to the Rybinsk Instrument Making Plant, in order to establish a licence for production. This did not yet give results, because of the price of the cogen unit of Caterpilar, which is expensive for the Russian market. Moreover, Russia has its own cogen units that are better suited for local conditions (temperature, local maintenance, etc) but this gave problems with the performance guarantee and gas compatibility.
Another initiative for technology transfer from Sweden to the RF with ETA and Eubia was a proposal SOBISU submitted under Intelligent Energy for Europe, about the stimulation of a new technology for the low cost production and utilisation in cogenerators of a modern biofuel: pellets from low value residues. In this proposal, a modern steam engine is presented (100 kW with development programmes for the 20 kW to 500 kW versions). Two Russian partners were in the consortium but the proposal did not pass to approval.
Still another technology, Stirling motors of 7 kW electrical power will be on the international market from next year on and cost about 4.000 Euro/kW. This information was found during a visit to the Solar Expo of Verona.

2.1.2.5 Task 5. Dissemination to foreign markets.

2.1.2.5.1 International Congress & Exhibition "Bioenergetics 2006", Moscow, 21 – 24 November 2006

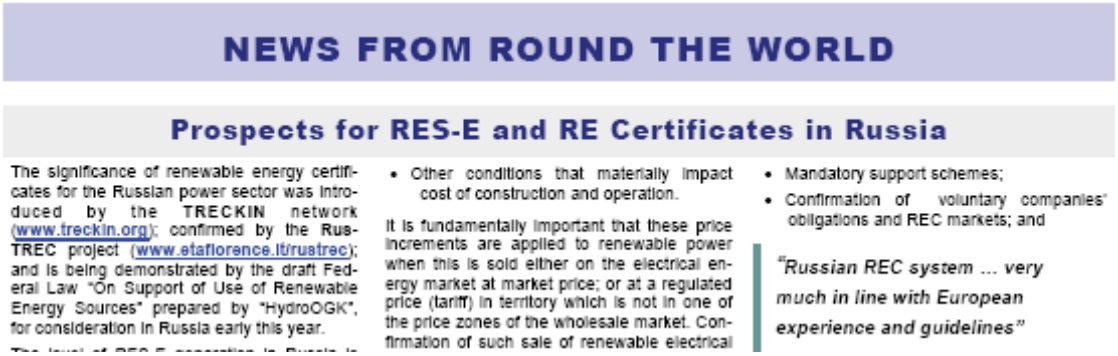
Event with participation of Sowena and INTERSOLARCENTER

This event was visited by over 1000 participants, from Russia, the NIS but also from EU member states. Partner Sowena had a stand with information about the RusTREC project, which acquired much interest. Moreover, partner INTERSOLARCENTER was a speaker and presented RusTREC to the audience.

The participation in the event was informationally supported by RECS/AIB. So, both TRECKIN/RusTREC experiences and all the newest documents and tendencies were presented, among them experimental Russian heat certificates (TRECKIN), hybrid carbon-green ones (Belgium) and draft CHP GoOs (AIB).

2.1.2.5.2 AIB Newsletter

The following is a fragment of the AIB newsletter nr. 5 of 2007-03-30, which dedicates a whole page about the results of the RusTREC and its relationship with RECS, which was also made concrete by a Russian participation (Anatoli Kopylov PhD, Federal Hydro Generating Company "HydroOGK"of the RusTREC Steering Committee and Mr. Egor Grinkevich, Head of Department of the New Businesses of Nonprofit Partnership "Administrator of Trade System" under RAO UES (ATS) in the Vienna RECS meeting during the project period. It can be downloaded on: http://www.e-control.at/portal/page/portal/AIB_HOME/AIB_ASS/DOCUMENTS /NEWS_ARCH/Newsletter%205.pdf; and the page about RusTREC is in the Annex.



NEWS FROM ROUND THE WORLD

Prospects for RES-E and RE Certificates in Russia

The significance of renewable energy certificates for the Russian power sector was introduced by the TRECKIN network (www.treckin.org); confirmed by the RusTREC project (www.etaflorence.it/rustrec); and is being demonstrated by the draft Federal Law "On Support of Use of Renewable Energy Sources" prepared by "HydroOGK", for consideration in Russia early this year.

- Other conditions that materially impact cost of construction and operation.

It is fundamentally important that these price increments are applied to renewable power when this is sold either on the electrical energy market at market price; or at a regulated price (tariff) in territory which is not in one of the price zones of the wholesale market. Confirmation of such sale of renewable electrical

- Mandatory support schemes;
- Confirmation of voluntary companies' obligations and REC markets; and

"Russian REC system ... very much in line with European experience and guidelines"

2.1.2.5.3 WIP efforts for the Pilot Transactions

In the second period of RusTREC project, WIP had the specific role to explore relationships between Russia and Germany (as example of EU member states) in the field of Green Certificates. Several contacts were established with the German energy market and German institutions, above all for the Pilot Transactions. Some of the organisations were:

- DENA (Deutsche Energie Agentur), the German energy agency which has already a cooperation programme with Russia (http://www.dena.de)
- Fichtner GmbH & Co. KG, a German consultancy company for emission trading which has excellent contacts to the Russian energy market (http://www.emissionshandel-fichtner.de)
- A-TEC Anlagentechnik GmbH a German engineering company interested in Russian green certificates (http://www.atec.de)
- ZAO Podlipki (Mr. Rainer Linke, brlinke@web.de) involved in an EU-Russian project on green certificates

Apart from these stakeholders, options to conduct pilot transactions with private consumers were also assessed.

After many efforts, which resulted certainly in dissemination on the German market of RusTREC (!), the positive developments of Green Certificates in the Russian legislation and its proposition to the Russian Parliament convinced the political levels in Russia and after all also the consortium of RusTREC that the Pilot Transaction were not anymore as important as they were at the moment of proposal writing: the Pilot Transactions were put into the contract in order to learn by doing, but also to convince the authorities to establish a green certificate system. Now, in the first place, they convinced themselves that such a system is good in Russia. Moreover, they designed also the characteristics for the system. Finally, they worked also on the applications of the system (how to support renewable energy through Green Certificates). Therefore, they put themselves some steps ahead of the Pilot Transaction objectives. Of course, it will be useful to start with some kind of a Test Phase (RECS did it also at the beginning with a big group of EU member states and it was supported by the European Commission).

2.1.2.5.4 ETA efforts to repeat an experiment of the Italian Government

Experiment by the Italian Ministry for Environment for the WSSD in Johannesburg

The Italian Government carried out a Pilot Transaction with the four premises of the WSSD in Johannesburg, supporting the production of the energy for them through Green Certificates, even if South Africa had no green certificate system. A telephonic contact with the Italian Ministry for Environment was established to discover whether there was in principle an interest to repeat it with RusTREC, then a letter (see fragment below, the whole letter in the annex) was sent, 7 February 2006. Unfortunately there was no further response.

Proposal for a bilateral agreement between the Italian and Russian Governments

Exchange of Russian Green Certificates and Italian renewable energy tecnologies

Considering the

1. Specific Support Action "RusTREC", with coordinator ETA – Renewable Energies, supported by the Sixth Framework Programme (FP6) of the European Commission, with the objective to assist the Russian Government with the establishment of a green certificate system;
2. The Russian intention to develop a certificate system, which is compatible with the RECS/EECS that is followed in the EU;
3. The interest of the Russian Government to exchange Western European Renewable Energy Technology with Russian Green Certificates;
4. The signing of the Framework Agreement between the Federal Agency on Science and Innovations of the Ministry of Education and Science of the Russian Federation and the European Biomass Industry Association (EUBIA);
5. The emission on the Italian market of Green Certificates in the amount of 5.000 GWh;
6. The co-operation between the Italian ad Russian Governments on political,

2.1.3 Workshops

The first Progress Report described already the following meetings:

- The Program Start Up Meeting (PSUM) was organised in Paris (19 October 2005), at the 14th European Biomass Conference and Technology Exhibition, 17-21 October 2005.
- The start of the **Inception phase** was in Moscow, 19 January, during the Training session, with the objective to prepare the participants and third parties to the principles of Green Certification and to coordinate the collection activities for the right information.

Under the last reporting period should be mentioned the following workshops, according the RusTREC contract, but also others were organised, which can be considered as co-financing.

- The contractually planned meeting was the Workshop after the Inception Phase (Moscow, 15 June 2006), which would use the information from this phase to make choices for a green certificate system that would best fit to the Russian society and its place in the international context.

  The presentations gave the current state concerning the Russian renewable legislation and how the new information from European experiences could fit into it. Moreover, it had to lay the foundation for the Russian association of green certification of renewable energy –

the National Team, according to the terms of RECS. The presentation of a third party: the HydroOGK, closely involved in the formation of the Federal Renewable Energy Law, showed the good opportunity that was taken up by the Russian partners: integrating the project objectives with this new law.
The discussion led to the agreed conclusions that:

- Without a final federal legislation, only the basic system could be formed, which would have to be invariant to a future scheme (as outcome of the legislation) of support of renewable energy;
- High expectations exist in the Russian market to use Green Certificates in a synergy with the EU market (for example an exchange of Russian Certificates with EU Renewable Energy Technology);
- The linkage of Green Certificates to the Kyoto mechanisms is interesting but need the full development of the infrastructure for it;
- Heat certification may be promising in Russia (and it is provided for in the Draft Law) but it needs to be reflected also in other ways in the federal or/and regional legislation.

Other meetings (of the EU partners) were:

- January 2006 during the first workshop: ETA and EUBIA visited the Centre for Energy Policy in Moscow, in order to discuss bio-energy within the Framework Agreement between the Federal Agency on Science and Innovations of the Ministry of Education and Science of the Russian Federation and the European Biomass Industry Association. The scope was specially the cogeneration with new technologies (pelletisers for forest residues + modern small steam generators) in off-the-grid areas, considering that the Russian policy intends to reward cogeneration (with the future green certificate system).
- EUBIA: 10 April 2007 in Moscow to Mr Tarassov of the agency for technical exchange for promotion of the technology (Vadim Tarassov, Director International Cooperation, ASPECT). This was again to promote the above mentioned cogeneration but also a new strategy to convert forest residues into hydrogen (now subject of an INTAS proposal), so that this bio-energy can be transported over very long distances through the pipelines, mixed with natural gas (separation at the destination is easy). Cheap hydrogen (about 1800 Euro/ton in this way) will help the cogeneration with large stationary fuel cells and Russia has much interest in hydrogen applications.
- Another initiative of Dr Grassi of EUBIA was his participation in the G8 Bioenergy Partnership, to promote four technologies that are important for Russia, among which the above mentioned steam engine cogeneration with forest residues, and the bio-hydrogen production. This was also mentioned in a letter for support to the Russia Duma (Parliament), to this proposal to the G8. This letter is added to the Annexes (8).

The Russian partners participated in the following large number of conferences, workshops and meetings to disseminate project goals and project results. Some of them are listed below:

- 8th International seminar on bio-fuels in clean power production & transport, Moscow, 29-30 November 2005 (partners IDI and Intersolarcenter). Organised by International Science and Technology Center (ISTC).

An outlook for bioenergy development, the green certification in this connection and RusTREC were presented by IDI, and the prospects for bio-renewable energy technology transfer from EU to Russia were highlighted by Intersolarcenter. The partners participated in the discussion about world prospects for green certification.

- 4th International Conference “Russia Power 2006”, Moscow, 14-16 March 2006 (partner Intersolarcenter). Organised by Penn Well Corporation (UK) and RAO UES.

The RE current state and development trends in Russia were presented, and the RusTREC role was shown.

- International Science Conference “Global problems of modern power engineering security: To 20-anniversary of catastrophe at Chernobyl NPP”, Moscow, 4-6 April 2006 (partner IDI). Organised under support of the Federal Authorities of Russia.

Global tendencies and development stimulus on renewable power engineering were highlighted to prove the necessity for applying green certification in Russia as a specific instrument to stimulate RE development. RusTREC was presented especially.

- 2nd International Conference “Alternative energy sources for big cities”, Moscow, 12-13 October 2006 (partner IDI with assistance by partner VIEN). Organised by Moscow Government.

The use of green certification in big cities’ energy complexes was presented with the emphasis on RusTREC studies lines. Partner IDI prepared the report and related publications, while partner VIEN presented the report (due to the forced absence of the speaker from IDI).

- RECS/AIB meeting, Vienna, 16-17 November 2006 (Anatoli Kopylov, Steering Committee)

This particularly important meeting is described in the paragraph 2.1.7 Harmonisation with EU study

- Conference “Clean Energy: Present and Future. Prospects for renewable energy development in Russia”, Moscow, 6 April 2007 (Anatoli Kopylov, Steering Committee). Organised by “Energy Market” magazine and RAO UES.

Economic conditions for the development of the Federal Law “On Support of Use of Renewable Energy Sources” were presented, with embedding of green certification. This presentation can be referred to the project activities only partly because it is much wider. Nevertheless, it reflected the main conclusions on RusTREC.

Other reports and presentations were done within appropriate local workshops and meetings in Republic of Komi (Sowena), Republica of Buryatia (CSE), at educational conferences of Moscow Power Engineering Institute (VIEN), workshops of EU-Russia Energy Dialogue (INTERSOLARCENTER) and meetings in RAO UES (IDI, VIEN, and Anatoli Kopylov, Steering Committee), as well as during special workshops and meetings in the State Duma through the Parliament Centre of the R.F. Federal Assembly (basically, Valeri Sevostianov and Anatoli Kopylov, Steering Committee, IDI, VIEN).

2.1.4 Cost estimates of RE

The contract describes this as follows:

> Application of an instrument to assess and visualise the national potential and costs for RE.
>
> A new instrument was used first in the Netherlands and then in W-Europe that provides clear overviews of the potentials and the costs related to the different renewable energy sources and as such complement the studies on potential that have already been carried out by one of the Russian partners (VIEN) in the Federation. Application of the instrument will help to decide for Russia, but also for sub-regions, which is the best and most economical composition of the total RET portfolio. The other way around it will also help to assess the effects for the Western European market if the Russian RE market is opened up. To this end, a study and networking will be carried out to integrate the potential Russian certificate system into the Western European certificate system.

The Russian stakeholders will do the main part of the work which is information gathering. As budget is not enough, a rough overview will be made for the whole country. Afterwards, a more detailed analysis can be carried out, also for subregions.

The IBRE instrument was perceived as positive in Russia, also because it is not a country that can be described with a few parameters, so cost estimates should be carried out regionally. Therefore, IBRE offers the way to characterise them individually with a clear scheme and define an energy policy for each of them. This is described in the first paragraph 2.1.4.1.

To show this variety of conditions over Russia, some descriptions about potential (regional and national) were given by the partners.

These results are all given in Chapter 3 (Results).

2.1.5 Heat certification study

Sowena as directly involved partner in a World Bank project in a remote area in Russia, carried out a study on heat certification. The form as it was mentioned in the proposal (certificates on heat, as counterparts for the known certificates on electrical energy), is nearly not used in the world and RECS was reluctant to cooperate with it, so for the interest of harmonisation with the EU (priority RusTREC objective), the focus was shifted to a similar concept: cogeneration certificates, which is a well supported strategy in Russia.
More about it in the first paragraph of Chapter 3.

2.1.6 Kyoto adaptor study

A study was written by ETA, considering several possibilities to link Green Certificates with the Joint Implementation Kyoto mechanisms. It contains a SWOT analysis, critical observations of Green Certificates experts and our answers on it. Moreover, it gives information about an alternative that is more easily accepted by the experts for linkage to Green Certificates: voluntary Carbon Credits.
Finally, it contains results of a workshop of Task 38 of IEA (Task 38 – Greenhouse Gas Balances of Biomass and Bioenergy Systems) during the 15th European Biomass Conference and Technology Exhibition, Berlin, 7-11 May 2007, organised by ETA. Here Florence van Stappen of the Walloon Agricultural Research Centre explained the Green Certificates mechanisms in Belgium as a useful instrument to mitigate GHG emissions.
For this study, also some visits were made during the trips to Moscow. Moreover, Kyoto material and news was collected (PointCarbon, UNFCCC, …)
The study is given in Chapter 3.

2.1.7 Harmonisation with EU study

In the contract is already mentioned the Russian interest to establish, through Green Certificates, co-operation with the W-European market. In particular, the interest exists to obtain W-European Renewable Energy Technologies in exchange with Russian Green Certificates. Though the objective of this project is to work towards a green certificate system that is in the first place a *Russian* market instrument, addressed to stimulate renewable energy production under national market conditions (the Dutch Green Label system saved in 1996 40% of the costs of the realisation of the *national* renewable energy targets), the second objective is to establish a market in the EU. This has, besides the jobs in EU enterprises, also the advantage, that the EU targets will be met more easily. In the light of the difficulties to reach them, this second objective gains importance.

Concerning the aim to use Green Certification for the exchange of Renewable Energy Technology from the EU, the conclusion of our activities is that the Joint Implementation (Kyoto) is much more suitable to do this end than Green Certificates on itself, but the proposal to link Green Certificates with the Kyoto protocol in a safe way will again make this original objective of many Russian parties interesting.

Concerning the way how to harmonise the new Russian system (now proposed in the Draft Law on renewable energy in the Parliament) with the EU, a distinction must be made between the RECS and the Guarantees of Origin, both mechanisms of the European Union. While RECS was designed and active much earlier than the Guarantees of Origin, they are technically very similar and the latter is now introduced as an obligatory system but only for the EU member states. The other one (RECS mechanism) is therefore, according to Peter Niermeijer of RECS International, the solution for non member states. The similarity between the two principles will thus make harmonisation to EU automatic for non member states that adhere to RECS. An example of such integration for Green Certification was also Turkey.

Another recommendation for harmonisation in this sector between Russia and the EU was to make the green certificate system in the first place an instrument within Russia, establishing it first as a basic instrument for monitoring the development of renewable energy and then as a national market instrument to oblige and/or reward the production of renewable energy.

The Russian choices for the way how to apply Green Certificates are much oriented towards a combination of two options that are also used in Europe. One obligatory mechanism is to oblige certain (big) producers to produce a part with renewable energy sources, the other mechanism is voluntary and consists of a reward on Green Certificates, which practically increases the income that producers can have from the sale of the energy. This will probably be combined in a way that different market players will be addressed by the two distinct mechanisms, or that one and the same market player might work with both mechanisms (for example in case of producing beyond the obligation).

Developing the green certificate system and using it in Russia in close cooperation with RECS (and this is now happening) can lead to a positive impact on renewable energy development in Russia. If this will happen, the EU market of Green Certificates will automatically see the opportunities for cooperation with Russia, and this again will reinforce the process of harmonisation. In this way, a self-sustaining strengthening of harmonisation (as legal compatibility) and economic cooperation may result.

The **cooperation with RECS** started already by the Aspirant membership of the RusTREC consortium, as in following email from RECS:

Subject: RE: Green certification in Russia
To: "Norbert Vasen" <norbert.vasen@etaflorence.it>
Cc: <info2@intersolar.ru>,
<irina@prominfo.ru>,
<akopylov@km.ru>

Dear Mr Vasen,

Excellent to read you would like to become aspirant member of RECS International. You are very welcome. I expect the cooperation between RECS and the organisations to be an important step towards a Russian green certificate system.

I shall send you and the mentioned key persons of the project the required log in codes.

As an attachment you find the official document that needs to be signed in order to become an official member. In addition you find a clarification of this document. When you are ready, you can post of fax them to the address / number in below.

Looking forward to fruitful cooperation.

Sincerely yours,

_____
Haike van de Vegte
Secretariat RECS International

2.1.7.1 Results of the visit to the RECS meeting in Vienna

The RECS/AIB meeting in Vienna (16-17 November 2006) played an important role in the RusTREC progress (and wider). There were a great deal of uncertainties about the Russian REC system. To shorten this deal, the Russian delegation took part in the Meeting (the Programme, see page 4, and the initial invitation are attached).

The delegates were: Anatoli Kopylov, writer of the Draft Federal Law on RES support (RusTREC Steering Committee); and Egor Grinkevich, represenative of Administrator of Trade System (nonpofit partnership in the structure of RAO UES) as that organisation which had been presumed by the Draft Law as the National IB.

The initial REC scheme developed for the Draft Law has been discussed at the meeting. After the discussion the creative ideas and advices received at this meeting were implemented in the Draft Law. The basic framework, which has been defined here, is very much in line with the European experience and guidelines.

The part of the meeting programme dedicated to the Russian green certificate system is given below. A personal invitation to the key persons by AIB Secretary General Phil Moody follows this.

Meeting Details Maribor
Meeting AIB and RECS International
16 and 17 November 2006, Vienna

Meeting Russian Delegation

Meeting Russian Delegation
16 November 2006
12.30 – 14.00 hours
ARCOTEL Wimberger Wien, Neubaugürtel 34-36, 1070 Wien

A special Russian delegation will come to Vienna to learn more about the possibilities to set up a RECS-certificate system in Russia.

- Welcome, and introduction to AIB and RECS International 10m
- Introduction to RAO UES, and to Russian renewable energy markets 15m
- The European Energy Certificate System (EECS) 15m
- Introduction to RECS International / Market issues 20m
- Discussion

This meeting is open to a limited number of members from AIB and RECS-I board members. For more information please contact the secretary general RECS (recs.secretarygeneral@recs.org) or the secretary general AIB (secgen@aib-net.org).

By email: Irina Zerchaninova - greentie@yandex.ru / irina@prominfo.ru
Anatoli Kopylov - akopylov@km.ru / kopylovae@gidroogk.ru

12 October 2006

For the attention of Irina Zerchaninova and Anatoli Kopylov

RECS / AIB Meetings – Vienna – 16 November 2006

Dear Colleagues,

On behalf of the Board members of AIB and RECS International, I would like to invite you and your colleagues to meet with us in Vienna on Thursday 16th November, from 1300 - 1430.
The venue for the meeting will be the ARCOTEL Wimberger Vienna, at Neubaugürtel 34-36, 1070 Vienna (Tel. +43-1-521 65/0) - see also http://at.arcotel.at/document.asp?id=1250.

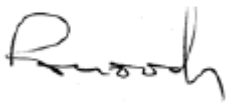
The format of the meeting will be:

- Welcome, and introduction to AIB (President AIB)
- Introduction to RAO UES, and to Russian renewable energy markets (Russian delegation)
- The European Energy Certificate System (EECS) (Secretary General AIB)
- Introduction to RECS International / Market issues (President / Secretary General RECS)
- Discussion

Please let me know if you will be able to attend, and who will accompany you.

I look forward to meeting you there.

Regards,



Philip H Moody
Secretary General

Association of Issuing Bodies

Registered Office: Rue du Canal 61 | B-1000 Brussels | Belgium
Administrative Offices: 21-23 Station Road | Gerrards Cross | Bucks | SL9 8ES | United Kingdom
Tel: +44 (0)1494 681183 | Fax: +44 (0)1494 681183 | Email: info@aib-net.org | Website: http://www.aib-net.org

Registered Number (numero d' entreprise): 0.864.645.330

2.1.7.2 Results of the other communication between Russia and RECS

Many questions, which arose during the decision making of the Russian stakeholders before and after the Inception Study, were resolved with emails to RECS (Phil Moody, AIB and Peter Niermeijer, RECS International), to Russian organisations, and also some to WIP. Many emails were exchanged between the coordinator (ETA) and the Russian group coordinator (IDI). The centre of information during this intensive information collections was certainly Ms Irina Zerchaninova of IDI. The result is mainly the Concept of "Green" Renewable Energy Certification in Russia, the Draft Federal Law on RES support and "zero version" of the Domain Protocol, which are in the Annexes.

2.2 Role of the several partners

The role of the partners in the period after 1 September was as follows:

ETA	ETA has been coordinating the project and managing several challenges, like: 1. The positive acceptance by the Russian Government and market of the green certificate system, which led to the reduction of some parts of the work programme, like the Pilot Transaction (having no sense after the success). Especially partner WIP in Germany tried to find interested parties, also with contacts in Russia like DENA), which could be involved in Pilot Transactions. Until the last moment, attempts were undertaken to save this part of the programme. Only towards the end of the project it became evident that it would be late or difficult to carry out this. In order to use the effect of the recognition of the Government and the market as well as possible, all the effort was focused on progress in this direction. Further attempts to start Pilot Transaction or to amendments were stopped. 2. Partner Berica was not performing well. After many attempts to involve them and to break through a difficult accessibility, we could establish that they were not stimulated because of a different (Russian) market prospective compared to the proposal period, and a too high political (and not practical/commercial) level of the activities. Therefore it was decided by ETA, after consulting the other partners and Berica, to end the relationship with them. A part of the advance payment (after detraction of their costs) was refunded to ETA. 3. Effort to help Russia organise a Biomass Conference, as ETA does regularly in the EU.
VIEN	Being a RE expert under the State Duma (Parliament), Prof. Vissarionov helped with promotion of the Draft Law with the green certification points. Was awarded the Baibakov Prize 2007, e.g. in recognition of the results within RusTREC (see 3.1 Cost estimates, 3.5 Small producers, …).
Solar Energy Institute	Was active in the studies for the potential of renewable energy in Siberia (WP5) and the application of certification to the use of heat and CO2 emissions reduction.
Intersolarcenter	Performed the studies for the potential of renewable energy in Russia, applying it to IBRE (WP5). As information point and realiser of several newsletters, they participated also actively in the dissemination.
Informelectro	Is the coordinator of the Russian group of five partners. Informelectro has been very active in the management and the assistance to the partners. Also many contacts with third parties were established and maintained by this partner. Especially the contact with the writer of the Draft Law (see Other parties), the new Issuing Body that will be established, the contacts with EU (among which RECS International, also help to a visit of third parties to RECS meeting in Vienna) were the outcome of the efforts of Ms. Irina Zerchaninova. She also helped, together with ETA, the Russian partners with the administrative and financial tasks. Active in the dissemination. The writer of the draft of the Concept of Green Renewable Energy Certification in Russia (see chapter 4) and the draft of the project recommendations (see chapter 5). Together with Prof. Vissarionov she was awarded the Baibakov Prize 2007, e.g. in recognition of the results within RusTREC see 3.1 Cost estimates, 3.5 Small producers, …).
Sowena	As technology specialists, especially with cogeneration, and as performers in a World Bank project in the Republic of Komi, they performed a study on cogeneration. They represented also RusTREC at the International Congress & Exhibition "Bioenergetics-2006", held in Moscow on 21-24 November 2006, see 2.3.5 Task 5. Dissemination to foreign markets.

Berica	Left the consortium, see first point of "ETA" in this table
WIP	Besides their contribution to the study in the first period of the German Green Certificates situation, they carried on attempts to find German initiatives and users, which could be interested in the Pilot Transactions of experimental Green Certificates from Russia to Germany. The contacts and discussion results within these attempts proved important to clear up the role of green certification in Russia.
EUBIA	EUBIA was active in the promotion of innovative biomass technology to applications that are particularly useful for Russia. In this context, the Framework Agreement between the Federal Agency on Science and Innovations of the Ministry of Education and Science of the Russian Federation, and the European Biomass Industry Association (EUBIA), established in Venice, Jan 2005 was very relevant. Criterium in this activity were the different price conditions for energy, which can make biomass less competitive than conventional energy in some places, and on the other hand the very high price in regions where there is a very low population density, driving high the price for infrastructure and energy. See also below the Task 4. Sponsorships in Russia and W-European countries to finance Pilot Projects. Together with ETA, some sponsorship proposals were submitted to the EC (IEEA), Intas and investors. Dr Grassi also participated to the visits in Moscow: January 2006 during the first workshop (also the Centre for Energy Policy in Moscow was visited together with ETA, in order to discuss bio-energy in the framework of the Agreement), and 10 April to Moscow to Mr Tarassov of the agency for technical exchange for promotion of the technology (Vadim Tarassov, Director International Cooperation, ASPECT). Another initiative of Dr Grassi of EUBIA was his participation in the G8 Bioenergy Partnership, to promote four technologies that are important for Russia. This was also mentioned in a letter for support to the Russia Duma (Parliament), to this proposal to the G8.
Other parties	HydroOGK: Mr. Anatoly Kopylov, Councillor for CEO and RusTREC Steering Committee Member, actively helped in the dissemination and harmonisation with EU, and was the responsible writer of the Federal Draft Law on RES support that is now in the State Duma (Parliament). The Draft Law contains Green Certificates and the ways, how to use it for support (thorough a mixture of mandatory and voluntary mechanisms) of renewable electrical ***and heat*** energy. The Energy Trading Platform, which is established in the Draft Law, will be the Issuing Body, represented by Nonprofit Partnership "Administrator of Trade System" under RAO UES (ATS), Mr. Egor Grinkevich, Head of Department of the New Businesses, as responsible person. ATS also helped with the newly established project experiment to develop a "zero" version of the Russian RECS/AIM Domain Protocol.

2.3 Deviations from the Work Programme

The **project results** are better than foreseen, specially because of the inclusion of Green Certificates in the Draft Law of RES support. However, the Pilot Transactions, with the aim of "learning by doing" were substituted by support to the writing of the Draft Law for renewable energy and the "zero" version of the Russian RECS/AIM Domain Protocol. These two achievements are to be considered very large and concrete steps towards the long term goal of RusTREC (wich even were not guaranteed as contractual results).
As the establishment of a green certificate system (the final aim) in Russia is a complex political and market process, depending on the will of much more groups than the Russian RusTREC partners, this final aim could not be guaranteed in the project period.
So, when the political and market forces showed the willingness to do these steps towards concrete establishement of the green certificate system, this was an encouraging surprise. The project process was therefore partly re-directed to providing the assistance for this final objective, taking away effort from the Pilot Transaction (which were considered as less relevant by these political and market stakeholders).
Summarising, the project success consists mainly in creation of the green certificates concept for Russia, embedding its basic points plus application on market support mechanism in the "Draft

Federal Law on RES support", the "zero" version of the Russian RECS/AIM Domain Protocol and establishing close contacts between the Russian stakeholders and RECS International (for now made concrete as a aspirant membership to RECS).

The **Pilot Transactions**: efforts redirected to urgent opportunities.
There were many efforts, in an earlier stage, to start Pilot Transactions in Germany and Italy, which resulted certainly in dissemination on the German and Italian market of RusTREC (!). However, the positive developments of Green Certificates in the Russian legislation and its proposition (Draft Law on Renewable Energy) to the Russian Parliament convinced the political levels in Russia and after all also the consortium of RusTREC that Russia didn't need Pilot Transaction as much as our effort to help with the Draft Law and the study on what applications of Green Certificates would best fit to Russia.

The Pilot Transactions were put into the contract in order to learn by doing, but also to convince the authorities to establish a green certificate system.
Now, in the first place, they convinced themselves that such a system is needed in Russia (monitoring and support or RES). Moreover, they designed the characteristics for the system. Finally, they worked on the applications of the system (how to support renewable energy through Green Certificates). Therefore, they put themselves some steps ahead of the Pilot Transaction objectives.
Of course, it will be useful to have some kind of exercise, for example with a Test Phase (RECS did it also at the beginning with a big group of EU member states and it was supported by the European Commission). But this will be better AFTER the approval of the Draft Law in Parliament (approval foreseen till the end of 2007, in accord with the opinion of the Mr Mikhailov of the R.F.Ministry of Industry and Energy, see the interview in the Annexes). It would be a good issue for another project between EU and RF.

Some discussion with P. Niermeijer of RECS, carried on during the preparation of the Pilot Transaction, is given in the Annex 9.

3 Results of target studies

In this chapter, mayor results of studies are presented.
It starts with the cost estimates or RES in Russia, including also studies on potential for Russia as a whole and for regional studies. An important part of this study is the International Benchmark Study on Renewable Energy – IBRE, which is now acknowledged by the partners as a good instrument for energy planning and setting goals.
A heat certification study follows and the role of CHP is analised, as this has special support in Russia.
Then, a study on the link between Kyoto mechanisms and Green Certificates is presented with a SWOT analysis, among others.
The problems of small producers and small grids are then described, and how Green Certificates might work for them, in harmony with the EU. This is an actual problem in Russia.
Finally, general possibilities for green certification in Russia are given, as a concerted opinion from several official organisations in Russian (publicated also as a newsletter on the website of the Ministry).

3.1 Cost estimates of RE

3.1.1 IBRE (by partner ISC)

Russia is rich by fossil fuels, as well as renewable energy. Estimation of the RES potential is made in the Inception report. Use of this potential can cover all the energy needs of Russia. From the technical point of view, all the RE technologies are well developed, and there is good equipment which allow to effectively convert the RE into heat and electricity. However, there is still a question – how much will cost the development of this potential and implementation of various RE technologies for society and will the cost correspond to the result achieved?

Different regions of Russia have different prevailing RES. Southern and East Siberian regions are rich of solar energy, Northern and steppe regions – by wind energy, Kachatka and North Caucasus – by geothermal energy, in mountainous ther is potential for small hydro. The cost of energy, generated from various RES and with use of various technologies varies.

In 2001 the analysis of potential and cost of its utilization for different EU countries was executed. The work was called International Benchmark Study on Renewable Energy – IBRE. The special analysis method was developed, which allows to estimate effectiveness and prospects of utilization of different RE sources in EU, to determine priority directions of RES use depending of their availability, potential and maturity and cost of technologies.

The survey was carried out by the Dutch Project Office for Renewable Energy (PDE), in close co-operation with CEA, Consultants on energy and the environment. CEA applied a framework to the survey that allowed a succinct account to be compiled of the policies and level of ambition in each country. This framework was developed by McKinsey and further refined by CEA in the framework of the Dutch Environmental Action Plans MAP and IMES.

It is relevant for the political planners to know more about the cost of a certain effort for sustainable development. Moreover, playing with several hypotheses of combinations of cheaper and costlier technologies, planners can also see how this influences the total cost of it.
For elaboration and realization of successful RE development program in Russia, it is necessary to set national targets for different RES. The technical and economical constrains must be considered while setting the targets. Implementation of IBRE method elaborated in EU for Russian potential and technologies would be useful and indicative. Within RusTREC framework such analysis was

implemented for technical RES potential and available technologies. The results of this analysis is presented below.

1. *Potential and cost of energy from RES*

There is general information on RES potential and technical potential of various types of RES. The information is presented in the Inception report as well. Unfortunately, there is no detailed statistical information on various RES technologies application in Russia. Estimations of economical potential were not implemented last several years. Therefore, existing data on capacities of RES equipment, as well expert data for missing information were used at the analysis and calculation of IBRE for Russia. The data were taken from open sources, as well as provided by VIEN.

Within framework of RusTREC, the collecting and systematization of data on potential of various RES and its utilization using different RE technologies were executed. For collecting of data the IBRE questionnaire was used. The RES potential was converted from millions of tons of coal equivalent (broadly used in Russian sources of information) to joules (1 t c.e. is equial to 29.3 GJ. Summary table for RES potential is given in Table 1.

For determination of cost of energy produced by various types of RES, the following data were used:

- cost of rated capacity was determined by current market cost of the RE equipment. Cost of 1 kW of rated capacity for different technologies is presented in Table 1.

- number of use hours (capacity use factor) for different RES technologies was assumed taken into account recommendations of [Безруких П.П.]. Calculations for pay-back period are also presented in Table 1.

Table 1

Type of RES	Technical Potential, PJ	Capacity use factor	Payback period, years	Lifetime, years	Cost of installations, k€/kW	Cost of energy, €/kWh
Solar energy (PV)	366	0.15-0.2	10	30	6-8	0.4-0.6
Small hydro	3067	0.4-0.45	25	50	1.5-4	0.03-0.05
Wind energy small large	293	0.12-0.2	8-10	20	 2-4 0.8-1.5	0.05-0.12
Biomass	1025	0.46-0.5	3-5	10-15	0.5-2	0.05-0.15
Geothermal energy	3369.5	0.5-0.55	5-7	20		

2. Calculation of realization cost for RES in Russia and charting of IBRE diagram

Basing on the results received, the graph presenting potential and cost of realization for different RES in Russia was created (cost diagram).

For determination of zero line the wholesale price of electricity in Federal Wholesale Market of Russia was taken. The price is about 700 rub per MWh.

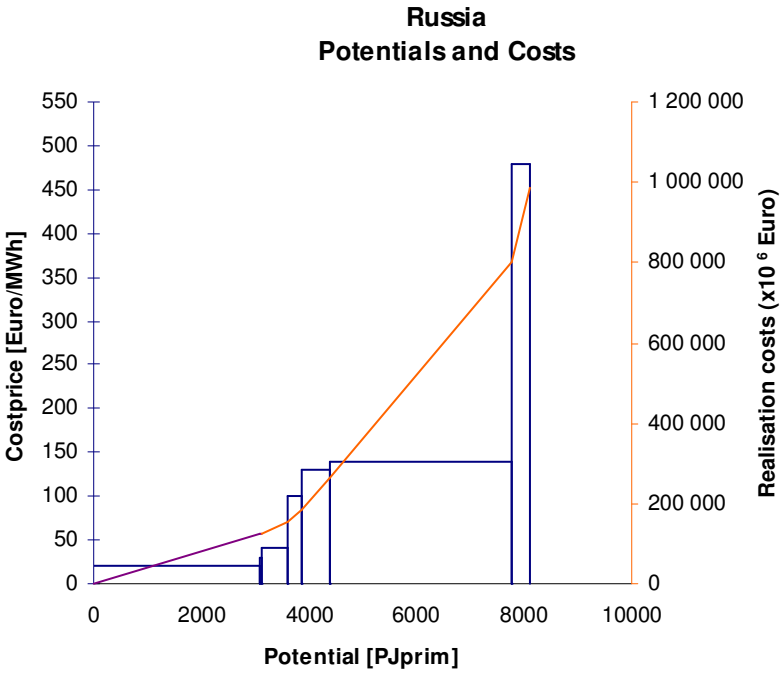
The horizontal axis of the cost diagram indicates the cumulative potential of renewable energy. The vertical axis indicates the surplus costs attached to each option. These surplus costs are obtained by calculating the difference between the cost price of a specific renewable energy option (per GJ of primary energy) and what it would cost a potential commercial operator to purchase a conventional or fossil fuel-based alternative (reference price). Financially viable options will therefore lie on or below the horizontal axis. This diagram can also be used to indicate the target for renewable energy.

If a country has a quantitative target, this is indicated in the diagram by a vertical broken line together with the year by which the target must be met.

Technical potential of RES was used during calculations. However, the IBRE methodology can be used for assessment of economical potential as well. It is not necessary to work only with technical potential: taking economical potential or even the potential that remains after applying local legal constraints, one gets two or three additional diagrammes that show the influence of it. This is also an extremely interesting exercise: if for example hydro would be a wide block in the technical potential diagramme, the permissible potential diagramme could give much less space to it. This confirms universality of the method for assessment of realization cost for RES in Russia and for specific regions of Russia.
In general it helps to fit the technology to the budget. Doing "What if" analyses, changing emphasis on different technologies, a planner can see how much renewable energy can be produced for which total cost.
In particular, one can see what influence the technical, economic and legal constraints will have on the potential/cost of each renewable energy technology. Another application is that legal constraints can be made lighter (with laws) for some technology, if one sees that too much of an expensive technology is needed to reach the target. IBRE can also be applied to see how a feed in tariff for this or another technology will influence the total cost of the target (adjusting the energy cost price with the feed in tariff).

The results obtained allowed to define which RES and technologies should be developed in first place in Russia. The IBRE calculations for Russia are well conformed to existing expert estimation for RES potential and technologies, made earlier in Russia. However, the form provided by IBRE, gives visual and understandable presentation of results.
IBRE methods can account the technical and economical potential, as well as social and ecological aspects at determination of realization cost for different RES in various regions of Russia. Such universality is indisputable advantage of IBRE methodology.

After specification of initial data, and taking into account all the factors influencing to realization cost, it is possible to recommend IBRE methodology for substantiation of national and regional targets for RES development in Russia.



Nr.	Type of Energy
1	Small hydro
2	Wind Small
3	Biomass Small
4	Wind Large
5	Biomass Large
6	Geo
7	Solar energy (PV)

3.1.2 Estimations of renewable energy potential

3.1.2.1 VIEN

Prospects for RE development in Russia

(An integral estimation of potential)

These works were of special interest for VIEN in view of its capacities and had crossings with the "Inception&Training" and "Workshops" WPs. They started in earlier autumn of 2005 and resulted in the television broadcasting all over Russia and abroad. It was the participation in the Gordon's project "2030"1 (Channel One Public Russian Television, 2005, 15 November, 00:00), devoted to long-term perspectives on topical questions with discussing different scenarios of the development. In this broadcasting two main persons were discussing, and Professor Vissarionov (VIEN) was one of them[2]. . There is a record of this broadcasting, which could be submitted on request. Its summary with consideration of the assumptions of Professor Vissarionov is given below. Professor Vissarionov is Honoured Worker of Science of the Russian Federation as well as head of the Department of Unconventional and Renewable Energy Sources of the Moscow Power Engineering Institute – Technical University (this university is the leading in Russia for power engineering). He is also Member of the Presidium of the Scientific-Technical Council of the National electricity company RAO "UES of Russia". Being a top expert on renewable energy, he is traditionally expected to express his views as a development scenario.

Summary
The contemporary phase of the development of the world fuel and energy complex can be characterised by the limitation of organic/nuclear fuel resources, jumping costs of the latter, significant greenhouse gas emissions and the additional heat, "leading to the catastrophic global warming".

Russia and the World as a whole have huge resources called as renewable energy, which are in large access of ones of fossil fuels and nuclear energy. Less than over half year, the Earth receives the solar energy much more than the energy accumulated in fossil fuels. The Sun will work within the space of several milliard years.

Today, the share of RES-E is significant in a variety of countries, for example, Island – 99.9 %, Norway – 99.7 %, Austria – 72.3 %, Canada – 60.5 %.

The rates of growth of use of RES are high. For example, the yearly growth for solar and wind energy installations is 30%. A number of countries are planning to generally move to energy consumption on the base of using RES. For example, Canada is planning to do so towards 2020. Germany can afford it towards 2025.

[1] "Gordon-2030" is the current name of the television broadcasting.
[2] It is a talk show with involvement of high professionals and representatives of the population, including young people, in order to consider the bird's-eye views on a selected topic. Such views are usually in the distance of 20-25 years and based on comparison of programmes, forecasts and opinions of different type, see the formal description on
http://www.1tv.ru/owa/win/ort5_peredach.peredach?p_shed_name_id=5692&p_alphabet_id= .

Russia has great solar energy resources which are still utilised insufficiently, while the "100000 Solar Roofs" programme is successfully implemented in Germany and the "Million Solar Roofs" one is implemented in US.

The territory of Russia is 48 times larger than that of Germany. The Russian wind energy resources are 50 times larger than the German ones. However, the wind energy capacity installed in Germany amounts to 18 mln kWh, which is 1500 times larger than the gross wind power production in Russia. If to attain the German level related to energy output per unit area, then the wind power capacity in Russia could exceed the existing Russian power capacities several times in 2030.

Only 10% of the Russian technical hydro energy resources are realised for big rivers in Russia. The analogous share for small rivers amounts to 0.5%. However, one can see higher figures for the other countries' resources, for example, 60-70% for a number of countries, 95% for France and 92% for Japan. About 100000 small hydro power plants are successfully working in China.

Now the total capacity of the Russian hydro power plants amounts to 20% of all power plants in Russia. If to use only 70% of all technical hydro energy resources here, then the hydro power capacities would exceed the total electricity capacities of Russia in 2030.

Technical resources of bio-energy and geothermal energy are great in Russia.

On http://www.1tv.ru is a talk show with involvement of high professionals and representatives of the population, including young people, in order to consider the bird's-eye views on a selected topic. Such views are usually in the distance of 20-25 years and based on comparison of programmes, forecasts and opinions of different type, see the formal description on http://www.1tv.ru/owa/win/ort5_peredach.peredach?p_shed_name_id=5692&p_alphabet_id= .
A fragment of one of them, with Prof. Professor Vissarionov, Honoured Worker of Science of the Russian Federation as well as head of the Department of Unconventional and Renewable Energy Sources of the Moscow Power Engineering Institute is included here.

"I see the energy of Russia in 2030 as the fully based on the use of environmentally sound renewable energy sources. My optimism is grounded on:
colossal energy resources of RES in Russia,
the ecological properties of them,
the rational character of their use,
the availability of the enormous research reserves on creating new (or breakthrough new) energy installations,
the availability of experts to implement the scientific, engineering and operational activities,
the awareness of the barriers, preventing from wider use of RES in Russia, and the one of overcoming these barriers."

3.1.2.2 Buyrat State Academy/Solar Energy Center (org. changed name)

The specified technical and economic RE potential in Baikal region

The promotion of energy efficiency and introduction of energy-saving technologies is being the strategic objective of all national economies and their regional allocations, including the Baikal region.
The climate in this region is continental with sharp variation. The population density is unequal (from 1 to 18.4 people/m2). This all causes additional trouble with power and fuel supply, while the requirements on ecological safety are getting especially high owing to stressing the special status of the Lake Baikal.
At present the Buryat energy system is in critically short supply. So, up to 94% of consumed electrical power is procured by Federal all-Russian Wholesale Electric Power and Wattage Market

(FWEPM). The capacity deficiency is covered by the unified Siberian energy system. As a consequence, the energy tariffs in the Republic are among the highest in Russia. Particularly, in the year of 2006 the average tariff was 1.25 roubles/kWh, the population-based tariff was 1.35 roubles/kWh, the agriculture-based tariff was 1.62 roubles/kWh. The cost of heat supply amounted to 3,700 roubles/Gcal (as of 1 January 2006).

The existing fuel & energy complex enterprises cannot guarantee reliable energy and fuel supply. The prevailing energy resource in the consumption pattern can be defined as coal: 48.4% in Republic of Buryatia (4 mtce/y), 32% in Irkutsk region and 60.1% in Chita region. The specific character of the development of the whole Baikal region stipulates the significant share of small boiler-houses, using local coal and firewood (about 1,000). The coal combustion of 4 mtce is equal to CO2 emissions of 11 mln tons under the O2 consumption of 22 mln tons, while the most energy deficit districts are just characterised by the most huge RES potential.

This potential was estimated and presented within the RusTREC Inception Report (see). However, the new data should be submitted because of the additional information on the subject matter. It is meant that 12 new projects to develop RE in the Baikal region are to be launched in the coming years.

In all, it is planned to put 6,474.45 kW of additional RE facilities into production, which will lead to producing 561,754 kWhe/y and 8,338,318 kWhth/y. The related economy will amount to 1,762.7 mtce/y, preventing 4,865 tCO2/y. The save of fossil fuel, based on active and passive solar installations only, will amount to 7,137 Gcal/y (17 mln roubles); the related O2 economy will be 9.6 mln tons per year.

The re-calculated RE resources: (a) the gross potential is 483·1012 kWh/y (the same), (b) the technical potential on the base of the estimated earlier (see Table 1) is 0.073·109 kWh/y + 27·109 kWh/y = 27.073·109 kWh/y (see Table 2) and (c) the economic potential for realisation of the additional projects is 8.8 mln kWh/y. Thus the regional RES potential is actually enormous. For instance, the realisation of the gross potential 1.8% and the economic potential 12% owing to introducing the indicated projects will lead to coal saving of 1,762.7 mtce/y, meaning, that only in Republic of Buryatia are 4 mtce/y burned.

Table 1
Technical potential of solar heat (without PV) in Republic of Buryatia, MWh

Districts		**2001**		**2006**	
		Gas & water supply	Heating	Technical potential	Economic potential
1	Barguzinsk	7045	1921	7045	6148
2	Bauntovsk	4147	285		
3	Bichurski	14121	3468	13588	591
4	Dgydinski	16154	1955	138923	17158
5	Eravninski	7773			
6	Zaigraevski	13892	36497	13892	90
7	Zakamenski	8867	2969		
8	Ivolginski	9372	12796	9372	838
9	Kabanski	13588	81940	13588	838
10	Kiginginski	8900	8159	7045	31613
11	Kurumkanski	7050	1272		
12	Kyahtinski	11668	10261	11668	682
13	Muhorshibirski	11729	5649		
14	Okinski	2307			
15	Pribaikalski	11308	12435	3160	1937
16	Nord-Baikalski	1786	35740		
17	Selenginski	9045	46742	138923	8380
18	Tarbagataiski	6954	1717	7045	312
19	Tunkinski	14176	544	14176	1937
20	Horinski	9710	3190		
21	Muyski	791	5813		
22	Ulan-Ude city	164060	628746		
	In all:	**354.453**	**902.107**	**72.903**	**8.816**

Table 2
Distribution of RES technical potential over kinds of RES in Baikal region, mln kWh

Kind of RES		**In all**	**Barguzinsk (district)**	**Ulan-Ude city**
1	Solar	27000 + 70*	38,7	1000
2	Wind	8.5 + 3*	1.54	0.73
3	Thermal waters	124.5	6.2	-
4	Small rivers	35.68	5	-
5	Biomass	1735.8	86.8	0.2
6	Surface waves (Lake Baikal)	35805 (MW)	7992 (MW)	-

*Calculated in 2006

3.1.2.3 Intersolarcenter

The following is an updated description of the evaluation of RES potential by the Russian Ministry of Fuel and Energy in the beginning of the 90s. It was also in the Inception Report and is repeated here for completeness.

Solar

Russia is located between 41 and 82 degrees north latitude, and solar radiation levels on its territory vary considerably. According to estimates, the average solar radiation in the remote northern regions is 810 kWh/m^2 per year whereas in the southern areas it is more than 1400 kWh/m^2 per year. Solar radiation levels also exhibit great seasonal variations. For example, at latitude of 55 degrees solar radiation is 1.69 kWh/m^2 per day in January, and 11.41 kWh/m^2 per day in July. Solar energy potential (see Annex I) is greatest in the south-west (North Caucasus, the Black and Caspian Sea regions), in Southern Siberia and the Far East. Regions with significant solar resources include: Kalmykia, Stavropol, Rostov, Krasnodar, Volgograd, Astrakhan, other regions in the south-west as well as Altai, Maritime, Chita, Buryatia and other regions in the south-east. In some parts of Western and Eastern Siberia and on the Far East the annual solar radiation is 1300 kWh/m^2 exceeding levels in the southern regions of Russia. For instance, in Irkutsk (52 degrees north latitude) incoming solar energy reaches 1340 kWh/m^2, and in the Republic of Yakutia-Sakha (62 degrees north latitude) the figure is 1290 kWh/m^2.

Wind

Wind energy potential varies over Russia. The Russian Wind Atlas shows that there are numerous areas where the annual mean wind speed exceeds 6 m/s. The highest mean wind speeds are found along the coasts of the Barents and Kara seas, the Bering Sea and the Sea of Okhotsk. Other areas with relatively high wind speed (5-6 m/s) include the coasts of the East-Siberian, Chukchi and Laptev seas to the north and the Japan Sea to the east. Slightly lower wind speeds (3.5-5 m/s) are found on the coasts of the Black, Azov and Caspian seas in the south and on the White Sea in the north-west. Significant resources are also found in the low and middle Volga regions, the Urals, the steppe areas of West Siberia, and around the Baikal Lake. The lowest mean wind speed occurs over East Siberia in the Lena-Kolyma core of the Asian anticyclone.

Over most of Russia, wind speeds are greater in the daytime than at night, although this variation is much less pronounced in the winter. The annual variation in mean wind speed (i.e. the difference between the maximum and minimum mean daily speeds) is insignificant for most parts of Russia. The annual amplitude varies from 1 to 4 m/s, making up 2-3 m/s on the average. Amplitudes are higher over the centre of the European part of Russia, East Siberia, West Siberia (except for northern areas) and especially in the Far East, where amplitude reaches 4 m/s. Annual amplitude of less than 2 m/s is observed over the south-west and south-east of the European part of Russia and over Central Siberia. In most of Russia, wind speed is greater in winter and autumn, except for the southern part of Central Siberia where maximum wind speeds occur in warmer months. The highest speeds over Yakutia and the Trans-Baikal region are observed in April-May.

Several attempts have been made to estimate the exact potential of wind energy in Russia, beginning with the Wind Atlas published in the USSR in the 1930s. In addition to the figures of Annex I (Bezrukikh et. al.), Perminov and Perfilov estimated the potential for electricity generation from wind to be $80x10^{15}$ kWh/year (gross), $6.2x10^{15}$ kWh/year (technical) and $31x10^{12}$ kWh/year (economic). According to their analysis, about 30% of the economic potential is concentrated in the Far East, about 16% in West Siberia and another 16% in East Siberia.

Hydro

Russia has vast hydro energy potential estimated at 2,395 bln kWh per year (gross). Medium and large rivers account for approximately 80% of the technical potential (1,670 bln kWh per year). The country's economic potential is 852 bln kWh per year and is currently being used at 23% only.

The potential of smaller rivers amounts to about 46% of total hydro energy potential but is hardly taken advantage of. According to the World Commission on Dams, Russia's hydropower potential is 29,000 bln kWh per year, of which 83% is from large and medium-sized rivers. The technical potential is estimated at 2,030 bln kWh per year. The economic potential, which embodies the level of economic development, economic efficiency, ecological and other factors, is estimated at 35% of the gross potential or 1,015 bln kWh per year. These figures are greater than customary Russian estimates.

Most of the potential hydropower resources are located in Central and Eastern Siberia and in the Far East. The North Caucasus and the western part of the Urals also have good hydropower potential. The Far East and Eastern Siberia combined account for more than 80% of hydropower potential and could produce about 450-600 bln kWh per year.

Biomass

Russia has rather great potential for wide-scale and effective use of biomass resources, converting annually up to $227x10^{21}$ J of solar energy and produced 14-15 bln tons of biomass as a result of processing 21-22.5 bln tons of CO_2. The chemical energy of such biomass volumes is $0.24x10^{21}$ J which corresponds to 8.2 bln tons of coal or oil equivalent.

Different branches of Russian national economy produce up to 300 mt (dry content) of wastes, of which: 230 mt in agriculture (130 mt in livestock farming and 100 mt in plant cultivation), 70 mt in cities (60 mt of solid domestic waste and 10 mt of waste water residues). The energy potential of such wastes is 190 mtce, of which 45 mtce can be produced annually. Up to 80 bcm of biogas, corresponding to 56 bcm of natural gas, may be produced by processing the abovementioned volumes of wastes using biogas technologies.

Geothermal

Geothermal resources of Russia are 10-12 times higher than the total potential of the organic fuel. The Russian territory is explored carefully, and all the major geothermal resources that have good industrial and energy potential are well known.

Geothermal resources with temperatures above 20-25°C may be considered promising and profitable for energy supply of some remote regions and national housing sector because today there are heat pumps and systems that produce heat carriers with temperatures of 80-90°C and above. Therefore, geothermal energy may be effectively used for heat supply of cities, settlements and standalone complexes on 75-80% of the total Russian territory.

Over 3.000 wells have been drilled in Russia in order to take advantage of its geothermal resources. The discovered ones are good enough to fully supply Kamchatka with electric power and heat for more than 100 years. Besides the high temperature Mutnovskoe field with capacity of 300 MWe located in the south of Kamchatka, there are known rich geothermal resources at Koshelevskoe, Bolshe Bannoe and Kireunskoe (in the north) fields. In total these fields may produce about 2000 MWe. The heat potential of Kamchatka's geothermal waters is estimated at 5000 MWth.

Also at Chukotka there are significant geothermal resources (on the border with Kamchatka), part of which has been already discovered and may be effectively used for supplying power to nearby cities and settlements. The Kuril Islands are rich in geothermal resources as well. They can produce enough electric and thermal power to supply this region for 100-200 years. The Iturup island features newly discovered biphase heat-transfer fluid resources the capacity of which (30 MWe) is enough to meet the energy needs of the whole island. The southern island Kunashir has geothermal heat reserves that are being used for electric power and heat supply of Yuzhno-Kurilsk. The subsoil of the northern island Paramushir is underexplored, yet is known to contain good resources of geothermal water of 70-95°C.

The Northern Caucasus has well studied geothermal resources with temperatures ranging from 70 to 180°C °C at depths of 300 to 5000 m. Local geothermal waters are used for heat and hot water supply for a long time already. Around 500,000 people take advantage of geothermal resources for heat supply of agricultural and industrial processes in the Northern Caucasus.

The Maritime, Pribaikalski and West Siberian regions also feature geothermal resources suitable for wide-scale use in industry and agriculture and, certainly, for heat supply of cities and settlements. Other geothermal resources of great interest are located in Krasnodar and Stavropol regions, as well as in Kaliningrad region with hot water reserves of temperatures up to 110°C and heating potential estimated at 1000 MWth.

With all the huge possibilities to use renewable energy, the share of RES (electricity plus heat) in the national energy balance in 2001 amounted to 3.5%. More specifically, the indicators attained for RES electric power generation and heat producing in regard to types of energy installations are reflected in Annex VII (the date of the State statistical service). A forecast on heat (in comparison

with electric power one – see Annex VI) is given in Annex YIII. This forecast was also prepared in the process of the elaboration of the Energy Strategy of Russia until 2020.
Taking into account the current situation in the RES sector, without specific programmes for its development in Russia no tangible steps in RES use can be expected. Development of renewable energy is declared in the Energy Strategy. However, in spite of foreseen introducing of up to 1000 MW of electrical and 1200 MW of heat generating renewable energy capacities, the share of RES in energy balance will not exceed 2-3%. This is definitely not sufficient for achieving sustainability goals.
Experiences of countries, where renewables are rapidly developing, show that for notable increase of renewable energy share in energy balance the supporting legislation framework has to be in place. In Russia there were several attempts to introduce such a framework. In 1999 Renewable Energy Law was approved by the State Duma (Parliament), but President Eltsyn put veto on it. Currently, the new concept of the Renewable Energy Law is being elaborated by the National electricity company RAO UES. It is expected that the new renewable energy law will be discussed in 2006 at the State Duma sessions.

Heat certification study. Role of CHP

Sowena carried on a study on the possibilities to apply a heat accountability that can be used with Green Certificates. The extensive study about Green Certification and CHP units is included in the annex, in Russian language, while a summary is given here in English.
One part treats the technology and the Russian situation, which needs more and more its advantages.
Another part includes the EC Directive 2004/8/EC about cogeneration. Finally is presented the part about energy supply in remote areas, which cover areas where 13 million Russians live without an electrical grid.

Cogeneration units
Cogeneration is one of the best ways to get the most out of a given quantity of fuel (fossil or from biomass). More than a technology, it is a concept so it has a very broad application area. Therefore, it has been identified as a cornerstone for energy policy, also by the European Commission. In particular, the goal is to double the amount of energy from cogeneration units from 9% (1994) to 18% (2010) in the European Union.
For Russia, cogeneration can be a great benefit, because of the rising costs of fuel, the need for more energy independency (not only of a region but also for individual users) and environmental problems can all be faced with its advantages. However, investment is still an important barrier as it requires immediately resources that are recovered only later.
Also the available technologies can deal with a very broad range of situations: the advantages of each of them are described in the annex about CHP.
The document describes also the difference between Green Certificates and CHP Certificates and identifies them as partly overlapping instruments to solve the problems for more integration of cogeneration in Russian society.
Finally, the role of the RusTREC project is described in relationship with this general development in Russia, mentioning the possible link with the European market of Green Certificates.

The EC Directive 2004/8/EC on cogeneration
This directive became active in March 2004 and gives two years time to the member states to implement it on their internal market.
The goal is to double the energy from cogeneration units from 9% (1994) to 18% (2010). It will involve much the liberalisation process and focus on non-utilised potential in the EU.
It requires the member states to establish a certification procedure for high efficiency cogeneration, identification of untapped potential and a strategy to turn this into cogeneration production capacity.

It gives information about calculation methods and indicates the means for cogeneration (technology and fuels).
The study links this Directive to the Russian initiatives, initiated under RusTREC and indicates it as a useful instrument for the Russian cogeneration strategy, particularly the certification part of it.

The energy supply in remote Russian areas

In Russia, gas is the most commonly used fuel, because of its practical properties and its price. The second most promising fuel can be considered to be biofuel, mostly from the huge reserves of wood. The agreements with the WTO led to price increases of gas, and therefore an increasingly strong position of (wood) biofuel.
However, for large (remote) areas, the access to gas is not so easy, and there the position of wood is already interesting.
Unfortunately, there are still significant barriers for the use of this biofuel: the lack of a price stimulus (like the tax mechanisms in EU), the lack of an infrastructure for supply of biofuel and the big distances. So till now, this second champion among the fuels takes a modest place: 0.3% of the total energy consumption in Russia.
A very good example of a scarcely populated area with many wood resources, where the Russian Government decided to do an experiment, in cooperation with the World Bank (GEF), is the autonomous republic of Komi, an area north-east from Moscow, large like France but with only 1 million inhabitants.
Distances between small cities and villages are very large and the maintenance of an electric grid that supplies even only a good part of the population would be very expensive. Also fossil fuels have to be “imported” and the transport costs make them very uncompetitive. Moreover, these fossil fuels have serious negative effects on the local Komi environment. This again has influence on economic life and social conditions (prices of energy, quality of the energy supply), so the project focused on small scale cogeneration (30 – 100 kW electric power) on wood, which doesn’t give only energy, but also heat, which is very important in a cold climate as Komi. They work on gasification, gas cleaners and internal combustion engines.

> Note: there has also been a attempt for technology transfer in this sense from an EUBIA member with a similar technology and with 10 years of guarantee, but till now the local project leaders prefer to use local technology. There is indeed an interest for EU technology, and to pay this partly with Green Certificates, but the price of EU technology and some other factors (like compatibility with local cold resisting parts) are still a problem.

New certification schemes like CHP certificates, heat certificates besides the (normal) electricity green certificates can make the step easier for Komi and similar areas towards cogeneration with biofuels.

3.3 Study on the link between Kyoto mechanisms and Green Certificates

Introduction

In the project Treckin, which resulted in the interest of the Russian Government related to Green Certificates capabilities and in the proposal of RusTREC to the European Commission, a presentation was given in Carthago in Tunis. The RusTREC coordinator (partner of the Treckin) launched the idea of Green Certification as a facilitator of Kyoto projects (CDM and JI), because it could be interesting for countries without Green Certification (like African countries, which were well represented during the Conference).
Also in Russia, there is a belief that Kyoto should be one of the drivers for renewable energy. In the Renewable Energy newsletter of October 2005, from ISC (partner) is stated “In Russia it is also necessary to implement Kyoto mechanisms for stimulating of renewable sources of energy (RES) utilization.”

The relevant text of the RusTREC contract that describes this facilitation is as follows:
JI projects are very costly in terms of preparing activities. These include activities like verification, writing of the project design document and base line studies. These costs are too high for many renewable energy projects, delivering less than a couple of MW, though the role of these projects in the sustainable development is undeniable. <biomass-based projects lead to good CO_2 reduction!.>
The idea of replacing these preparing activities by a much simpler procedure for renewable energy is possible because the base line is once for all determined for electrical energy (lesser extent for heat), for a country or region. Verification is already included in the Green Certificates, because they are at the same time a guarantee of the origin. Another positive aspect is the umbrella function of Joint Implementation: the Green Certificates can be collected for a number (similar or not) projects and the (reduced) JI overhead costs will be shared by many renewable energy producers.

In this document, this idea is elaborated, especially for Russia.
A SWOT analysis is given to describe Strenghts (internal positive factors), Weaknesses (internal negative factors), Opportunities (external positive factors), Threats (external negative factors).
Some often found objections and answers to them are given.
An example of a system in Belgium is given that shows a way of linking Green Certificates to CO_2, even if it does not seem a direct link to Kyoto mechanisms.

SWOT analysis for linkage Green Certificates / Carbon Credits

Strenghts	**Weaknesses**
○ Green Certificates make it less costly to monitor and approve a renewable energy project for Kyoto. ○ Carbon Credits are easier to export, because of the global acceptance. Green Certificates are even difficult to export between EU countries. This means that a coupling mechanism with Green Certificates will make it easier to bring the latter to other markets. ○ A clear conversion mechanism from Green Certificates to Carbon Credits can be provided by redemption of the Certificates at the moment of conversion. This excludes double counting. ○ Green Certificates are easily assigned to (independent) power producers, even if they are small. In this way, the link to Carbon Credits could also add in another way to its usefulness: collecting Green Certificates from more small projects and redeeming them into one larger JI project.	○ Green Certificates overlap Carbon Credits only partially: Green Certificates represent energy production from renewable energy, Carbon Credits represent reduction of emissions of greenhouse gases. This can complicate the conversion of the one into the other.
Opportunities	**Threats**
○ Green Certificates enjoy already a good position in the Draft Law and have important support. Moreover, the infrastructure is being put in place (Issuing Body, RECS membership, user group …). At the same time, the Kyoto Protocol was ratified by Russia and its organisation is in full development. ○ According to an article in the Renewable Energy newsletter of ICS: “In Russia it is also necessary to implement Kyoto mechanisms for stimulating of renewable sources of energy (RES) utilization.” ○ For now, there is not yet a market for Green Certificates, not in Russia nor abroad. Therefore, the link to Carbon Credits can be an interesting way to generate revenue (for example in the EU). ○ Russia has much interest to import renewable energy technologies, the Kyoto Protocol provides good mechanisms to do this. ○ Verified Emission Reductions (for example Gold Standard) are another way to link Green Certificates to Carbon Credits and offer an additional market, also in W-Europe. This market consists of prestige-sensitive companies and local governments, which are not constrained by emission allowances. This market is interesting because the process is less cumbersome than Kyoto Flex-Mec projects (JI for RF) but can equally benefit from the verification mechanisms of (voluntary) Green Certificates. This idea finds less objections from Green Certification experts and officials. ○ Kyoto is seen in Russia as a driver for RE.	○ Green Certificates have, in general, a higher market value than Carbon Credits, in terms of its conversion rate. This will make the conversion without sense if there is a market for Green Certificates. Obviously, this is a Threat for the conversion, not for the Green Certificates. ○ There are disagreeing opinions about the linkage between the two mechanisms, so it will be necessary to show that a clear link method excludes double counting. ○ The Additionality requirement for the Kyoto projects (JI) can make renewable energy projects ineligible if there are targets for renewable energy. But this will be only true if these targets will be in Russia and only if these targets are global for all sectors. Not if there are sectors without these obligation: they will have the right to claim Carbon Credits, for which Green Certificates can be a facilitator.

Some often found objections and answers:

In the definition of the AIB the Carbon credits are excluded: meaning that a buyer of a green certificate (standardised by the AIB) cannot claim the carbon credits;

> Carbon Credits as such may not be in Green Certificates, based on the need to avoid "double counting", but greenhouse gases are avoided. Green Certificates include all benefits of renewable energy, environmental and other, and it is true that the owner of a Green Certificate cannot see the greenhouse gases apart from this Certificate. But, as evidence of the renewable energy and therefore also of the avoided emissions of the various greenhouse gases (in accordance with the regional/national statistics on how much of these gases are produced for each MWh of energy), this Green Certificate can be redeemed to release them. At this moment, the greenhouse gases (avoided by the renewable energy production), are available and can be converted into Carbon Credits according to appropriate procedures of the DNA (Designated National Authority). In this way, there is not anymore a risk for double counting: from the moment of redemption, the Green Certificates can not be used anymore. Only the new Carbon Credits exist from then on. The part of the Green Certificates that is not related to avoided greenhouse gases (Green Certificates represent much more) will get lost or can be used in another way, at the moment of this redemption.

Rules in the EU (ETS): Renewables are excluded from JI, because it is not 'additional'. The target for renewables in the EU is an obligation so can be seen as Business As Usual.

> Apart from the possibility to exclude them from the target fulfilling by redemption, the Russian Federation is outside the ETS. Therefore, renewable energy projects in the RF can create Carbon Credits that are additional for the EU. If there will be a possibility for trade of Green Certificates between the RF and the EU, then this will probably give more value than the conversion into Carbon Credits. If however, the Kyoto mechanism will be earlier in place and/or the Russian Green Certificates will find no market in the EU (also EU member states among themselves have difficulty to accept Green Certificates), it may be convenient to convert the Green Certificates and sell the resulting Carbon Credits.

Rules for Kyoto: can you transfer the carbon credits of a renewable plant from Russia to Europe? In principle 'yes'. But that needs to be clarified under the principle of JI, an agreement between governments and not companies. This may make the Kyoto mechanism less accessible for companies.

> It is true that the transfer of Carbon Credits plays on high level. Bit this is the big advantage of the Kyoto mechanism: that it is related to a global Convention, making it possible to establish these transfers between combinations of countries. The transfer across borders of Green Certificates is more difficult and therefore confined to special bilateral agreements. This high level at which the transfer is done, is also the reason that they are costly and only convenient in case of large projects. The lack of a concrete market for Russian Green Certificates on the EU market is the reason that RusTREC is studying this mechanism of linking Kyoto and Green Certificates. Finally, JI is a mechanism not only between governments, also companies are involved, they are the investors and implementers of projects in host countries, of which the governments have then to approve the transfer from the host country to the country of the investor.

The conclusion is till so far that the original idea, to study the Kyoto mechanism as a possible way to transfer Russian Green Certificates in another form to the EU, is still a useful recommendation. It is acknowledged that the Russian infrastructure for accreditation of Joint Implementation is not yet working, but on the other hand, the link for Green Certificates trade between different countries (also inside the EU) seems more difficult to establish, because it is not laid down as a world standard (while JI is acknowledged as such).

Green Certificates based on CO2 avoidance in Belgium

This information was taken from an Altener project of the EC, by AEBIOM:
see www.ecop.ucl.ac.be/aebiom/K4RES-H.
It shows shortly an original scheme for Green Certificates (GC) in the Walloon region (South BE). Even if it doesn't create a direct link with Kyoto, it does with the greenhouse gas CO_2. Moreover, it gives the Green Certificates also for heat energy (only if coupled with electrical energy) in a way that greatly rewards cogeneration. In this way, it is relevant also for the other innovation that is part of Rustrec: Green Heat Certificates.

1. Title
Green Certificates

2. Description
In the Walloon region (South BE) an original scheme for Green Certificates (GC) has been implemented in 2003. It is based on the avoided CO2 emissions of a RE or energy efficiency power plant compared to a reference. 1 GC is acquired for each 456 kg CO2 saved. Emission reduction on the heat part of cogeneration is calculated, resulting in a much higher income for electricity for these plants.

3. Promoter
The Walloon region government.

4. Actors
The scheme is managed by a new public organisation, CWAPe (Commission wallonne pour l'électricité).

5. Financing scheme priorities
The scheme is related to electricity from renewable and efficient fossil fuel based plants, but the calculation of the GC takes the heat production into account through the global CO2 emission reduction. Heat only applications are not considered.

Recommendations

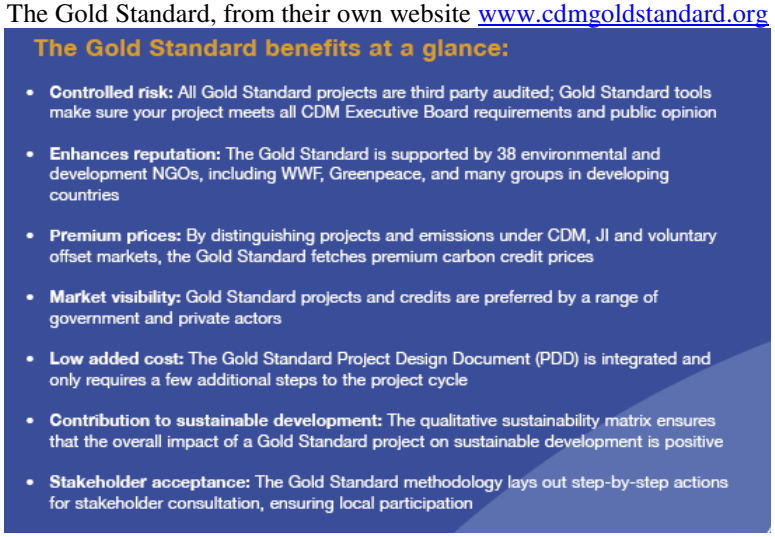
The Russian Federation has much interest in purchasing renewable energy technology from the EU and to pay with the outcome. During discussions, politicians declared that Green Certificates would be the ideal "currency" for this exchange. If this can be obtained directly, it will be a good success. If Green Certificates continue to cross borders with difficulty (as also between EU member states), then Carbon Credits of the JI Kyoto mechanism will be a recommended medium to create the currency, the more so because JI is already a mechanism that places technology in a host country against delivery of Carbon Credits (corrisponding to what Russia would like to achieve with Green Certificates).

Cooperation with Wallony (Belgium) can be beneficial, also because Russia has high expectations from cogeneration, as the efforts of partner Sowena shows. It follows from the Wallonian experience that especially cogeneration obtains very good benefits from the Green Certificates mechanism, so this will help to pursue a determined stimulation of cogeneration.

From one side, the link between (voluntary) Green Certificates and Voluntary Emission Reductions enjoy higher consideration of Green Certification experts than Green Certificates with Kyoto mechanisms (fear for confusion and double counting). From the other side, also the Draft Law mentions the Voluntary market as one of the most promising solutions. Russia will probably choose for a mixed Voluntary / Obligatory system (for different parts of the market). Concerning a voluntary system, there is indeed interest of companies to appear on the market with a green imago, even when they will not be obliged to consume/produce green power. Therefore, cooperation should be tried with the Dutch www.climateneutralgroup.com (largest provider to Dutch clients of Voluntary Emission Reductions), or with the Golden Standard (another global organisation for Voluntary Emission Reductions, see the picture after this paragraph. This will result in a less cumbersome process of generating Emission Reductions with a more apparent "face" (link to well identified projects with high environmental and social value) that will be attractive for voluntary enterprises and organisations.

The Russian participants to the Rustrec project and third parties, of them in particular HydroOGK, demonstrated a very positive engagement in the activities and the project results are beyond the expectations of the proposal to the EC: the project was able to assure only assistance, but the prospective is the real establishment of the Green Certificate System. There is interest to go ahead with other projects and apply for further support from the EC. This has to be encouraged. Many experiences of EC-programmes show that a series of consecutive projects are the most successful. Some objects for a follow up project are: formation of a Russian market group, implementation of a Green Certificate System based on the outcome of the Draft Law for Renewable Energy, harmonisation with the EU market for Green Certificates and exchange programmes of Renewable Energy Technology.

The Gold Standard, from their own website www.cdmgoldstandard.org



3.4 RAO UES and small producers. Harmonisation with EU study

The Unified Energy System of Russia (RAO UES) is, logically and in fact, the main customer for a green certification system. The reformation of the system raises such interest because the reformation goals envisage the enhancement of the National electrical network with more diversity of utilised energy sources and related technologies as well as with new incentives for the development, especially, market-based. The main initiator of the Draft Federal Law on RES support in Russia has been Federal Hydrogenerating Company (HydroOGK) with the presumed National IB as Administrator of Trade System (ATS) or an organisation authorised by ATS, and both are elements in the structure of RAO UES.

The above mentioned facts mean great advantages for a would-be Russian green certification system. ATS is holder of all the basic data for the functioning of a green-e certification and works through the most modern Internet-based platform of high reliability; thus, its certification system could be harmonised with RECS/AIB fully at least from this standpoint. No gathering (calculation, confirmation) problems are expected also in cases of the new grid-connected production devices. In addition, the indicated reforms and the Draft Law comprise also capabilities to develop small territorial (local) electrical networks. Besides, it is supposed that more RES-based autonomous power plants will be gaining acceptance in Russia.

The factor of small producers, not connected to the central grid, is a problem for green certification, not only technical but also methodological. To provide monitoring green-e electricity all over Russia and to have the status of the National but not "RAO UES' IB", ATS will need to work with any possible local electrical networks and even with autonomous power plants, if the Russian Government is interested.

What data to transmit (register) from the local points to the central point and in which way to transmit (register) them on such a big territory as Russia? Technically, it is possible through electronic communications and/or mobiles, and not this is the problem. All the techniques are available, and their vendors (Russian and foreign) have preventively been revealed. But what about the audits for small grids, not to speak of autonomous power plants? To audit a small remote electrical network in a military camp, group of farms and so on, one can spend money, only to get there, equal to the expenses for all other procedures plus cost of green certificates. If not to audit such networks on the regular base, it is hard to believe the information being received. And, these networks will undoubtedly be left beyond admitted by RECS/AIB.

Many options were considered in this connection. And the decision has not been found yet. Preventively, a way seems as establishing special responsible persons for small local networks, when the persons are not those working at related production devices but "high" end-users or real customers (for instance, commander of military camp, director of farms association). They could additionally confirm the data transmitting from the production devices and be responsible in case of the information distortion. Then, appropriate audits could be as selective and not often. Another way is to establish territorial green certification systems, but it can surely be too expensive for involving parties in many localities and, due to it, not attractive. When it comes to autonomous power plants, if these are not under enterprises but homeowners', analytical methods for power calculations seem to be realistic which is in a contradiction with the eligible in view of the general green certification principles (the produced amount is read directly from a meter).

The called circumstances may be considered as a Russian specialty and not facilitated by EC on the level of further studies. However, the research conducted within RusTREC allowed to see some crossings useful for the progress in the general methodology of green renewable energy certification. These crossings correspond with WP6 (Heat certification), WP7 (Kyoto adaptor study) and, especially, WP8 (Harmonisation with EU). Some promising lines are given below.

There has been a practice in Russia when small hydro plants and wind energy systems (within local grids or autonomous) are used partly or basically for the goals of producing heat, and it is possible to meter the "transitory" heat. Because the only experience to certify green heat was gained in Australia (and in Russia during TRECKIN experiments, FP5!), the special discussion between RusTREC partners, AIB and Australian structures close to ORER was launched. In this process the partners revealed that, being the heat certification in fact, such certification had been called as "component electrical" and connected with replacing non-efficient electrical heaters. Moreover, both the replacing production devices and the replaced ones are not grid but autonomous. However, it is important for Australia, and it has been introduced in her practices.

In the indicated Russian case (certification of "transitory" heat), we have to do with real heat certification, when the produced amount can be calculated through additional meters or applying the efficiency coefficient for electricity taken to produce the heat (usually about 95%). The latter approach is hardly less reliable than those applied in Australia. And, possibly, it could be considered by RECS as one of the prospects. Moreover, RAO UES is not only the electrical corporation. It deals with heat either, though in much less extent. Gaining experiences about certification of heat, it might issue green heat certificates, at least in a voluntary system. (Unfortunately, no large structure in the Russian heat energy sector is interested in issuing green certificates yet.)

Small producers of renewable energy (both electrical and heat), involving in the introduction of CHP systems, could also benefit from CHP certificates (shown in the Chapter 3.2). But not only. Being commissioned on some remote territories as autonomous, they could have "little" competitors to declare contributions to greenhouse gas mitigation. In such cases, hybrid "black-green" certificates could be issued as in Belgium or Canada's practices, and such certificates, as it was studied together with the German RusTREC partners, could have a demand in Europe.

About the monitoring again. Another (long!) discussion with RECS/AIB was launched by RusTREC partners and the Steering Committee. Is it principally correct to certify energy for "own needs only" (home installations)? Issued certificates may lead to a support for their holders. Thus, if "yes", then we should support all rich people, which are able to buy expensive commodities. Perhaps, it depends on the National priorities. Therefore, green certification for autonomous power plants was not denied.

To date, and as a conclusion for Russia: green-e certificates as a tracking means can be issued for any RES-based production devices. But, from the standpoint of the state support, only those worked for the public and social needs (working for a grid) can come with these certificates for a support. Green heat certificates as a tracking instrument can also be issued for any RES-based production devices. But prospects for support of green heat with the use of green certificates should be considered additionally and, maybe, in favour of the autonomous production devices.

To summarise. RECS/AIB is the most powerful and reputable green certification structure in the world. But new experiences and related interests have been appearing in various parts of the world. To meet "contrary" capabilities in Europe, these experiences should be investigated in Europe carefully. Besides, Guarantee of Origin's systems are now introduced in Europe. So, the confirmation of "green attributes" for the "sake" of "green attributes" is getting a rather independent task. And the certification problem for local grids (on big territories) and for autonomously produced energy may become more and more important in Europe, too.

What can this mean for the cooperation Russia – EU, beyond the established RECS/AIB goals?

It is impossible to make a cold evaluation of RES-based power production in Russia if not to use a REC system. Therefore, it is impossible to evaluate results of long-term targets of the power production and consumption. As a consequence, the data about the results of the national programmes are getting disputable. And even RES production capacity will be added outside the framework of these programmes.

Establishing a REC system, it is hard to evaluate the efficiency of European and joint initiatives to support the renewable energy development in Russia. Such initiatives cover (and may cover) special co-operation programmes and grants, credits and other financial investments, technology transfer and so on.

The submission of REC among reporting requirements could become a good incentive to better reporting results both in Russia and abroad, facilitating officials (and corporate management) to decide about prospects of the support.

Moreover, commercial agreements with the use of REC may become a reality (for instance, construction of power plants, technology transfer). Another question in this connection: what is the value of Russian certificates for Europe? An answer: when bilateral agreements are established, a specific "internal" status for the certificates may be established within the agreements and for them only (after the establishment of the full Russian green certificate system). Such an agreement was attempted with the Italian Ministry of Environment. Even if such "associated" certificates will not be traded on the free market in Europe, they could still play the role of a proof for the agreement conditions.

3.5 General possibilities for green certification in Russia

Summarising the findings of the RusTREC studies, materials of the target discussions and special reviews prepared in the project duration, as well as in regard with the opinions of the Russian experts, the general possibilities for green certification eligible for Russia were defined as follows.

Would-be green certificates could be issued, transferred and used in Russia:

- For the tracking of the production, supply (selling) and consumption of renewable energy;
- As Guarantees of Origin;
- For the goals of submission of disclosure information toward the nature of energy for producers, suppliers (sellers) and consumers of energy;
- For affirmation of the rights for support within specific renewable energy supporting schemes;
- For receiving tax allowances;
- As a complimentary value (commodity), sold together with physical energy;
- As a derivative on voluntary and mandatory financial markets (when green certificates are issued and redeemed in accord with the obligation rules, but transferred in accord with the commodity rules);
- For inter-party accounting under transfer of renewable energy technologies;
- In the frameworks of target programmes of buying green certificates to compensate additional expenses for producers, suppliers or consumers of renewable energy (state, municipal and support funds' programmes);
- For estimating efficiency of renewable energy technologies in the context of tasks of energy saving and promotion of energy efficiency;
- As a reliable source of information about greenhouse gas mitigation on the base of renewable energy technologies.

These directions were included in the RusTREC Press release of 1 November 2006 (see below, starting with the green banner). The release was placed on the IDI' Web (see http://www.informelectro.ru/pic/zip/Zelen_Sertificat_1_11_2006.doc), disseminated through electronic communications as well as during available conferences, caused considerable reactions in Russia, and to a large extent brought the partners and the Steering Committee closer to the drawing-up of the Concept of "Green" Renewable Energy Certification in Russia.

RusTREC
Green Certificate System for the Russian Federation

Российско-Европейский проект

«Зеленые сертификаты как инструмент для мониторинга возобновляемой энергии и стимулирования развития возобновляемой энергетики в России»

Пресс-релиз
1 ноября 2006 года

Данный проект стартовал в 2005 г. при поддержке Европейской Комиссии (FP-2002-INCO-Russia_NIS-SSA-4-SSA, contract 012012) и является развитием известного проекта TRECKIN (Tradable Renewable Energy Know-How & Initiatives Network = Сеть обмена опытом и выдвижения инициатив в области торговли сертификатами возобновляемой энергии). Целью проекта является содействие введению системы зеленой сертификации в России.

Для достижения указанной цели выполняются следующие работы:

- оценка возможностей формирования российской системы зеленой сертификации в разных вариантах;
- проведение семинаров и мероприятий по тренингу для экспертов и лиц, принимающих решения;
- инициирование акций, связанных с гармонизацией будущей российской и европейской систем зеленой сертификации;
- подготовка предложений по возможному использованию зеленых сертификатов в проектах совместного осуществления по линии Киотского протокола;
- разработка рекомендаций по возможному использованию зеленых сертификатов в структуре тепловой энергетики.

С европейской стороны в проекте участвуют ETA Renewables как координатор и BERICA (Италия), Европейская ассоциация по использованию энергии биомассы, WIP Германии. С российской – Институт промышленного развития «Информэлектро» как координатор российской группы, «VIEN – Возобновляемые источники энергии», ИНТЕРСОЛАРЦЕНТР, Центр солнечной энергетики Бурятской государственной сельскохозяйственной академии им. В.Р. Филиппова, Научно-технический центр ветроэнергетики «СОВЭНА».

Представители западноевропейской Renewable Energy Certificate System (RECS) International, Федеральной гидрогенерирующей компании ОАО «ГидроОГК», РАО «ЕЭС России» и Парламентский центр Федерального собрания РФ «Высокие технологии, интеллектуальная собственность» являются членами Координационного комитета по проекту.

В ходе выполнения проекта реализуется следующая общая концепция.

Зеленый сертификат определяется как документ, подтверждающий факт производства определенного количества энергии из возобновляемого источника, и с учетом формирования международных рынков, а также новых направлений применения, может быть использован в России и (или) за ее пределами непосредственно или будучи конвертированным:

для отслеживания производства, поставки и потребления возобновляемой энергии;

в качестве гарантии происхождения энергии из возобновляемого источника;

в целях раскрытия информации о характере произведенной, поставленной или потребленной энергии;

для подтверждения права на поддержку производителей, поставщиков или потребителей информации в рамках схем обязательной поддержки возобновляемой энергетики;

для получения налоговых льгот;

как комплементарный товар – продаваемый совместно с физической энергией;

как производный финансовый инструмент на добровольных и регулируемых рынках;

в качестве платежного средства при трансфере технологий;

в рамках целевых программ покупки зеленых сертификатов для компенсации затрат производителей, поставщиков или потребителей возобновляемой энергии;

для оценки эффективности использования возобновляемой энергии;

как источник достоверной информации о сокращении выбросов парниковых газов.

Консорциум **РусТРЕК** является ассоциированным членом RECS International.

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4 Concept of green certificates in Russia and its implementation

4.1 The concept

The concept explains the Green Certificates and how it fits into the Russian legislation, and a future support scheme. It is given in the Annexes.

4.2 Implementation of the concept in the Draft Federal Law on RES support

The Draft Law was in fact a project that was started by the HydroOGK in 2004, in order to keep up with the worldwide trend to make more use of renewable energy, to exploit the very rich Russian resources and to solve the problems of local energy security of supply and environmental problems. It is included in the Annexes.

4.3 About prospects with RECS/AIB

The Russian stakeholders will wait till the end of this year for the approval of the law. Then they will probably become a full member of RECS and start to implement the green certificate system.
This is now good on way because of the clear ideas about the possible renewable energy support mechanisms that are based on Green Certificates and which fit to the Russian society. Moreover, the design of the Domain Protocol started already.

So called “zero” version of the Russian Domain Protocol was prepared in the RusTREC duration.

The procedure of its preparation was as follows.

1.Requesting the template most suitable for Russia and explanatory documents from RECS/AIB.

2.Studying all these documents.

3.Selecting the schemes potentially suitable for Russia. To date, the RECS scheme proved to become such scheme with a prospect for (RES-based) CHP one.

4.Translating the basic Domain Protocol into Russian. Discussions with RECS/AIB on RES factor and other matters.

5.Launching the discussions with the ATS heads. Inserting the indispensible texts in the translated Domain Protocol and resulting in its “zero” version for Russia.

An important comment. Before passing the Draft Law, the edition of the template was implemented in a “low-keyed approach” manner.

1.

5 Recommendations

The follow-ups and further investigations

Based on the results of the complex analysis of all the materials presented above, in the context of embedding them in the Russian legislation, and in regard with the current situation in Russia,

RusTREC Consortium and RusTREC Steering Committee believe it reasonable to take the actions given below and to pursue the research, developments and demonstration activities on "green" renewable energy certification in Russia, more specifically:

1. To consider possibilities of establishing the all-Russia Issuing Body for "green" renewable electricity certification on the base of Nonprofit Partnership "Administrator of Trade System" (visit http://www.np-ats.ru).
2. To form a voluntary Russian Association of Certification of Renewable Energy, joining the interested representatives of producers, suppliers, traders, engineering companies, governmental and nongovernmental organisations, which are working in the electric power industry.
3. To draw up the drafts of the following documents:
   - foundation documents for the Russian Association of Certification of Renewable Energy (electrical and CHP production devices);
   - Regulations for the Russian Renewable Electricity Certificate System;
   - foundation documents for the Russian Issuing Body to issue renewable electricity certificates;
   - Procedure for the Formation and Maintenance of the Central Database of Renewable Electricity Certificates;
   - National Domain Protocol within the frameworks of the participation of Russia in the international Renewable Energy Certificate System – RECS International (visit http://www.recs.org);
   - Supplemental Agreement on Renewable Electricity Certificates with the international Association of Issuing Bodies (visit http://www.aib-net.org).
4. To implement an experimental issuing and use of "green" renewable electricity certificates within the structure of the renewable energy support systems, forming in Russia, in regard with the system requirements on the part of RECS International and the RusTREC-studied promising possibilities for the application of "green" certificates, along the lines:
   - internal Russian certificates for producers in the Unified Energy System of Russia (RAO UES);
   - internal Russian certificates for producers in local electrical networks;
   - exported Russian certificates (through RECS International);

- imported European certificates (through RECS International).

5. To conduct comparative studies of concrete ways for issuing and transferring "green" renewable electricity certificates, possible in Russia, among them ways based:
   - on treaties of cession and other assignment agreements related to rights or debts;
   - on commodity markets;
   - on securities markets.
6. To develop schemes for commercial and other agreements with the use of "green" renewable electricity certificates in Russia and analogous international agreements, among them:
   - schemes for renewable energy technology transfer;
   - ones for construction of power plants;
   - ones for compensation programmes;
   - ones for launching electric power development funds.
7. To conduct additional studies and approbation of possibilities of establishing a Russian "green" renewable heat certificate system.
8. To conduct additional studies and approbation of possibilities for renewable CHP certificates in Russia.
9. To conduct additional studies and approbation of possibilities on how the interaction between the system of "green" certification and the system of "carbon" certification could be implemented.
10. To research the Russian technologies, promising for their qualification as equal-to-"green" technologies, capable of issuing "green" renewable energy certificates marked with "Equal-to-renewable technology".
11. To research the capacity of the systems for combined use of renewable and non-renewable energy sources in Russia and to develop the recommendations how to use "green" certificates for stimulating such systems, following the principle of continuos expansion of the renewable energy role in the Russian economy.