FROM THE AMERICAN PEOPLE

PRINCIPLES OF REGULATION TO PROMOTE THE DEVELOPMENT OF RENEWABLE ENERGY IN THE BLACK SEA

April 2012

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USAID FROM THE AMERICAN PEOPLE

National Association of Regulatory Utility Commissioners

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Acronyms

(Section number in brackets)

BSRI - Black Sea Regulatory Initiative (S1.1)

DSO - Distribution system operator

DoE - U.S. Department of Energy (S3.7)

ERA - Energy regulatory authority (S2.4)

EIA - U.S. Energy Information Administration (S3.7)

ENTSO-E - Association of electricity transmission system operators in the EU (S4.4)

FIT - Feed-in tariff (S5.15)

GC - Green certificate (in the U.S. - Renewable Portfolio Standards (RPS) (S5.15, S3.3)

IEA - International Energy Agency (S.3.7)

ISO - Independent system operator

MISO - U.S. Midwest ISO (S8.9)

MISO MRETS - MISO RES-E verification scheme (S8.9)

NTC - Net transfer capacity (S9.3.b)

PJM - Regional transmission organization in the eastern US that operates the wholesale electricity market (S8.9)

PJM-GATS - PJM RES verification system (S8.9)

RBE - Renewable Balancing Entity (S5.9)

RES - Renewable energy resources (S2)

RES-E - Renewable electricity (S2)

RPS - Regulated premium scheme (S5.26)

TERC - Texas Renewable Energy Credit program (S8.9)

TSO - Transmission system operator (S6.23)

WREGIS - U.S. Western States RES-E certification scheme (S8.9) Accreditation of GC: (S8.5.a)

EXECUTIVE SUMMARY

The accelerated development and deployment of renewable energy technologies with related policy options and network responses have become a major focus for national governments, regulatory institutions, and power industries across the globe. Renewable energy is assuming an increased importance due to security of supply issues as well as environmental concerns.

The objective of the 'Principles of Regulation to Promote the Development of Renewable Energy Sources (RES) in the Black Sea Region' is to serve as an easy guide for regulatory and policy decision makers by presenting succinctly an inventory of fundamental assumptions, approaches, mechanisms, tools, best practices, and national experiences in the field of renewable energy. We hope it will guide regulatory action in further promoting the growth of renewable resources in an environmentally friendly and harmonized way.

The 'Principles of Regulation to Promote the Development of Renewable Energy Sources (RES) in the Black Sea Region' was prepared by the Regional Center for Energy Policy Research/REKK based in Budapest, Hungary, and represents a yearlong combined drafting process of the national regulatory agencies in Armenia (the Public Services Regulatory Commission/PSRC), Azerbaijan (the Tariff Council/TC and the State Agency for Renewable Energy/SARE), Georgia (Georgian National Energy and Water Regulatory Commission/GNEWRC), Moldova (the National Energy Regulatory Commission/ANRE), Turkey (the Energy Market Regulatory Authority/EMRA), and Ukraine (the National Energy Regulatory Commission/NERC), with the Organization of MISO States (OMS) serving as a project resource.

The National Association of Regulatory Utility Commissioners (NARUC) implements the Black Sea Regulatory Initiative (BSRI), a project framework for the Principles, under the auspices of a cooperative agreement with the United States Agency for International Development (USAID). The BSRI provides special focus on regulatory developments in an expanded regional context for consideration of issues related to electricity transmission system regulation and electricity trading across national borders in order to move toward regional harmonization of the national regulatory arrangements consistent with the European Union Directives.

The 'Principles of Regulation to Promote the Development of Renewable Energy Sources (RES) in the Black Sea Region' presents comprehensive information for national energy regulatory authorities in the Black Sea region to promote a more efficient development and utilization of renewable energy resources through a better understanding of various roles and decisions of regulatory agencies, governmental institutions and the power industry in the emerging field of renewable energy. As an everyday practical resource to an energy regulator's work, the Principles offers an instructive review of interrelations between regulatory policy and technological issues with an opportunity to establish more coordinated approaches and stronger regulatory cooperation in the sphere of renewable energy. The Principles adds a significant value to the existing regulatory mandates by enhancing the internal capacities and creating opportunities for cross-border electricity exchanges and exploiting resource complementarities at a regional level. Furthermore, it is our hope that the Principles will become an important tool for supporting the work of national governments, state agencies and other institutions with significant authorities over the renewable energy sector.

In eight sections, the Principles examines the emerging role the energy regulatory authorities play in implementing particular measures that aid the renewable electricity (RES-E) sector development, and underscore select actions and obstacles to mobilizing private and public investments for the greater RES-E expansion.

Sections 1 and 2 define the types of the renewable energy sources, noting their complementary nature on the regional level, and underscoring the need for greater regional coordination in their utilization.

Section 3 discusses general objectives in the promotion of renewable energy and highlights particular issues related to the work of national regulatory authorities in promoting effective, efficient, transparent and stable regulatory rules for RES-E market participants.

Section 4 highlights the relationship between policy making and the RES-E regulation, and identifies particular functions of the regulatory agencies in aiding the RES sector development. The section also discusses the importance of timely feedback of market information into the legislative and regulatory rulemaking processes to avert early flaws in the RES market design.

Section 5 discusses financial and regulatory support schemes necessary to promote investment and sustainability of the RES sector. Such regulatory assistance includes priority network access, financial instruments, green certificate trading, regulated price regimes, and production quotas. The section explores in great detail particular aspects of each form of regulatory support.

Section 6 examines issues related to technological challenges and system constraints in integrating renewable energy resources into national power networks by reviewing issues related to system balancing, queue management, and measures that provide increased flexibility to the supply and demand sides of the electricity sector. Here, the role of regulatory agencies rests on providing incentive remuneration schemes to support easier grid access and more flexible grid operation. The section also discusses issues related to cost causation in network upgrades.

Section 7 discusses an important prerequisite for the construction and production of renewable energy by establishing a licensing regime and regulatory monitoring of the RES-E installations. Here, the section underscores various regulatory solutions to the interrelated issues of RES-E support and system integration, and highlights the importance of a licensing regime that is simple and inexpensive for investors.

Section 8 identifies several issues and objectives pertaining to the RES-E certification process, and examines particular regulatory functions with respect to reporting and verification.

Section 9 discusses the significance of cross-border cooperation and regionalization of renewable energy base while underscoring the importance of transmission infrastructure, and harmonized rules as preconditions for building a regionally integrated RES-E market.

PRINCIPLES OF REGULATION TO PROMOTE THE DEVELOPMENT OF RENEWABLE ENERGY SOURCES (RES)

under the

Black Sea Regulatory Initiative (BSRI)

Section 1 - Context of the Principles

(1) On the basis summarized below, the Energy Regulators of the Black Sea Regulatory Initiative (BSRI) [1] decided to commonly develop Principles of Regulation to promote a more regionally coordinated and harmonized utilization of renewable energy resources (RES).

a. It is recognised that the countries involved in the BSRI process are well endowed with RES of different kinds. In particular, hydro, biomass, wind, geothermal and solar resources are abundant in the region.

b. It is recognised that a more coordinated and harmonized utilization of often complementary regional resources to serve regional load for electricity could benefit the participating countries. The possibility of cross border cooperation in resource utilisation will be enhanced by the accomplishment of on-going projects like the EU-funded Black Sea Energy Transmission System.

c. It is understood that a better utilization of RES could reduce the dependence of some BSRI countries on imported energy resources (Armenia, Moldova, Turkey and Ukraine). It could help Azerbaijan replace local use of natural gas with better priced gas exports. The utilization of vast hydro resources could make Georgia a significant electricity exporter of the region. At the same time, RES utilization could also help in reducing greenhouse gas emissions of these countries and contribute to developing local industry and creating 'green' jobs.

d. It is recognised that certain BSRI countries have already succeeded in establishing policies and regulations with the aim of promoting more sustainable RES utilization. An operational electricity market environment and feed-in tariff schemes in Turkey and Ukraine have already generated significant interest for renewable electricity (RES-E) related investment projects. Pressure on transmission operators to connect RES-E generators to the grid and on regulators to provide a transparent, non-discriminatory and investor friendly investment climate in this sector is increasing.

[1] Armenia, Azerbaijan, Georgia, Moldova, Turkey, and Ukraine.

e. It is understood though that the present level and quality of regulatory cooperation, experience sharing and harmonization in this field is insufficient and creates an obstacle to mobilizing private and public investments at the regional level that could be justified by the resources themselves. Closer regulatory cooperation could also result in simplified and more harmonized licensing practices with an expected benefit for RES utilization.
f. It is recognised that the BSRI platform provides an excellent opportunity to learn from the accumulating regulatory experiences of the US and the EU on RES utilization.

(2) This document will cover the following regulatory issues related to RES-E regulation: the definition of RES; general principles of RES-E regulation; the relationship between policy making and regulation in the area of RES-E promotion; RES-E promotion schemes; grid integration of RES-E; licensing and monitoring the RES-E market; renewable electricity certification; cross-border cooperation in RES-E utilization.

Section 2 - The definition of RES

(1) This document's references to RES include all types of resources for electricity generation that is promoted by national legislation of any BSRI country.

(2) In this document, the potential sources of RES-E include: wind, solar photovoltaics (PV), solar thermal electricity, hydropower, solid biomass, biogas and geothermal.

(3) In some cases the burning of solid waste for electricity (and heat) production is also supported in the context of the RES-E regulation. While solid waste should not be considered as a renewable energy source, its utilization to produce district heat provides environmental benefits for the citizens of several European cities.

(4) RES utilization by plants over a certain capacity size might in some cases be detrimental to the natural environment or might promote an overuse of local natural resources. Therefore, RES-E promotion schemes often set maximum capacity limits for certain types of RES-E plants. It is common to set capacity limits for biomass and hydro generation units for this reason.

Section 3 – General Principles to Guide Regulatory Action in Promoting RES Penetration

(1) Renewable energy resource utilization is not an objective in itself but should serve more general economic and energy policy objectives. Combating climate change, improving energy supply security and promoting local industry are the most common of these objectives.

(2) However, it is better to avoid RES-E regulation that becomes a specific sort of trade restriction. An example is making eligibility for, or the level of, RES-E support conditional on a pre-defined share of 'domestic' manufacturing input for RES-E projects. While promoting local industry is a legitimate policy objective, such regulations might become counter-productive, difficult to enforce and might at the end become an obstacle to RES-E utilization.

(3) It is common that direct RES related policy objectives are manifested either in mandated RES shares in gross final energy consumption (EU) or in renewable portfolio standards (US). These policy objectives may be general, or they may be resource-specific when policy makers intend to focus the attention of project developers on particular resources.

(4) The energy regulatory authority (ERA) plays an important role in implementing and sometimes even developing measures that affect the speed of RES-E sector development. Thus the ERA should seek the *effectiveness* of RES-E regulation to ensure the flow of sufficient investment into the sector to meet RES utilization targets. The ERA is advised to carry out *regulatory impact assessment* on a regular basis to check the effectiveness of regulatory action to promote RES-E.

(5) Regulators should, at the same time, promote *cost efficient* RES-E support measures in order to provide least cost end customer electricity services. Scepticism towards RES-E comes in part from the significant subsidy its promotion involves. Energy poverty is one of the major obstacles to promoting RES-E in the countries involved in the BSRI. Thus the most efficient use of available support funds is vital for the credibility of RES policy.

   a. Technology neutral, single price support schemes, the application of open, competitive tenders in allocating grid connection and RES development rights and green certificate trading are highly cost effective RES regulatory measures (see Section 5).

(6) Regulators should promote a proper investment climate by providing *transparency, consistency, credibility and* (a certain level of) *stability of RES-E related regulatory rules* for market participants. Today the majority of RES technologies will not survive in the market without continuous support. Thus, the level and predictability of this support will be the single most important component affecting the profitability and financial viability of RES-E projects.

(7) Fast technological advancement of the RES-E industry might justify the provision of limited *flexibility* for the regulation to adjust support levels closer to technology costs. However,

such adjustments should comply with pre-announced conditions. Regular and publicly available assessments of RES-E technology costs by the Energy Information Administration of the US Department of Energy or by the International Energy Agency can assist ERRAs in benchmarking support levels to technology costs.

(8) Since the early stages of RES development frequently involve subsidies, particular attention should be paid to *prevent corruption through the application of transparent regulatory procedures*.

(9) Regulators should provide the possibility of *easy, inexpensive (small administrative burden and timely response) and non-discriminatory entry for RES-E developers* to the electricity market. The licensing and permitting regime for RES-E installations will be crucial in this regard. A one-shop licensing regime might be useful in streamlining the administrative procedures related to RES-E market entry (see Section 7).

(10) Incumbent market players might not be too friendly to new entrants. Conventional generators are competitors to RES-E producers. RES-E integration requires additional efforts from grid companies to maintain operational security. Thus RES-E market monitoring should pay due attention *to preventing discriminatory practices* by these market players against RES-E generators. Also, carefully designed incentives to compensate for RES-E connection costs might offset grid company disincentives to integrate RES-E.

(11) RES-E market regulation and market monitoring is a relatively new and complex regulatory task. National ERAs should devote sufficient financial and human resources to complete this task. ERAs should also internalize RES-E regulation and monitoring into their organizational structures and procedures.

Section 4 - The relationship between policy making and regulation promoting RES-E

(1) It is legislation by the Parliament and/or the government that, as a rule, sets out the main objectives as well as the broader regulatory environment for RES-E utilization and promotion. A separate Act on renewable energy is not an inevitable precondition for a well-functioning RES-E promotion scheme to be in place.

(2) ERA involvement in meeting RES-E related policy objectives is mostly limited to assistance in designing and operating RES-E support mechanisms; setting feed-in tariffs; RES-E licensing and monitoring; certification of RES-E; revising and approving grid access, balancing and settlement rules for RES-E; and approving rules for cross border trade in RES-E.

(3) *Integrated network, generation and resource planning* might be helpful in identifying the most valuable renewable energy resources of a country or region and also in setting priorities for network expansion that can support the utilization of RES in an effective and cost efficient manner. Integrated planning can be promoted by policy makers, executed by the

transmission companies and approved by the ERAs. Whenever specialized state agencies are authorised to regulate the utilization of specific natural resources (e.g. off-shore wind resources in Germany, hydro resources in Turkey), their involvement in integrated network planning is unavoidable.

(4) In the EU the association of electricity transmission system operators (ENTSO-E) is responsible for developing a 10 year transmission network development plan that takes an integrated approach to RES resource utilization objectives and transmission expansion and upgrade needs. The MISO in the US is also engaged in joint and integrated network planning.

(5) Delayed reaction to regulatory flaws can be very costly in the RES-E sector. This is why an immature RES-E sector requires a *fast feedback of market information into the rulemaking process*. The ERA usually has useful insights into the issues and problems renewable investors face before their investment decisions are made and into the operation of their assets. Also, the ERA, through its monitoring activity, might identify flaws in RES-E market rules at an early stage. It is of utmost importance that communication channels are in place to feed this information back into the legislative and rulemaking process e.g. in the form of regular reporting, or consultations with ministry representatives, legislators and industry representatives. ERAs are encouraged to take a pro-active role in initiating regular consultations of this kind.

Section 5 - RES-E support schemes

(1) Although technological advances and the consequent decrease in technology costs is fast in the RES-E industry, most technologies still need financial and regulatory support to be able to compete with conventional electricity generation.

(2) From a regulatory point of view, RES-E support schemes should comply with some minimum requirements.

(3) RES-E support schemes (and not the level of support) should be transparent and stable over a pre-defined time period. The scheme should include the timing and the mode of its phase-out. Transparency and stability together can provide credibility for the support scheme necessary to promote investment into RES-E.

(4) RES support schemes must be effective. That is, they have to result in increased RES-E generation in accordance with policy objectives. Therefore the ERA might temporarily accept higher rate of return for RES-E than for conventional generators.

(5) RES-E producers should only receive the minimum necessary support since “excessive” subsidies will put an unnecessary burden on final electricity customers.

Priority network access

(6) The most common regulatory support is to provide priority network access for RES-E generators. This can include either support of network connection or priority dispatch once connected to the grid or both. Grid connection issues will be further discussed under Section 6.

(7) *Priority dispatch* (sometimes called must-take) for RES-E generation mandates the network operator to accept the produced renewable electricity whenever it is produced, regardless of its production cost. Under liberalized electricity market conditions, a zero $ sale offer by the RES-E generator will usually ensure that its production is purchased by other market participants. Note two potential limitations regarding obligatory purchase by the network operator.

a. The RES-E regulation may establish maximum production quotas for certain types of RES-E. In these cases the producer is eligible for priority purchase (and perhaps also for other support) only up to the amount of the quota.

b. The network operator may be allowed to reject RES-E when such a purchase might pose a serious risk to system security. However, the rules for such a curtailment of RES-E production should be pre-defined and transparent. The network operator should be financially liable for his action and should report the explanation for curtailment to the regulator and the affected parties. Rules should clarify whether the network operator is liable for paying even in times when the RES-E producer is curtailed.

(8) Priority dispatch for a RES-E generator is not equivalent to payment of subsidies for electricity. The RES-E producer can often enter into bilateral contracts (including export contracts) or sell its electricity into an organized market if it exists. In this case, the generator is paid the market price of electricity.

(9) Priority dispatch is sometimes complemented with the additional regulatory support of appointing a buyer for the RES-E generator. This entity is often called a renewable *balancing entity* (RBE). RES-E generators are often obliged to sell their electricity to the RBE. The RBE might be the network operator or a separate entity that is an aggregate buyer of RES-E.

(10) The RBE might provide at least two important services for RES-E generators: cheap balancing and the settlement of balancing costs and production subsidies (if any). Especially for weather dependent renewable producers, the cost of purchasing balancing energy for aggregated RES-E production will be cheaper than for individual units.

Financial support schemes

(11) Financial support schemes for RES-E can target either investment or production.

(12) *Investment support schemes* might take the form of investment grants (refundable or non-refundable), supported investment credits (credit support or credit guarantee) or tax credit schemes (in the US production or investment tax credits) The source of funding for such support is mainly state budgets or sometimes funds provided by international financial institutions and/or development banks.

(13) *Production support schemes* focus either on the produced quantity or on the price of renewable electricity. The source of financing for production support schemes (both quantity and price) is generally an extra charge included in the end customer tariffs.

(14) The simultaneous regulation of RES-E price and quantity might lead to economic inefficiency. The choice of policy instrument should depend on policy preferences. If the primary policy objective is to reach – but not exceed – certain quantitative RES-E production targets with certainty, the primary choice could be quantity obligation schemes. If the primary policy objective is to keep control over RES-E prices in order to guarantee the financial viability of certain types of RES-E projects, a price support scheme might be the proper instrument choice. A combination of price and quantity regulation might be useful in controlling the overall budget for RES-E support at the cost of economic efficiency.

(15) Most EU countries apply direct price support schemes in the form of regulated feed-in tariffs (FIT). The so called green certificate trading system, which is a production quantity based support scheme, is also becoming more and more widespread. Within the EU green certificate trading is applied in Romania, Poland, Great Britain, Sweden, Belgium and partly in Italy. Other countries apply different types of FIT schemes.

Green certificate trading

(16) When the policy objective is to produce a pre-defined quantity (or share) of RES-E at a future point in time, regulators can simply chose to oblige electricity suppliers to purchase the prescribed amount of renewable electricity, e.g. in proportion to their sales for end customers. Suppliers can prove they have met their obligation by purchasing green certificates from eligible RES-E producers. RES-E producers have, in this system, at least two products[2]: electricity and a green certificate (GC) for each MWh of their production, the latter being certified by or under the supervision of the regulator.

(17) Due to scarcity (demand is higher than supply), a price will develop for GCs. This price will provide revenue for the RES-E producers from GC sales in addition to their revenue from electricity sales. At the same time, the end customers will pay for the additional cost of suppliers to purchase GCs.

[2] RES-E producers can also sell system services to the system operator.

(18) Organized trade of GCs might result in a transparent and uniform GC price. For example, power exchanges can easily manage to introduce green certificates as one of their products. Price transparency improves the RES-E investment environment.

(19) The GC trading scheme, due to its uniform price regime, tends to pay for the production of different renewable technologies equally without regard to their production costs. It thus provides the highest profit for the cheapest technology. Thus the scheme is efficient: it provides the targeted RES-E production quantity at least cost to the customers.

(20) Another nice property of GC trading is that technological development *ceteris paribus* increases RES-E supply and decreases the GC price. Thus the gain from technological development and the related technology cost decrease ends up with the customer.

(21) However, GC schemes operate efficiently only when a large number of RES-E producers exists (no market power).

(22) The volatility of the GC price might reduce the scheme's attractiveness for investors.

(23) In some cases regulators would like to combine the efficiency of a green certificate trading scheme with a support for expensive technology. For example, this can be done by granting a unit of production (MWh) from these technologies with multiple green certificates. Note that such a differentiation will distort the economic efficiency of the scheme.

(24) A quota obligation scheme must be enforceable and sanctions are needed for cases of non-compliance (obliged suppliers not buying enough green certificates). Non-compliance is to be sanctioned by payment of a fee, called buy-out price or non-compliance fee, for each unit of GC not purchased. The non-compliance fee will be an effective price cap for the tradable GC price. Setting the non-compliance fee serves not only the objective of penalizing non-compliance, but also provides cost safety for consumers of renewable energy.

(25) When a green certificate trading scheme is in place, the regulator is likely to have the responsibility of certifying and tracking RES-E (see Section 8), monitoring the settlement regime and enforcing green certificate market rules.

Feed-in tariff versus feed-in premium schemes

(26) In addition to priority dispatch, RES-E generation is often supported via some form of regulated price regime. This can take the form of a fixed regulated tariff (often referred to as a feed-in tariff), when the actual tariff level is not directly related to wholesale electricity price changes. Alternatively, a regulated premium scheme (RPS) can set the support as a regulated premium over the wholesale market price.

(27) In Europe, the FIT normally contains a subsidy premium over the normal market price of electricity. However, the regulated tariff can also function as a bottom price protecting

RES-E producers from market prices falling below some pre-determined level. In this case, the RES-E generator sells at the normal market price except for low price periods when it receives the regulated price.

(28) In the US, RES-E generators are often compensated at 'avoidable cost' as the maximum payment. Whether avoided cost means system average cost, system marginal cost or the retail price varies system by system.

(29) FITs are normally set for a fixed time period (10-15 years) ahead. FIT rates should only be changed by the regulator under pre-defined conditions. The stability and predictability of the FIT makes the scheme attractive for investors and financial institutions.

(30) The mode of phase-out of the FIT support scheme should also be defined in advance.

(31) The method for setting an initial FIT can be based on different approaches.

a. *The usual cost plus (or rate of return) method.* The justified capital, operating and maintenance costs of the different RES-E technologies are estimated and combined with estimated production quantities to arrive at a FIT.

b. *Benchmarking*. An international benchmarking of FITs can complement the cost plus methodology or can itself serve as the basis for establishing RES-E feed in tariffs.

c. *Avoided damage method.* In this case we estimate the environmental and health damage that is avoided by a MWh production by a given RES-E technology that replaces a MWh of a mix of conventional generation. The amount of avoided damage per unit of production can be paid for the RES-E producer in addition to the normal market price without a loss to social welfare.

(32) There exist various practices to adjust, with a pre-defined frequency, the FIT rates. Degrading rates reflect the regulatory expectation that RES-E production costs will decrease over time. Fixed tariffs or FITs escalated with an inflation index provide strong incentives for developers to enter the RES-E market.

(33) Volatile exchange rates might seriously impact the profitability of foreign owned RES-E generators. A regulatory solution to mitigate this risk is to include a transparent and regular exchange rate correction regime into to the FIT methodology. We find an example for such a regime in Ukraine.

(34) An important property of a fixed price FIT system is that technological development and the related production cost decrease *ceteris paribus* will lead to increased profitability and production of RES-E.

(35) When unforeseen technological development leads to a disproportionate difference between the FIT and the production cost of the RES-E producer, resulting in a potential 'overshooting' in RES-E installations, the regulator should have the means to adjust the FIT level closer to costs. Such actions should comply with the condition discussed under point (29) of this Section.

(36) The regulated premium is also normally fixed for a pre-defined time period. However, the premium system is riskier than the FIT – and thus less attractive for investors – because future market prices are difficult to forecast. For electricity customers, however, RES-E will cost less under the RPS than under the FIT scheme.

Different types of FIT

(37) Feed-in tariffs might be uniform or differentiated depending on the type of renewable energy, the technology applied, the size of generators, the time of the day (e.g. peak or off-peak), the season, and the time of commissioning the unit.

(38) A uniform FIT system is – similar to the GC trading system – cost efficient: it provides least cost RES-E to the customers. This leads to a situation, when only one or just a very few renewable technologies are attractive.

(39) In the case of differentiated FIT however, the regulator can encourage the creation of a more diversified renewable mix but consequently at a higher cost. Most of the existing FIT schemes in Europe are differentiated by technology and/or size, reflecting that the development of a diverse technology portfolio remains an important continental RES-E policy objective.

(40) In a differentiated FIT scheme the change in the relative FIT levels will reflect RES-E policy preferences.

(41) Differentiation by technology

a. The cost of producing electricity based on renewable energy differs by technologies and fuel type.

b. If FITs differ by technology, it is not only the cheapest renewable source that can be utilized, which help to diversify the RES portfolio.

c. With this type of support scheme the regulator can favour a technology, which otherwise would not appear in the RES-E technology mix. There might be diverse reasons to promote specific technologies: more favourable attributes (e.g. better predictability), an expectation that the technology is to become less expensive in the future (e.g. PV), or the promotion of the domestic manufacturing of the given RES-E technologies.

(42) Differentiation by size

a. The promotion of small, decentralized RES-E generation might be a reasonable regulatory objective. For example, a set of smaller (e.g. 5 MW) biomass power plants can better perform from the perspective of local resource utilization or sustainable forestry than one larger (e.g. 50 MW) biomass plant. It may also lower transmission costs. However such a policy might result in higher generation costs since the rule of scale economies says that the smaller the installed capacity, the higher the production cost is.

b. FIT preference for units with smaller installed capacity might reduce efficiency. A significant FIT premium for smaller units might encourage building several smaller power plants at the same location instead of a larger one. Such an outcome will decrease the overall RES-E production efficiency and will increase the burden on electricity customers.

(43) *Differentiation by vintage* means that, in order to take the impact of technology development on production costs into account, the regulator might set a different (typically lower) FIT for new RES-E installations than for existing ones.

(44) *Time differentiated* FITs can motivate RES generators with load following capability (e.g. biomass or biogas) to produce electricity in peak load periods and to be off-line in off-peak periods. The application of time differentiated tariffs within a day is more common than time differentiated seasonal FITs.

(45) The application of time differentiated FITs is not recommended for intermittent generators (e.g. PV or wind).

(46) In order to prevent the installation of outdated RES-E production technologies with low technical efficiency, the regulator might make eligibility for the FIT scheme conditional on meeting some minimum technical requirements by RES-E producers.

The role of production quotas in FIT support schemes

(47) In cases of network constraints (see Section 6 on grid integration issues) or limited support budgets for RES-E the regulator can set production quotas for different RES-E technologies as part of the FIT scheme.

(48) With the quota system the regulator can keep the burden on electricity customers within the limits of the support budget.

(49) In order to further reduce the cost of the scheme, the regulator could auction the production quotas among potential producers. Bidders can compete in their discounts to the FIT. In contrast to the case of auction, an administrative allocation (e.g. pro-rata) is an inefficient method of quota allocation since in this case the scarcity rents remain with the producers instead of the consumers.

Determining production quotas should be transparent, stable and set for a longer time period.

Section 6 - Grid access and integration

(1) The penetration of RES-E generation technologies is hindered by technical and economic challenges that inhibit their integration into the electricity network. These challenges can be discussed under the following headings:

a. *Distance from resource to load*: large scale and high quality renewable resources, such as off-shore wind or solar power in the desert, are usually far away from the load centres.
b. *Obsolete grid infrastructure*: insufficient transport capacity, network design and limited interconnections due to outdated systems may often block or delay renewable development.
c. *Scarcity of high quality RES resources and grid connection capacity*: there might be multiple applications to develop the same RES resource or use the same grid connection possibilities.
d. *Intermittency*: weather-dependent renewable generation is not only unable to follow any pre-set schedule, but in many cases even 12-hour production forecast errors are an order of magnitude larger than those for demand predictions.
e. *System flexibility*: as variable production sources are introduced into the grid at a larger scale, the flexibility of the system must also be expanded to avoid adversely affecting the security of electricity supply and the integrity of the grid.

(2) The penetration of RES-E generation is often constrained by network expansion and upgrade opportunities. The time required to permit and install RES-E generation units is often significantly shorter than that for network expansion and upgrade necessitated by massive new RES-E connections. It is also common that regulators first put effective incentives in place (e.g. in the form of generous feed in tariff systems) to encourage new

RES-E generation, but neglect similarly effective remuneration schemes for transmission and distribution companies for their grid development efforts.

(3) Therefore, an important RES-E related regulatory task is to develop an effective incentive regulation to remunerate RES-E related network investments. Such regulation should include a method to define and allocate connection and network upgrade costs among RES-E producers, network companies and final customers.

Definition and allocation of connection and upgrade costs

(4) The two major types of costs related to RES-E utilization are the cost of developing the resource (e.g. installation of a wind farm or developing a hydro generation unit) and the cost of its connection to the distribution or transmission grid. While the cost of developing the resource should clearly be covered by the investor,[3] the definition and allocation of the cost of connection between the developer and the network company is often a matter of policy or regulatory choice.

(5) The total cost of connection consists of the direct cost of connection to a network substation and the potential additional costs of network upgrade and/or expansion that the new connection might make necessary. When developers only pay for the direct cost of connection to a substation, it is a *super shallow connection charge* regime. When developers have to pay for the direct cost of connection and also for the necessary upgrade of the existing grid, it is a *shallow connection charge* regime. Finally, when developers have to pay for the total cost of connection, it is a *deep connection charge* regime.

(6) Economic theory suggests that the deep connection charge regime is the proper choice for connection cost allocation. According to the cost-causality principle, costs should be borne by those who cause them.

(7) Based on this principle, European regulators propose that charges for connecting to and using the system should, in principle, be transparent, cost-reflective and not dependent on the source of the electricity.[4] Such a Regulation will encourage developers to carefully evaluate the trade-offs between RES quality and the cost of connection.

(8) In the US, more effort is put into identifying both the costs and benefits of grid expansion and to develop cost allocation regulation based on the results of cost-benefit analyses.

(9) Regulation can also decide to partly or fully *socialize* the cost of connection and grid upgrade, to facilitate the satisfaction of RES-E policy objectives. Socialization in this context

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[3] Publicly provided investment grants often contribute to investment costs. Tax credits are also applied to promote RES-E investments.

[4] *Regulatory aspects of the integration of wind generation in European electricity markets.* A CEER Conclusions Paper, Ref: C10-SDE-16-03. 7 July 2010, pp. 20-22.

means that retail customers, instead of developers, pay, in the form of network or end customer tariff increases, part or the full cost of network expansion to integrate RES-E into the grid.

(10) Under a fully regulated, vertically integrated market structure, the total cost of connection is paid by end customers.

(11) When independent RES-E generators are allowed to enter the market, the Regulator might consider partial or full connection cost socialization to ensure that transmission lines are built and RES-E generators locate where the best resources exist. Large-scale and high quality renewable resources, such as off-shore wind or solar power in the desert, are usually far away from the load centres. Providing access by extending transmission lines close to these resources can be, with good reason, considered public investments to benefit from positive network externalities.

(12) Cost socialization of grid expansion or upgrade (e.g. the promotion of net metering) might also help the spread of small, decentralized RES-E generators and household micro generation which could otherwise be prohibited by network connection costs being high relative to the size of these projects. However, connection cost socialization in case of RES-E will distort the competition across generation projects of different fuel sources.

(13) The Regulatory practice with regard to connection cost allocation is diverse both in the US and the EU. The Federal Energy Regulatory Commission of the US has not adopted a generally applicable standard or method for transmission cost allocation, so in the US, the method used for allocating the costs of new transmission facilities varies across the transmission system operators. In the EU, the National Regulatory Authorities regulate connection cost allocation.

(14) *Integrated generation and transmission planning* might help transmission operators and regulators to better understand the trade-offs between renewable resource quality and the cost of connection and to design a sufficient connection charge system.

(15) When RES-E investors are to connect to integrated network operators that have production and trading interests, these operators might be motivated to foreclose those RES-E projects from the market that compete directly with their production units. These barriers can be easily implemented by the integrated network operator through discriminatory practices to grid connection requests. In order to promote fair competition for development opportunities, regulators should ensure transparent and non-discriminatory practices from the side of network companies with regard to grid connection and access.

(16) Technical standards for the connection of RES-E producers should be established by grid operators and approved by the Regulator, e.g. as part of the network company's Grid Code. Such technical standards should be transparent, easily available for investors, and should

strike the right balance between system reliability needs and simplicity in order to promote RES-E penetration.

Queue management

(17) The volume and asymmetry of incentives and development time requirement between RES-E generation and network upgrade projects (referred to in point 0 of this paragraph) often results in competing investor requests (or *queues*) to develop certain renewable resources or to connect production facilities at given grid connection points.

(18) Regulators can respond to such a situation either by providing generation developers a *non-constrained connection right* to the grid or by establishing, in cooperation with the network companies, connection capacity limits to the grid and develop an evaluation and selection methodology to grant scarce development and connection rights. This latter option is called *queue management*.

(19) Providing non-constrained connection rights for RES-E developers might lead, under market and regulatory conditions favourable for these developers, to a very fast and excessive RES-E penetration that might compromise grid operation reliability either at the transmission or distribution levels. Therefore such a regulatory solution might be useful at the start-up phase of the RES-E industry but might turn out to be unsustainable in the longer run.

(20) A more promising regulatory approach to managing competing investor requests is queue management. This will include the establishment of connection capacity limits and the development of rules of connection capacity allocation.

(21) The regulatory background of queue management should be ready and published before the resource is opened for developers.

(22) Competitive tendering to allocate connection capacity and /or resource development licenses (or rights) should be preferred to other allocation schemes (e.g. first come first served) because such tenders might provide RES resource development at least cost for the customers. For example, winning a tender of this sort can be based on the fee/kWh feed in tariff bid of the developers. Such a scheme, by promoting competition, might provide a significant discount to an officially established uniform feed in tariff.

(23) In case of connection capacity licenses (rights), the TSO is best positioned to manage competitive tendering. Resource development rights can also be managed by the regulator, in cooperation with the network company.

Intermittency and balancing

(24) Weather-dependent (or intermittent) renewable energy generation technologies – such as wind and solar power – are to some extent inherently uncontrollable. Therefore, once

they are connected to the grid, they are unable to operate as load-following entities. Moreover, their production levels cannot be predicted with absolute certainty even a few hours ahead of real time. Since low-cost, flexible technological options for providing large-scale storage of electric power is not yet available, the massive application of intermittent RES-E poses a challenge to the continuous real-time system balancing operations of the affected grid company.

(25) In order to ease the stress on system balancing, the regulator should establish incentives both for intermittent RES-E producers to provide improved forecasts of their future production to the system operator and for the system operator to allow those producers more flexibility in adjusting their forecasts as better weather forecast information becomes available for them.

(26) A sufficient incentive for intermittent RES-E producers to improve their production forecast is to mandate that they provide a forecast (schedule) of their production to the system operator (at least by hour) and to establish an imbalance charge for deviation of their actual from forecasted production (imbalance charge). The incentive to avoid paying imbalance charges will motivate generators to better utilize weather data and forecasting techniques.

(27) Imbalance charges should be related to actual system balancing costs.

(28) Because of the uncertainties of weather forecasting, the combination of a long lead time for the mandatory scheduling (e.g. month, week or day-ahead) and high imbalance charges might undermine the profitability of intermittent RES-E producers. For this reason, the regulator should ensure that the system operator allows these producers to adjust their schedule intra-day as close to real time as possible.

Additional possibilities to improve system flexibility

(29) Some non-weather-dependent renewable producers, such as biomass or hydro plants, put no additional strain on system flexibility due to their ability to operate according to schedule. On the other hand, truly intermittent resources – wind and solar – can, in significant quantities, pose serious challenges to a system that was developed with a mindset of reasonable predictability.

(30) Regulators can choose one or more of the following potentially effective solutions to increase overall system flexibility. The regulator should consider the substantial difference in the cost of the options.

a. *Aggregation.* The high local variability of intermittent generation can partly be balanced out by geographic aggregation via consolidating smaller balancing areas into larger units. A complementary policy may be to mandate a more dispersed pattern of wind installations within a given control area, although such a restriction on locational choice can decrease the efficiency of wind resource utilization.

b. *Pooling reserves among several control areas*. Introducing a more flexible approach to control area (including cross border) interchanges (such as dropping the requirement that all secondary reserves must be procured from within the control zone) can allow cheaper reserves to be called in from neighbouring territories.
c. *Building new resources.* A trivial and but most costly solution to the flexibility problem is simply to build more power generation capacity that is able to provide system flexibility, such as CCGT or hydro units.
d. *More frequent scheduling.* See point (28) above.
e. *Incentives through tariffs*. In addition to mandating the payment of imbalance charges by intermittent generators, regulators can design tariff schemes to motivate other load-following units that are unable to provide regulation service to schedule their operations in such a way as to assist system flexibility. One example could be to discourage the production of biomass units at night, in order to allow enough gas-fired or hydro units to operate and provide downward flexibility to the system.
f. *Storage and centralized control*. In times when the level of production from intermittent sources exceeds electricity demand, energy storage in the form of compressed air, pumped hydro, flywheel units or thermal storage (e.g. hot water) units becomes indispensable. Alternatively, as a short-term fix, system operators could be given direct control over the production of intermittent generation, while providing proper compensation to the owners of constrained units.
g. *Demand response*. Regulators could design incentives for large consumers to provide short-run system flexibility in much the same way as generators do. Many industrial processes are such that their electricity supply can be interrupted for a few hours without significant economic losses, which is often a less costly way of providing emergency reserves than having stand-by generation capacity.
h. *Smart grids.* Future upgrades of the electricity network (so-called *smart grids*) will likely allow an increased use of large scale automated demand response, further enabling the integration of weather-dependent renewable energy sources into the electricity system. An increased application of net metering devices should be part of this process.

Section 7 - Licensing and monitoring of the RES-E market

(1) Licensing the construction and production of electricity generation by energy regulatory authorities is not a universal practice in countries where electricity generation is a liberalized activity. In those cases when getting a license is a precondition for the generator

to enter the market, it is common to oblige only those plants to go through the licensing procedure with an installed capacity exceeding a certain minimum size (20-50 MW).

(2) It is not a universal practice to oblige RES-E generators to be licensed by the ERA. The reason is that the installed capacity of the typical RES-E generating unit is small and individual RES-E generators do not tend to significantly impact the operation of the electricity system.

(3) Large scale RES-E projects like multi-tower wind farms, off-shore wind projects of hundreds of MW size or large concentrated solar plants are exceptions to this rule and will require specific treatment from a licensing point of view.

(4) The objective of mandatory RES-E licensing by the ERA is to establish the basis of regulatory monitoring and control over RES-E producers. There are legitimate reasons to establish such monitoring.

   a. Since RES-E producers tend to be supported in some form (e.g. through a FIT regime) and for a predefined period of time, someone has to keep track of whether the support is used legitimately. The task of certifying RES-E generation, often made mandatory by legislation, is strongly related to this tracking and monitoring job.

   b. Financial data collection and analysis should support the establishment and improvement of regulated feed-in tariffs for RES-E generators.

   c. A proper understanding of the behaviour of RES-E generators and their cooperation with grid operators is necessary to create and modify market and support scheme rules that can efficiently promote a massive penetration of RES-E generation.

   d. The transparency provided by a proper licensing procedure and regular data publication based on market monitoring might contribute to build the credibility and sustainability of the RES-E market.

(5) ERAs are in an ideal position to carry out the tasks listed under point (4) of this paragraph. ERAs are often involved in developing and implementing RES-E support schemes discussed under Section 5. ERAs are, in principle, in a good position to develop regulatory solutions to the interrelated issues of RES-E support and grid integration (discussed under Section 6), given that grid operators are the licensees of the ERAs.

(6) If the regulator is not involved in carrying out at least some of the tasks listed under sections (4) and (5) of this paragraph, RES-E licensing by the ERA may not be necessary.

(7) In several countries, investors must acquire several licenses and authorizations for the construction and operation of RES-E installations beyond that of the ERA. Building, environmental and hydrological authorities as well as the affected grid operators are the most common parties involved in the authorization process.

(8) RES-E licensing should be as simple and inexpensive as possible. Otherwise it might itself become a major obstacle to RES-E penetration.

(9) In practice, beyond insufficient financial incentives, the complexity of the licensing and authorization procedure is considered to be the second major obstacle to RES-E penetration. The following are the most frequent administrative obstacles related to licensing that deter the penetration of RES-E.

   a. *Lengthy procedures and long lead times to obtain the necessary permits.* For example, a 2 MW wind project can gain the required permit in 10-18 months in countries with a fast licensing regime, while the time requirement for the same project can reach 60-84 months in countries with a lengthy licensing system. Potential remedies for this problem include:

      i. *The prescription of obligatory response periods for the licensing authorities.* The following sanctions should be available for the investor for the case when the authority misses the response deadline: (a) the investor can be provided with the right to initiate an administrative *inaction law suit*, although such a procedure can also be lengthy; (b) the other solution is called *tacit approval*. This means that if the authority does not respond to the license application by the response deadline, the application is automatically approved.

      ii. Capacity building of public administration through training and by appointing the most experienced authority for the licensing job. The lengthy licensing procedure is often due to the lack of knowledge and experience of the involved public administration.

   b. *Excessive number of authorities involved in the licensing process.* The number of authorities involved in the licensing process might exceed 40 in some countries. The high number of and the lack of coordination among the authorities can make the process long, complicated and expensive. As the number of the authorities involved in licensing increases, so too does the prospect that *corruption* will spoil the authorization process. In addition, the objectives of local versus state/federal level authorities might be contradictory (due to concerns related to environmental protection or tourism, local authorities often object to the implementation of RES-E projects supported by state/federal authorities). Potential remedies for this problem might include:

i. *One-stop shop licensing regime.* This means the assignment to one administrative body/central agency of the responsibility for coordinating the authorisation procedures. Four European countries that are among the most successful in promoting RES-E apply the one-stop shop regime (Denmark, Finland, Germany and Sweden). Without reducing the number of requested permits and involved authorities however, this solution will not significantly reduce the time requirement of licensing.

c. *Unclear administrative framework and inconsistent application of laws*. This problem might be overcome by the adoption of detailed legal provisions, or by the issuance of interpretation guidelines. Well drafted guidelines might provide a more flexible option when compared to overly-detailed legal provisions. The predictability of the licensing procedure can also be improved and the risk of corruption decreased by reducing the discretionary power of licensing authorities. The application of this principle is that the authority has to issue the license without any further consideration when the applicant meets all the requirements included in the relevant legislation.

(10) As is the case with other emerging energy market segments (electricity spot and forward markets, balancing markets, cross-border capacity markets, natural gas product markets, etc.), the regulator should build up its market monitoring capabilities with regard to the RES-E market.

(11) A consistent system for data collection, analysis, evaluation, reporting and publication should be established to support the improvement of the regulatory scheme and market development.

(12) The regulator could also create a consistent monitoring regime to identify the most pressing non-cost barriers (e.g. administrative procedures) to RES-E penetration and establish regular reporting to support policy development in this regard.

(13) In the US the market monitoring function, including the monitoring of the RES-E market, is sometimes outsourced and carried out by an independent market monitoring company.

Section 8 - Certifying renewable electricity

(1) The penetration of RES-E production assumes the establishment of renewable electricity certification. It is common that the regulators are authorized to issue green certificates for the eligible producers.

(2) A GC proves that a certain amount of electricity has been generated from renewable energy sources. GCs serve tracking, accounting and disclosure purposes, and can be traded under the Green Certificate Trading support scheme (see Section 5, points (16) - (25) about the latter).

(3) Green certificates can be issued and registered in paper as well as in an electronic format, the latter implying less administration in implementing the system.

The objectives of RES-E certification

(4) Once it is produced, the path of delivery of renewable electricity cannot be traced physically in the electricity network. Thus a certificate system is needed in order to account for RES-E production. This accounting serves one or more of the following purposes:

a. It can serve as a *certificate of origin* in order to verify that certain targets imposed by regulatory authorities or national policies are met (EU, certain US states).

b. It can prove the *eligibility of generators to receive subsidy* under a feed-in-tariff (FIT) or premium system, and accounts for the eligible RES-E quantity.

c. It serves *disclosure* purposes by providing consumer information on the sources of electricity generation (it is an EU obligation to provide detailed information on the source of electricity production on the electricity bill; certain US states have similar requirements).

d. It can *facilitate cross-border trade of RES-E* amongst states. For instance, in Europe a so-called 'statistical transfer' of renewable electricity production targets is possible amongst member states, or with third countries, to fulfil RES targets.

Administrative rules, institutional settings

(5) Administering a certification system generally involves the following steps:

a. *Accreditation* of RES-E generation installations, which confirms that the generation of renewable electricity from a given installation is measured, and fulfils the conditions of the RES-E certification system. It may include a pre-accreditation phase and post-auditing processes as well.

b. *Issuing GCs,* which implies that the issuing body certifies the corresponding quantity of RES-E generation for a given time period and records it in its registry.

c. *Recording trade and transfers of GCs.* If GCs are transferable, all trade and transfers must be tracked in the registry of the competent body. This process has to ensure that double counting of RES production or consumption is avoided.

d. *Redemption.* The market can redeem the GCs according to the rules of voluntary or obligatory RES-E certification schemes. It also means that after utilization or expiry, the certificate is withdrawn from the market. In the EU RES-E system the maximum expiry time for a GC is 12 months. Expiration varies among US states but is typically greater than 12 months.

(6) The certification process can be based on self-reporting with an active involvement of the regulator. In this case, the regulator might have the role of creating and implementing the certification framework. By doing so, the regulator plays a key role in operating the certification system, and this role might present a heavy burden on its operation.

(7) An alternative solution is for an independent agent to verify the RES-E production and manage the registry of transaction with GCs (if any). In this case the role of the regulator is limited to accrediting and regularly inspecting the agent and the certification system.

(8) In some cases the role of the regulator can be limited to certain parts of the certification system, (e.g. issuing), while other functions (e.g. trade administration and registry) is handled by other entities. For example, the cross border trade of RES-E could be accredited by an independent agent. In Europe 16 member states harmonized their green certificate systems, according to the recommendation of the Association of Issuing Bodies, which enables certificate transfer amongst member states.

(9) In the US, the certification process requires third party verification to be performed by an independent auditor, and most regions or sub-regions have their renewable tracking systems, called central reporting agencies (a few examples include the PJM GATS system, MISO has M-RETS, Texas has the Texas Renewable Energy Credit program, and the western states have WREGIS). The use of these tracking systems is generally voluntary, but some states might require the use of them for the implementation of their own RES support schemes.

Other relevant issues

(10) The certification system could also be expanded to account for renewable heating and cooling systems. This latter use in the EU is optional.

(11) There are some additional certification issues related to biomass based RES-E generation.

a. According to the relevant EU regulation, biomass based RES-E should exclusively come from sustainable forestry in order to qualify as renewable electricity production. This requires a further certification step, when the origin of the biomass used in the energy transformation process is traced back to the source.

An additional issue arises in connection with 'mixed burning', that is, when biomass is burned together with other fossil fuels (mainly with coal or lignite). For this case a calculation and certification method should be established in order to accurately account for the electricity eligible for RES-E support.

Section 9 - Cross-border cooperation in RES-E utilization

(1) The BSRI can provide a significant value added to the participating countries only if this regulatory cooperation helps to enhance the opportunity for cross border electricity exchanges at the regional level. Only such an enhanced electricity market place could mobilize the sufficient level of private and public investments justified by the amount and quality of renewable energy sources at the regional level.

(2) The existence of sufficient physical infrastructure, including cross border transmission capacities, is the primary precondition for building a regionally integrated electricity market. The accomplishment of on-going projects like the EU-funded Black Sea Energy Transmission System or the interconnection of Turkey with the ENTSO-E system are all significant steps in this direction.

(3) Regional electricity market building for RES-E alone is not a feasible possibility. A regional RES-E market can only be part of a wider electricity market building process for the region. The BSRI cooperation might contribute to this process by at least the following activities.

a. The opening of the national generation sectors by allowing independent RES-E generators to enter these markets.

b. Developing harmonized rules for third party access to local transmission grids and cross border transmission capacities. For example, the implementation of A Net Transfer Capacity (NTC) based cross border capacity allocation system, typical within the EU, could be a sufficient step in this direction.

c. The establishment of a harmonized green certification system, allowing the transfer of GCs across the region. Such a regulatory environment could enhance RES-E cross border trading opportunities.

d. The establishment of a permanent body to facilitate regional regulatory cooperation. The activity of this body could be focused on facilitating regional transmission planning and on harmonizing cross border electricity trading rules. Such a body could also carry out the monitoring of the region's electricity markets.

APPENDIX A

to the Principles of Regulation

to Promote the Development of Renewable Energy Sources (RES)

The objective of this Appendix is to complement the main text of the Principles of RES Regulation with data, examples, illustrative case studies, good practices and regulatory failures to learn from, taking experiences from the BSRI countries, the US and the EU. The main text is intended to be a stand-alone material, but the simultaneous reading of the two might enrich the reader's understanding of the Principles and their application in the context of day-to-day regulation. The cases and examples are presented with reference to the according section of the Principles.

Context

Section 1 (1) a. - Summary RES data on BSRI countries from country data templates, mid 2011

	Hydro		Wind		Solar		Biomass		Geothermal	
	Potential	Actual	Potential	Actual	Potential	Actual	Potential	Actual	Potential	Actual
	MW		MW		kWh/m2	MW	MW		MW	
Armenia		128		3				1		
Azerbaijan	500	17	1 500	2	1 750	-	1 800	-	1 000	-
Georgia	15 000	91*	2 500	-	108 MW	-				350
Moldova	428	-	600	-	1 250	-	40 PJ	-		-
Turkey		16 809		1 483						94
Ukraine		71		105		88		4		
* Small Hydro Power Plant										

(Source: data provided by regulators under the BSRI project)

Section 1 (1) c. - RES utilization can increase supply security as well as the export of conventional energy resources

Azerbaijan has recently introduced an innovative solution to finance RES utilization in the country. The Agency on Renewable and Alternative Energy Sources, established on July 19, 2009, got the responsibility to assess RES resources of the country and to manage RES utilization pilot projects.

The financing of the Agency is based on the acknowledgement that RES utilization substitutes for local gas use, thus freeing up extra quantities of gas for better priced export. Thus, part of the extra revenue that the gas producer gains from gas export (instead of local sale) will be channelled into funding the activities of the Agency. This system will simultaneously increase RES utilization and gas export possibilities for the country.

General principles to guide regulatory action in promoting RES penetration

Section 3 (2) - RES promotion as trade restriction?

In Turkey an increasing amount of RES-E capacity is integrated into the electricity system. It has become a concern for energy policy that most of the RES-E plant components are being imported. Therefore, in order to promote the development of the domestic renewable industry, a differentiated FIT system is to be introduced. This system provides additional remuneration for power plants utilizing domestically manufactured equipment (see table below and Schedule II).

Feed-in tariffs in Turkey

	Price (US Dollar cent/kWh)		
Plant Type	**Schedule I (10 years)**	**Schedule II (5 years)**	**Total**
Hydro	7,3	2,3	9,6
Wind	7,3	3,7	11
Geothermal	10,5	-	10,5
Biomass(including landfill gas)	13,3	-	13,3
Solar	13,3	6,7	20

In Ukraine the promotion of RES-E started with a new legislation passed in April, 2009 and a feed-in tariff system introduced as a follow up in 2010. Eligibility to receive FIT, however, will be dependent on whether the investor will use local suppliers to provide for RES-E installations from 2012.

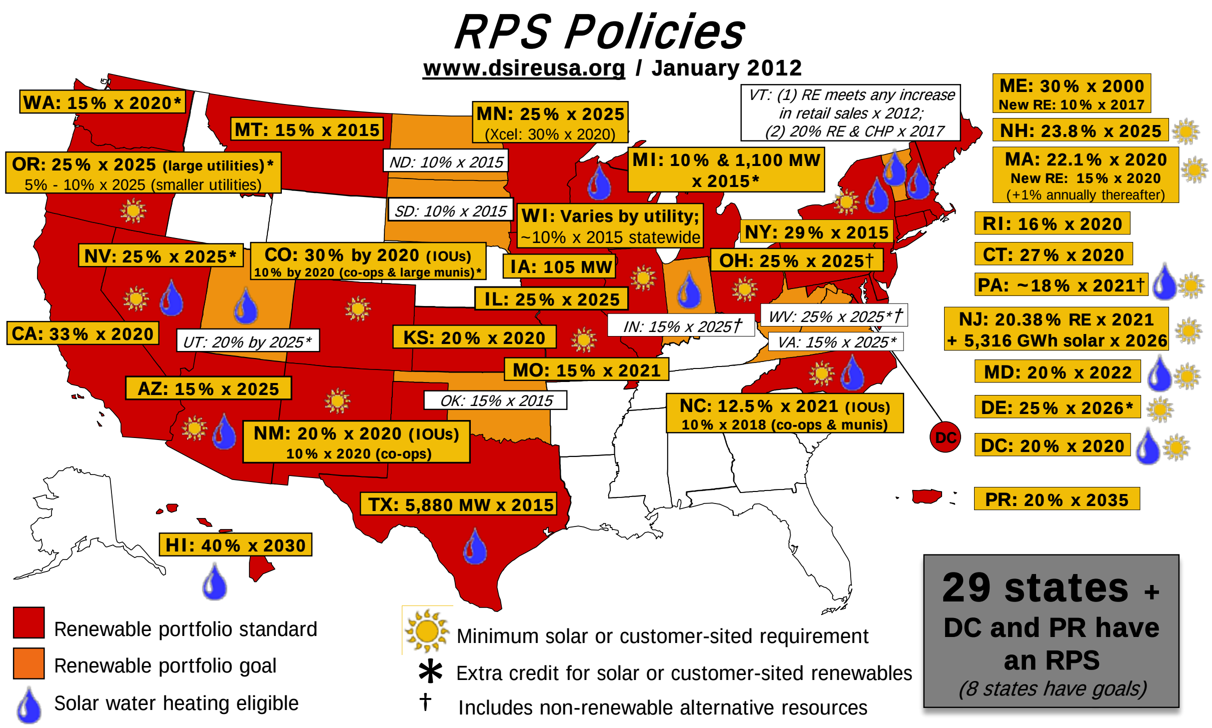
Section 3 (3) - Mandated RES shares in gross final energy consumption

Below is an illustration of mandated RES shares in gross final energy consumption for the EU27 by 2020. The country specific targets add up to an EU level overall 20% RES share in gross final energy consumption by 2020. The country specific targets are related to the 20% overall target, country specific RES resource availability and bargaining power of the country in negotiating the agreement back in 2009.

National overall share and targets for the share of energy from renewable sources in gross final consumption of energy in 2020

	Share of energy from renewable sources in gross final consumption of energy, **2005**	Target for share of energy from renewable sources in gross final consumption of energy, **2020**
Belgium	2,2 %	13 %
Bulgaria	9,4 %	16 %
The Czech Republic	6,1 %	13 %
Denmark	17,0 %	30 %
Germany	5,8 %	18 %
Estonia	18,0 %	25 %
Ireland	3,1 %	16 %
Greece	6,9 %	18 %
Spain	8,7 %	20 %
France	10,3 %	23 %
Italy	5,2 %	17%
Cyprus	2,9 %	13%
Latvia	32,6 %	40 %
Lithuania	15,0 %	23 %
Luxembourg	0,9 %	11%
Hungary	4,3 %	13 %
Malta	0,0 %	10 %
The Netherlands	2,4 %	14 %
Austria	23,3 %	34 %
Poland	7,2 %	15 %
Portugal	20,5 %	31 %
Romania	17,8 %	24 %
Slovenia	16,0 %	25 %
The Slovak Republic	6,7 %	14 %
Finland	28,5 %	38 %
Sweden	39,8 %	49 %
United Kingdom	1,3 %	15 %

In the US no federal level legislation on renewable energy utilization targets exists. Instead, 29 states established obligatory (renewable portfolio standard) or voluntary (renewable portfolio goal) quantitative policy objectives for RES-E utilization.



Section 3 (10) - Examples for potential discriminatory practices by grid companies for RES-E generators

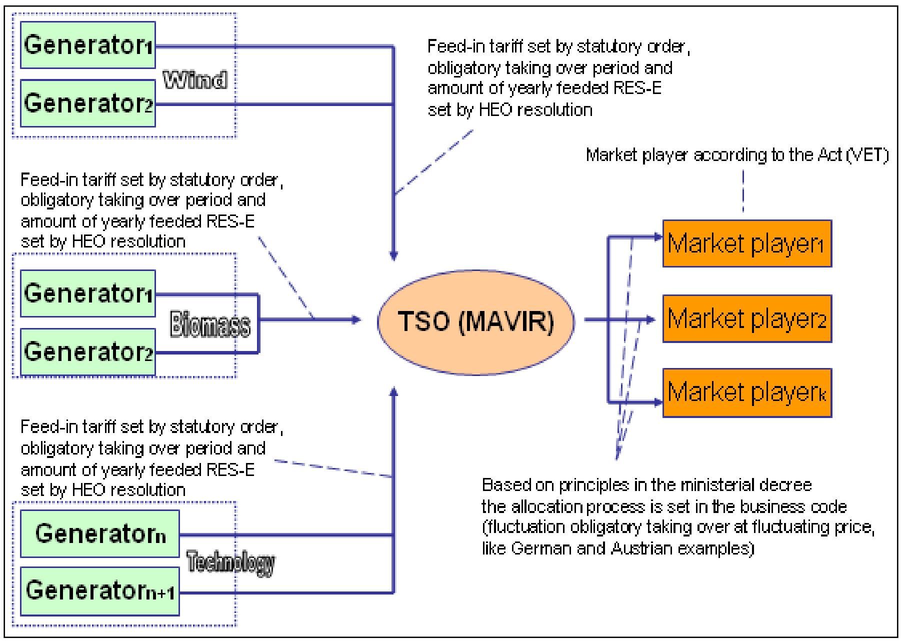
If they wish, grid companies might most easily discourage the connection of independent RES-E producers throughout the grid connection process. First, if the grid company has a priority in determining the cost of connection and/or deciding about its allocation among the investor, itself and customers, the burden on the investor might be prohibitive. It is sometimes also observed that grid companies abuse their power of deciding about the point of connection for independent RES-E developers so that developers are required to connect to a faraway connection point. The typical reason given is that the closest connection point is overloaded (that might be true). The regulator has an important role to play in preventing such practices.

RES-E support schemes

Section 5 (9) - An example for the balancing and settlement regime for RES-E generators: the obligatory feed-in balance circle and the settlement regime of Hungary since 2008

Those RES-E producers that wish to sell their electricity under the FIT scheme are obliged to join the feed-in balance circle. Since the beginning of 2008 the Hungarian electricity TSO (MAVIR) has been responsible for running this balance circle. This means that MAVIR is a centralized purchaser and re-seller of RES-E. Its purchase is based on self-submitted and then approved schedules of producers that are to pay for their imbalances.[5] Balancing is done by MAVIR itself. On the selling side the transmission system operator distributes the purchased electricity for those market participants that serve final customers.[6] The rule is that these market players are obliged to purchase electricity from the RES balance circle in proportion to their customer portfolio and are allowed to pass through the extra cost of this electricity into their retail price. Finally, the settlement of transactions is also in MAVIR's responsibility. The Figure illustrates the operation of the obligatory feed-in balance circle.

The Functioning of the Hungarian Feed-in Tariff Model from 2008



(Prepared by REKK)

Section 5 (23) - Granting different amounts of green certificates for a unit of RES-E MWh by technology

Below is an example from Romania for a green certificate trading system that grants different quantities of green certificates for electricity production by different technologies. The

[5] Year 2008 started with a fierce debate between the producers and MAVIR over the system of scheduling and imbalance prices. Especially, the original system of scheduling and pricing the imbalances of wind electricity was contradictory. In December 2008 the related regulation was amended and the dispute settled so that the tolerance range for schedule imbalances was significantly increased for wind.

[6] Traders, general service providers, production license holders selling electricity directly to consumers, importers. See Decree 109/2007. (XII.23.) GKM.

regulatory objective here was to mitigate that property of the single price GCT scheme that provides highly different profitability for different technologies, mostly preferring those with least production costs.

Number of green certificates granted per MWh RES-E production. Romania, 2011

RES type	Type of electric unit / plant	Number of GC/MWh	Period (years)
1. Hydraulic energy – used in electric power plants with Pi ≤10 MW	new (commissioned after January 1st, 2004)	3 GC	15
	upgraded	2 GC	10
	commissioned by January 1st, 2004 and not upgraded	0.5 GC	3
2. Wind energy	new	2 GC by 2017	15
		1 GC as of 2018	
3. Biomass, biogas, bioliquids, geothermal energy, gas from waste processing, sludge fermentation gas in waste water treatment plants	new	3 GC	15
	highly efficient cogeneration (additionally over 3 GC)	1 GC	15
4. Solar energy	new	6 GC	15

GC: one unit of green certificate

(Source: presentation by Maria Manicuta, 2011, ANRE, Romania)

Section 5 (28) - Pricing RES-E in the US

The US experience has not used the "feed-in tariff" terminology. The difference lies in the level of compensation. The US model used "avoidable cost" as the maximum payment, with the intention that consumer rates would not be increased. States had latitude in determining whether avoided cost means system average cost, system marginal cost, retail price, or something else. No subsidy premium was added. State efforts to provide higher prices for certain types of generation were resisted until very recently. The FERC now seems willing to allow premium prices for particular portfolio requirements. Tariffed rates for RES in traditionally regulated states are subject to approval by state regulators.

The conventional feed-in tariff adds a subsidy premium. Conceptually, there are several legitimate ways to determine an appropriate premium: a standard industry-wide margin, a project-specific margin, or declining margins tied to the plant's capital.

Larger projects in RTO markets operate on a commercial basis. Their compensation depends on their dispatch and the market prices during the periods they operate. FERC and MISO want to increase the number of renewable projects that can be economically dispatched by the MISO, with the project able to respond to automated dispatch signals. MISO's program began in spring 2011 and now includes about 20% of the wind resources in the region. The ability to dispatch this generation will avoid over-supply conditions during periods of light load.

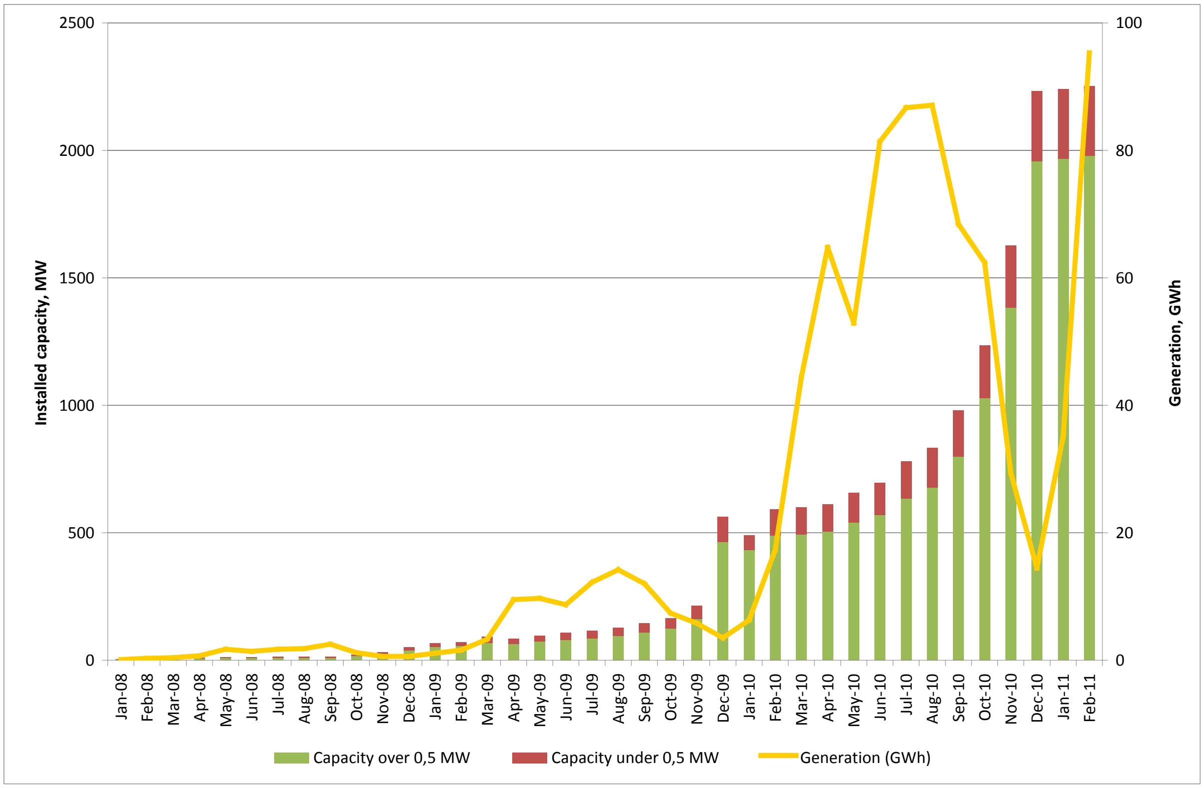
(Prepared by David Boyd and William H. Smith Jr.)

Section 5 (35) - Regulatory failure to learn from: Stimulating photovoltaic (PV) electricity production in the Czech Republic

The 2002-issued Electric Energy Act introduced a differentiated and obligatory feed-in tariff and bonus system for the support of renewable electricity production in the Czech Republic. For individual technologies different feed-in tariffs were established, which were to be renewed annually by the regulator. The photovoltaic production received the most attractive tariffs, values of the feed-in tariffs and bonuses being 3-4 times higher than official prices established for other technologies. In 2008, for example, the price of 1 kWh of PV generated electricity was at least 54 eurocents.

Until 2008, PV based electricity production was negligible, but in 2009 its share was already 25% of all green electricity, and in 2010 it qualified as the most attractive renewable electricity producer. Between January 2008 and January 2009 the number of licensed PV projects had a six-fold increase. By January 2010 installed capacities passed the 500 MW limit, and at the end of the year amounted to 2000 MW. Production and utilization of the capacities was significantly low (see Figure)

Development of installed PV capacities and production in the Czech Republic, 2008-2011



(Source: ERÚ)

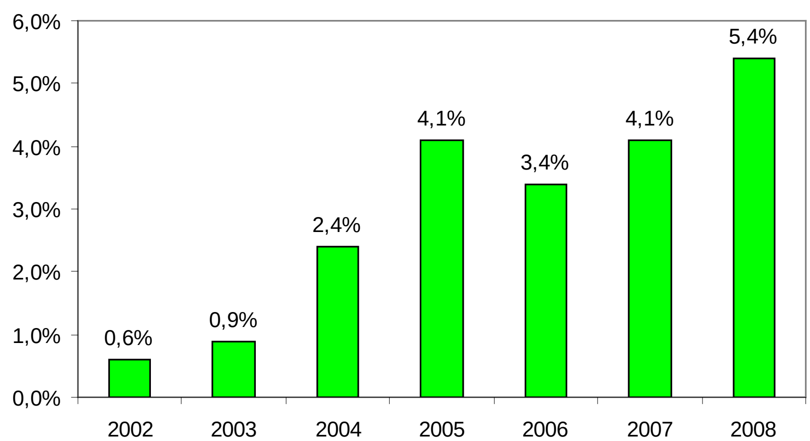
The investment surge occurred for two reasons: attractive tariffs and quick decrease of PV investment costs, the latter amounting to 40% (!) in 2009. This change was not followed however by feed-in tariffs. Thus the overpriced FIT system, in a country having lower than the European average solar exposure, was able in a short time period to generate considerable installed PV capacities. The increase of green electricity support demand for 2011 was estimated to cause a 12% increase in the public consumer price and 18% in the business sector.

(Source: REKK analysis)

Section 5 (38) - The selective nature of the uniform price FIT with regard to technology: the Hungarian example

Hungary has promoted RES-E in a consistent manner since the beginning of 2003. The primary motivation to introduce a support scheme was the country's obligation to the EU to provide 3.6% of its electricity generation by the use of renewable sources by 2010. In 2003 the government had little understanding of the country's RES potentials and did not have a clear preference for any of the available RES-E technologies. The objective was to meet the EU target with the minimum level of subsidy. Thus the energy regulatory agency (Hungarian Energy Office: HEO) prepared a proposal to introduce a uniform feed-in tariff. The proposal for the level of the FIT was based on an avoided damage study to estimate how much external costs can be avoided by producing a MWh of RES-E instead of by using the existing generation park of the country. After the introduction of the uniform FIT, several large (up to 50 MW) biomass units, converted from burning coal to wood, entered the RES-E market and the country met its RES-E market share objective by 2005. More than 90% of the increase was due to large biomass plant generation.

The development of RES-E share in Hungary



(Source: MAVIR, Hungarian System Operator)

While this simple scheme helped the country to reach its RES-E objective relatively quickly and at low cost, it has been criticised heavily for a number of its properties. First, it encouraged outdated coal units with low fuel efficiency (< 30%) to enter the market (however, the low investment needed to refurbish the units made them economically efficient). Second, a large scale utilisation of firewood for electricity generation purposes is considered by many critics as an offense on Hungarian forests (although the regulation rules that only wood from sustainable forestry can be utilised for RES-E production and no one ever proved a case of breaking this rule). Third, providers of more up to date (and more expensive) technologies have been consistently lobbying to provide differentiated FITs to allow these technologies also to enter the RES-E market. As a consequence, the support scheme was revised with the aim of making FITs more differentiated in 2007. The present (end of 2011) revision of the Hungarian FIT scheme is making further steps in the direction of technology based differentiation.

Grid access and integration

Section 6 (4) - An innovative solution for grid connection financing in Turkey

Turkey applies an innovative RES-E connection cost sharing scheme. The rule allows the Turkish electricity TSO (TEIAS) and the investors to choose from the following options:

- If the investor pays for the connection line then the TSO will pay back to the investor this amount in 10 years from its investment budget.
- Otherwise, TSO will put the required investment for the connection of the power plant in its yearly investment plan (will be approved by state planning organization) and these procedures take approximately 3-5 years for bidding (plus construction period).

This scheme provides a strong incentive for the investor to pre-finance the connection in the hope that a significant part of this cost will be socialized later.

(Source: Presentation of Gül Okan & Nurhan Ozan, 2011: Planning for wind and queue management)

Section 6 (9) - Connection cost socialization in the US

In the U.S., the MISO uses different cost allocation methods depending on the main purpose for which the transmission facility was built. Transmission projects are categorized by their primary purpose:

- maintaining the reliability of delivered energy and meeting load growth needs (described as baseline reliability);
- interconnecting new generating plants;
- converging the delivered price of energy at different locations across the system by reducing or eliminating congestion (described as market efficiency); and
- satisfying public policy requirements/goals such as renewable energy integration.

Thus RES-E related network development is considered a public policy project to satisfy renewable energy procurement requirements. The Federal Energy Regulatory Commission of the US has recently approved the following cost allocation method for public policy projects in the Midwest ISO:

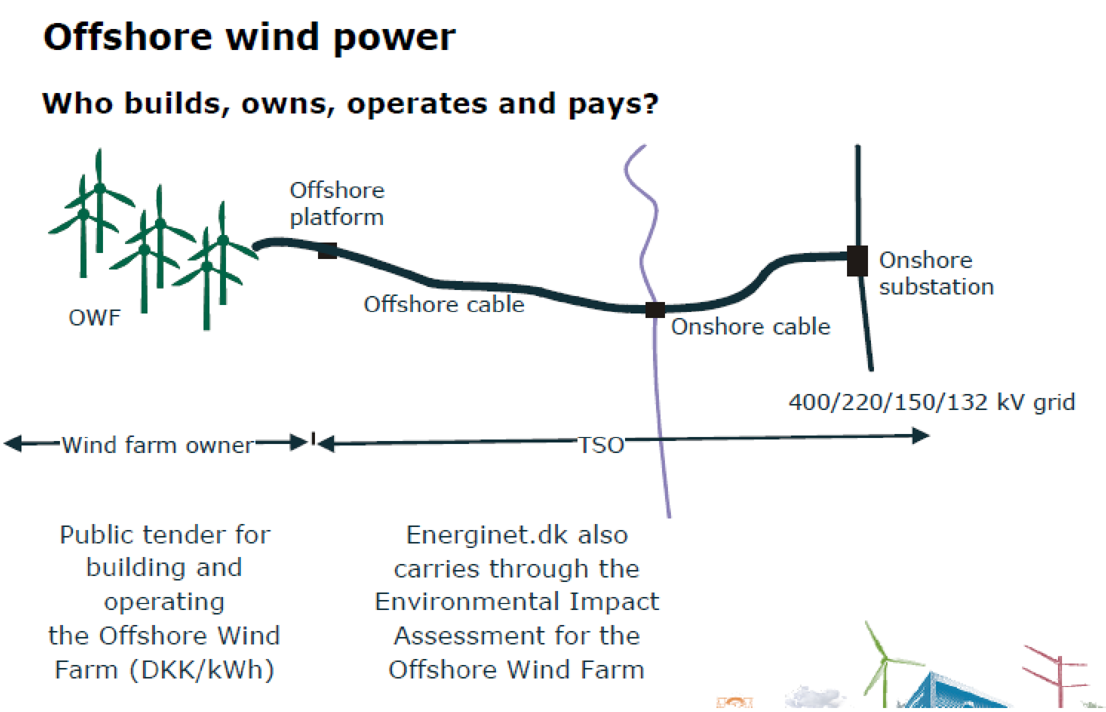
> *100% of the project cost is allocated to Midwest ISO customers and to exports (except exports to the neighboring PJM region) using a load ratio share method based on megawatt-hours (MWh) withdrawn.*

This is clearly a case of connection cost socialization in order to promote RES-E utilization.

(Source: Presentation of Randy Rismiller, 2011, Transmission cost allocation in the U.S. Midwest region)

Section 6 (11) - Best RES-E resources are far from load centres and connection needs innovative financing: Danish offshore

The best European wind resources are often located offshore. It is always a matter of policy to decide how to finance the network connection that supports the extraction of those valuable resources. Denmark, a country where wind generated electricity covered 28% of total electricity consumption in 2010 and rich in offshore wind resources, decided on the following mode of connection financing (see figure below). The building and connection of the offshore platform to the onshore substation is financed by the TSO and this cost is financed through regulated transmission tariffs paid by all customers. At the same time a public tender is launched to develop offshore wind farms. The developer is to pay for developing the farm and for its connection to the offshore platform. This regime is relatively simple and also allows room for competition and efficiency through the tendering process.



(Source: Presentation by Flemming Wibroe at the ERRA training course on RES Regulation, 2011: Achieving 20% wind power in the Danish electricity system and moving on to 50%.)

Section 6 (19) - Non-constrained connection rights and investment overshooting: Turkey 2007

Under favourable conditions for economic growth and in the presence of a properly structured electricity market, Turkey opened its RES-E licensing for wind developers just for one day in November, 2007. At that time no system of allocating development capacities among competing applications was in place, nor were detailed technical conditions for grid connection published. That is, an essentially non-constrained connection rights regime was in place in the country. The authorities received more than 70 GW of wind development applications on that single day (total installed generation capacity was 41 GW at that time in Turkey). It took three years for the Turkish authorities to put a system in place to manage such a large number of applications.

Section 6 (20) - The queue management process in Turkey

The queue management process in Turkey includes the following steps:

(1) The available capacity for connecting wind generation is published by the TSO (TE İAS).
(2) Wind power plant applications are forwarded to EMRA (Turkish Regulatory Agency) for these capacities.
(3) These applications are forwarded to TEIAS to study connection opportunities.
(4) TEIAS gives its comment concerning the availability. If the application is the only one at the substation, EMRA licenses that application.
(5) If there are multiple applications, a bidding process is done by TEIAS to determine the owner of the capacity.
(6) After taking the license, the investor signs a connection agreement with TEIAS.
(7) A project will be approved by the Ministry of Energy and Natural Resources; after the realization of the project a System Usage Agreement will be done with TEIAS.

(Source: Presentation by Gül Okan & Nurhan Ozan, 2011: Planning for wind and queue management)

Section 6 (22) - Wind capacity allocation in Hungary *versus* Turkey

The ways available wind development capacities have been allocated in Hungary and Turkey to date differ sharply. The first is an example to illustrate the disadvantages of a purely bureaucratic allocation process and the connected regulatory risks. The latter is a case to illustrate how competitive bidding might benefit developers and final customers at the same time.

Hungary

In December 2010, only 295 MW of wind capacity was integrated into the grid, providing around 1.4% of the total electricity consumption in Hungary. This share was way below the EU average (5.3%), leaving Hungary the 20th in rank among member states.[7] One reason for low intensity of wind investments may be found in the shortcomings of the licensing process.

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[7] EWEA (2011): Wind in power - 2010 European statistics.

Until 2006, only negligible wind power producing capacities existed in the country (around 17.25 MW of the 8171 MW of total Hungarian generating assets). In 2005, the regulator for electricity, gas and district heating, the Hungarian Energy Office (HEO) called for a wind power installation tender. At that time, a FIT was already in place for electricity from wind and no connection capacity limit for wind generation was published. The precondition for participating in the tender was, among others, to have a building permit, a grid connection license and an environmental permit. Investors had to spend considerable time and resources to gain these permits, and contact about 40 authorities to receive them. Upon submitting the tender documents in late 2005, it was still unclear for the investors on what basis the HEO would grant wind development licenses. Furthermore, the deadline kept changing: the first deadline of 31 December 2005 was postponed to the end of January 2006, and curiously, applications submitted in February 2006 were still accepted. The HEO closed the application period on 16 March, 2006. By January 2006 HEO received licence applications for 1400 MW while this amount decreased to 1140 MW by mid-March. It was only after closing the period for submitting applications when the TSO (MAVIR) claimed that the grid could accommodate only a small amount of intermittent generation. As a response, the HEO set an overall limit of 330 MW for allowable wind connection capacity.[8] The decision was made in March and a summary of the decision process published on 3 April 2006. Finally, the HEO licensed those projects, which complied with the following conditions:

- Were already connected to the grid by 31 December, 2005. (This meant only 17.25 MW)
- Were below 50 MW of capacity and had a license for grid connection by 11 November, 2005.
- For projects under 2 MW, those who handed in their tender documents by 1 March 2006
- For those wind parks that handed in the tender documents by 2 February 2006

Projects meeting these criteria amounted to around 550 MW. At the end of the process, 3 firms representing 55% of the allocated capacities formed a common group and applied for

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[8] This amount was determined as follows: According to the operational grid code, only 90MWs of imbalances can be tolerated in the system without endangering grid security in a 5 minute interval. In the tendering process, wind power facilities reported to be online in around 24% of the hours on average. Assuming that wind power generation in 24 hours can be forecasted with 10% reliability, MAVIR and HEO drafted the following inequality:

$$(p_{max} * 0{,}24) + (p_{max} * 0{,}24) * 0{,}1 \leq 90MW$$

which is maximised by p_{max}=330.

license together.[9] HEO constrained the capacity of wind farms to 51% of the applications (*pro rata*) and finally allocated licenses for 300 MW. Applicants were only charged administrative costs but there was no bidding involved in licence allocation (*free allocation of development rights*).

The above described allocation regime created a solid ground for rent-seeking behaviour. The process was regarded doubtfully even by the winners of the tender. Some mentioned that the grid safety constraints were worked out after the bids were submitted, and it was rumoured that connection licenses were dated back before the required deadline in some cases. By the end of 2010 the awarded capacity development licenses were still not fully utilised.

A second wind capacity tendering round was to be carried out in 2009-2010. On 30 June 2009, the Minister of Transport, Communication and Energy authorized the HEO to start another tender. An additional 410 MW of capacity were to be allocated. Although this time HEO provided a detailed document describing the tendering method and the evaluation of bids in September 2009, in 2010 the newly appointed Minister for National Development[10] amended the decree regulating the wind tender. Consequently, the HEO had to cancel the process in mid-July 2010. According to the reasoning of the HEO and the Ministry, the further integration of wind power would increase end user electricity prices, which was against the policy of the government aiming at constraining energy expenses of households.[11] In spite of the sound preparations, political interests overwrote the intentions of the regulator. This time the major argument to stop further wind development was, instead of system security constraints, its impact on end customer prices.

There are some lessons to learn from the Hungarian case. The lack of clear rules on granting wind development licenses, the ex-post definition of a quantitative cap on allowable development rights and the pro rata allocation of licenses created the possibility of rent-seeking behaviour in the first round of tendering. Regulatory risk around the scheme resulted in significant and unnecessary costs for investors. The second round illustrates regulatory learning

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[9] Data is still not publicly available on how many projects, by which companies, when and with what capacities were handed in.

[10] After the new government came to power in 2010, a restructuring of state administration took place. The Ministry of Transport, Communication and Energy was replaced by the Ministry for National Development.

[11] A note to this reasoning: Feed-in tariffs in Hungary are financed by end users, who pay fixed tariff for each kWh consumed. However, feed-in is awarded not only to renewable producers, but also cogenerating power plants as well. The bulk of the feed-in payment (represented 1,7 Ft/Kwh) is received by the co-generators (1,2 Ft/Kwh), not by renewable producers.

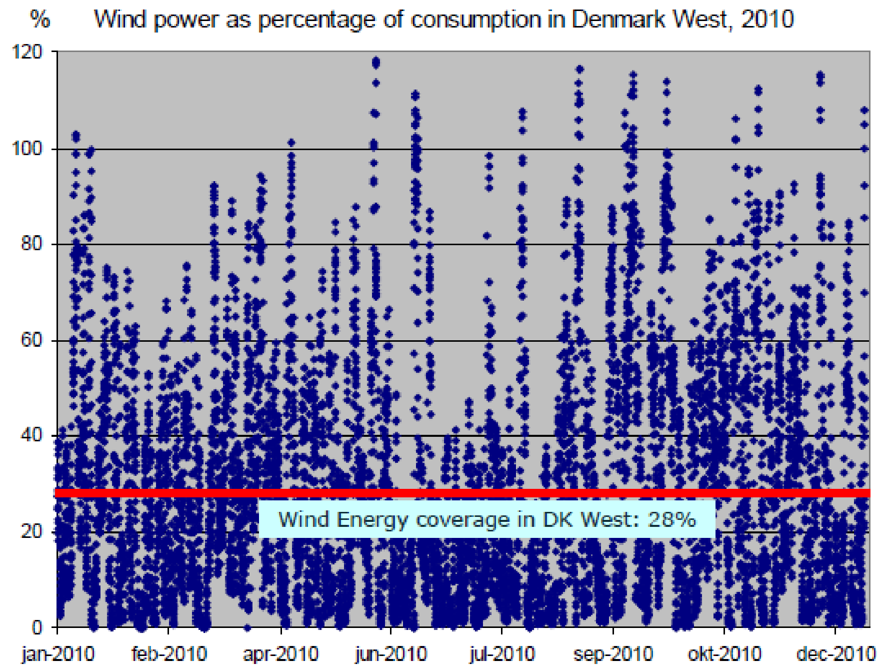
(development of transparent rules ahead of the tender) as well as continued regulatory risk and related investor losses (ex post cancellation of the tender).

Turkey

Turkey has also gone through a regulatory learning process to manage wind development projects in the last five years. They opened the first round for wind development applications in 2007. At that time the market environment for development was very good: booming world and Turkish economic growth were prevailing. Also, the Turkish electricity market was operational, balancing and settlement services available and a credible regulatory environment in place. The country announced a feed in tariff for wind developers. Under these favourable and unconstrained conditions wind projects became over-promoted. The regulator received over 70,000 MW (!) of wind capacity applications in only one day in November, 2007. It took almost 3 years for the Turkish authorities to solve this problem since many projects were overlapping and the available wind connection capacity was limited. Finally a system for managing applications was established that includes the elements of technical evaluation, the establishment of development (grid) capacity limitations at the TSO substation level and competitive auctions of development rights at the same level. Auctions are managed by the TSO at the substation level. In the future the basis for bids will be a discount from the FIT.

Section 6 (30) – Balancing wind electricity under a high penetration rate – the case of Denmark

In response to ambitious policy goals and support mechanisms, the amount of installed wind capacity has increased over 3000 MW in Denmark. Wind plants generated 28% of electricity consumption in Denmark West by 2011. Generated wind electricity exceeded consumption in several hours, while in other hours wind only provides a very small share or zero percentage of consumption in the country (see figure below).



The efficient integration of this large-scale, weather dependent and volatile wind power production is only possible by the system operator (Energinet.dk) through the application of several means. First, a strong international transmission grid helps the Danish system to trade and balance in a wide geographical area, including the Nordic countries of Europe and Germany. Efficient international electricity markets with clear price signals and trading opportunities close to real-time help to balance volatile wind production through international transactions. For example, very high wind generation drives market prices down and makes it profitable for Norwegian pump storage operators to purchase electricity in these hours and sell electricity back to the market when wind generation is down and market prices are high. The cooperation between the gas and electricity systems also helps since flexible gas based generation units can be used to balance intermittent wind generation. Flexibility in generation is also increased by technical connection requirements for all generation sources prescribed in the Grid Codes. The flexibility of the demand side is enhanced by a revised power system control architecture for active control of distributed resources and smart grid solutions.

(Based on: Presentation by Flemming Wibroe at the ERRA training course on RES regulation, 2011: *Achieving 20% wind power in the Danish electricity system and moving on to 50%.*)

Licensing and monitoring of the RES-E market

7 (1) - Licensing renewable energy projects: the case of Germany

The German RES licensing process (similar to the whole RES support scheme) is fast and efficient. In 2011 the share of RES-E was over 16% in electricity generation in Germany.

RES-E generators do not need to get a license from the NRA to start their operation. The framework for licensing RES-E projects is determined by environmental and building legislation (Federal Emission Control Act, a Building Code and the associated secondary legislation).

The objective of emission control legislation is to avoid harmful environmental impacts and it requires an environmental license for establishing electricity generation. The task of licensing is carried out by the local environmental authority. The time requirement to accomplish an environmental impact assessment (EIA) for major projects is 7 months. Projects with moderate environmental impact should not go through a full EIA process; in this case the time requirement of licensing is 3 months.

During the 7 or 3 months processes the environmental authority is obliged to ensure the issuance of all the related permits and authorizations related to the project in question. Individuals and non-governmental organisations have the opportunity to file objections to the project during this period. Authorities should disregard filings after these deadlines.

Small projects (small biomass/biogas units, wind turbines under 50 m, thermal solar installations, solar PV) are exempted from environmental licensing. The emission limits and environmental regulations are, however, also related to these projects. It is thus better for project developers to notify the authority about the project to get feedback on whether the project meets the environmental regulations in force.

The issuance of the environmental license is completed in a one stop shopping manner. The local environmental authority coordinates the permitting procedure of the other affected authorities.

Renewable projects also must obtain a building permit from another authority, the local building authority. The time limit for the procedure is 10 weeks. In a simple case the notification period is 4 weeks.

If an applicant meets the pre-defined environmental and building permission requirements, the authorities can't deny issuing the licenses. The authorities are obliged by law to act fast and without delay. In case the authority delays in accomplishing the procedure, or does not respond in due time to the appeal of an applicant whose application was rejected, the authority can be litigated in court.

Section 7 (2) - Licensing deregulation in Georgia: SHPPs

Georgia deregulated the licensing and operation of small hydro power plants in the country. They are exempted from licensing procedures and setting of the tariff and can sell energy both under direct contracts (including to retail consumers), and with the help of the commercial system operator, in the balancing market. As a result, the financial situation of SHPPs has improved. Also, licensing in Georgia is free of charge, the procedure is transparent, it lasts for one month and it is in principal a one-shop system.

Section 7 (8) - Moldova and Turkey solutions to simplify and make licensing inexpensive

We find multiple examples from the BSRI region for promoting RES-E by limiting the licensing fee for such projects. In Georgia the licensing of SHPPs is free of charge. In Moldova the licensing fee for RES-E projects is limited to €150. In Turkey, RES-E projects pay only 1% of the regular licensing fee and the companies are free from the annual licensing fee payment for the first eight years of their operation. Moreover, in a number of countries projects below 500 kW are exempted from licensing. Armenia limited the time requirement of the licensing procedure to 60 days

Section 7 (13) - Market Monitoring – the US Midwest experience

In the markets operated by the Midwest Independent Transmission System Operator (MISO), the goal of market monitoring is to ensure that markets operate competitively and efficiently, in order to achieve the benefits of competition. Market monitoring should also provide improved transparency to the markets and increased confidence in the market overall.

Market monitoring is designed to identify:

- Flaws in market rules that create inefficiencies or gaming opportunities;
- Efficiency improvements;
- Market power abuses and manipulation;

The Independent Market Monitor (IMM) monitors the conduct and actions of both market participants and the MISO. The Midwest market was designed to have the market monitoring function separate from the MISO; it is performed by an independent entity outside the MISO organization. Independence of the Market Monitor from the RTO is important because it monitors the MISO's rules, procedures, and operations. The IMM is required to be independent of any market participant by adhering to conflict of interest restrictions that prevent the IMM from having any relationships with any market participant. The Monitor is also separate from the regulatory agency, although it reports frequently to regulators.

The IMM's processes to accomplish this role include:

1. Downloading and processing of market data (initiated every 30 seconds).

2. Real-time screening and analysis to identify circumstances that require further investigation (monitoring reports are produced continually and email alerts/text messages are sent automatically to IMM staff 24/7).

3. Investigations of market operations or conduct identified through the daily screening or through the receipt of a complaint.

4. Periodic analysis and reporting, including:

   - ✓ Monthly and quarterly market reports to the Markets Committee and FERC;

   - ✓ Investigations on market conduct are reported to the Midwest ISO or to the FERC;

   - ✓ Assessments of an existing or proposed market rule or change of market design.

   - ✓ Annual State of the Market Report;

5. Provide advice to the RTO regarding market issues or recommendations to modify market rules and procedures;

6. Presentating information and conclusions regarding the performance of the market to:

   - ✓ Market participants (periodic through participant committees);

   - ✓ State regulators (quarterly);

   - ✓ Midwest ISO Board of Directors (monthly)

   - ✓ FERC (weekly or more as needed).

7. Development and maintenance of production software to implement the market power mitigation that runs in the Midwest ISO;

Market monitoring addresses a broad array of competitive and efficiency issues. This scope includes:

- The existence of market power: evaluating competitive issues and the effectiveness of market power mitigation measures.
- Abuses of market power: identifying conduct by participants to exercise market power.
- Market manipulation: detecting attempts to influence market outcomes or settlements through fraud or manipulation.
- Market performance: determining whether market rules and procedures provide efficient incentives and lead to efficient market outcomes.
- Operator performance: evaluating whether the Midwest ISO is operating the system in a manner that is consistent with its reliability requirements and not undermining market performance.

The IMM's scope of work is limited to market operations involving existing facilities. The IMM does not review the MISO planning process or its queue management. It does not administer or review renewable energy certification programs.

Among the tools used by the IMM are typical cost patterns for each generating unit. If market offers vary from the typical patterns, the IMM can inquire into the operator's reasons for the unusual offer. The IMM is aware that renewable units frequently offer at "zero" price, meaning that they will accept any price set by the market. In the US Midwest, wind generators that receive government subsidies may even offer to provide power at negative prices. The IMM screens allow these offers if they conform to the expected patterns of that generator type.

Potomac Economics serves as the market monitor for four regional markets: MISO, Texas, New York, and New England. The market monitoring function requires an interdisciplinary team of experts, including economists, power system engineers, generation engineers, software developers, and other professionals with mathematics and statistics skills. Potomac Economics currently has 23 staff to perform market monitoring. The market monitoring function also requires an extensive market monitoring software system and data interfaces with the ISO. MISO budgets just over $2 million annually for market monitoring.

***(**Prepared by William H. Smith Jr; based on a presentation by Dr. David Patton, President, Potomac Economics, Inc., January 31, 2011)*

Certifying renewable electricity

Section 8 (4d) - The Association of Issuing Bodies

Standardised energy certification can support the trading of RES-E across borders. The activity of the Association of Issuing Bodies (AIB), an independent, voluntary and non-profit organization in Europe can well illustrate this statement. The energy certification by AIB offers conclusive proof of the source of energy. It does this by creating a unique certificate to represent the attributes of a specific unit of energy. This can then be transferred from owner to owner, thus enabling the final owner (or a body acting on its behalf) to prove the source of the generation.

Such certificates may be used to enable consumer choice, and their use can also be a condition of financial support being made available by government or private bodies.

Where certificates are passed between different governmental or commercial regimes, these regimes must be harmonised if the information they carry is to be accurate and reliable. The AIB has developed - and acts of guarantor of - such a harmonised system, the European Energy Certification System. EECS offers a set of agreed standards, known as the "Principles and Rules of Operation" - the PRO) which ensure that the systems of its member organisations are compatible with each other.

The operation of the PRO is administered for each regime - normally, a geographical area - by an Issuing Body. This is an organisation that is unique to that regime, and is commercially independent of certificate holders.

For more information on the activities of the AIB, see

http://www.aib-net.org/portal/page/portal/AIB_HOME/.

Section 8 (7) - Measurement and Verification of Renewable Energy – the US Midwest experience

The Midwest Renewable Energy Tracking System (M-RETS) is a non-profit organization that tracks renewable energy generation in participating States and Provinces and assists in verifying compliance with individual state/provincial or voluntary Renewable Portfolio Standards (RPS) and objectives. M-RETS is an important tool to keep track of all relevant information about renewable energy produced and delivered in the region.

Currently, several States and Provinces participate in M-RETS including Illinois, Iowa, Manitoba, Minnesota, Montana, North Dakota, Ohio, South Dakota, and Wisconsin. Each State has policies in place requiring or strongly encouraging utility development of renewable resources. M-RETS uses verifiable production data for all participating generators and creates a Renewable Energy Credit (REC) in the form of a tradable digital certificate for each MWh. To prevent double-counting, generators participating in M-RETS track their generation output by M-RETS.

In addition, M-RETS will consider tracking non-renewable generation from any of these states in the future.

Participation in M-RETS is voluntary although some states may designate M-RETS as the tracking system to be used to meet State renewable energy standards. RECs are retired by utilities in order to comply with State renewable energy mandates. Only projects registered and tracked by M-RETS will qualify for renewable mandate purposes in most States.

M-RETS is an easy to use, Web-based system that creates, verifies, manages and enables trading for RECs. The system provides a full suite of capabilities to create unique certificates, track serial numbers, track certificates in company accounts, enable transfers and transactions, track certificate retirement, and enable compliance reporting with a full audit trail.

RECs in M-RETS may be saved for retirement in the future, and may also be bought and sold by M-RETS members. Import of RECs into M-RETS from other regions of the U.S. is not common at this time, but is anticipated in the future. Any party, including non-generators, such as traders, marketers, and end-use customers may establish an account in the M-RETS system.

All data in M-RETS is verified. M-RETS will not determine eligibility for State or voluntary programs. Each individual State is responsible for determining whether or not a particular generating unit qualifies for a State program or not. However, the State Commissions may use the information collected and verified by M-RETS to conduct this determination. M-RETS issues reports on activity within the system, including public reports that provide a directory of account holders, a directory of registered generators, and a report describing aggregated M-RETS activity.

M-RETS activities are supervised by a board of directors that represents the stakeholders who use the system. M-RETS has State appointed board member positions currently filled with individuals from North Dakota, South Dakota, Minnesota, Iowa, and Wisconsin. The board also has positions that represent different user groups (one each for investor owned utilities, municipal utilities, cooperatives, and power marketers). Finally, there are two board positions reserved for non-governmental organizations.

The users of M-RETS are charged fees sufficient to operate the system. These include registration fees, subscription fees ($500-$2,000 per year per account), REC creation ($0.005 per REC issued), and REC retirement ($0.03 per REC retired).

The chart below was generated from the M-RETS public reporting system and shows REC transactions for 2010:

Fuel Type	# Certificates	# Certificate Transfer Retire	Sub-Account	Export Sub-Account
Biogas	145,147	211	107,143	0
Biomass	1,707,470	159,890	737,803	0
Hydroelectric Water	36,452,994	418,628	1,684,589	13,762
Municipal solid waste	359,161	26,783	43,478	7,254
Solar	945	0	12	0
WHR	316,777	9,666	0	0
Wind	16,627,336	9,949,265	6,264,334	574,337

(Prepared by David Boyd and William H. Smith Jr., the Organization of MISO States)

APPENDIX B

GLOSSARY OF TERMS

(Principles' Section number in brackets)

Acronym	Definition	Reference to the Principles
FIT	**Feed-in tariff** - minimum prices for feeding into grids electricity generated from renewable energy sources. The synonyms: "premium-set tariffs", "premium prices", "favourable tariffs". Introduced especially for renewable energy price setting.	(S5.15)
	Grid Code - A document containing the minimum technical rules for connection to the network and maintenance of network stability, security and reliability, mandatory for all market participants. This document must be prepared by a transmission system operator (TSO) and approved by a regulatory body (independent regulatory agency or ministry) representing the government of the country in which the TSO is located.	(S6.16)
GC	**Green certificate** (in the U.S. - Renewable Portfolio Standards (RPS) – it is about to prove that a certain amount of electricity has been generated from renewable energy sources. GCs serve accounting and disclosure purposes, and under specific regulations they can be traded.	(S5.15, S3.3)
	Green certificate trading - A RES-E support system where the regulation obliges electricity suppliers to purchase a prescribed amount of renewable electricity, e.g. in proportion to their sales for end customers. Suppliers can prove they have met their obligation by purchasing green certificates from eligible RES-E producers.	(S5.16)
	Intermittent generators - Weather-dependent electricity producers with a problem to follow a pre-set production schedule and forecasting future production. Typical cases are wind and photovoltaic generators.	(S5.45. S6.1d)
ISO	**Independent system operator** is the entity charged with reliable operation of the grid and provision of open transmission access to all market participants on a non-discriminatory basis	

	(ERRA Legal Regulation Working Group Terms).	
	One-stop shop licensing for RES-E - The assignment to one administrative body/central agency of the responsibility for coordinating the authorisation procedures related to RES-E investment projects.	(S7.9.b.i)
	Priority dispatch (sometimes called must-take) for RES-E generation mandates the network operator to accept the produced renewable electricity whenever it is produced, regardless of its production cost.	(S5.7)
	Priority network access - The most common regulatory support is to provide priority network access for RES-E generators. This can include either support of network connection or priority dispatch once connected to the grid or both.	(S5.6)
	Queue management - The establishment of connection capacity limits to the grid together with an evaluation and selection methodology to grant scarce development and connection rights for RES-E developers.	(S6.18)
RBE	**Renewable Balancing Entity** is an electricity market participant that is responsible to cover the imbalance between the forecasted and the **actual** electricity production of those RES-E generators that are selling their electricity to this entity. RBE can be the TSO or an electricity trading company.	(S5.9)
RES	**Renewable energy resources** means renewable non-fossil energy sources (wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases) *(Directive 2003/54/EC).*	(S2)
RES-E	**Renewable electricity** means electricity produced by the use of renewable energy sources.	(S2)
	Regulatory impact assessment - The analysis and assessment of the effectiveness, costs and benefits of major regulatory changes.	(S3.4)
RP	**Regulated premium scheme** – a production support scheme that provides a fixed bonus over the wholesale electricity market price for RES-E producers	(S5.26)
RPS	**Renewable Portfolio Standard** – is a regulation that requires the increased production of energy from renewable energy sources by a number of states' legislation in the US. The RPS mechanism generally places an obligation on electricity supply companies to	(S3.3)

	produce a specified fraction of their electricity from renewable energy sources.	
TSO	**Transmission system operator** - a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the transmission system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long term ability of the system to meet reasonable demands for the transmission of electricity; *(Directive 2003/54/EC)*.	(S6.23)