

# **The Republic of Moldova: An enabling environment for wind and solar energy**

Snapshot: A field case study of puzzle pieces for sustainable development

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Words cannot express all that I would like to say so rather keep it short and sweet. It has been an adventure and I have grown very fond of Moldova.

**Mulțumesc!**

## **Author's note**

The author is aware of the fact that the content of the thesis has been influenced by the experiences in the field and various actors' interests and agendas. The difficulty lies from an author's perspective to describe the actual and perceived situation and arrive at conclusions that represents Moldova in a fair manner within the focus of the study. The purpose of the thesis work was to highlight and identify opportunities for Moldova in creating an enabling environment for renewable energy, as part of long-term sustainable development and EU-membership plans.

Globally, the energy sector is a giant money-machine and responsible for 25 percent of all green house gas emissions. In the EU, utilities are under fierce pressure to reduce their emissions and enable green, smart energy consumers. The new EU directive for renewable energy further enables new actors – enterprises and consumers - to become produce energy and sell it to the grid. The emerging smart grid is a future enabler and micro-generation of renewable energy sources such as wind and solar power are key-drivers. In the author's view, given the current climate situation and mediocre outcomes of the recent conference of parties (COP) meetings, a renewable energy mix is crucial for a sustainable future. For the utilities in general, great interests are at stake. On one hand, emissions have to be reduced to reach agreed targets. This means that utilities proactively need to help energy users and consumers reduce their energy consumption. On the other hand, micro-generation by new actors will further reduce the energy quantities supplied by traditional utilities. All in all, this is likely to generate less income for utilities and increased competition on the market. For Moldova, addressing the energy sources and the accumulated national energy debt of 200 billion MDL, over 12 billion EUR, is part of the country's democratisation process and EU-membership. This change process has been continuously evolving since the Republic of Moldova declared independence in 1991. As Moldova transforms over time in the transition towards an Europeanised system, different actors may find that their roles and level of influence are changing. As a result, many actors are likely to try to protect their own position and interests.

Renewable energy is a somewhat controversial area and the author believes that the experiences in the field may not have been the same given another topic. More importantly, the author was incredible impressed and inspired by the enthusiasm and support of the people that want to make a difference and their tireless work to enable a sustainable future for Moldova. With these words, the author wants to ensure that the reader is aware of that certain views are likely not representative for Moldova in general but related to the topic, and that the author was influenced by various stakeholders. Nevertheless, the thesis has tried to describe and analyse the situation as it was perceived. Hopefully, all the people driving the transition will keep going as it is obvious that there is great progress and attention from the international community. A major step forward was the recently elected president Nicolae Timofti in March 2012, that helps resolve a political grid-lock and provides stability to the transition process.

## **Abstract**

The Republic of Moldova is celebrating 20 years of independence and is still almost completely dependent on energy imports from the Russian federation. Renewable energy is in its infancy despite a climate that is well suited for solar and wind energy with 2,300 sunshine hours per year and measured wind speeds up to 8.5 m/s. Moldova has a history of wine production and wide spread usage of more than 6,000 wind mills across the country. However, this is not common knowledge and there is a perception that renewable energy is not feasible in Moldova. Lack of enforcing regulation, transparency and political stability are part of missing pieces of the puzzle to trigger mass deployment. Currently, there is high attention on becoming an EU member with great commitment from the international community for EU integration and addressing energy security and efficiency. EU has allocated 42.6 million EUR for the energy sector. SIDA is allocating 12.2 million EUR annually until 2014, distributed across three sectors where energy is part of the initiative for a sustainable society. SIDA is coordinating the donor energy activities in cooperation with the Ministry of Economy and the Department of Energy Security and Efficiency. The thesis explores what is required to create an enabling environment to successfully deploy wind and solar energy by identifying key actors and their activities to gain access to critical resources through the interaction process. The role of individual choice in enabling the final pieces of the puzzle and determining the direction of the evolution of actor webs, activity patterns and resources constellations.

**Keywords:** renewable energy, solar energy, wind energy, transparency, enabling environment, enforcing regulation, momentum, energy independence, EU integration



## **Executive summary**

The Republic of Moldova, Moldova, is almost completely dependent on Russian energy imports that Moldova cannot afford nor control. During the republic's 20 years of independence, the lack of affordable, secure and efficient energy supply has stalled the development and Moldova is one of the poorest countries in Europe. Renewable energy sources like wind and solar power has not been implemented despite promising and proven capacity and initiated projects have failed. Funding has been available and is even more so now with the high international attention and actions taken for EU-integration. The vast majority of Moldovans want to see Moldova becoming an EU member and there is strong commitment from the state and all the sectors. Political and economic instability is complicating the situation and addressing the energy sector is one key for economic growth and sustainable development.

Globally, the energy sector contributes to 25 percent of all greenhouse gas emissions. EU is placing heavy pressure on the energy sector to reach the EU triple-twenty target of 20 percent renewable energy by 2020. Moldova, in the progress towards EU membership, appears to be advancing quickly with legislation. Many of the puzzle pieces for renewable energy implementation are beginning to fall into place.

The purpose of the research is to develop an understanding of what is required to ensure an enabling environment for successful implementation of lasting, larger scale wind and solar energy deployment in Moldova. There is proven and promising potential for wind and solar power but no real deployments or utilisation of wind and solar energy despite being cornered by Gazprom. What is the problem? How can these barriers be overcome to create an enabling environment for wind and solar energy? In addition, what is required to enable micro-generation and selling excess capacity to the grid?

The methodology applied is a field case study of Moldova and the theoretical framework combines networking theory, governance and individual choice for collective action. The unit of analysis is the role of actors and their interactions. The findings and analysis have been structured according to model of actors, resources and activities and their bonds, ties and links. As interdependencies develop, actor webs, resource constellations and activity patterns form. Everyone is interdependent on everyone else. Through cooperation, the total joint benefits of all accumulated actions can exceed what each actor or individual could accomplish on their own by attracting a critical number of actors to commit to long-term benefits. Self-organised institutions or interests groups that develop trust are able to trigger the change. Mutual commitment and monitoring are mechanisms to implement new rules. The challenge for an actor is to prioritise who to interact with. Individual choice determines the success of the strategy to proceed.

An enabling environment is beginning to take shape. These major steps forward are the result of strong government commitment and close cooperation with the donor community. Together, the actors are striving to achieve energy security and efficiency in Moldova. The joint efforts taken by the government and the donor community, with SIDA in the lead, are proceeding quickly. Yet, many challenges need to be addressed and there appears to be a lack of enforcing regulation, feed-in-tariffs and lack of other incentives that are delaying the progress. Lack of transparency is a crucial factor.

There is no competition on the energy market and energy users and consumers cannot swap supplier. A complex web of actors has evolved over time. The actors are linked together in

obvious and less obvious ways to gain or maintain access to other influential actors, resources or funding, knowledge, information and capacity. In the process, some actors are blocked and information and resources are missing. Very few actors appear to have access to the majority of the resources to enable a complete picture. Some actors appear to be favoured and there appears to be a need to ensure that relevant public procurement mechanisms are in place and that a competitive environment is created.

The lack of political and economic stability makes investors hesitate. The interviewed actors in the energy sector listed close to twenty barriers that need to be resolved. The different views on the potential of wind energy can be addressed by creating a reliable wind map once and for all that adheres to EU-standards. Several wind, solar and biomass projects are currently being initiated and deployed. Renewable energy sources are the only local energy sources available in Moldova. “Soviet way of thinking” has been pointed out as a cultural barrier. Short term gain is prioritised before long term collective benefits. The general society appears not to be all that involved yet, although awareness campaigns have been initiated.

The conclusion, supported in the feed-back from the respondents, is that there is a strong momentum and potential for the deployment of renewable energy. EU membership is around the corner. By addressing renewable energy deployments of wind and solar power on a larger scale, many of the current political and economic challenges will be solved. Energy independence, with secure and efficient supply, will help pave the way for a sustainable future.

This is a complex challenge that involves many areas of society. Key-success factors to speed up adoption of renewable energy and deploying wind and solar power, enable production and micro-generation for the national grid have been identified, indicating order of priority:

- Enforcing regulation for acceptance and adoption of renewable energy
- Affordability of renewable energy and solar and wind power equipment
- Open energy market that enables competition, attract investors and new players
- Transparency in decision making, tariffs, bills, regulation
- Make it personal– involve people on all levels, create awareness and trigger commitment
- Equal justice for energy producers and consumers
- Free from corruption – promote and recognise steps in the right direction
- Knowledge and capacity of renewable energy and the promise of EU

A personal reflection is that it is clear that the momentum is real and there is a lot to be enthusiastic about. It is very inspiring to see all the commitment and tireless work. The barriers encountered during the stay only show that Moldova has almost reached the tipping point. Some barriers appeared desperate and disorganised. The interferences appeared to involve a surprising amount of people performing somewhat “half-hearted” actions. It shows that if a student can create this kind of stir, the change is already happening. The interferences are merely the last remains of a former culture, in many cases going through the motions and pretending to “play the game”. It is all good.



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## Abbreviations

AEER = Alliance for Energy Efficiency and Renewables

ANRE = National Agency for Energy Regulation

ARA = Actors, resources and activities

ASE = Alliance to Save Energy

ASM = Academy of Science

ATM = Automated Teller Machine or cash point

CBC = Cross Border Cooperation

CC = Climate Change

CFU = Carbon Finance Unit

CIS = Common Wealth of Independent States

CPEE = Cleaner Production and Energy Efficiency

CPR = Common Pool Resources

EEA = Energy Efficiency Agency

EBRD = European Bank for Reconstruction and Development

EC = European Commission

EIB = European Investment Bank

ENGO = Environmental NGO, see also NGO and INGO

ENSI = Energy savings International AS

ESCO = Energy Service Company

EU = European Union

EUR = Euro

FORMIN = Ministry for Foreign affairs of Finland

FIT = Feed-in tariffs

GDP = Gross Domestic Product

GEF = Global Environmental Facility

GiZ = German Development Cooperation

GJ = Giga Joule

IDA = Industrial Development Agency

IEA = International Energy Agency

IIIIEE = Institute of International Industrial and Environmental Economics

IEP = International Environmental Politics

IMF = International Monetary Fund

IMP = International Marketing Purchasing (group)

INGO = International NGO, see NGO, covering more than three countries

IPCC = Intergovernmental Panel on Climate Change

kV = kilo Volt

KWh = Kilowatt per hour

MDL = Moldovan Leu

MEUR = Million Euro

MIEPO = Moldovan Investment and Export Promotion Organisation

MoE = Ministry of Economy

MoEn = Ministry of Environment

MoC = Ministry of Construction

MoSEFF = Moldovan Sustainable Energy Financing Facility

MSIF = Moldova Social Investment Fund

MUNEE = Municipal network for energy efficiency

NEEP = National Energy Efficiency Programme

NGO = Non Governmental Organisation or non-state organisation, see also INGO and social enterprise

NIF = Neighbourhood Investment Facility

NREAP = National Renewable Energy Action Plan

OSCE = Organisation for Security and Co-operation in Europe

PJ = Peta Joule

REEEP = Renewable Energy and Energy Efficiency Partnership

SHS = State Hydrometeorological Service

SIDA = Swedish International Development Cooperation Agency

TI = Transparency International

TUM = Technical University of Moldova

UF = Union Fenosa

UK = United Kingdom

UN = United Nations

UNDP = United Nations Development Programme

UNEP = United Nations Environment Programme

UNIDO = United Nations Industrial Development Programme

USAid = United States Agency for international development

WB = World Bank

WMO = World Meteorological Organisation

# 1 Introduction

The Republic of Moldova, or Moldova, is almost completely depending on energy imports, mainly in the form of natural gas from Russia. The unreliable and unsecure energy supply has been stalling the development since declaring independence on August 27, 1991. The costs and accumulated debts to Gazprom and Moldovagaz are keeping the country in a grid lock and cul de sac which enables Gazprom to lobby and influence political decisions through their price setting mechanisms.

The country is aspiring to become an EU-member and there is a lot of enthusiasm and commitment to develop and integrate with EU and the rest of the world. This commitment is shared by the international community and the country is experiencing high attention of making the transition. The need for the availability of accessible, reliable and affordable energy is evident across the society, both for the commercial sector and private households.

Moldova has no fossil fuel resources but a history of utilising wind mills across the region and enough sunshine to produce and export wine. A lot of measures have been taken to address the energy situation and trigger sustainable economic growth but so far, most initiatives have not made any visible contribution. In many cases, projects are started from scratch and the wheel is re-invented ever time.

However, things are changing and the donor community is committed and cooperating closely with the government. There is a drive to make things happen quickly and as a result many steps have been taken towards EU-integration and an enabling environment for wind and solar energy is beginning to form. Yet, there are still many hurdles and legacies from the Soviet era that needs to be addressed in the transformation of the energy to becoming a market economy.

The thesis was developed as a follow-up on the strategic environmental development project in April 2011, where energy efficiency in buildings was addressed in Chisinau, the capital of Moldova.<sup>1</sup> The Moldovan government and they donor community are simultaneously addressing both energy security and efficiency in the transformation of the energy sector. The government is implementing measures for energy efficiency across sectors and alternative energy supply and renewable energy sources.

## 1.1 Research objective

The purpose of the research is to develop an understanding of what is required to successfully implement long-lasting, larger scale wind and solar power energy projects in the Republic of Moldova.

The paper explores what is required to enable renewable energy implementation. By acquiring an understanding of how Moldova and the international community is cooperating to address energy security and efficiency, the paper aims to identify possible gaps in what is needed to create an enabling environment. In addition, the thesis taps into what is needed to

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<sup>1</sup> The report is available for download here:  
<http://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=1969348&fileOId=1969360>

enable energy users such as enterprises, hospitals and individual households to both consume and produce heat and electricity, and become “prosumers”<sup>2</sup>.

## 1.2 Research question

In the Republic of Moldova, there is proven and promising potential for wind and solar power but no real deployments or utilisation of wind and solar energy despite being cornered by Gazprom. What is the problem?

How can these barriers be overcome to create an enabling environment for wind and solar energy? In addition, what is required to enable micro-generation and selling excess capacity to the grid?

## 1.3 Scope and limitations

The paper focuses on the renewable energy sources wind and solar power since there is proven, sufficient wind speeds and sunshine (SHS, TUM 2011), which will be demonstrated. A century ago, there were more than 6,000 wind mills and Moldova produces high quality wine<sup>3</sup>. Biomass, or bio fuel, is not included but is referred to as part of the renewable energy mix. There are current pilot projects to help address the energy dependency and support the development in rural, poor areas by using existing non-edible agricultural waste. In general, Moldova is not well suited for extensive biomass deployment as there is severe forest and land degradation and risk for soil erosion and dust winds, desertification (SHS, Entrepreneurs 2011). Combustion also contributes to emissions. The potential of hydropower is almost saturated and it impacts nature and scarce water supply in a negative manner.

The geographical location focus is the Republic of Moldova, and the areas that are suitable for wind and solar energy deployments, while drawing parallels to relevant successful experiences around the world.

Language barriers impact the outcome to some extent, as the author does not speak Romanian or Russian and local population’s level of English differs. However, with the help of locals and translators, measures have been taken to remove as many of the barriers as far as possible. Google translator has also turned out to be very helpful and knowledge in French. Language turned out to be a smaller barrier than expected.

Cultural opportunities and barriers, the tradition of staying close to the own circle, have impacted the ability to meet the right people. Some doors have been wide open, and also helped opening new doors, while others have been closed, or difficult to locate. Some meetings have been postponed endlessly. This was to be expected as the topic is sensitive and it takes time to show that intentions are sincere and unbiased. Sometimes surprisingly sincere and detailed information was provided by those who appeared to show no interest. The lack of available information also provides a different type of information.

It appears that the comprehensive collection of information provides a good overview and supports the findings. The people who have been interviewed have higher education and

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<sup>2</sup> A prosumer is an energy user that consumes and produces energy: producer+consumer=prosumer

<sup>3</sup> See literature overview, findings etc. for proof-points of feasibility of wind and solar power



many are in high and influential positions in society. However, there is always a risk of manipulation and biased information. Hence, several sources – personal and written – have been explored to cross-reference the information as much as possible.

#### 1.4 Research design and methodology

The research has been carried out in the form of a case study, which is common in policy, community and management research. The strategy is to apply a pluralistic case study that explores, describes and explains wind and solar power implementation and adoption in the Republic of Moldova in order to answer the main questions why and what, by also looking at how, where and who (Yin, 1994). Hence, the angle is an exploratory approach and includes “...case studies, histories and experiments as the preferred research strategies. This is because such questions deal with operational links needing to be traced over time, rather than frequencies or incidence.”(Yin, 1994, p.6).

The what-question can be answered by performing an exploratory case study that enables the development of a hypothesis and arrive at propositions for the future. The what-question is closely related to the variations of the how-question, in other words how many, who and where. (Yin, 1994, p.5)

Yin defines a case study as “...an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.” (Yin, 1994, p.13). A case study may include actors such as individuals and organizations, processes, programmes, institutions and activities. There is no set case study research design.

In this paper, the exploratory single case study is the main approach since the researcher has no control over current events. Historical evidence will also be utilised to describe crucial events that have lead up to the current situation. The study applies data triangulation, using multiple sources of evidence to prove claimed facts and avoid manipulation.

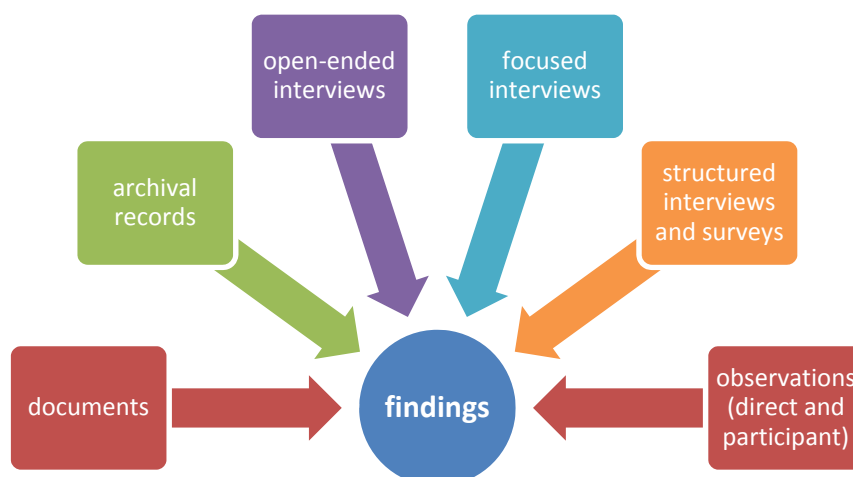


Figure 1-1 Illustration of Yin’s data triangulation and convergence of multiple sources of evidence in a single study. Source: Yin, 1994 p.93.

The evidence, contemporary and historical, is collected through direct on-site observations in the Moldova, backed up by desktop research, and through systematic interviews based on a qualitative survey to answer certain general questions. The multiple resources are accumulated through observations, structured interviews and surveys, focused interviews, open-ended interviews, archival records and document. The outcome and findings, or facts as Yin refers to it, from the research will propose measures that can be taken by drawing on experience from other multiple cases, and hopefully generate further trial activities in terms of wind-power project and individual household micro-generation. The unit of analysis is the role of actors – public, private and individual and in particular regulators - and their interactions. Wind and solar power are used to illustrate principle findings.

To develop a snapshot of the current situation and identify the gaps between what is important and what missing to be able to deploy wind and solar energy, a set of parameters have been used in the survey to indicate a trend for what areas need to be addressed. The parameters are based on “A practical guide for policy analysis” by Bardach E. (2008) and evaluated from three perspectives, including general society, economic system and markets, and political system and authorities. The parameters are rated by the respondents on a scale from five to one on the level of importance for successful renewable energy deployment and to what extent these parameters currently exist in the Republic of Moldova, where five is very much so and one is not at all. The survey is filled in during personal meetings, treated as confidential. The purpose is to support facts and gain an understanding of what the perception is among different actors. The survey does not have the ambition to prove a quantitative analysis merely serve as an indication of trends supporting qualitative findings.

Both the survey questions and rate-it-questionnaire are available in English and Romanian, see appendix for the actual forms.<sup>4</sup>

## 1.5 Intended audience

The intended audience for the master thesis is actors who are interested in the development of the Republic of Moldova from a sustainable development and renewable energy and security perspective. In particular, organisations who intend to or are involved in the development of the energy sector, new actors and individuals that are trying to navigate and decide who and what to prioritise. In particular, the intention is to highlight potential actor webs, activity patterns and resource constellations to the committed actors who are trying to make a change in a complex scenario. In addition, anyone who wants to gain insights into the challenges of renewable energy implementations, sustainable development in developing countries and how the transformation from post Soviet to a democratic market economy may evolve.

## 1.6 Definition: Soviet mentality

In this paper, the term Soviet mentality is viewed as the difference between short-term and long-term thinking and how that impacts the choices that individuals and other actors make.

During the research project, many people have commented that one key barrier is what may be referred to as the “Soviet mentality” or “Soviet way of thinking”. A journalist at Moscow

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<sup>4</sup> See appendix 10.2 and 10.3 respectively for the survey questions and rated parameters in English and Romanian.

times comments that the “The Soviet Mentality Is Alive and Well” when referring to “...how Russia's political elite has failed to develop a new, modern style for governing. When observing, for example, how our leaders speak with the public and make decisions, it reminds me so much of the Soviet way of doing things”.

No one has defined what Soviet mentality actually is. It may be understood as prioritising short-term gains before long-term joint benefits. Discounting future gains for economic and physical security today as a result of low expectations for the future.

It has to be stressed, that there is no nationality related to this term. From the thesis perspective, it is perceived as a culture that has evolved as a result of a period of time in a non-democratic, enforced system.

## 1.7 Disposition

The outline of the paper is as follows. In chapter two, the foundation of the theoretical framework for global governance, collective action and networking theory is explained. Chapter three provides some background information about Moldova and critical historical and political events that are affecting the situation today. In chapter four, an overview of literature that is relevant for the Moldova case and renewable energy scenario is provided and discussed. This is followed by the findings in chapter five, that are structured according to the theoretical framework and described from the point of view of actors, resources and activities. These are analysed in chapter six by looking at actor webs, resource constellations and activity patterns, and how these are impacted by individual choice. Chapter seven includes a discussion on where Moldova is today and the realistic possibilities from an economic perspective to implement the findings. Possible alternatives to develop the country are discussed. In addition, research design and methodology is discussed and reflections are made. The main conclusions are drawn in chapter eight. In addition, the appendices contain a snapshot of current affairs in Moldova, the survey questions and the parameters that have been rated.

## **2 Theoretical framework**

To answer the research question and develop a case study of the enabling environment required to implement wind and solar energy in Moldova for sustainable development, the following theories have been applied as a supporting tool.

The theoretical framework starts by describing global governance and actors, arenas and issues in relation to sustainable development and international environmental politics according to Palgrave Advances in global governance by Whitman et al. (2009) and international environmental politics by Betsill et al. (2006). There are limited opportunities to apply the ideas of global governance world-wide since the world level of sustainable development is scattered and heterogenous. However, the ideas are relevant in the “new second world” of candidates for EU enlargement such as the Republic of Moldova that are capable of taking part in global governance with frequent cross-border interconnections and integration of politics, law, economy and society.

To avoid the risk of oversimplifying and by setting a too narrow the scope, an alternative is to focus on transnational advocacy or support networks, where actors are connected through main, shared ideas, common goals, knowledge or social movements. The main challenges with transnational networks are that the objectives, level of influence and power sources may not be visible to the eye, hence making it difficult to perform empirical research. This problem can be addressed by either looking at formal NGOs or particular campaign, project or programme such as energy sector reform and renewable energy implementations when analysing transnational networks.

This is followed by taking it down to the individual level in order to trigger and achieve collective action and governing the commons to develop joint benefits according to Ostrom (2007). By learning from the theory of the firm and the theory of the state it is possible to find a way to achieve collective action and organise institutions to ensure supply, commitment and monitoring. Both approaches rely on an outsider and single individual to trigger the change.

The analysis is based on the networking theories developed by the international marketing and purchasing, IMP, group with Ford and Håkansson et al. Ford et al. (2008) analyses interactions and the importance of working together and using others to develop relationship and enabled cooperation between actors in joint activities and resources over space and time. The network model of actors, activities and resources, ARA model, is a conceptual framework to analyse interaction processes and outcomes that has been developed based on empirical research by Håkansson et al (1992). Traditional market models can be applied to describe events taking place in another context than the pure trade of goods and services, since the main objective of market models is to achieve equilibrium and enable stability through balancing supply and demand (Bardach, 2005, p.18). The importance of working together, co-operation and using others has been researched in marketing, general network, interorganisational studies and political science, game theory and social network studies (Ford et al, 2008).

In this case, the ARA model is being applied to describe the actors, resources and activities, and their interactions in the Moldovan energy sector. The purpose is to develop an

understanding what needs to be done to enable successful long term and wide-spread implementation and acceptance of renewable energy in the Republic of Moldova from the top level and government to individual households.

## 2.1 Governance, environmental politics and sustainable development

A functioning feasible system for global governance has been identified as a necessity for sustainable development (Bruyninckx, 2006, p. 276). One definition of global governance is "...the complex of formal and informal institutions, mechanisms, relationships and processes between and among states, markets, citizens and organisations – both intergovernmental and non-governmental – through which collective interests are articulated, rights and obligations established and differences are mediated."(Thakur et al, 2006, p. 233). It is a way to understand and portray a political environment that is experiencing significant transformation.

Global governance can be seen as the result of a multitude of resource exchange between multiple actors. The difference between global governance and international politics is the ability of actors and their resources to direct corporate and individual behaviour across regional borders. This enables governmental and non-governmental organisations, NGOs, to apply a joint approach and cooperate to address particular policy issues as a result of increased space and spheres of authorities. Individuals have been empowered through the knowledge and skill revolution, communication across borders is enabled by emerging new technologies, and as a result of continuously on-going globalisation new actors are created and mutual dependencies between societies increase. An increasing number of actors, across space and with access to multiple resources mean that politics is an increasingly chaotic area where stability and order is achieved through joint efforts and new measures taken by a broad range of actors. Regulations become legitimate when commonly agreed on through a comprehensive, purposeful decision process characterised by transparency and accountability. (Dingwerth et al, 2009) In addition, organisations are resource dependent and "...effective and efficient governance requires political, financial, cognitive and moral resources."(Dingwerth et al, 2009, p.44).

Actors in governance may include international organisations such as European Bank for Reconstruction and Development, EBRD; World Bank, WB; United Nations, UN; and International Monetary Fund, IMF. In addition, international bureaucracies such as the European Union, EU; non-governmental or non-state organisations, NGOs<sup>5</sup>, like Transparency International, state agencies and local communities such as legislators, regulators and energy efficiency agencies; private foundations, business actors, knowledge communities such as IPCC; media; and migrant communities. These actors represent the foundation of globalisation and may impact the political system and financial flows. As the multitude of actors become increasingly heterogeneous, non-state actors demand a significant share of governance resources.

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<sup>5</sup> NGOs can be defined in many ways, according to UN an international NGO, or INGO, is an NGO serving more than three countries. An international NGO is defined as having international interests. Environmental NGOs, ENGOS, are also emerging. There is also a debate of how to define NGOs with commercial interests and the risk of defining NGOs as representing all that is good for society. There may also be NGOs defined according to environmental, business/industry interests, human rights etc. Betsill, Michele M. (2006). *Advances in environmental politics – transnational actors in iep*. Palgrave MacMillan, Yew York, USA. p.172-193. NGOs with commercial interests may be defined as any business if the main focus of the activities is to generate profit, or as a social enterprise if the main purpose is to do good through business but over a long-period of time where it takes time to generate profit and the purpose is to create a self-sustaining NGO (author's comment)

### 2.1.1 Resources

In the rare case where actors control all resources to govern across borders, the cooperation with other is unlikely. A more common situation is when some actors hold and have access to some resources and as a result need to use other and cooperate to gain access to sources that are controlled by other actors and their partners. Functioning institutions and mechanisms are a prerequisite to enable resource exchange and collaboration. (Dingwerth et al, 2009, p.48)

**Political resources** are limited to the state and a few intergovernmental, hybrid and governance organisations. When it comes to human rights issues, the European Court of Human Rights provides individuals with legally binding, international treatment against member states. Other actors may have indirect access to political resources through their network. **Financial resources** are a prerequisite for political projects and only few non-state actors are secure funding such as the European Bank for Reconstruction and Development, EBRD; Global Environmental Facility, GEF; World Bank, WB; and the International Monetary Fund, IMF. In addition, private funding and to some extent business actors and migrants may contribute. However, these funds are often out of reach for the government. **Cognitive resources** includes knowledge and information and all actors including NGOs, entrepreneurs and enterprises, scientists, governments and international bureaucracies may possess relevant information to address a policy issue. NGOs play an important role as their transnational structure enables them to be active in national and international politics, access unique access to information from communities and governments and often conduct leading research. Examples include UNDP, UNEP, WMO, UNEP and IPCC. When an actor holds **moral resources**, this means that the actor has legitimacy and is considered to be legitimate by the relevant audiences such as the general public. Due to the subjective nature, legitimacy is different from monetary means or influence. The foundation for NGOs legitimacy is in their role as looking out for the voice- and powerless. For scientists and academics, it is a result of their expertise in policy-making and objective knowledge, free of values of influences. To ensure effective environmental governance, policies have to be supported and proven by the scientific community. Activities and campaigns can change the perception of an actor's legitimacy. Representatives for international or regional communities and intergovernmental organisations carry significant potential. Media, nationalist or political movements as well as civil society can support or create barriers for an actor's legitimate right and capability to implement policies. (Dingwerth et al, 2009).

It is rare that an organisation controls all of these resources. A state can access and collect relevant information to issue and distribute binding regulations and policies. Outside individual states, this level of resource control is uncommon and EU only enjoys certain control such as financial resources for environmental regulation. In democracies, the elected government is being perceived as having the legitimacy to represent the population.

### 2.1.2 Governance

Governance takes place in the intergovernmental, trans-governmental and transnational, or multinational, space when actors exchange resources and work together. By joining forces and coordinating influence, know-how, funds, policies and legitimacy, the actors achieve common goals and gain benefits while expanding their sphere of influence towards other actors in the network. In addition, the role of public-private partnerships is gaining in importance in area of sustainability governance. One example is the UN Global Compact where UN granted participating actors a certain level of legitimacy in return for some

political influence over conduct of large multinational corporations. Resource exchange characterise the relationship between NGOs and international organisations, and the increased level of interaction in decision making is a result of an expanding scope of environmental regulation and increased complexity that demand expert environmental knowledge. “However, access to governmental deliberations is not granted to all environmental NGOs, but only those that command the most relevant resources at the lowest price.”(Dingwerth et al, 2009, p.53).

Governance is executed through the exchange of resources. Formal exchange allows for independence and centralisation, commitment to counterparts can be more credible and actors can pool and leverage resources more efficient. To agree on and stabilise expectations from and commitments to each other, actors develop procedural rules and establish a body for decision-making with equal weight of all the stakeholders and accreditation process to ensure relevant certification and independence from business influence. Resource exchange takes place among equals and is symmetrical. Informal exchange of resources happens in public-private partnerships such as the UN Commission on Sustainable development. Informal co-operations are often limited in time duration and depend on earmarked funds for the project or activity. Members, roles and responsibilities may not be clearly defined as in the world economic forum, which is made up of donors and foundations cooperate on their own terms. When the demand for resources outweighs supply, the resources exchange is asymmetrical. Many NGOs battle for financial support from few actors and private foundations with sufficient monetary resources, and these foundations rely on a limited amount of partners to implement the programmes. The resource dependency approach, including power relations, portrays global governance in relation to institutions and resource exchange between equals and unequal's.

The function of governance is to articulate collective interests, establish legal rights and obligations and mediate differences when actors take conflicting stands on pending regulation or regulation is not accepted by at one actor or several.(Dingwerth et al, 2009, p.55) Knowledge is required for all three functions of governance, while demand for legitimacy and influence may vary. Availability of funds is a pre-requisite to develop and implement policy.

The resources exchange shifts focus from governance management to the resources necessary to sustain the arrangements and highlights interactions across governance levels. There is a risk that “...individual actors may pursue their political ends not through rule based coordination (that is, through *governance*) but through other means such as violence, direct action, or ad hoc coalitions that may not count as governance in the more narrow sense.”(Dingwerth et al, 2009, p.61).

The transnational<sup>6</sup> actors impact institutionalised politics, civil society, policy and practices and the broader structures such as sovereignty or independence as well as capitalism and entrepreneurship. One common strategy is networking, developing relationship between actors through different linking activities to gain control of critical resources and cooperate. Transnational actors may be distinguished as environmentalists or business and industry groups. The latter enjoys power through the central role they play in society and creation of economic growth and production of energy – “money talks”. The environmentalists enjoy the legitimacy based on their perceived expertise that can convince the state to implement

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<sup>6</sup> Transnational actors have no specific country identity while multinational actors are managed from their “home” country.

policies and practices. Environmental NGOs, ENGOs, have the ability to drive and enforce certain action through persuasion. Media can play a crucial role in paving the way or creating barriers.

The activities and impact of transnational actors may be divided into *setting the agenda*, *developing policy and regulation*, and *hands-on implementation*. Transnational actors are a heterogeneous group with various interests and purposes, with access or control to different resources by being active in different networks and over time developing relationships and working together across space. (Betsill, 2006).

## 2.2 Collective action

It is difficult to get individual people to perform voluntarily work together in order to pursue and achieve common interests in order to increase common welfare and living conditions. Logically, it should make sense that a group with common interests and ability to create joint benefits that all members of the group will enjoy, the group will join forces to reach these goals. However, it appears that this is only valid when the group is limited in size with few individuals or there are some enforcement mechanism and or piece of equipment to trigger joint-action for common gains. The size of the group is not determined by numbers but by each actors ability to influence and impact. (Ostrom, 2007).

### 2.2.1 Free-rider

The free rider problem is a core dilemma in collective action as there is always some passive individuals that are impossible to exclude and will enjoy the benefits of other individuals efforts. The free rider doesn't contribute to the joint-effort merely benefit from the advantages it brings. The temptation to free-ride, or the notion that some actors will, may influence the decision process with unfortunate outcome. Or some may free-ride and the collective outcome and benefits may be less than optimal. Hence, rational individuals act irrational. The challenge is how to enhance the capabilities of individual users of natural, common-pool resources, CPR, and change or remove these constraints and enable the individuals to develop, manage and govern their own common, joint resources. This challenge can be referred to as the tragedy of the commons, challenge of collective action, or the problem open-access or property resources. It can also be used as propaganda by certain actors to prove and enforce the problems and corner individuals. (Ostrom, 2007)

To solve this trap, it is necessary to apply the assumption that "...individuals try to solve problems as effectively as they can."(Ostrom, 2007, p. 24). And that the reason behind irrational behaviour by rational individuals is equal capabilities to reason and comprehend complex environments, instead of being lazy, evil or incompetent. This is critical in complex situations that lack predictability, information and trust, characterised by transactional difficulties. In policy creation, decisions may be based on the assumption that individuals are unable to self-organise and self-govern without authorities. In fact, self-organised and self-governed enterprises and organisations like law firms and co-operations are common with developed mechanisms (Ostrom, 2007). To succeed with collective action and create joint-benefits, independently of who the organising actor is, the problems related to avoiding free-riders, securing extensive commitment, creating institutions, implementing rules and monitoring individuals must be solved.



### 2.2.2 Common-pool resources

In common-pool resources, people that are depending on access for economic return have strong incitements. Since they impact the standard of living and economic wealth, there is strong motivation to address the situation in a joint manner and enhance their own productivity over time. If the self-organisation fails, it is an indication that other barriers are interfering. The theory is limited to an environment focusing on renewable resources, severe scarcity and individuals can harm one another. (Ostrom, 2007, p. 26) Common-pool resources may be natural or man-made and is large enough to make it costly to exclude users. The resources may be units of wind and solar power generated, flow through a resource system such as the electricity grid or pipes for thermal energy. Single or multiple individuals and firms may gain access.

The user can be referred to as the appropriator, or an individual energy consumer or user<sup>7</sup>. Providers are often the same as the producer. All users utilise the same system but consume different units. The usage, or lack thereof, may impact others. An appropriate way of allocating resources is crucial to secure the motivation of users to contribute to a working resources system and supply. Uncertainties and lack of knowledge impacts the situation as well as time, the benefits in the immediate future are perceived as more valuable than long-term. Norms and behaviours impact perception of alternative choices for groups and individuals. “An individual’s choice of behaviour in any particular situation will depend on how the individual learns about views, and weighs the benefits and costs of action and their perceived linkage to outcomes that also involve a mixture of benefits and costs.”(Ostrom, 2007, p.33).

### 2.2.3 Trigger collective action

To trigger collective action is not easy and complicated further by many uncertainties including external factors such as wind blown and sunshine, market price, production cost, access to funding and location stable environment. A major internal and external factor is the lack of knowledge. A defined structure of the resource system, its internal boundaries and characteristics must be developed, as well as an understanding of how each energy user’s individual actions will impact the amount of available resources units and the outcomes for the individuals that are self organised in the interest group. Uncertainties will never be completely removed and is an on-going learning process for the individuals.

In certain environments, the users will be more motivated to make it work and find better solutions and their common problems and is also dependent on the symmetry of available information to the individuals. Collective action is in many cases directly related to time, individuals are more motivated to act and contribute if the benefits are delivered in the nearer future than more long-term. “In other words, individuals discount future benefits – how severely depends on several factors.”(Ostrom, 2007, p.34). Time frames also impact whether individuals expect to enjoy and reap the benefits long-term and are able to pass the result of their efforts to new generations, as well as the “return-of-investment” or for competing solutions. Economic and physical security impacts discount rates, and energy users that are unsure of whether they will be able to eat the next day or year will discount heavily on future gains when trading with the ability to survive in the near future. The same

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<sup>7</sup> In this paper an appropriator is defined as an energy consumer or user.

applies if other's actions can destroy the common resource, the users that have limited their use will change behaviour.

Commonly shared behaviours and customs in a society regarding the value of the present versus the future as well as what is perceived as proper behaviour when keeping promises or being honest also impacts the discount rates. These values are also routed in daily routines and impact alternative solutions that evolve over time as a behaviour that is viewed as unacceptable will not even be considered as a future strategy. The level of opportunism, or cunning self-interest, in an environment will impact the ability to succeed.

The more socially accepted it is to break promises or accept bribery, the more likely each user is to act opportunistically as they expect everyone else to do the same. Creating a long-term commitment and stability becomes increasingly difficult. By managing, monitoring and introducing sanctions it is possible to reduce the mistrust and acceptance of opportunistic behaviour. Individuals may develop contingent strategies over time in relation to others.

#### 2.2.4 Self-interest or lead by example?

In collective action, everyone is dependent on and impacted by everyone else's actions and each individual need to consider the choice of others. The interdependence is a reality for as long as the same resource is shared. If a user act according to own strategies, without consulting others, the net benefit is decreased and at worst destroyed. The joint return can never be as high as it would through cooperation and organised collective action. To succeed with self-organising, chaos needs to be replaced by planned, orderly and regular decisions and actions that are taken in a certain order. The strategy "lead by example" will motivate others to focus on long-term benefits rather than short gains if many share the same approach. Requiring a minimum set of individuals to comply is one way to get others to join and contribute and benefit from this "frequency-dependent" behaviour. Changing incentives for certain actions and making available information can trigger positive activities and cooperation. Changing from independent to collective action is no easy task, the cost to enable the transformation can be high and the benefits gained are shared by everyone independently of contribution. Research shows that some individuals are able to successfully solve the problem and some are not (Ostrom, 2007, p.40).

An entrepreneur seizes the opportunity to create competitive advantage and gain benefits by cooperating with other actors like consultants or suppliers in mutually dependent relationships. Once goals have been reached, the results or proceedings are distributed to the partners. The counterparts choose to enter into the agreement voluntarily. As competition increase, the entrepreneurs will need to develop efficient internal institutions. Similar applies in the state when an individual, or ruler, identify the need for organisation to achieve benefits. If the organisation is enforced by fear, individuals will try to protect themselves. By oppression, the ruler can produce enforced collective action and collect proceeds, taxes or labour by threats of sanctions. A ruler with a good conscious uses the gains to increase standard of living to a level that justifies increased taxes and reducing oppression. If not there may be mutiny as the ruler will not be pushed by an open market to develop efficient institutions. Both the ruler and entrepreneur keep the surplus for the benefits gained, they commit and are credible to punish those who do not oblige. Hence monitoring the performance is a key factor. Creating trust and a sense of community are mechanisms for ensuring supply. Mutual monitoring will enable mutual credible commitments to be made, without them new rules fail.

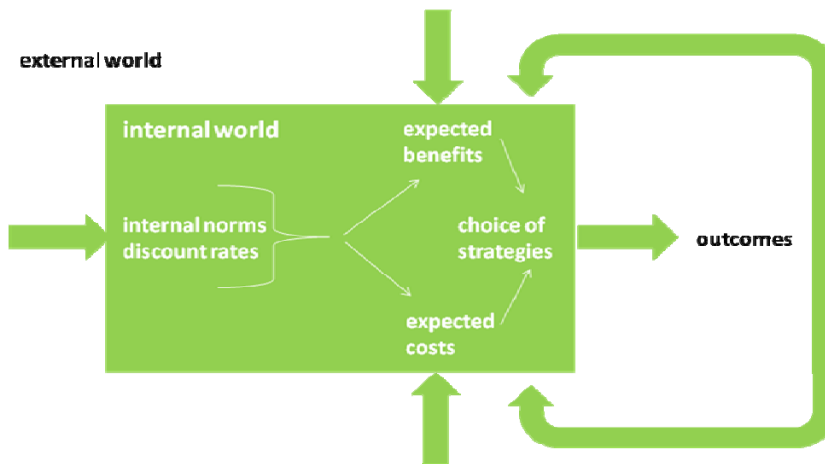


Figure 2-1 The internal world of individual choice. Source: Ostrom 2007 p.37

Common provision problems are related to assigning responsibility and making individuals accountable for common resources, infrastructure, maintenance, support etc. The problem is also closely linked with the user problem of allocating resources. Both are time-dependent. Provision problems focus on the investment and productivity and may occur on the supply and demand side. The supply side is concerned with long-term infrastructure investments, set-up of the resources and maintenance and to ensure optimal performance, users need to cooperate and avoid free-riding. Demand side is related to sustainable consumption, ensuring enough for all users and future users. When it comes to renewable energy like solar and wind power, the withdrawal is not related to the total yield. But availability of relevant location to place the equipment may be limited. The essence is that all actors' actions and strategic choices are depending on and impact all other individual actors' actions and ability to act to gain access to resources through different activities.

### 2.3 The ARA model

The network model of actors, resources and activities, the ARA model, is a conceptual framework to analyse interaction processes and outcomes that has been developed based on empirical research by the International Marketing Purchasing, IMP, group (Håkansson et al, 1992). In this case, the ARA model is being applied to explore the cumulative process of interactions over time in the Moldovan energy sector. The purpose is to develop an understanding what needs to be done to enable successful long term and wide-spread implementation and acceptance of renewable energy in the Republic of Moldova from the top level and government to individual households.

Interaction is defined as "...the substantive process that occurs between business actors through which all of the aspects of business: material, financial and human and all of the elements of business: actors, activities and resources take their form, are changed and are transformed." (Ford et al, 2008, p.12). As actors interact through different activities to gain access to crucial resources, over time the actors evolve and are defined by their interactions. Through the interactions, the actors develop relationships.

The interaction process or content between the counterparts can be illustrated by three interconnected, mutually dependent layers: **actor bonds, activity links and resource ties** (Håkansson et al, 1995). These layers are in turn impacted by "the constellation of resources,

pattern trend type of activities and web of actors in the wider network.”(Ford et al, 2008, p. 13).

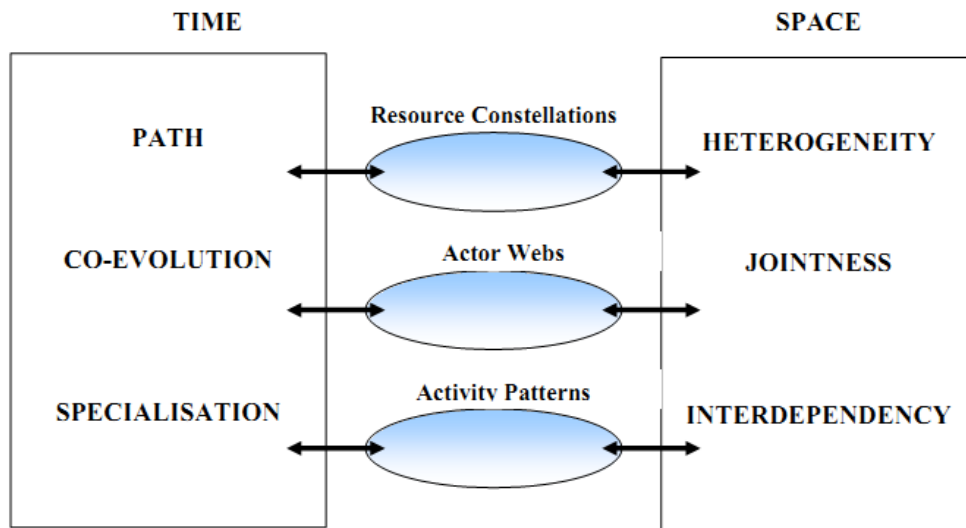


Figure 2-2 Analysing business interaction. Model of the business interaction process.  
Source: Ford et al 2008 p.25

The total content of interaction is larger than the sum of interconnected activities, transactions and communication flows, which results consequences that go far beyond the certain relationship between the two counterparts. It directly impacts the involved actors, their other relationships and third parties that may also gain from the events and developments (Blankenburg-Holm et al, 1996). The same applies vice versa and what is happening in the broader network impacts the specific relationship between two actors. Every relationship impacts and connects webs of actors, constellations of resources and patterns of activities across networks to some extent.

In the **actor layer**, through interaction, bonds or interpersonal links develop between mutually committed individuals based on how the actors know, trust, appreciate and influence each other (Wilkinson et al, 1994). These bonds will vary in strength and influence the direction and level of interaction. **Actor bonds** are important for knowledge sharing of opportunities and solutions.

In the **resource layer** actors adapt resources to one another when the relationship develops. Mutual adaptations include tangible and intangible resources as an example a plant or equipment and knowledge. **Resource ties** form over time as two actors jointly deal with and adapt their resources (Waluszewski 1990). In the innovation process for resource adaptation, efficiency in resource utilisation may be improved and new resource combinations may be developed (Håkansson et al, 2007).

In the **activity layer**, the integration and synchronization of activities between actors takes place. The activities and the counter parts activity structures may be more or less firmly connected and integrated. The absence or strength of **activity links** in a relationship has significant impact on the involved actors.

There is an important interplay between the three layers, they are interwoven and impact each other. Activity links can constrain or enable resource adaptations. Resource ties can

restrict or benefit coordination of activities. Actor bonds can enable and create opportunities for developing activity links and resource ties.

The three layers of the interaction process are related to time and space. The content embeds time and space and impacts actor relationship, how they perform activities and combine and utilise resources. The concept emphasise the effect interaction has for knowledge creation and sharing of information and experiences between actors. Through the interaction process value can be co-created and generated, and activities and resources have a direct impact on the economy. There is always a risk that this may lead to unfavourable activities or unproductive investments. However, interaction may provide the opportunity to create stability and as a result the ability to predict power. Through increasing and regularly influencing interactions with counter parts and third parties in the broader network, an actor can increase level of adaptation or alternatively, find new ways and webs of actors for joint development of resources to generate a beneficial outcome. (Ford et al, 2008)

Despite the sometimes substantial costs and limited independence that are the trade-offs for developing relationships, the upside is the broad range of opportunities and benefits that would not have emerged otherwise. The nature of interaction can be defined as a confrontation process that takes place between actors and their organisations, transforming the actors' resources and activities as well as their own organisations over time and space, impacting the structure and processes in the economic landscape. Interaction is the foundation of development.

Through comprehension of previous interactions it is possible to understand current actors, their activities and resources as well as the economic logic that links them together. An analysis of the dealings in an interactive environment focuses on the specific interaction process between various actors in the web. Hence, an analysis of the progress in an interactive environment revolves around the advancement of particular interaction processes between actors instead of the transformation taking place within a single actor. The transformation within the actors is an expected outcome, rather than the shaping factor in the interaction process. (Ford et al, 2008, p.15)

### 2.3.1 Interaction and time

Interaction takes place over time through continues events where one thing leads to another. This makes it almost impossible to define a start and an end. This is valid for both new and existing organisations. This means that there are no new networks and new actors will have limited impact on existing networks. New actors and new relationships emerge from already existing, historical networks. All actors are impacted by the past, present and the future. New actors, activities or resources impacts the pre-existing network and it adapts and accommodates new entrants and their relationship which sometimes creates benefits or disadvantages for existing actors. All actors contribute with their past and new actor interactions impacts existing relationships. In relation to technology, this observation is referred to as path dependency. Path dependence is defined as "...the analysis of interaction must always look behind current patterns of interaction to what has preceded them and framed their evolution."(Ford et al, 2008, p.17).

As interaction is an on-going process, evolving over time as a result of experience and learning between two or several actors, it makes it difficult to identify an end-result and make predictions since the point of interaction is that every interaction in turn impacts numerous interactions in multiple directions. Interactions are not evenly distributed over a time line and

critical episodes or events may involve complex multi-party interaction. Interaction at any particular point in time is not pre-determined by past events but also influenced by arising issues from other interactions and other parts of the network. Critical interactions rarely stand out but are made up of a web of insignificant or mundane interactions that are connected in an evident or unnoticeable way, when combined they form the relationship between the actors. One event impacts and is understood by each participant in a different manner. A chain of events is in many cases a structured routine way of working and most interaction events are not critical incidents. However, every new innovation or novel component limits and increase the opportunities of future interactions for all participants in the network and may trigger diverse consequences. Hence, it is difficult for actors to understand and anticipate possible alternative outcomes and options resulting from interaction. Another challenge is for actors how to interpret, predict and manage the string of events that happens in a haphazardly, unknown order. Individual actors have a preferred progression in mind for the future. “These subjectively preferred or predicted sequences mean that a researcher seeking to explain interaction over time will have to be interested both in the evolving views and pictures of the actors as well as how activities and resources are actually evolving.”(Ford et al, 2008, p.19).

### 2.3.2 Interaction and space

The content of the interaction determines the position and direction of an interaction process, and impacts the relative position of actors, activities and resources in different dimensions of space such as geographical location, triggered knowledge, activated resources, carried out activities and generated costs and benefits (Johansson et al. 1998). The position of a specific interaction process, relative to others, generates consequences. Actors develop unique relationships through interaction, which drives their position in relation to other actors. Hence, it is not possible to isolate or describe a single interaction process without taking into account the connection to other related, simultaneous interaction processes. These connections in space will result in that some interaction processes become closely related and increase the level of number of interactions, like in joint technology development that also need the involvement of initially unknown actors providing support technologies and new actors that apply and implement the solution.

“Interaction with a specific counterpart indirectly but systematically relates an actor to a whole set of other actors. Interaction is a way for ideas, solutions and technologies to travel across several actor boundaries.” (Ford et al, 2008, p.21).

An actor’s ability to interact on behalf of their counterparts sets the foundation for the operation. This is common in the financial services sector, import and trade organisations, and an actor may connect and serve as facilitator between disconnected actors, enabling the extension of the interaction process across the network.

Through interaction with heterogeneous, distant and sometimes yet unknown potential partners, actors are able to gain sustainable competitive advantage and create stability in an ever changing environment. Stability and structure position an actor relative to others and so on. Each actor’s position in the network is reflected in their interactions, providing the current context. However, long term the position and structure transforms as a result of continuously on-going interactions, actors develop different, specific interdependencies over time.

“A consequence of the importance of space is that there are no general rules to enable us to determine what interaction is appropriate. What is good in one situation – in one place - may not work in another...what is right in the short run may be wrong in the long run and what is perceived in a positive way by one counterpart may later be viewed negatively by the same counterpart.” (Ford et al, 2008, p.22-23).

The key challenge for an actor is to decide who to prioritise and interact with. The actor’s relative position and close link between space and interaction creates a dynamic structure that evolves over time. The space dimension impacts interaction, and as a result the directions and substances of linked interaction processes influence evolution, simultaneously organisations develop in relation to each other in an ever changing environment.

Routines and normal day-to-day operations represent the majority of an interaction process. Despite mundane interactions, these normal routines unintentionally result in new, informal and formal, rules and regulations that set the framework for what is acceptable behaviour and may impact the entire network. These rules, legal or illegal, widely impacts actors in a network and set the boundaries for insiders and outsiders such as ethics, rules, laws, terms, solving disputes, markets share and pricing. Routines are a double edge sword, they provide stability by making it possible to predict and demonstrate trustworthiness. On the other hand, when routines are institutionalised it becomes difficult to question ways of working and problems like inefficiency etc. develop.

The ARA model explains how space and time is related and illustrates how the three layers of actors, resources and activities - which are interrelated in space and time - interact and are shaped by the process. The model shows complexity between all the layers where interaction takes place in the form of activity patterns, resource combinations and actor webs in relation to time and space.

“An actor exists in the context of its network and is defined by its relationships and through its interactions in that network. An actor’s interactions effectively determine its characteristics, its capabilities, its scope, its freedoms, its obligations and its restrictions. Each actor and each interaction will depend on and be based on the actor’s own resources and those of others who stand with it, behind it and against it.”(Ford et al, 2008, p.31).

## 2.4 Comments

The purpose of the theories described above is to set a foundation for the connection between global governance and collective action. Theoretical framework applied to structure the findings and perform the analysis is based on the ARA model. This combined with the theory on individual choice while borrowing key aspects from the global governance to highlight key aspects to create an enabling environment for implementing renewable energy in Moldova.

### 3 About the Republic of Moldova

The Republic of Moldova declared independence on August 27<sup>th</sup> in 1991, when the former Soviet Union was dissolved. It is a landlocked country, situated between Romania and Ukraine. The republic includes the by UN unrecognized break out territory Transnistria, which declared independence in 1990 and is located between the Dniester River and the eastern Moldovan border towards Ukraine. Around 3.6 million people live in Moldova and life expectancy is 66 and 73 years respectively for men and women (UN, 2010).

The Moldovan economy is relatively small and the Gross Domestic Product, GDP, in 2009 was 3.9 billion Euros, which is smaller than neighboring countries (WB 2011). GDP per capita is noticeably below other South East Europe countries and most Common Wealth of Independent States, CIS, countries. The country is open to trade, increased exports and foreign capital investments are cornerstones for sustainable growth (EU 2011). In 2009, Moldova ranked 131<sup>st</sup> in GDP according the International Monetary Fund, IMF, world list. IMF is slightly optimistic in the short-term forecast. Salaries are low and many have several jobs to be able to make a living. Despite many large banks, nor private people or households or entrepreneurs take loans, as interest rates can be close to 20 percent and it is difficult to borrow money for longer periods of time than one year. At the same time, Moldova has one of the highest levels of currency exchange in the world, around 40 percent, indicating money laundry (EBRD, Entrepreneurs 2011).

As a result of geographical location, Moldova has limited access to natural resources, apart from arable land, which has impacted the economic performance (OECD, 2010). Energy sources are solar, wind, biomass and hydropower. The local languages spoken in Moldova are Romanian and Russian. The country has a turbulent history and it was once part of Romania. Today, the languages are still identical and Moldova and Romania have similar cultural traditions. The majority language that is spoken in Moldova is still Romanian and it is now the official language, spoken and written with the Latin alphabet<sup>8</sup>, as a result of the language law in 1989. “Limba noastră” is celebrated every year on August 31<sup>st</sup>. (BBC 2011)



The area of the Republic of Moldova is also known as Bessarabia and is located between the rivers Dniester and Prut. The loss of the Moldovan coast line on the black sea to Ukraine is somewhat of a national trauma. It was initiated in 1812 by Russia, and some feel that Moldova’s slow development can be related back to that point in time. The decision resulted in the entire land piece being confiscated in the 1940s, only leaving Moldova with a 400 meters wide pathway to the Black Sea. (TUM 2011)

Figure 3-1 The Republic of Moldova.  
Source: BBC Cooperation, 2011.

<sup>8</sup> Romanian had previously been taught out and written with the Russian Cyrillic alphabet in Moldova.



### 3.1 Energy sector

Moldova is highly dependent on energy imports of fossil fuels and electricity, equally 94 percent of the country's energy needs (EEA 2011). The majority of the import is natural gas supplies from the Russian federation. The federation has a strong power position as a result of a continuously running and accumulating debt and the expenses for energy imports represents a large proportion of the GDP. The high energy intensity, approximately three times higher than in EU, is a major barrier to create competitive advantage and trigger economic development. The 750 kilometers distribution system is leaking and buildings are badly insulated. As a result, a combination of energy security and efficiency measures has been identified in the National Energy Efficiency Programme, NEEP for 2010-2020 (MoE 2011). The dependency on Russian gas is straining and limiting growth, the situation further stalls development due to lack of secure energy supply. Gazprom plays a major role and has cut the gas supply twice. The first time in 2006 as Moldova refused to pay a doubled price and the again in January 2009, due to a disagreement between the transit country Ukraine and Russia (BBC 2011).

The main characteristic of the energy sector of being highly centralised was developed during the Soviet times. The country is connected to the national grid and in Chisinau there is a well developed trolley bus system that runs on electricity and is being constantly developed and promoted as the green alternative.

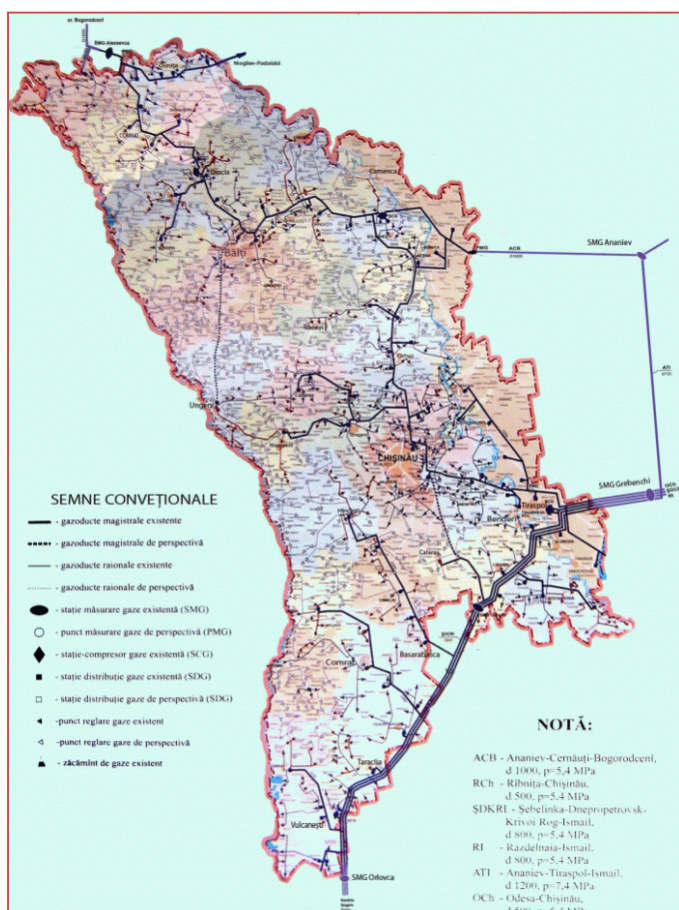


Figure 3-2 Transmission and distribution of natural gas. LTD “Moldovatrangaz” is fully owned by JSC “Moldovagaz”, which is 50% owned by “Gazprom”, 35% by the Government of Moldova and 14% by “Tiraspoltrangaz”. Source: Government of Moldova (2007).

The Moldovan market structure is characterised by an unbundled single buyer, with public ownership of energy generation and transmission while distribution is privately owned. The legal regulatory framework is inadequate but there are independent regulators. This can be compared to Romania and Ukraine, which both has whole sale competition, adequate legislation and independent regulators and where only the transmission is publicly owned. (Ljung, 2007, p. 160)

Until now there have been no wind power plants, but there is demand for connecting to the grid with about 500 MW of wind power. There is currently no balancing capacity to cope with intermittence and real time balancing is possible only by imports from Ukraine power system. (Moldelectrica 2011)

Electricity, heating and hot water is expensive and a typical bill during the winter months for a 75 square meter apartment is around 100 EUR

per month, which in some cases represents almost twice the salary<sup>9</sup>. For instance, the poor usually do not utilise district heating, in Moldova only 17 percent of the deprived use district heating compared to 57 percent of the ones who are better off (Ljung, 2007, p. 92).

The number of electricity customers in Moldova is 1,283,815 users. The supplied electricity in Moldova in 2010 was 3.9 billion kWh and 369.9 million kWh was exported to Romania. Moldova's power grid is interconnected with Ukraine over seven power lines of 330 kV, Romanian and Bulgarian power grids of 400 kV. (ANRE 2011)

As illustrated below, between 2001 and 2010, the production of electricity (light purple legend) has been pending within the brackets of 830.7 million kWh in 2004 and 1042.9 kWh in 2001 million kWh. The consumption of electricity during the same period (dark purple legend) has been on a steady increase from 2166.0 million kWh in 2001 to 3311.6 million kWh in 2010.

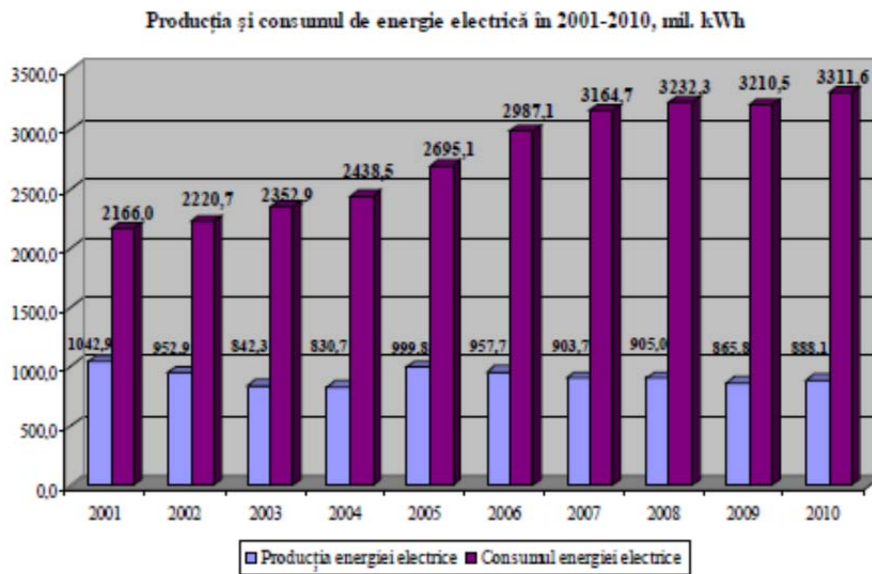


Figure 3-3 Electricity production and consumption in 2001-2010. Source: ANRE 2011.

In 2010, there were 615,220 natural gas customers that consumed 1,089.8 million m<sup>3</sup>. The general population represents 31 percent of the consumption, the energy sector 42 percent and other users 27 percent. Gas transit to other countries accumulated to 16,670.5 million m<sup>3</sup>. There are over 18,000 km of natural gas pipelines, including 570 km of transit lines. (ANRE 2011)

Between 1997 and 2010, the tariffs for natural gas have almost ten-folded and increased from 454 MDL or around 28 EUR per 1000 m<sup>3</sup> to 4098 MDL or 250 EUR.

<sup>9</sup> Visit to private homes in Chisinau, April 2011.

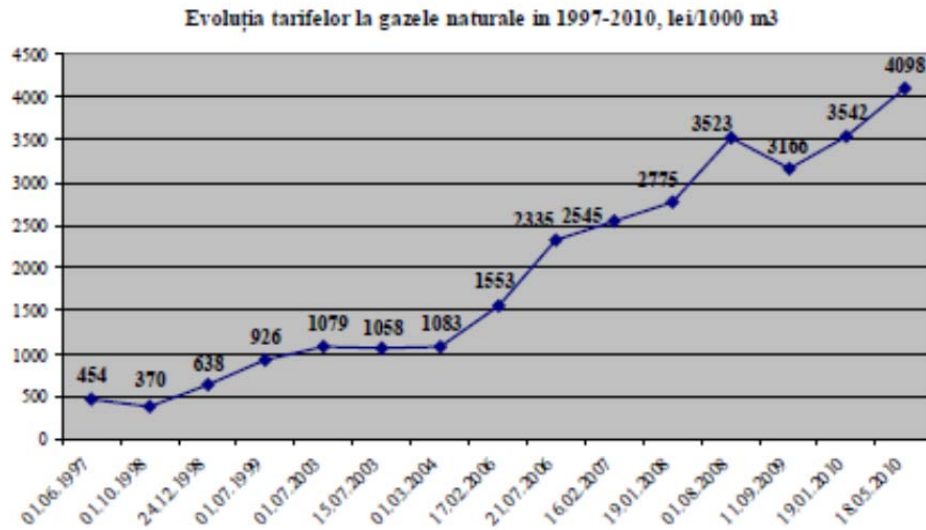


Figure 3-4 Evolution of natural gas tariffs between the years 1997-2010. Source: ANRE 2011.

### 3.2 Comments

The transition from a centrally planned to market based economy has been a struggle. Moldova experienced accelerated recovery towards 2005 as a result of economic reforms, legislation and regulatory framework. An unstable political impacts the situation, and the international community is supporting the positive developments. The implanted language law is perceived by some as the excuse for the east bank district of river Nistru, with a majority of Russian speaking population, to break away and proclaim independence. The Moldovan Transnistrian Republic has not been internationally recognized. However, the Moscow State Duma legislator declared that the region should be viewed as “zone of special strategic interest for Russia” in 1996, and Tiraspol is the only international Russian military presence in Europe (Brezianu 2011). Through a "5+2" process, EU, US, Russia, Ukraine and the Organisation for Security and Co-operation in Europe, OSCE, are trying to resolve the situation. Russia’s participation is crucial for a successful outcome, but EU and US must take part (Hill 2008). During the Soviet era, commercial enterprises and industries, and power plants were established on the eastern shores of river Nistru. Today, Tiraspol is still a commercial centre with 28 percent of Moldova’s industries and 90 percent of the country’s energy production (Brezianu 2011).

## 4 Overview of literature for the Moldova case

In the process of exploring existing literature, research and information relevant to the Republic of Moldova and implementation of the renewable energy sources wind and solar power in Moldova, it became apparent that there is little information available. If it exists, it may not be accessible or reliable. The first conclusion is that there is very little information in general regarding Moldova and even less so when it comes to renewable energy. Second, the region is a hot topic looking at the handful of university theses that have been written just in Sweden during the past couple of years at Stockholm Business School, Jönköping International Business School, the Swedish University of Agricultural Sciences and Halmstad University.

### 4.1 Renewable attention

Around the world, there is high attention on renewable energy and the transformation of the energy sector is on-going across the world to reduce climate impact, since green-house gas emissions from the energy sector contribute to 25 percent of all emission (Tieto 2010). EU is focusing on opening up the market to trigger micro-generation, renewable energy deployment and enabling users to turn “green”. EU has included renewable energy sources as a one way to reach the triple 20-goals. North America has come quite far due to their energy situation. China is building the largest solar cell power stations in the world, and plans to be the largest producer by 2025, and Google plans to produce its own electricity with a huge solar cell installation and is investing heavily in wind farm projects<sup>10</sup>. As a result of the tragic events in Japan following the recent earthquakes and accidents at Fukushima, many countries are also reviewing the energy sources and future strategy where Germany has taken lead and plans to eliminate all nuclear power<sup>11</sup>.

In the book “Living in the environment” from 2009, Miller et al. discuss the potential, progress and a change in the attitudes towards renewable energy sources. Solar and wind are the fastest growing sources of energy and the entire world’s demand for electricity would be met by installing large-scale solar cells on merely four percent of the world’s deserts (Miller, 2009, p.147). Adopting renewable energy is a way to ensure secure energy services and supply, mitigating climate change and driving economic growth, equity and sustainability and the manufacturing wind turbines and solar panels and cells presents a great potential for job creation and economic recovery. “Wind is abundant, widely distributed, and cannot run out. A wind farm can be built fairly quickly and expanded as needed... Within a few years, wind is expected to be the cheapest way to produce electricity.” (Miller 2009, p. 421) providing that the right measures are taken and that costs for renewable energy is compared on equal basis, without subsidies, to nuclear power and traditional fossil fuel. As technology develops and the industry gain experience in operation and maintenance and the mass market takes off generating economies of scale, the costs are likely to be reduced for both solar and wind

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<sup>10</sup> In April 2011, the company had invested 250 million EUR in clean power. Source: <http://gigaom.com/cleantech/google-invests-100m-in-another-wind-farm/>

<sup>11</sup> Net energy efficiency of producing electricity for space heating from nuclear power plants is only around 17 percent, 83 percent is waste during production, further losses occur during transmission. If the energy utilised to deal with the waste is accounted for, the actual net energy efficiency is merely eight percent, 92 percent is wasted. (Miller, 2009, p. 402. Net energy is the amount of high quality energy that reach and can be used by the energy consumer (Miller, 2009, p. 374)

energy systems. Attitudes are beginning to change and renewable energy sources often suffered from the “not in my backyard” phenomena, NIMBY. However, in the US, farmers are beginning to realise the potential of making money from wind energy and the “wind has turned” to attitudes resembling do “put it in my backyard”, PIMBY. The farmers are generating income from hosting the wind turbines or farms, or becoming energy producers themselves while still being active farmers. Others have changed their business to leasing land for wind farms as it provides a better income. A wind turbine on 0.1 hectare has the capability of producing electricity to a value of around 215,000 EUR<sup>12</sup> per year; the farmers did not have to make any investments but received 2,135 to 7,000 EUR per year in royalties per turbine mounted on their land (Miller 2009, p. 421).

Germany is one of the countries with the highest deployed wind power capacity in the world. Europe is manufacturing 80 percent of the wind turbines on the market (Miller 2009, p. 420). This may not last as the Chinese industry is developing quickly<sup>13</sup>. Germany is the world leader in solar power, producing 55% of the world’s solar electricity, as a result of heavy investments in solar-cell research and development since the early 1990’s (Miller, 2009, p. 417). Considering the climate in Germany with an average 1,738 hours of sunshine per year, this proves that solar energy is possible in most regions<sup>14</sup>. The numbers of hours of sunshine per year in Moldova are between 2,100 to 2,500 hours, depending on the region<sup>15</sup>. Wind speeds in relevant locations in Moldova have been measured above 7 m/s, as will be shown later in this chapter, while feasible wind speeds are sufficient at 4 m/s (EBRD, SHS and TUM 2011). With new technology development, Germany has also found a way to double the efficiency according to the International Energy Agency, IEA. The country is at the forefront in Europe when it comes to compensating energy consumers for micro-generation and selling excess capacity to the grid. The success has been enabled by the enforcement of the law that makes it mandatory for German utilities to purchase excess electricity capacity micro-generated by businesses and individual household that consumes and produce electricity, at four times the market price to trigger commitment and investments.

## 4.2 Renewable sustainable development and energy independence

Moldova is still struggling with some post Soviet challenges in the transformation to a market economy. The economic growth and development has been slow, despite 20 years of independence. The core of the crux lies in the energy dependency on energy imports from former Soviet. Many reports have been written on the topics of renewable energy and sustainable development in the world. Not all reports have connected the two topics, nor

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<sup>12</sup> Exchange rate: 1 EUR = 1,405 USD. 1 MDL = 0.061 EUR, or 6 Eurocents. Exchange rate as of September 8, 2011, from [www.oanda.com](http://www.oanda.com).

<sup>13</sup> MAKE Consulting ranking of wind turbine manufacturers’ market share in 2010: 1) Vestas Denmark 12%, 2) Sinovel China 11%, 3) GE United States 10%, 4) Goldwind China 10%, 5) Enercon Germany 7%, 6) Gamesa Spain 7%, 7) Dongfang (DEC) China 7%, 8) Suzlon India 6%, 9) Siemens Germany 5%, 10) United Power China 4%, 11) Mingyang China 3%, 12) REpower Germany 2%, 13) Sewind China 2%, 14) Nordex Germany 2%, 15) XEMC China 1%, Others 12%. NB, the German manufacturer REpower is owned by India’s Suzlon.

<sup>14</sup> Using Berlin as an example, latitude & longitude: 52°27’N 13°18’E, with an average range of sunshine between 1.1 hours per day in December and 8.1 hours per day in June. Annually, on an average, there are 1738 hours of sunshine and approximately 4.8 sunlight hours per day. Retrieved on September 3, 2011, from <http://www.climateemp.info/germany/>

<sup>15</sup> The latitude and longitude of Chisinau, the capital of the Republic of Moldova, is 47°00’N, 28°50’E according to [http://www.mapsofworld.com/lat\\_long/moldova-lat-long.html](http://www.mapsofworld.com/lat_long/moldova-lat-long.html). Sources for hours of sunshine: SHS 2011, [http://www.moldovawineguild.md/wine\\_industry/wine\\_regions/index.html](http://www.moldovawineguild.md/wine_industry/wine_regions/index.html) or <http://www.weather-and-climate.com/average-monthly-Rainfall-Temperature-Sunshine-in-Moldova>.retrieval date September 3, 2011.

linked them to the opportunities for developing countries, but both the report from World Economic Forum “A renewable world: Energy, equality and ecology” by Girardet et al, 2009, and the SIDA studies no 20 on “Energy sector reform: Strategies for growth, equity and sustainability” by Ljung and point out how the implementation of renewable energy can trigger sustainable development, economic growth, equality and support the transition to free democracies.

The report from World Economic Forum discuss that by addressing the energy issues and enable developing countries to become independent from energy imports of fossil fuels and ensure secure and stable supply, it is possible to trigger sustainable and economic development (Girardet, 2009, p.102). So far not much has happened, but renewable energy sources are available and have gained increasing attention lately as a way to enhance quality of life trigger economic growth. Energy use and economic growth are closely related, which is well documented and illustrated by the inequality of energy usage around the world, the richer the countries the higher consumption. Ljung points out that by adopting renewable energy, developing countries can create a platform for growth that is environmental friendly and abundant in source. At the same time, mitigate possible emissions and become energy independent.

The SIDA report highlights how “...access to modern energy services is essential for sustainable development...” (Ljung, 2007, p.29). The report analyses the power sector, focusing on energy delivery and the influence on availability and price. Ensuring functional energy services is a crucial component in poverty alleviation and achieving the millennium development goals. Access to the grid has been achieved in most former Soviet countries. Diversifying supply and regional cooperation are ways to create energy security and this is critical especially in countries with a centralised infrastructure that is to supply interruptions, vulnerable to losses and disasters such as earthquakes. Research shows that even the less fortunate are willing to pay for a secure supply but have limited capabilities to act due to high access costs like connection fees (Ljung 2007, p.27). Functioning governance is critical and the electricity sector has been ranked as one of the sectors with the highest levels of corruption by the NGO Transparency International. A competitive market with private participation, enhanced strong regulation, transparent pricing and involving the civil society are ways to move towards a corruption free environment, including applying an attitude of zero-tolerance towards corruption. Regulation, market and ownership structures are key components in the transformation of the energy sector but objectives are different depending on a specific country’s current situation, the relevant measures to be taken may change over time (Ljung 2007, p.38).

Internal and global market conditions influence the reform and the results are related to a countries specific situation at a specific point in time, as illustrated in the conceptual framework of the energy sector. The relationships between the actors, interdependencies and access to resources impact the transformation process and the type of support needed from the international community.

The SIDA report points at five areas that need to be considered when developing policy and regulation in sustainable development and energy transformation: “Economic growth and sustainability: efficiency and financial sustainability, soundness; impact on the poor and other vulnerable groups: affordability, access and gender consequences; environmental sustainability: use of renewable energy, energy efficiency, minimizing negative environmental impacts; security of energy supply: supply interruptions and price spikes; democracy and good governance: transparency and minimising corruption, voice – especially of the poor and



human rights” (Ljung, 2007, p.37). District heating distribution systems are often inefficient and leaking and the users pay for the inefficiency. Part of the transformation is to support energy service providers or energy service companies, ESCOs, to develop their portfolio and include renewable energy sources. Incentives and measures reducing risk enable the development. Given the nature of the energy sector, developing instruments that allows transparency is crucial.

### 4.3 EU integration and new renewable energy directive

Moldova is focusing on transposing and implementing EU legislation in preparation for EU integration. Oberthür et al. discuss the purpose of the new EU directive on renewable energy in “The new climate policies of the European union – internal legislation and climate diplomacy” from 2010. The purpose<sup>16</sup> of EU’s new renewable directive (2009/28/EC) was from the very beginning to reduce emission from energy consumption by replacing fossil fuels with renewable energy sources to mitigate climate change and sustainable development. It also contributes to a more favourable trade position by relying on a mix of energy sources that are consumed, developed and produced locally instead of imports. In addition, the technology drive to develop relevant and affordable technology for renewables enhances innovation and creates new employment. Already today, 1.4 million people are working in the renewable energy sector technology and taking green measures have contributed to economic growth (Oberthür et al., 2010, p. 117). Experience also shows the added benefit of addressing these issues on a European level in a coordinated manner to address global sustainability issues.<sup>17</sup> Collectively securing energy supplies for existing and new EU members and enable the integration of national markets enables joint “...economic development, employment and innovation...” (Oberthür et al., 2010, p. 118).

The policy has been justified by the need to replace fossil fuels to reduce emission from the energy sector and the fact that renewable energy directly influences these levels, both solar and wind energy are emission free sources. It also acknowledges the need for new technology to enable the change. In the European Commission’s new “climate and energy packet” from 2008, the correlation between climate change and renewable energy is acknowledged. The urgent need to address these issues on a coordinated European level has also been identified.

This resulted in the renewable energy directive 2009/28/EC which includes the elements of developing a consumer market for green energy and a grid reform in directive 2001/77/EC that sets the targets for renewable energy, includes certificate to guarantee origin of energy and trade with green electricity. Consumers should be able to be able to identify what type of energy they consume on their electricity bill and chose the preferable source or mix with guaranteed origin. The framework also includes national support schemes and subsidies for investment and operating support. The grid reform aims to address the regulatory, administrative and market barriers to create a competitive pan-European market and enable renewable energy producers to enter the market and compete with incumbent utilities. The process to guarantee access to the grid for renewable energy producers was initiated in the

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<sup>16</sup> The initial purpose of the energy policy to double the amount of primary energy for consumption to twelve percent by 2010 has not made an impact as planned. Some countries like Sweden, Finland and Denmark had already reach levels above 41, 28 and 17 percent respectively for renewable energy, compared to an EU average of a little more than nine percent in 2006 (Oberthür et al, 2010, p. 119).

1990s. Who will carry the cost to develop the new grid remains an issue. Member states are allowed to make the system operators responsible, which in turn means that the consumers pays the extras cost of the new grid. The alternative is that producers cover the cost with the help of subsidies for renewable energy.

The new directive on renewable energy has already demonstrated its importance for economic growth. "Green recovery" has shown to play a role in recovering from recessions in economic down turns. (Oberthür et al., 2010). The member states national action plans are the foundation for successful development of renewable energy production, innovation and energy mix and the reduction of greenhouse gas, GHG, emissions.

The international community is also supporting developing countries address climate change through the Official Development Assistance, ODA, and dedicated climate change funds under the United Nations Framework Convention on Climate Change, UNFCCC, and the Global Environment Facility, GEF. As climate change is the result of unsustainable development, most agree that the developed world is responsible for helping the developing world to deal with these issues and this support should be on top of existing aid. EU is supporting developing countries to mitigate and adapt to climate change and integrate these issues into sustainable development through action plans and thematic programmes that targets the poor people. EU has made great contributions and showing the way. (Oberthür et al., 2010).

#### 4.4 Moldova: An enabling environment for renewable energy

The recent university theses that have been written on Moldova cover the topics trust, democratisation, donors and energy.

The master thesis on trust in Moldova, "Tillit i Moldavien: "Trust is the willingness to permit the decision of others to influence your welfare", by Svedin et al. from 2010 explores corruption and the development and importance of networks. How and with whom trust is established and maintained as a result of lack of trust between citizens, general public and the government. Lack of governance enables corruption and business people only trade with people, often family members that they can trust as a contract may not be enforceable. Traditional ceremonies and gifts are means to expand the network. The closed networks are focused on family first, followed by relatives and god-parents and friends, furthest away in the circle of possible business partners are people who share the same ethnical group, speak the same language and live or come from the region. The paper emphasises the importance of and dependency on functioning institutions to enable the creation and development of trust. In the developed world, it is common that trust evolves over time and in Sweden an oral contract is a firm contract by law that shall be adhered to – "pacta sunt servanda". This is possible because the basic, core foundation for an institutional framework is well established. As Svedin et al. discuss, for Moldova to fully realise the potential of a democracy and transform into a market economy, an open, safe society is required where transactions are open and transparent. The fact that most activities take place in a closed circle is a barrier, but it can be overcome by increasing stability and reducing risk. Networks needs to open up and trust needs to be developed. Moldova has been independent for 20 years, but democracy does not mean corruption-free. According to Svedin et al, experience shows that it takes 40 years to go through this painful and cumbersome transition but it is possible and change takes time and Moldova can be seen as certainly being on its way.



The thesis by Skogmalm on democratisation, "Demokratisering underifrån: en studie av det civila samhällets utveckling", from 2009, explores democratisation and points to the fact that aid can influence society and ordinary citizens and enable people to become aware of and demand their rights. One conclusion is that a major obstacle is lack of respect for the general public from state institutions, there needs to be mutual respect between the institutions and the general society. Free press and reducing the dependency on donor funds is crucial for a continuously positive development that enables changes on the individual level. The lack of respect for the individual can make donor funding problematic if the resources are only distributed to the state institutions, the focus needs to be both bottom-up and top-down. Democratisation processes take time and a justice system needs to be in place that legitimises the civil society.

In the thesis "Implementation of renewable energy in the Republic of Moldova – society and landscape in transition" from 2010, Kjellberg takes the perspective of society development. It concludes that the greatest potential is in solar energy and biomass, and the forest represents big potential for biomass. In addition, the paper makes the statement that there is not a lot of wind and that wind energy have limited potential. On the other hand, the papers also illustrates the interest for wind energy from the local population in Lozova, where some hills that are now residential areas used to have wind mills. An option is solar panels on roofs on public buildings and private households that could be managed by private companies and leased to the inhabitants. The paper concludes that renewable energy is needed to ensure energy security and supply, but long term planning is made difficult due to political instability and high interest rates. Kjellberg points out that the attitude of the new generation is different and if the same determination is applied to implementing renewable energy that enabled rapid roll-out and uptake of the internet, renewable energy can become a reality very quickly once the decision has been made.

Gunnarsson's et al. thesis from 2010 on "Waste Management with focus Waste incineration with energy recovery in Chisinau Municipality, Moldova" explores the opportunities to use existing waste in co-incineration of waste and sludge. The conclusion is that it appears that it could be a good approach to address the unsatisfying waste management and generate energy although this needs to be approached with a long term perspective. The paper also emphasises that there are renewable energy sources, which are currently not fully utilised, or even begun to put into use. The potential that was estimated in 2005, draws the conclusion that the technical potential in total 113.4 Peta Joule<sup>18</sup>, PJ, out of which solar and wind has the highest potential with 50.4 and 29.5 PJ respectively and hydro 12.1 PJ. The total potential for biomass is 21.5 PJ, where agricultural wastes, fire wood and wood processing represent 16.5 PJ. Biogas and biofuel are merely five percent.<sup>19</sup> The paper concludes that renewable energy sources are still taking the first steps and that deployment and utilisation of renewable energy will contribute to a reduction of dependency on imports.

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<sup>18</sup> 1 Peta Joule, PJ, is equivalent to 1,000 Giga Joule, GJ. The assumption is being made that the authors of the paper meant 113.4 PJ and not 113,4 PJ as written in the paper and that the "." was lost in translation,

<sup>19</sup> The estimates of the potential of renewable energy sources are from 2005, and the source of the table was a result of correspondence over e-mail with Gunnar Olvik at SIDA in October 2009 on the topic of technical assistance to the Ministry of Economy and trade and the energy efficiency agency. NB! These numbers come from the period before the new current Energy Efficiency Agency was in place that is now lead by Mr. Mihail Stratan, who was recently appointed, and before the energy coordination of donor funds started through SIDA together with the Ministry of Economy and Department of Energy Security and Efficiency, the EU-delegation, EBRD, WB and other donor organisations and countries.

Together, these theses provide some insights into the opportunities and challenges that the Republic of Moldova is struggling with in their transition to democracy and a market economy and create an enabling environment for wind and solar energy. The cultural aspects are highlighted and the importance of present international community and active donors in sustainable development and the implementation of renewable energy. The papers on renewable energy and energy recovery from waste also highlight the somewhat different perceptions on what appears to be scattered knowledge of the potential for renewable energy in Moldova<sup>20</sup>. This appears to be true in particular when it comes to the potential of wind energy. The weather makes it difficult to deny the capabilities of solar power given the wine sector. In the next section, the potential for wind and solar energy in Moldova is illustrated based on the “Renewable energy feasibility study” by Todos et al. from 2002.

#### 4.5 Moldova: Promising and proven potential for wind and solar energy

In the feasibility of renewable energy in Republic of Moldova, Todos et al. evaluate and demonstrate the potential of the renewable energy resources wind and solar power, and biomass. The study defines biomass as the residual aspects and organic origin wastes and excludes organic material that can be mass produced in the agricultural sector (Todos et al. 2002, p. 104). There are many challenges with biomass, one of them being the contribution to greenhouse gas emissions, in terms of water vapours, methane, nitrogen oxide, ozone, chlorofluorocarbons and hydrofluorocarbons among others. Programs for industrial biogas installations in villages have proved to be difficult. One such project failed in Romania during the Ceausescu leadership as it required each household or family to act and the habit of collectivism is strong and difficult to break (Todos et al 2002, p.143). Given that the mentality of the former Soviet Union still persists in Moldova, social economic and cultural aspects needs to be considered, people needs to be educated qualified specialists secured. Given the scope of the paper, biomass is not covered here to any extent.

Renewable energy sources represent the safest and cheapest way to produce electrical and thermal energy (Todos et al. 2002, p.19). All technologies are absent of carbon dioxide, CO<sub>2</sub>, emissions, or have a zero sum balance of CO<sub>2</sub><sup>21</sup>. Among the renewable energy sources, technologies producing electricity from wind power and converting solar power into thermal energy and electricity through photovoltaic installations demonstrates the largest potential. Applied in their relevant and specific niche, these technologies compete with traditional fossil fuel (Todos et al, 2002, p. 20). Adoption and deployment of wind farms has shown great potential for large scale electricity production connected to the grid and complement existing electricity production. Solar energy can be used for electricity production, heating and cooling apartment buildings and provide warm water.<sup>22</sup> So far, only small-scale deployments of renewable energy technologies have been carried out and the projects have represented such an insignificant part of the total consumption that the public has been unaware and shown very little interest (Todos et al, 2002, p.20).

Conversion technologies<sup>23</sup> make it possible to turn wind energy into electric or mechanical energy. Solar energy can be turned into electric or thermal energy with solar photovoltaic

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<sup>20</sup> Ronny Arnberg from Borlänge Energi AB has been involved in both papers exploring energy opportunities in Moldova.

<sup>21</sup> In biomass combustion the emitted CO<sub>2</sub> is made up for by the re-growth of plants, hence the net emissions are null.

<sup>22</sup> Author's comment: Mälarenergi has found a way to store solar energy in district heating system and use the brown energy to run white goods and household devices, such as washing machines.

<sup>23</sup> Biomass energy can be converted into electric or thermal energy, this also includes organic wastes.

cells, PVC, and solar panels or collectors<sup>24</sup>. Electricity generation through wind power, solar photovoltaic installations and thermal solar energy show potential to be able to compete with traditional fossil fuel in the right niche. Large scale electricity production has the capabilities of complementing existing fossil fuel combustion, thermal, hydraulic and nuclear power plants by connecting to the network. Photovoltaic cells turn solar energy directly into electricity and solar collectors generates thermal energy for warm water, heating and cooling in apartment houses. Solar energy in Moldova can be used for farm produce drying and sanitary water heating through thermal conversion solar energy, and water pumping and providing electricity to small energy consumers through photovoltaic conversion. Other areas of possible application could include electrical energy production, water distillation, floor space heating, running systems connected to the network, entertainment and vehicles, telecommunications etc.

#### 4.5.1 Wind energy potential

In the feasibility study, Todos et al. point out that different research from time to time has come to different conclusions when it comes to the potential of wind energy based on wind speeds<sup>25</sup>. There are two models to assess wind energy potential, the American NASA model based on climate theory and air current and the EU Wind Atlas Analysis and Application Program, WAsP computer program, applied by EU to develop the European Wind Atlas. Similar maps exist in Central European countries such as Austria, Croatia, Slovenia, Czech Republic and Slovakia. The WAsP takes into data from the past ten years and accounts the actual territories and obstacles of the location in a radius of 50 kilometres estimates wind value, speed and wind direction, climatology to estimate variations between season and the potential for energy production independently of type of air-generator.

The geographical location of Moldova is favourable for wind energy deployment and history demonstrates that the region has successfully utilised windmills across the area. In 1901, there were 980 windmills in Chisinau and 6,208 in Moldova (Todos et al. 2002, p. 34). In 1923, the regional statistics authority in Chisinau evaluated the economic potential of villages and the report show the wide spread application of windmills. The development continued in the 1950s with more than 350 mechanical wind installations, with 6.2 horse-power air motors and many blades, to pump water based on estimated wind speeds of 8 m/s. They were gradually replaced as needed in the 1960s with more modern and cost-efficient electrical systems. The wind energy was slowly pushed out during this time as a result of increasingly large parts of daily life became electrical combined with low price on electricity. The authors point out that articles and research with contradictory and negative views on wind energy were the result of rush jobs without a serious driving force to deploy wind energy and the studies at that time were performed at the Chisinau Meteorological Station which is not representative as it is surrounded by obstacles and wind interfering objects (Todos et al. 2002, p.34).

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<sup>24</sup> Chemical, or photochemical, and mechanical conversion methods are also possible but not included in this paper as they are not commonly used and have not shown the same economic and technical development that is required for mass market uptake.

<sup>25</sup> This is still the case and in the recent thesis by Kjellberg (2010), the conclusion is made early that there is not enough wind speed to use wind as a renewable energy resource.

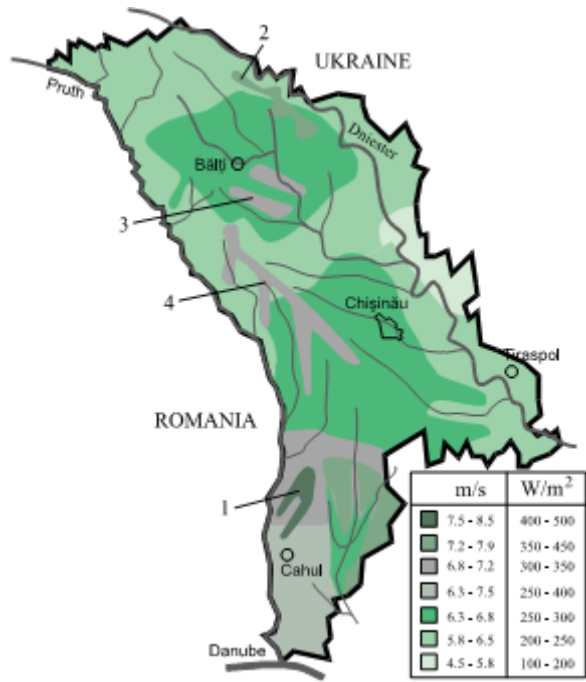


Figure 4-1 The map of wind energy potential of the Republic of Moldova, at the height of 70 m above the ground. Source: Todos et al. 2002, p.37

Wind energy resources have been documented in the southern part of Moldova according to the results below. These measurements could be performed on any territory in the country.

Table 4-1 Highest levels of wind energy resources measured around meteorological station in the southern part of the Republic of Moldova at various heights above the ground up to 200 meters.

Height above the ground in meters [m]	10 m	25 m	50 m	100 m	200 m
Meters per second [m/s]	5.35	6.18	7.02	8.20	10.01
Watt per square meters [W/m <sup>2</sup> ]	171.3	246.1	330.5	503.0	941.0

Source: Todos et al. 2002, p. 36

Wind power generators can be deployed in three different ways, either as an autonomous system providing for the total, closed, electricity consumption required for light, computers, telecommunications and heat; or in combination to feed into the common energy network in parallel and used as fuel in a local energy system; or by deploying a wind farm or wind energy power plant with a large group of generators that delivers electricity to the public network on a commercial basis.

The study highlights that the one key criterion for successful wind energy deployment is choosing the right location with the following characteristics: high average wind velocity, stable wind flow and a dominant wind direction, access to roads and electricity network, price of land, ecological restrictions, air traffic and environmental impact. According to the authors, these requirements are met in Moldova, with the exception of natural reserves. The

cost of land in this case is less important since the optimal locations, or “Mill Hills”, are less suitable for agriculture<sup>26</sup>. Apart from hills, areas around larger water territories may be considered. A strict technical and economic evaluation in the selection of relevant location needs to be performed. (Todos et al. 2002, p. 60).

One kWh of wind electricity directly replaces the same amount of fossil fuel, without the emissions, and directly impacts the need for imported energy and increases energy security and supply. There are some negative effects such as electromagnetic and noise pollution, alienation of panted land and landscape change<sup>27</sup>. These issues are continuously addressed as the technology evolves and noise levels are reduced to the minimum; the challenges of electromagnetic pollution that impacts telecommunications have been solved by replacing metallic blades with pitches, glass fibre and plastic fibre; the space required for a wind mill is shrinking and 90 percent of the occupied territory of a wind farm can be used for agriculture and there has been no negative effects reported on humans or live stock; esthetical design and colour of the wind farm can complete or change a landscape (Todos et al 2002, p. 63). The feasibility study also points to that potential risks that are evaluated by financial institutions in wind energy projects include political climate and currency and credit risks that are directly related to the political stability. Risk of project failure is an important risk factor to secure funding.

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<sup>26</sup> Author’s comment: Even if the wind mill is placed on fertile solid that is being used, it is possible to combine agriculture with energy production as it is done in southern Sweden. It can also create income for the farmer, or reduce energy costs.

<sup>27</sup> Author’s own view is that the wind farms can be beautiful

### 4.5.2 Solar energy potential

Solar energy was already trialed in pilot projects for water heating and greenhouses during the 1950's. The research and development came to a halt when the prices of fossil fuel dropped, in combination with lack of political commitment. Activities were initiated again between 1982 and 1990 with specialised urban projects for kindergartens and factories such as the chocolate factory Bucuria, solar drying plant for tobacco etc. but the technology was poor and badly maintained. In the past, solar energy was used to dry fruit and distill water to produce salt through salt-water evaporation on the former coast line.

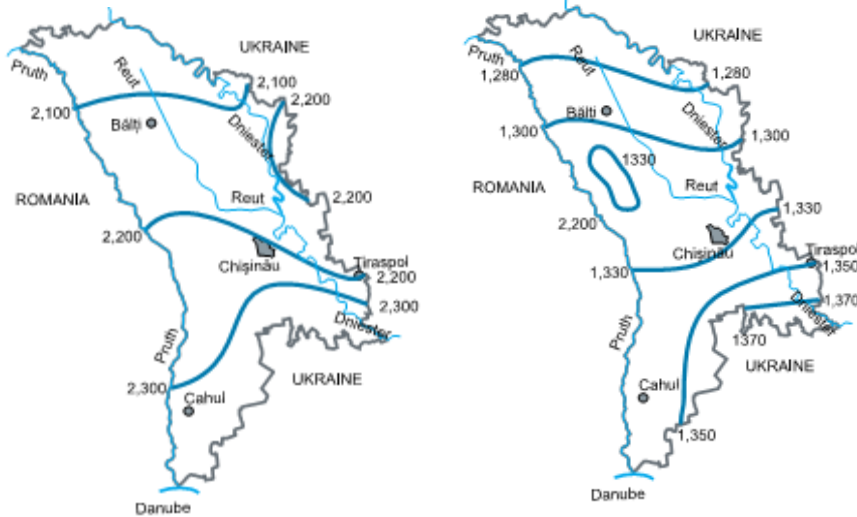


Figure 4-2 Duration of sun brightness h/year (right) and annual values of the global solar radiation, kWh/m<sup>2</sup> year. Source: Todos et al. 2002, p.77-78

There is no lack of solar radiation and most research demonstrates an average of 2,100 to 2,300 hours of sunshine per year in different parts of the Moldovan territory. The duration of sun brightness per year and annual values of solar radiation is illustrated below on the maps, initial source is from Ghidrometeoizsat in 1978 and former Leningrad, now St Petersburg.

Table 4-2 Under conditions of medium cloudiness monthly radiation and duration of sun brightness the central zone of the Republic of Moldova.

Month	1	2	3	4	5	6	7	8	9	10	11	12	Total
Radiation kWh/m <sup>2</sup> /month	35	46	84	129	164	192	189	164	123	78	33	25	1,265
Sun brightness h/month	72	75	133	190	246	291	312	294	230	165	69	55	2,132

Source: Todos et al. 2002, p. 78

The study also discusses different types of technologies that are to be prioritized for wind and solar energy implementation and also looks different suppliers, like Danish Vesta and the US Solar One, at and their solutions. Bearing in mind that research and development have progressed during the past decade, the importance of the feasibility study is not what technology to use or which supplier but to point at the fact that Moldova has untapped

potential in renewable energy sources, the region appears to be well suited for wind and solar deployment and there are capabilities and existing knowledge. Since the entire country is connected to the national grid and have a well developed trolley bus system in town with more than 50,000 inhabitants, there are capabilities to benefit from renewable energy sources across the country – and export once connected to the European grid – and enable a emission free public transport system. This is long term opportunities as the current infrastructure needs to be upgraded r replaced but there is a foundation.

#### 4.5.3 Sustainable development and growth

At the first glance, it appears that electricity production from renewable energy sources is more expensive than fossil fuels. However, if the environmental benefits are taken into account and grants and subsidies given to traditional energy production based on fossil fuels, or nuclear power, a different picture evolves (Todos et al. 2002, p.151).

“If the government would include the external cost in the energy price and would support the technologies that ensure the improvement of the environment state, by the added value/income, all the renewable energy sources would be used, without the delay, at the global level.”(Todos et al. 2002, p.148).

The authors point out that the obstacles that need to be addressed revolve around the institutional framework, legislation and regulation, education of young specialists and the financial aspects. The government needs to commit to the implementation of renewable energy and support the activities to succeed once financing is in place. The implementation of renewable energy would bring social benefits, including new job creation and creating a positive public opinion by creating awareness of energy efficiency and consumption. The evolution of the Moldovan power system would reduce the dependency of the “whims of GAZPROM company” (Todos et al. 2002, p.64).

#### 4.5.4 Two sides of the same coin?

In general, these finding are also supported in the report “Technology needs and development priorities” that was developed under the United Nations Framework Convention on Climate Change, UNFCCC, and published in 2002. The reports covers technology needs in the energy sector.<sup>28</sup> Even if both reports use similar sources and facts, there are two different conclusion indicated in the feasibility study and the report for climate change. In the latter is states that given Moldova’s location “... only some areas on its territory benefit of favourable winds for the development of wind energy systems.” (Technology report 2002, p. 88). The feasibility study states that “... on the country’s territory exist enough zones with favourable conditions for building wind energy (farms) plants...that can generate electrical energy at convenient prices, competitive with the ones generated by classical power plants, especially those, which are following to be built.”(Todos et al. 2002, p. 61).

These differences may be as a result of lost meaning in the translation to English. However, it should be noted that both reports were published in Chisinau 2002 under the project

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<sup>28</sup> During July and August, the document was also available on-line, but the link does not appear to be working anymore: [http://www.energyplus.utm.md/index.php?option=com\\_content&view=article&id=63&Itemid=56&lang=en&limitstart=3](http://www.energyplus.utm.md/index.php?option=com_content&view=article&id=63&Itemid=56&lang=en&limitstart=3)

“Climate change: Enabling activity (Phase II) in cooperation with UNDP and funded by GEF in cooperation with the same actors. In addition, the feasibility study has the disclaimer that “The views expressed in this study are those of the authors and not necessarily shared by UNDP” (Todos et al. 2002, p.2). The report and the study appear to be a response to each other. From the outside, it may be perceived as the feasibility study is an attempt to clarify certain stand points that may not come across in the climate change report and that may add to the scattered views on the potential of renewable energy sources in Moldova. In the feasibility study, it is emphasised that in “...different environments the existence of favourable wind and profitable wind energy potential appears as doubtful for its exploitation in the RM.”<sup>29</sup> (Todos et al. 2002, p.29).

In addition, the authors stress that the repeated, multiple observations and scientific research shows that wind speeds are high enough and there are sufficient relevant geographical regions for wind farm deployments. Both studies point at the importance of establishing a credible, reliable, and internationally accepted wind map or atlas that can help trigger investments and demonstrate the wind speeds across the country once and for all.

#### 4.6 Mechanisms to trigger deployment of renewable energy

Tariffs and incentives are critical to the development. According to Ljung (2007), feed-in-tariffs that enable selling renewable energy to the grid have proven highly successful with the right type of tariff, but subsidies can become a trap between the single buyer and the public when the price on renewable energy drops. Competitive bidding, or tendering where renewable energy producers bid for purchase agreements or access to state managed funds, is another support scheme, and net metering is a third mechanism and a variation on pricing laws that “... permits consumers to install small renewable systems at their homes or businesses and then sell their excess electricity to the grid.” (Mendonca, 2007, p. 15).

EU national support schemes may be grants, tax exemptions, subsidised price, green certificates, tender schemes, reduction on tax for electricity production. Operating support, feed-tariffs, obligations and green certificate regimes turned out to be the most common measures. Feed-in tariffs and premium payment are fixed prices above market price or mark-ups on market price, for domestic renewable electricity that is fed into the grid. The government regulates the support, it is usually guaranteed for at least ten, or up to 20, years to provide certain stable conditions. Both methods can be related to a preferred technology choice. The difference between feed-in tariffs and premiums is that feed-in-tariffs is the total price per unit of electricity while premiums are paid to the producer on top of the market price for electricity. (Oberthür et al, 2010, p.121). The government can require that energy users, producers and suppliers source a certain quota from renewable energy sources. This is usually combined with green certificates that can be traded.

To trigger and enable the establishments of new energy plants and infrastructure development that ease the production and distribution of renewable energy across EU, a cooperation mechanism has been implemented that allows member states to transfer and trade virtual “statistical energy” and cooperate in joint projects across borders to reach targets and comply with the directives. Statistical energy means that it is possible to virtually transfer a certain amount of renewable energy produced in one country to another in order to reach targets. Joint projects can involve co-financing of energy infrastructure to trigger

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<sup>29</sup> RM refers to the Republic of Moldova.



activity. These measures are especially aimed at member states that are in the development phase and lack resources and capabilities. In addition, member states can coordinate their national support schemes in a joint support scheme for green certificates or feed-in tariffs. (Oberthür et al., 2010, p. 133-134).

These mechanisms are also open for third countries like Moldova, the contracting parties to the energy community treaty and the Energy Community to enhance cooperation and joint benefits as well as achieving the targets of 20% renewable energy sources by 2020, also referred to as the triple-twenty targets. The urgency and current momentum in Moldova to become EU members and address the energy situation may enable Moldova to become a green field for renewable energy<sup>30</sup> for EU to further demonstrate the common way forward towards secure renewable energy sources and supply.

#### 4.7 Renewable energy enables energy users take control

The research papers on “Motives for and barriers to household adoption of small-scale production of electricity: examples from Sweden” Palm et al. from 2011 and Kovic’s paper on “Investigating technology transfer projects and institutional development in developing countries” from 2009, shows that energy consumers want to be able to take control over their spending, save money and be able to choose supplier and type of energy.

The motivation for Swedish energy consumers and households to adopt micro-generation of renewable energy is quite strong and, the concern for the environment and being green consumers is a key driver. People like to think of themselves as role models and set examples for others. But it is also a way to protest against the energy companies, being able to choose and move away from energy companies that only wants to earn money and does not care for the household and energy user. It is a way to become independent and utilising natural resources. However, there are still barriers that need to be addressed including regulation that enables households to micro-generate at a lower cost and sell back to the grid. People want to produce their own electricity, become self-sustained and be protected from power failure while caring for the environment and being able to sell excess capacity to the grid (Palm et al 2011).

People want to be able to make a choice and take control over their access to and consumption of energy. This appears to be a common feature across the world, independently of region or political and economic situation. Kovic’s paper, investigating technology transfer projects and institutional development in developing countries and looking at models for feed-in tariffs for individual households, concludes that the approach depends on how well the financial systems and institutions are functioning.

One business model for micro-generation is to offer energy services towards a set small, standard consumption fee in the case when the population is not able to get loans like in Zambia. The energy service companies in this case only operated as the providers and the government owned the equipment. In a functioning market, like Kenya, with a substantial private sector, the energy consumers have choice although many may not be able to afford more than the cheapest service and low-end type of equipment. In this scenario, it turned out to be possible to set up a market model, where the households paid off the loans for the

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<sup>30</sup> SIDA defines green field project as a newly constructed facility.

solar equipment in small, monthly instalments. Accessibility and involvement in the project of the intended user is a key success factor.

The loans were paid back, but it is not clearly stated during what pay-back period. The research was performed in Kenya and Zambia and may appear farfetched – apart from the fact that giraffes, elephants and zebras used to stroll around on the Moldovan land many years ago<sup>31</sup> - but these models have also shown to be working in the US where SunEdison<sup>32</sup> provides energy services and is responsible for the equipment and service delivery all-throughout the contract which runs over 20 years. Sun Edison is now approaching break-even without subsidies (SunEdison 2010). There appears to be no reason for why providing renewable energy services in this manner would not work in European countries like Sweden to trigger mass market adoption and put pressure on traditional utilities. It could be solar or wind energy, but the key is to make it an affordable, safe and predictable investment. The service could also start with leasing the equipment with the choice of acquiring it over time.

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<sup>31</sup> Visit to the national history and ethnical museum Chisinau, August 2011.

## 5 Findings

The findings have been acquired through field research and this time around, 15 personal interviews with 19 individuals were performed. In addition, three organisations have been interviewed over e-mail and phone. The structured survey questions served as the basis for both the structured and open interviews. The questionnaire with the rate it parameters turned out to be surprisingly informative and also functioned as a door opener. One third of the respondents rated the parameters. The information have been acquired though meetings, personal open and structured interviews, communications over e-mail, desktop research on site in Chisinau during the month of July and August 2011. Some information was also collected during the first visit in Moldova in April 2011.

This section describes the findings. The chapter illustrates the role of the actors, their interactions in the energy sector and their environment. According to the ARA model, the actors, resources and activities are linked together in the network through their actor bonds, activity links and resource ties.

### 5.1 The context of the Moldovan energy sector

The Republic of Moldova has since independence maintained the organisation of a democratic state and despite that the majority of the interviewees pointed out that one of the main barriers to change, development, economic growth and energy independency is the political instability. The first hurdle is the current situation with an acting president that initial came from the current opposition, the communists. The acting president was appointed by the parliament after changing the laws for how the president is elected. The coalition now lacks the mandates in parliament to change the law that enables the people of Moldova to elect their president in the Republic of Moldova in the same manner as other republics or appoint a permanent candidate. The opposition recently suggested a new candidate to run for president. The other political hurdle is the situation with the unrecognized break out province Transnistria that controls the gas supply from Moldovagaz. All in all, these hurdles further make foreign investors hesitate and jeopardise becoming an EU-candidate. Reducing the dependency on energy imports reduces the volatility, and locally produces renewable energy and the connecting to the European grid though Romania is a major step forward.<sup>33</sup>

Until now, performed feasibility studies with a positive outcome have failed to be turned into projects and when successful pilot projects have been carried out, they have the failed to scale to larger, permanent implementations.

### 5.2 Actors

The actors that are active and directly or indirectly influence the energy sector in Moldova include the public sector, the international community, utilities and energy service companies and entrepreneurs that are trying to break in and become energy producers, local NGOs and social enterprise type of consultancies and service providers – and in the centre of it all – the energy users.

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<sup>33</sup> A snapshot of current affairs is provided in the appendix.

### 5.2.1 Energy users

The renewable energy users, consumers and future producers, i.e. prosumers, in Moldova are home users, industrial users and micro and small medium sized enterprises, SMEs. The final consumers are the potential renewable energy users. There is a strong difference between energy user and network user. The latter includes generators, distribution system operators, suppliers and final consumers. The energy users are residential apartments and houses, kindergartens, schools, hospitals, higher education institutions, administrative buildings,



various business establishments, institutions and organizations. Individual actors in the general society are everyone and anyone in Moldova consuming energy. From high officials to the middle class and common people to the most deprived. Some pay their bills and some lack the funds. Some have work and other have to find other ways. The gaps between the classes are vast which shows on the very expensive cars on the streets and the complete selection of products in the shops that many cannot afford. The energy bills consume a large proportion of most people's income and stall the economic development and growth. If users are late with their payments, or get disconnected, a personal visit to Union Fenosa is required. The user may also have to pay a hefty reconnection fee of several hundred Euros, before even being able to receive electricity again

*Figure 5-1 The Union Fenosa office where people have to go in person to settle unpaid bills or get reconnected to the network, conveniently located next to an ATM. Photo: Pia Långström, 2011.*

(Entrepreneurs 2011).

### 5.2.2 Authorities

**The National Agency for Energy Regulation, ANRE**, is a legal entity, not being subordinated to any other public or private authority. ANRE provides regulation for activities in the energy sector, issues licences, consumer rights and tariff policy. ANRE regulates the renewable energy market, approves tariffs and develops contracts and issues licenses for renewable energy and biofuel trade and electricity production.<sup>34</sup>

**The Energy Efficiency Agency, EEA**, is the public authority in the field of renewable energy and energy efficiency. EEA is responsible for the implementation of state policy in the field of energy efficiency and renewable energy sources; participation in drafting

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<sup>34</sup> It is unclear who controls and influence ANRE's activities. ANRE was established by the Government of Moldova in 1997. The information about ANRE on [www.anre.md](http://www.anre.md) ends in 2002 and there are no annual reports available apart from an activity report from 2008. ANRE influences the reality of Moldovans to a great extent as they set the tariffs for gas and electricity. USAid supports ANRE in knowledge sharing and cooperation to develop feed-in-tariffs. Close connections to the government mean close connections to Moldovagaz and Gazprom. The responsibility for heat supply tariffs was transferred to local public authorities such as Chisinau municipality in 1999 (ANRE 2011).

legislative acts, programs and national action plans; developing pilot projects; certify training managers and auditors, communication, and consulting central and local public authorities.

**The Ministry of Economy, MoE**, of economy is in charge of business activities energy efficiency and renewable energy and the Department of Energy Security and Efficiency is hosted by MoE as well as the new agency for energy efficiency. MoE is responsible for the coordination of donor activities in the energy sector with SIDA taking the lead in organising all the donor coordination. MoE is responsible for promotion and implementation of the state policy in the energy sector. Moldova is a member of the South East European Energy Community Treaty and the MoE will assume presidency in 2011.

**The Ministry of Environment, MoEn**, is responsible for all issues related to climate change and hosts several areas under its umbrella, including the state hydro meteorological services, activities around nuclear and radioactivity, ecology and geography, geology and mineral resources, environmental information and being the focal point for GEF.

**The State Hydrometeorological Service, SHS**, is part of the Ministry of Environment and monitors the status and development of hydro meteorological conditions and the current quality and evolution of the environment in the Republic of Moldova and is a permanent member of the world meteorological organisations, WMO. SHS's role is to provide credible and accurate information according to international standards that decision makers can rely on. SHS provides meteorological and climate data to local and central authorities, the population, economic agents, national security and international experts to prove and justify the design and creation of long term socio-economic initiatives for sustainable development.

**The Municipality of Chisinau** is very committed to the environment and drives projects for energy efficiency, trolley buses, EU-integration etc. The majority of the residential and public buildings are managed by the municipality, who is a majority owner in Termocom. There is some cooperation with the municipal owned energy company is Sweden, Borlänge Energi<sup>35</sup>.

### 5.2.3 International community

**The European Bank for Reconstruction and Development, EBRD**, contributed to 100 million EUR and is one of the major actors in Moldova. So far all the projects have been successful and the loans repaid without problems. EBRD only finance business or private sector, not individual people, however it is possible for a housing association or similar to form an interest group and apply for a loan as a "company" or enterprise. EBRD utilises MoSEFF consultancy service in the initial evaluation part of a project. EBRD also enables co-financing through a participating bank-loan the local banks, MAIB and MICB and the international bank BCR Chisinau.

**The EU-delegation** has established a local energy donor group and operations for EU budget support in Moldova. The local EU-delegation is very focused on supporting Moldova to achieve candidate status and later on membership. One key area<sup>36</sup> that is being addressed

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<sup>35</sup> Borlänge Energi AB, is a municipal owned energy company in Sweden that is very active in Romania and Moldova. The company's international branch appears to work closely with the municipality of Chisinau. Borlänge Energi is also involved in supporting university students from Sweden writing their thesis on-site. They are involved in youth exchange programmes for a broader Europe and biomass and waste to energy projects. <sup>35</sup>

<sup>36</sup> EU also supports other projects including the development of EU framework agreements, justice sector policy reforms, and confidence building measures, CBM, between Moldova and Transnistria together with Finland, Sweden and UK. The

is the energy sector, 42.6 million EUR has recently been awarded to Moldova for energy security, energy efficiency and technical assistance. The funds will be paid out in three instalments based on performance, according to the fulfilment of agreed, defined criteria in the policy matrix, during the coming 36 months. The objective is to strengthening the institutional capacity and people, provide training and support investments by creating a revolving fund. Develop and consolidate the legal and policy framework, monitor and follow-up. Adopt EC-legislation and energy efficiency directives, and promote deployment of renewable energy. The EU-delegation provides budget support to the local government.

**The Finnish foreign ministry, FORMIN**, is running three programmes as part of a wider Europe initiative for regional cooperation in Caucasus, Central Asia and the Eastern European countries Moldova, Ukraine and Belarus. The focus is on stability and security, trade and development, developing the information society, sustainable development in society and energy and environment. FORMIN cooperates closely with EBRD, UNDP and the Organisation for Security and Cooperation in Europe, OSCE. FORMIN has developed co-operations in Central Asia to develop meteorological capacity and services, and is supporting the connection to the European Grid in Eastern Europe.

**The Global Environment Facility, GEF**, has been active in Moldova since 1994 and has until now, invested around 32 million EUR in Moldova. The GEF focal point for the political and operational roles in Moldova is, since 2008, the minister of environment to ensure control over activities and resources. GEF is a World Bank initiative and managed by UNDP and UNEP.

**The Swedish International Development Cooperation Agency, SIDA**, focuses on aid and coordinates the energy efficiency activities in the donor community in Moldova as the lead donor as requested by the local government. SIDA directly supports the Department of Energy Security and Efficiency under the MoE and the new EEA. SIDA's efforts are noted and appreciated among key stakeholders, the donor community and government<sup>37</sup>. SIDA has committed 110 million SEK or 12.2 million EUR per year between 2011 and 2014 to Moldova<sup>38</sup>, focusing on three sectors: democracy, human rights and equality; sustainable society; and market development to address climate change and promote sustainable and economic development, good governance, transparency, anti-corruption and EU-integration. The energy initiative is part of the development for a sustainable society, the estimated support for 2011 is 3.6 million EUR (SIDA 2011).

**Transparency International, TI**, is the global anti-corruption organisation and in Moldova the main focus is on strengthens the capacity of independent NGOs, evaluates the impact of corruption on the social, economic and democratic development, supports the government to combat and monitor anti-corruption activities and raise public awareness.

**The United Nations Development Programme, UNDP**, manages and drives renewable energy initiatives and energy efficiency projects focusing on using readily available waste straw supplied from local agricultural enterprises, stimulate the market, raise national

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WB, USAid, US, MSIF, Soros Moldova Foundation, Swiss Development Cooperation, the Czech Republic, National Endowment for Democracy and other actors are also contributing to CBM projects. (EU-delegation 2011)

<sup>37</sup> All interviewees pointed out the successful initiative, approach, commitment and accomplishments so far by SIDA.

<sup>38</sup> Accumulated over a four year period the total amount is approximately 48.8 million EUR in total. 1 SEK = 0,11100 EUR. Exchange rate as of September 8, 2011, from [www.oanda.com](http://www.oanda.com).

capacity, ensure sustainability and replication of projects and drive perception for renewable energy by sharing knowledge and results.<sup>39</sup>

**The World Bank, WB**, focuses on government and poverty mitigation, provide strategic advice, government support. The GEF run is also run through the WB, UNDP and the ministry of environment. The WB provides direct budget support to the government and WB and SIDA are reforming the district heating system. The bank is also supporting upgrades of Moldelectricas transmission network and actions are being taken to interconnect Moldova with the Romania and European grid and the gas pipeline.

The energy sector donor family in Moldova includes in total 15 actors from different regions and organisations such as Romania, Greece, Italy, France and the Millennium Challenge Corporation. The major donors are EBRD, EU-delegation, the German Development Cooperation GiZ, SIDA, UNDP, USAid and WB (SIDA 2011).

#### 5.2.4 Academia

**The Academy of Sciences, ASM**, is “an equal partner to the government” with the legitimacy to develop draft laws and strategies. The power institute belongs to ASM and is involved in the development of new laws, norms and strategies. ASM has developed recent reports on solar energy in Moldova.<sup>40</sup>(TUM, SHS and the Government of Moldova 2011.)

**The Technical University of Moldova, TUM**, was founded in 1964 and is accredited by the state. It is the only higher technical educational institution in the Republic and is cooperating with the Royal Institute of Technology in Stockholm, Sweden. Research is conducted by experts in the fields of renewable energy and energy efficiency. Experts at TUM are authors of the renewable energy feasibility study were part of starting up the energy audit centre and are currently involved in large scale wind power projects.

#### 5.2.5 Utilities and energy service companies

The Moldovan energy sector is strictly regulated and divided between different players: **Moldelectrica** is the state-owned Moldovan transmission system operator. **Moldovagaz** is the national gas operator, distributing gas from Gazprom, and in essence only controlled to 35 percent by Moldova.<sup>41</sup> **Union Fenosa Gas Natural, UF**, distributes electricity<sup>42</sup>. The company controls three of the five companies of electric power distribution in Moldova purchasing the total shareholding of I.C.S. RE Chisinau S.A., I.C.S. RED Centru S. A. and I.C.S. RED Sud S.A that all have merged into I.C.S. Red Union Fenosa S.A. Union Fenosa serves 65 percent of the customers with 72 percent of the total supply of electricity (ANRE 2011). **Red Nord SA** is the electricity transmission utility in the Northern part of Moldova

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<sup>39</sup> The total project budget is 14.56 million EUR, allocated by the European Commission (14 million EUR) and UNDP Moldova (560,000 EUR).

<sup>40</sup> The planned interview was postponed.

<sup>41</sup> In discussions, Gazprom’s power position has been pointed out several times. Parallels can be drawn to other post Soviet countries on how influence is executed and pressure put on governments to ensure interest for Gazprom. One example is the current situation in Ukraine where the opposition is accused of making a disadvantageous deal with Gazprom.

<sup>42</sup> Union Fenosa is often described and referred to as a European, Spanish company. In the spring of 2011, there was information on-line connecting UF with Halliburton and there were indications of UF being the only non-US or European company contributing to rebuilding Iraq. This information is nowhere to be found as of September 2011.

and currently involved in a solar power pilot project. Red Nord and Nord-Vest serve 36 percent of the customers with 27 percent of the total electricity supply (ANRE 2011). **Termocom**<sup>43</sup> is a joint stock company, JSC, under the Chisinau Town Council and Municipal Council, owning more than 72 percent of the company. Termocom produce, supply and distribute thermal energy, i.e. heat and hot water.

### 5.2.6 Entrepreneurs

There are private Moldovan entrepreneurs and SME are attempting to move into the energy sector and micro-generate. One example is Project Willpower that is deploying a solar power project together with the Swedish the Growth Board, Tillväxtverket, and Solarus AB to trial new solar equipment and produce electricity that will be sold to the energy company Red Nord. The awareness project is part of the demo-environment commitment, where businesses, governments, municipalities and institutions get the chance to test new environmental technologies in SIDA's partner countries.

### 5.2.7 Financial institutions and banks

The financial sector and banking system does not function very well in Moldova and there are barely any international actors present. Neither companies nor private people will approach the bank for a loan as interest rates are often set to close to 20 percent and long-term pay-back time is often one year<sup>44</sup>. The European Investment bank, EIB, is active in local projects and cooperates closely with the European Commission's Neighbourhood Investment Facility, NIF, and EBRD. EIB has new energy project planned and recently sponsored 90 new trolleybuses in Chisinau. EBRD enables co-financing through a participating bank-loan with two local banks, Moldova-Agroinbank, MAIB and Moldinconbank, MICB, or the international bank BCR Chisinau, a subsidy of the ERSTE group through Romania.

### 5.2.8 Local NGOs and social enterprise

**The Alliance for energy efficiency and renewables, AEER**, is a local NGO-type actor in the energy sector that is frequently consulted in energy efficiency projects. It evolved from the former programme for Cleaner Production and Energy Efficiency in Moldova that ended in 2007 and was run by the Norwegian Energy Savings International, ENSI, USAid and the Alliance to Save Energy, ASE. According to the final report<sup>45</sup>, common areas were identified with ASE to cooperate and develop the revolving fund and the proposal for the energy efficiency agency. ASE in Moldova continued the activities in the form of AEER.

**The Moldova Social Investment Fund, MSIF**<sup>46</sup>, is focusing on developing local communities and capacity; improve social infrastructure and services and creating employment through small scale public projects and enabling micro-business. Cooperates

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<sup>43</sup> The company deployed a horizontal distribution system and individual substations where installed with a grant from SIDA. The residents reduced the heat bills with almost 50% through direct contracts where the consumer is billed for actual proper consumption based on their own personal meter in the apartment.

<sup>44</sup> If the borrower is lucky. Compare this with SunEdison, who requires 20 years commitment for solar panel installations.

<sup>45</sup> The Cleaner Production and Energy efficiency in the Republic of Moldova Status Report December 2007 is available for download here: <http://www.ensi.no/index.php?ledd2ID=721&sideID=93>

<sup>46</sup> Contacted for interview.



with the World Bank and has received financial support from Soros Foundation and the governments of Sweden, United Kingdom, Japan and USAid. (WB 2011)

**The Moldovan Sustainable Energy Financing Facility, MoSEFF**, is a consultancy firm focusing on energy projects and is often contracted by EBRD in the initial phase. Some of the staff at MoSEFF have connections or were involved in the original CPEE in a similar manner to AEER. Cooperating with Fichter project consultants and is Allplan.

### 5.2.9 Media

Media should play an important role, but as a result of lack of free press and access to newspapers and reliable information, the general society rely on word of mouth from people they trust to gain access to important information. This was illustrated when the gas was cut for refurbishment of the pipes, people “just knew”. Many rely on internet, and mass market uptake has been rapid. However, information on-line is also censored and often removed.

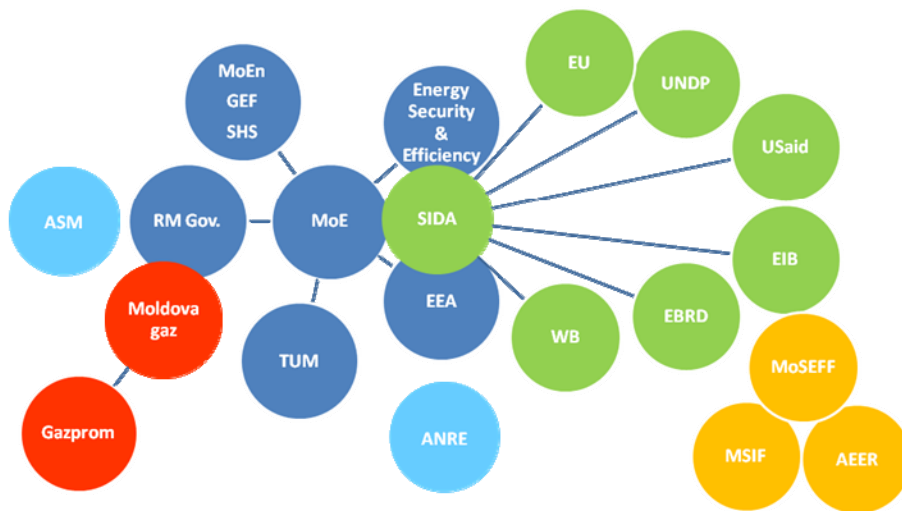


Figure 5-2 A web of key actors in the Moldovan energy sector. Illustration: Pia Långström, 2011.

### 5.2.10 Actor bonds

There appears to be established relationships between most of the key actors in the energy sector. Joint meetings are hosted by the MoE and Department of Energy Security and Efficiency and include the new EEA, ANRE, MoEn, SHS and the international donor community. In addition, local NGOs and social enterprises are often present.

The international actors in the Moldovan energy sector are working closely together and meet regularly, often bi-weekly, more often and have developed a good cooperation for technical assistance in relation to the energy donor group operations (EBRD, WB 2011). The actors are responsible for different segments. EBRD focus on the private sector, the EU-delegation’s local energy donor group and operations for EU budget support and supporting Moldova to achieve candidate status. SIDA focuses on aid and coordinates the energy efficiency activities in the donor community in Moldova as the lead donor. WB supports the government budget and activities to alleviate poverty as well as running GEF together with UNDP.

EBRD does not work directly with, or provide budget support for, the poorest or provide micro-financing for those who cannot borrow. The allocated EU energy efficiency fund of

14 million EUR should be used to help the poorest that have no means to pay: pensioners, people below poverty line and public places like schools. This money should be directed for those with no ability to pay. Others can pay and they should pay their part.

There seem to be relationships established with the financial institutions through the international community and EBRD. The energy companies are involved but the least visible. Termocom appear to be the most open and active player. Academia seems somewhat disconnected and most of the focus seems to be on ASM and some cooperation with TUM.

There are very few NGOs that work for public good and not for profit. Many actors claim to be NGOs for tax reasons. NGO is for public good. One respondent pointed out that the only organisation operating as a real NGO in Moldova appears to be Transparency International, currently focusing on human rights issues (EBRD 2011). There are also smaller niche players in the energy sector like the environmental organisation Gutta-club, that is driving the international school project "SPARE" in Moldova and performing restorations of windows and demonstrating how new renewable energy sources can be used (MoEn 2011). What Moldova needs is commercial business with a good conscious that will bring jobs, pay decent wages and provide EU-adapted working conditions (EBRD 2011).

One key actor appears to be AEER who refers to itself as an NGO. The organisation has become very successful in terms of getting involved in projects and securing funds for energy related. They have become something of a spider in the web, with no real competition. Almost all actors interviewed pointed to AEER in relation to energy efficiency and renewable energy. At the same time, it was emphasised that it is the only NGO in the energy sector. However, the only real NGO present in Moldova is TI, currently involved in improving the justice system and driving campaigns against bribery by promoting famous people who takes a stand against corruption.

Others again pointed out that AEER may appear like a large organisation since they are present and visible everywhere and very productive in producing material on energy efficiency in buildings. Many are not aware of the fact that the training of auditors for energy efficiency in buildings has been continuously on-going at TUM since the programme was terminated. AEER does not cooperate with TUM, although for a period of time there was some cooperation with TUM though the consultancy firm MoSEFF.

AEER promotes their vast experience. They were active in the former Alliance to Save Energy, ASE, project supported by Energy Savings International, ENSI, then continued through the USAID, while working actively in the municipal network for energy efficiency, MUNEE, and more recently through the EU hosted network to manage energy<sup>47</sup>. The president of AEER has experience from building associations through the a republican union for housing development and also participated in the capacity building program under the cleaner production and energy efficiency programme, with the purpose of establishing a centre of energy audits and train auditors on energy efficiency in buildings. The centre was self-sustained by the time it was shut down in the end of 2007 and came very close to establishing a revolving fund for energy efficiency in buildings. During the same period, the first attempt to establish a national agency for energy conservation failed due to lack of funds

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<sup>47</sup> <http://www.managenergy.net/actors/3886> this page is also as close as one gets to an official AEER home-page, with links to [www.aeer.md](http://www.aeer.md)

(ENSI 2007). AEER appear to have kept the responsibility for energy efficiency, but not the cleaner production programme.

### 5.3 Resources

Critical resources that were identified in order to create an enabling environment for renewable energy include both tangible and intangible resources. Political, energy, cognitive – knowledge, information, skills, capacity; technology - including hardware and software; financial; legal rights and legitimacy; are resources that have been emphasised.

#### 5.3.1 Political resources

Government support has been pointed out as they key resource. The government is committed, open and enables access and cooperation to enhance efficiency in use of funds, knowledge and capacity to energy security and efficiency. A lot of emphasis and focus is placed on succeeding with the national programmes and action plans for energy efficiency and renewables. The strategies apply and align to EU policy instruments, legislation and targets in order to sufficiently support and secure the relevance of the measures taken by donor coordinated energy sector working group. One example is the working group and the other is the establishment of the EEA with the objective to train energy managers, auditors and boiler inspectors. The general director was recently appointed and the agency was looking to fill six new positions by the middle of July.

#### 5.3.2 Energy resources

Wind and solar power have not been considered until now as serious alternatives. Gaps in the primary legislation, a weak investment climate and until now, lack of a coherent national strategy for renewable energy are other reasons. There is a lack of information and awareness around how and why renewable energy sources should be utilized for sustainable energy purposes. In some cases, people have thought that solar panels are illegal (MoEn 2011).

Solar radiation and direct reflection is comparable to Africa and Moldova enjoys 60 percent of the radiation in Sahara during the warmer half of the year (SHS 2011). The measurements have been performed at the stations in Chisinau and Codrii. There is potential for both electrical photovoltaic cells and thermal energy generating panels. For small enterprises the biggest potential is to produce electricity, and for consumers to the most feasible is to start producing thermal energy, for heating and hot water. Wind speeds for turbines mounted at above the ground measure from 7 m/s and above, with specific wind energy greater than 350 Watts per square meter (W/m<sup>2</sup>). The most favourable potential areas for wind power installations, with tower heights of 70-95 meters, in Moldova are the heights of Igheciului, the high Nistru river banks, the Ciulueului hills, the central plateau of Moldavia and the regions Cahul and Iaraclia (SHS 2011). The areas with measured wind speeds of 7 m/s are suited for wind farms. In 2000, the strongest wind was recorded at 44 m/s at the Codrii station. Bird routes are monitored to find jet streams. The wind comes from the North West and there are currents of 200-300 km “tail wind” in the jet stream.

#### 5.3.3 Knowledge, information and capacity

Awareness about renewable energy is beginning to spread both in government, business and among the general population much more so now than in 2002. Renewable energy has the

potential to provide 100 percent of the energy supply, not just 25 (TUM 2011). Mandatory legislation, enforcing regulation and capabilities to sell capacity back to the grid in the same manners as busying megawatts is still theoretical but beginning to happen. With local, renewable energy resources and electricity production, Moldova is no longer depending on imports via Transnistria which will contribute to economic and political stability. Regulation is crucial and the donor community plays an important role in making it happen (TUM 2011).

There is local capacity in terms of research and pilot projects, entrepreneurs and academic knowledge that is sometimes not available or shared. There may be a lack of skilled labour since they have gone abroad. The brain drain is a major problem in early transition countries is the brain drain, which many have pointed out in Moldova as well. Young people leave the country as they feel that there are no opportunities.

Ability to self-organise exists in order to achieve common goals that can bring significant benefits over time. To make it happen, people need to be aware of the benefits and develop trust. This implies the necessity of some well organized information campaigns, which should be carried out by competent institutions.

Bankable data that investors can rely on is a resource that is missing and could be solved by the wind map. In the Baltics, a wind atlas was developed by the UNDP and GEF in 2003<sup>48</sup>. The map takes one year to develop and requires that 10-12 meters are mounted on relevant areas for wind energy. The meters are missing and there is equipment need to install the meters on during one year, something like a base station tower or repeater. The wind map was co-planned with the telecom planning in Turkey. A recent map has been developed in Italy, using 200 meters and there is second hand equipment and Volvo trucks ready to be reused. WASP is mandatory for EU countries. The software exists at TUM who has done some initial measurements with one meter. An estimated budget between 150,000-500,000 EUR is needed for the project (TUM, SHS 2011). Wind farms have been successful in Romania and Turkey, with feed-in-tariffs in place. There are clearly investors waiting to start in Moldova, but a proper regulatory frame work is still missing when it comes to take-off agreements to enforce the acceptance and purchase of wind energy to the grid and feed-in-tariffs (EBRD 2011).

#### 5.3.4 Technology

New advanced, efficient and relevant technology has been highlighted through the interviews. First of all, in order to stimulate households to use renewable energy for electricity, heat, cooling, etc. the local availability of renewable technologies is needed. Currently, there are very few suppliers or resellers of renewable energy generating equipment. On the other hand, the population is not well informed about the potential of renewable energy. The energy infrastructure is old and need to be replaced, upgraded or refurbished. One example is the old combined power heat plant, CPH 1, in Chisinau, is located in a residential. It is very inefficient, it is not safe and CPH 2 is running well below its capacity. Suggestions include dynamite or turning it into a museum (WB, Termocom 2011). The distribution and electricity network is currently being refurbished. Termocom thermal heating system is oversized which generates 20 percent of the leakages and the pipes are the

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<sup>48</sup> Retrieved on October 17, 2011, from the renewable energy and energy efficiency partnerships <http://www.recep.org/index.php?id=9353&text=policy&special=viewitem&cid=5>

property of the housing association. It is only possible for a limited number of people in a building to disconnect or the whole system fails. There is lack of available, relevant and affordable solar and wind power equipment. Solarus AB are trialling their new solar equipment in Moldova as the first field implementation and many other vendors or manufacturers want to get involved with their technologies and solutions.

The project is driven by Proiect Willpower in cooperation with Solarus AB in a sports complex, it is a demo-project with the aim to sell 100 percent to the grid and have two separate meters, one for ingoing and one for outgoing watts. The Solarus hybrid solar panels are mounted on a sports school in Drochia, SIDA provides a grant of 2.9 million SEK and the local school is contributing 1.8 million to the project. The grant makes it possible to field-trial modern environmental technology solutions for sustainable urban development and renewable energy. The demo-project connects the recipient country with foreign enterprises. Solarus modular solar thermal collector includes three types of solar collectors, thermal, and hybrid solar-cell panels and the same panel provides both heat and electricity. The solution has 50-70% lower material content than other solar panels, which significantly reduce production costs and allows for shorter pay-back time. Solarus claims that the system enables solar energy to become competitive with traditional energy sources.



*Figure 5-3 The demo-environment sports school in Drochia and Solarus hybrid CPC-PVT-300W system.  
Sources: Proiect Willpower and Solarus AB, 2011.*

### 5.3.5 Financial resources

Financial resources are available in general to the public and private sector. The donor community is committing funds over the next four years. EU recently allocated 42.6 million EUR and SIDA in total 48.8 million EUR distributed across the three focus sectors, which includes energy. Funding appears to be available support the energy sector, SME development and EU-integration. But the poorest have no possibility to get a loan or pay their bills. It was suggested that part of the funding, 14 million EUR, could be made available to implement energy efficiency measures to support the poorest and less fortunate part of the population, since both SIDA and the EU-delegation provide budget support to the local government (EBRD 2011). Micro-financing may take place through EU and SIDA or EIB (EBRD 2011).

It was expressed that financing should be organised and secured for renewable energy projects through a transparent and non-discriminatory approach, when choosing the

beneficiary in the case of a fund managed by public authorities. The conditions and requirements for obtaining the financing should be clearly defined, with minimal bureaucracy. Access to financial sources must be provided and support with drafting applications of grants and loans.

### 5.3.6 Legal rights and legitimacy

The need for trustworthy, reliable and credible regulation has been pointed repeatedly. Lack of funding is not the issue but the general framework is dysfunctional. As one respondent commented, “nobody knows what the tariff is!”(Entrepreneur 2011). The public budget needs to be 100 percent transparent. The existence of incentives or different supporting schemes for small-scale household generation of renewable energy like net-metering would definitely boost the use and adoption of renewable energy by the individuals and private households.

It has been pointed out by several actors that if the general tariffs were increased by one or two percent, wind energy could represent five percent of the total power consumption (TUM, MoE 2011). Critical factors are proper legislation, credible regulation, access to network, full producer rights and feed-in tariffs. ANRE approved the tariff for biogas to be sold to Union Fenosa, the green tariff was set to 10.5 cents versus 9 cents.

Laws that regulate the renewable energy field in the primary legislation and determine the conditions for producers, suppliers and consumers include the Renewable Energy Law 160-XVI/12.07.2007, the Law on Electricity 124/23.12.2009 and the Energy Efficiency Law 142/02.08.2010. To enable wind and solar energy production and consumption, enforcing regulation restricts types, selection, set up and operations of equipment. In addition, enforcing regulation exists that establishes alternative energy tariffs and access to electricity and renewable energy supply. The most important secondary legislation needed to ensure and regulate a working energy market is in place and all acts that regulate the electricity market are applicable for renewable electricity generation (ANRE 2011). There is a regulation on guarantees of origin of renewable energy and a special methodology for the calculation of tariffs for green electricity and biofuels. ANRE is currently working on a National Renewable Energy Action Plan, NREAP, following the template approved by European Commission. Primary and secondary legislation is crucial for a liquid, flexible market. Secondary legislation helps ensure a fully functional market, by setting specific rules, mechanisms, requirements and schemes. EU’s new renewable energy directive 2009/28/EC is being included directly into the legislation (MoE 2011).

The tariff-scheme is the hot topic today, and the current approach for renewable electricity is that all expenses incurred by an entity, which operates a renewable power plant must be fully covered by the tariff, while offering a reasonable return on investments. ANRE<sup>49</sup> approves the tariffs for investors based on information provided. An amendment to the existing renewable energy law will replace the old approach and the feed-in tariff, FIT, scheme will be based on technology and capacity. The FIT will be included in the law and adopted during 2012 to enable reduce investment risks. Currently, this seems to be the most efficient scheme, taking into consideration the peculiarities of our country. There were some discussions about the possibility of tradable green certificates but this mechanism will not work properly, since the electricity market is not fully deregulated. The liberalization of the

electricity market will take place in two stages, for non-households by 2013 and for households by January 2015. (ANRE 2011)

Once a foreign company is successful in finding the right labour and getting all the pieces into place, the final barrier may be access to land or location in the first place. Access to land can be solved by legislation and enable renting or buying. A wind turbine does not require much space, 20 turbines requires less than one hectare spread out over an area of 50 hectares or more precisely 0,75 hectares or 1.5 percentage of the total area (TUM 2011). The importance is to get access to the right location. Rent-seeking may be an issue after the company is established which makes the business environment unstable and eventually the enterprise may go out of business due to rapid rent increase (EBRD 2011). This barrier is to be expected once real, large deployment of solar and wind farm are becoming real. One way is to buy the land. This was done by the European car manufacturer BMW to produce wire and cables in the Balti region. The plant employs around 5,000 locals; it runs smoothly and is very successful. The local people are happy to have stable, safe jobs with EU-standard working conditions (EBRD, Termocom 2011).

### 5.3.7 Resource ties

Resource ties are few and evolve mainly around access to funds, EU-integration and the energy sector working group. Adaptations and regulation are driven by the international donor community and government. Information is not shared and knowledge about the capabilities of renewable energy sources is scattered if available. Human capacity is not being utilised. Positive developments and experiences are not shared. Innovation is stalled and inefficiencies are present when it comes to resource use. There appears to be inefficiency in resource use and adaptations that a heritage from the history. Successful pilots or feasibility studies have need been replicated and utilised. Access to funds is not the missing the problem but instead what actually happens to the funds once they are allocated. There are cluster of actors that appear to have the majority of the access to funding. Resources may be tangible or intangible, but that may also been said for the resource ties.

## 5.4 Activities

Critical activities that have been identified in order to create an enabling environment include synchronisation and joint activities between actors to enable governance and setting a common the agenda, developing policy and enforcing regulation and mechanisms, hands-in implementation to involve the energy users and inspire collective action for joint benefits.

Enforcing regulation and relevant technology are the most important factors to deploy solar and wind energy. When it comes to choice of technology highly efficient wind turbines, solar panels and cells that meet economic efficiency criterion were emphasized. Some respondents stressed the importance of advanced high-end cutting edge equipment, other the economic aspects. Ideally, the equipment should be efficient from an energy production and economic perspective and compatible for the future. To create a renewable energy market, the possibility to easily access, connect, integrate and sell to the grid based on clear and beneficial market rules in a stable economic environment is crucial. Ensuring access to relevant locations, with proven solar and wind potential, according to local feasibility studies and meteorological data. The creation of a wind map is crucial to select the location and also provide investors with reliable information. Regulation is critical to provide incentives for renewables, non-discriminatory access to the grid, clear and transparent licensing procedures, clear and transparent market rules, a well defined grid code.

#### 5.4.1 Hands-on implementation of renewables

The working group for energy sector coordination is established and appear to be functioning well. Cooperation is on-going together between the government and all the major donors and actors in the energy sector. Currently, there are many on-going activities by many actors. One of the most exiting projects is a large scale wind park with capacity of 100-200 MW (MoE, TUM, SHS 2011). UNDP is driving a biomass project for using exiting straw agricultural waste and burn for thermal heating in the rural area. The project includes the entire community entrepreneurs become energy producers for the benefits of the communities. An end-to-end programme is set up around the project to inform, educate, maintain and replicate in other projects (UNDP 2011).

EBRD has performed successful renewable and energy efficiency projects in Bulgaria and those experiences are leveraged on to set up a revolving, self-sustaining fund. There has been a trial in Chisinau in an apartment building where a wind turbine was installed on the roof to produce electricity for lights in the hallway and solar panels to produce hot water. For unknown reasons, the project failed, despite the same kind of projects being successful in Romania (TUM 2011). There is a new building down town Chisinau near the train station with solar panels on the roof but it appears to be a private dwelling<sup>50</sup>. Two additional solar power projects are being initiated for apartment buildings in Chisinau. A Chinese solar panel company is looking to set up a factory in Orhei. A Japanese funded project to micro-generate energy in a hospital with the capability to sell the equivalent of 20 percent of consumption to the grid.

For micro-generation in households, subsidies and stimulations like tax credits and financial support need to be in place. Smaller commercial projects are sponsored by EBRD and EIB to support the government.

The Ministry of Economy and the department of energy security and efficiency has recently initiated project on renewables together with EBRD, it is an eight month long project that will identify what needs to be done and a road map. Feed-in-tariffs needs to set and access to the grid ensured for producers. One way is to set a fixed tariff to enable competition, as the tariffs are likely to be higher than fossil fuels. A draft for feed-in tariffs will be done during the autumn.

#### 5.4.2 National action plans

The National Energy Efficiency Program, NEEP, sets the priority policies and actions that shall be implemented 2011-2020 in order to address the increasing energy prices, import dependency and climate impact of the energy sector (EEA 2011). The program focuses on energy sector improvements and renewable sources to diversify the energy mix and increase the use of renewable energy. The implementation is ensured through the national actions plans for energy efficiency and renewable energy. The plans are updated and approved every three years and include technical developments and adoption of EC directives.

By 2020, at least 30 percent of the energy mix should come from renewable energy sources. According to the NEEP, primary energy consumption and GHG emissions should be reduced by 20 percent respectively by 2020. The share of renewable energy should increase

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<sup>50</sup> Tried to visit the building and get more information from the ministry of construction, but they were not aware of any such projects.



from six percent in 2010 to 20 percent in 2020. The target for 2015 is nine percent. The share of bio fuels in the energy mix should by 2020 reach at least ten percent. Current hydro power and biomass consumption is around five percent. Today, biomass is commonly used in the rural areas but has not been accounted for as systematic ways to measure need to be developed (MoE 2011).

The action plans align with the EU-directives and states that access to should be enabled for new energy producers and energy service companies. The Moldovan government implements the objectives and establish priority directions of the state policy to enable renewable energy sources. Local electricity suppliers and distribution system operators are obliged to accept and acquire all the renewable electricity produced according to a predetermined share of electricity depending on markets share (ANRE 2011).

EU and Sweden support the approximation to EU standards and legal framework, assist in the energy strategy and development of and national programmes and action plans for energy efficiency and renewable energy.

#### 5.4.3 Energy commitments and joint activities

Following the announcement of close to 100 million EUR from SIDA and EU over the coming four years, intense activities and negotiations are on-going to agree on relevant and feasible commitments and deliverables. The targets need to be strict enough to make the required change but doable to ensure optimal outcome given the complex political environment. Creating public awareness is crucial for a successful outcome. The technical requirements of the grid need to be evaluated and technical assistance will commence during 2011.

The local EU-delegation in Moldova has identified the energy sector as a key-priority. The European Neighbourhood and Partnership Instrument, ENPI, is bilateral national indicative programme for 2007-2013, with a budget of over 273 million EUR, prioritising governance, rule of law and fundamental freedoms. The INOGATE programme enables and support cooperation in energy policy development between the European Union and the partner countries in Eastern Europe, Caucasus and Central Asia. There are currently on-going projects across the region to identify and promote energy efficiency investments, energy market integration and sustainable energy, capacity building for sustainable energy regulation, and energy savings in the building sector. Through the Covenant of Mayors<sup>51</sup> initiative signatory cities and local governments commit themselves to go beyond the 20 percent objective of carbon dioxide, CO<sub>2</sub>, emissions reductions. So far, 14 cities in Moldova have signed up and small-scale pilot-projects are being initiated. Support is available for signatories lacking financial and technical resources. Full institutional support is provided by the European Commission, EC, and Committee of the Regions, the European Parliament and the EIB. Currently, small-scale partnership pilot projects are being initiated with the covenant signatory cities.

In addition, EU has allocated 126 million EUR for cross border cooperation, CBC, connecting the gas-pipeline between Moldova, Romania and Ukraine during 2007-2013. The interconnection project includes a feasibility study and a pipeline between the border cities Iasi in Romania and Ungheni in Moldova. A programme is on-going to establish a

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<sup>51</sup> The Covenant of Mayors is the mainstream European movement involving local and regional authorities, voluntarily committing to increasing energy efficiency and use of renewable energy sources on their territories. By their commitment, Covenant signatories aim to meet and exceed the European Union 20% CO<sub>2</sub> reduction objective by 2020, retrieved on August 29, 2011, from [http://www.eumayors.eu/index\\_en.html](http://www.eumayors.eu/index_en.html)

foundation for renewable energy mass deployment and uptake solar energy and efficient use of biomass from agricultural wastes. The project includes proof-of-concept demonstration pilot projects to promote renewable energy and sustainable development strategies. The project is implemented by MSIF and the allocated budget is 2 million EUR.

Sweden is the lead donor in the energy sector and focusing on supporting small medium size enterprises and enabling people to influence their energy usage and bills for sustainable development. SIDA educates energy users to express demand and make politicians, authorities and institutions accountable. Through joint stakeholder cooperation, energy sector planning and agreed energy strategies, priorities are set and clarified for investments to minimize the arbitration and corruption in decision making.

Despite two decades of independence, existing Soviet standards and legislation still create barriers for market competition and regional trade. Hence, the SIDA donor support is aimed at helping set the legislative and normative framework, create a financial environment for the private sector and SME and larger enterprises, triggering the ability to turn ideas into action by developing the entrepreneurial culture and management in the business sector, and enable an internationalisation and a competitive energy market. The approach is to prioritise investments and deploying relevant activities at the right time. Sweden is, together with the Ministry of Economy, the Department of Energy Security and Energy Efficiency and the Energy Efficiency Agency and EU, increasing the capacity to implement and monitor results. EBRD, MoSEFF and Sweden are cooperating on supporting the private sector by enabling access to capital and secure energy supply to create a function local market for enterprises. Together with EBRD, USAid develop an entrepreneurial culture and turn ideas into action. Together with EBRD, EIB and EU enable internationalization and create a competitive energy sector to reduce the cost and increase security of supply by market by improving interconnections. ANRE is setting the prices to attract investments and new markets are explored for renewable energy sources and feed-in tariffs.

In Moldova, EBRD supports the development through the technical assistance and business advisory services. The business advisory services, BAS, work directly with private enterprises to adapt to transformation into a market economy by providing industry specific advice in as an example energy efficiency and environmental protection. The funding is partly covered by EBRD, bilateral donors like SIDA or multilateral donors like GEF. The EBRD business advisory service helps companies - micro, small and medium sized enterprises - identify business and consultancy needs in order to get established. The average grant is around half the project cost and max 10,000 EUR for local consultancies. The purpose is to help organisations get used to procuring and working with consultancies. So far all 70 consultancy projects have been successful. SIDA finance 70 percent and the funds are released once the project has proven successful and after the final audit. EBRD directly finance technical assistance in energy sector through MoSEFF consultants who help screen and evaluate potential projects. One example is a project to swap boilers, where MoSEFF performed an initial on-site survey and then hands over to by EBRD appointed experts<sup>52</sup>. Another is the recent Orhei juice company, where EBRD recently installed a new boiler, which was financed through EBRD credit line and cooperation with MoSEFF. A new project focusing on

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<sup>52</sup> Sometimes there is a lack of skilled labour since they have gone abroad. A major problem in early transition countries is the brain drain, which many have pointed out in Moldova as well. Young people leave the country due to lack of opportunities and in Moldova some feel that young people are not appreciated. To address this issue, EBRD are also working with business incubators and initiatives for young entrepreneurs.

renewable energy and feed-in tariffs has recently been established, the report should be ready early 2012 to be able to adopt EU standards by the end of next year. Yet another example is the project to develop energy from alternative sources in Moldova, where EBRD helped establish biogas Inter to produce energy from biogas emitted from the organic landfill in Chisinau. In 2008, the annual income was 450,000 EUR and the electricity produced is delivered to energy consumers through the national grid. EBRD has succeeded with renewable energy implementation in Bulgaria, and these experiences are now being reused in Moldova. ENSI also have successful outcomes from creating self-sustaining revolving fund for energy efficiency in buildings that can be re-used in Moldova. EBRD applies strict procurement policy and rules and have defined enforcement mechanisms, policies and procedures to combat fraud and corruption in EBRD projects.

#### 5.4.4 Activity links

The activity links are quite strong in the energy sector working group and cooperation seems to be flowing. All actors have praised the progress SIDA has enabled and the commitment of the MoE. Outside the core group, there seem to be weak or inexistent links. The strength of the links seems to be related to international presence and evolve around the donors and their activities. SIDA emphasises the importance of the involvement with the local community and some campaigns are taking place. Most are aware of that Sweden and EU are providing funds but apart from that, involvement is limited to the people that benefits from pilot projects, like the UNDP straw waste initiative. There may be a risk of appearing disconnected from energy producers and energy consumers if the core activities evolve around the government and international community. On the other hand, giving the environment, people are used to not being involved due to lack of trust. Once there is real momentum in the projects and it becomes possible to “copy-paste” there will be proof-of-concept pilots to point to as examples of what is possible.

Currently, the individual energy consumer is only involved with the energy provider in their local area, to the extent of receiving energy and bill payment. It is not clear to what extent the energy companies are involved, may it be reactively or proactively. Red Nord appears to be at the forefront and Termocom showed interest in using solar energy for thermal heating. Renewable energy is an opportunity and may be perceived as a threat for energy service companies in a deregulated market. Deployment of the renewable energy market should not represent a threat for companies that operate in the energy field. The regulator, ANRE, monitors the activity of regulated utilities and, by adjusting tariffs for authorized activities such as energy services, all costs incurred by utilities are fully covered so that they do not experience losses when providing these services.

## 5.5 Network

The Moldovan energy sector is a complex mix of different actors and their visible and invisible interconnections and dependencies. Through their past, present and future interactions, actor webs, resource constellations and activity patterns are formed.

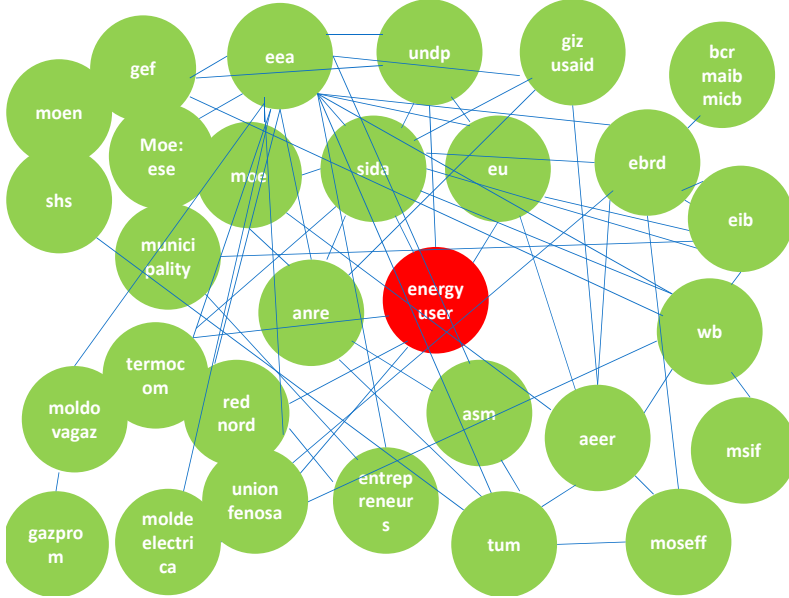


Figure 5-4: A snapshot of the map of the actors in the Moldovan energy sector and their connections.

Source: Illustration by Pia Långström, 2011.

Above is an attempt of a snapshot of actors that can drive – or halt - an enabling environment for implementing wind and solar energy. Key actors have been identified to central and local authorities, the donor community, academia, financial institutions and energy users and consumers that may become prosumers given the right conditions.

## 5.6 Comments by the respondents and interviewees

The respondents, 19 individuals representing 15 different actors, in the energy sector interviewed were asked to list the top five critical barriers that need to be removed. Depending on their role in the sector, different barriers were highlighted. Most mentioned more than five areas and many were common and repeated several times.

The most critical barriers are:

1. Soviet thinking
2. Regulatory barriers
3. Affordability of renewable energy
4. Access to the network
5. Tariff – cost recovery levels

One barrier that the international community expects is rent-seeking for land, once a wind or solar project is deployed on leased land – or any other type of business for that matter. This view was shared by some local actors; others did not foresee that it would be a problem. Other obstacles included cultural barriers, project applicability, operating facilities, knowledge and experience, lack of awareness and payment schemes. Legal barriers, legislation and equal

justice, and reliable “bankable” all add to the financial barriers generated by a nonfunctioning financial sector that influence the investments. All these barriers are related to the hurdles caused by the political instability and economic climate. The following comments below were made by the respondents.

**Investment climate:** Proper legislation and enforcing regulation needs to be in place, and in particular when it comes to renewable energy and feed-in-tariffs. Transnistria needs to be resolved through regulation to enable energy independency and EU membership. There is a lack of proper regulatory frame work for wind farms when it comes to take-off agreements. Despite the law stating that energy companies are obliged to accept and purchase micro-generated wind and solar energy for distribution on the national grid, the law is not yet enforced. The regulation on excess capacity sold back to the grid is unclear as well as the actual feed-in-tariffs. The existing law on renewables appear general, and as a result contributes to an uncertain investment climate. The lack of wind map, providing “bankable data” and proof-points for solar and wind potential to make investors feel comfortable.

**Cost and price:** The cost for renewable energy needs to be compared with the price of energy dependency and imports. It is unclear what the actual final price for wind and solar energy will be and what the consumers will pay. Relevant price comparison with traditional fuels where subsidies and other discounts are removed and sound measures for investments over a longer period of time is considered. Concrete discussions on subsidies for renewable energy, final tariffs, final price and proofs of wind speeds are missing.

**Energy users:** Awareness and information was also mentioned, and there is a lack of state programs for promotion of renewable energy production and usage and a general understanding of what renewable energy is and why it is good. Campaigns targeting the population of Moldova regarding renewable energy are needed. There is no technological and commercial experience from renewables.

To explore possible patterns and support, or contradict, the findings, the interviewees were asked to voluntarily and anonymously rate a set of parameters in relation to their level of importance for successful deployment of renewable energy and to what extent they currently exist today in Moldova from the perspective of general society, economic system and market, and political system and authorities.

The most important factor is equal justice in front of the law, which also shows the biggest gap in comparison to the current situation. This is closely followed by the importance and lack of regulation to enforce existing legislation, a free market for energy sector, banks and business; affordability of energy; transparency of political system and authorities and energy security, service and supply. Critical parameters are also being free from of corruption, functioning financial institutions, cost efficiency; willingness to pay, law, knowledge capacity and accessibility to funding and loans. In addition, a couple of parameters stand out. In the general society, absence of fear and freedom as well as trust in other individuals was not rated as very important and neither do they appear to exist. The same appear to apply when it comes to the economic system and market in relation to trust between actors and individuals, stability and ability to improve. It must be stressed that these parameters only provides a snapshot of a possible pattern. So far, around a third of the interviewees have rated the parameters, most appeared pleased to that the questions were asked. The impression was that the information sharing became more mutual and sincere, possible as the selection of parameters portrays a certain perception of the current situation and it may have opened some more doors.

## 6 Analysis

This section analyses the actor webs, resource constellations and activity patterns that have formed as a result of the interactions between actors in the Moldovan energy sector network to gain access to critical resources by performing various activities over space and time according to the ARA model of the interaction process. The impact of individual choice is critical for how the interdependencies evolve and are analysed based on the ideas on collective actions. The individual actor plays a crucial role in the interaction process to create an enabling environment to implement wind and solar energy in Moldova. Interdependencies develop through the interaction process and impact an actor's ability to interact on the behalf of their counterparts across the network. One actor influences all the other actors in the network and everyone else's access to resources, and how these resources are shared and combined. Lack of or limited interaction impacts the opportunities vice versa, and as a result limits the possibilities for actor webs, resource constellations and activity patterns that evolve. Current interactions and interdependencies impact future opportunities.

### 6.1 The context of the Moldovan energy sector

The economic situation of the Republic of Moldova, as well as the political unrest represents one of the most important factors for past project failures. Historically, projects have failed mainly due to lack of finance, consideration of and reliance on fossil energy and Soviet way of thinking. The local investment climate does not offer enough guarantees for a potential investor to ensure that there are possibilities to cover all costs generate reasonable return on investment long-term.

Many pieces of the puzzle to create an enabling environment for renewable energy appear to be falling into place, at least on a surface level. Progress appears to be fast, triggered by the donor community and government commitment, in particular by the MoE and MoEn who are bravely pursuing the goals and are open to share information<sup>53</sup>. Still, it is a sensitive topic, and the Ministry of Construction did not feel comfortable in sharing any information and denied any on-going activities for solar energy in buildings.

Since Moldova lacks any energy resources apart from renewables, the most intriguing aspect is what appears to be the denial of, or propaganda against, capabilities for wind and solar energy in Moldova. The most logical explanation is that these activities to keep control over the energy resources are carried out by those who gain on the situation – Energy exporters to Moldova and political interests that want to keep the country land-locked and far away from Europe. The measures taken during the summer to restrict foreign visits is certainly a step in the wrong direction and send strong signal to the Moldovans and international community. Independently of the reasons behind, the perception that renewable energy sources are not sufficient or possible, or affordable is wide spread. This view may not be shared, but disagreement are not communicated openly until know, with great caution to add. In the end,

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<sup>53</sup> Link to article triggered by MoEn on the importance of making wind and solar energy happen [http://www.eco.md/index.php?option=com\\_content&view=article&id=2050:rm-are-probleme-la-capitolul-energetic&catid=98:conomie&Itemid=469](http://www.eco.md/index.php?option=com_content&view=article&id=2050:rm-are-probleme-la-capitolul-energetic&catid=98:conomie&Itemid=469)

the energy dependence on imports impacts the entire country and all actors in the energy sector.

In the end, it is the energy users and people of Moldova that bear the cost and pay the price. Moldova has accumulated a huge debt of more than 12 billion EUR<sup>54</sup>, or to 200 billion MDL, to Moldovagaz and Gazprom (EBRD, WB, MoE 2011). If the average monthly salary in Moldova is 3,556.8 MDL/month, is equivalent of 42,674.4 MDL/year or approximately 216 EUR per month and 2,595 EUR per year. The debt of 12 billion EUR spread over the population of 3.6 million equals a debt per capita of around 3,333 EUR, which is almost 30 percent more than the annual income. If every single Moldovan citizen of all ages had the average same salary used it to pay off the debt it would take almost 15.5 months.

There are many interested companies and investors ready to “go wind” once there critical hygiene factors are in place. There are already feasible business cases and success stories from other parts of the world. One respondent pointed out that all the pieces are now falling into place, but it is now up to the locals how they want to have it. Other former Soviet countries have experienced similar challenges with mal functioning banking and justice system, such as former Czechoslovakia in the 1990s, and still managed to make the transition.

## 6.2 Individual choice

In the interviews, many have referred to that the problem is the remains of the Soviet culture – Soviet mentality and way of thinking. Given the low salaries and the fact that people do appear to be doing ok, there is obviously “creative income generation” and it appears that one common way is to report on visitors and foreigners which was noticeable in relation to both visits. It can also move to more extremes, and as one interviewee put it “the system makes people evil”. Still, everyone has a choice so when long-term gains are discounted for short-term small personal wins, that indicates that people cannot imagine what is possible for them and that hope is running out. Experiencing all the commitment, there is certainly hope and great ability to realise the change and become EU members.

Lack of trust and individual choice impacts the interactions between actors – organisations and individuals – and their relationships. As every actor is the centre of its own network, the interactions with actors in their own network - that in turn may be linked to other networks - determine the scope of the network, freedom to act and obligations or restrictions for each actor. In this situation, the Soviet mentality is limiting the possibilities and it is the reason for why the actor bonds, resource ties and activity links are limited. In many cases actors are either locked in, or blocked. The result is visible in the scope of the resource constellations, actor webs and activity patterns that have developed over time.

## 6.3 Interaction process

### 6.3.1 Actor webs

Actor web are forming and it appears that a community with common goals and interest that working closely together to evolve transform the energy sector. The so far, successful outcome of the initiatives from the government to appoint SIDA to coordinate donor activities and the newly established EEA seem to have created a closely connected working

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<sup>54</sup> According to allmoldova.md on August 16, 2011, see appendix 10.1 for details.

group to address the energy challenges. The government, EEA, SHS, and the regulator ANRE, the international community with SIDA, EU, UNDP, EBRD, WB and the rest of the donors seem to have developed a close network. SIDA, UNDP and EU are cooperating to create awareness and involve the ordinary people through campaigns but also direct energy enhancement projects.

Apart from the energy working group, actor webs appear few and small, if in existence. There seem to be clusters of organized webs that have evolved from historical constellations and that are limiting cooperation across network interactions with other actor webs. This appears to be the case around the NGO-type of organisations and consultancy services.

As a result of the somewhat isolated actor webs, there are limited flows of information and knowledge sharing. Academia seems to be kept somewhat on the side, there is some cooperation with ASM but TUM in particular seems to be underutilized. This may be a result of historical bonds that have evolved over time, new actors and individuals may partly be excluded due to the lack of trust for the unknown and not knowing who the actors are, and what bonds they in turn have developed. Partly, it may also be a result of actively excluding some actors to gain benefits and access to limited resources. Actors appear to be connected in visible and less visible ways or not at all.

The donor community seems to play an important role in triggering changes and can possibly open up the network further as the cooperation evolves and the level of mutual trust develops. There are set routines in place, the actors are beginning to know and trust each other and as a result change is beginning to happen. The challenge now when the energy sector working group is taking shape, is to avoid co-evolving into yet another small disconnected actor web. Dare to open up for interaction and joint activities with new actors and dare to disconnect from others. Enable trust by developing a relevant, closely connected core group with open information and knowledge exchange that together manage external interference and act as the tiger team it appears to be. Leveraging on external sources and key-actors but make a clear distinction between the roles of the different actors and where they fit depending on position and interest in the working group.

The web of actors that have evolved over time looks skewed somehow. This is a complex area with many involved actors and a situation that impacts everyone on an individual level. The network is small and actors appear isolated. Apart from when it comes to AEER. All but two interviewees made strong recommendations. It is like the expression “all roads lead to Rome”. Those who did not, appear to have come to learn more about this specific actor<sup>55</sup>. Independently of the reasons, it does not seem appropriate or professional to involve an organisation that is a beneficiary of donor funds and most view as a consultancy company to such a large extent as appears to be the case. In the business world, consultants are kept outside the door until a decision has been made.

The role of ANRE is unclear and in particular when it comes to influence over tariffs from the government and gas suppliers<sup>56</sup>. Some claim that nobody knows what the tariffs are and that progress is slow, but it appears that things are beginning to change. ANRE appears to be an accepted actor that is mentioned as a key player that covers its niche. The costs and

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<sup>55</sup> During the interviews there was a feeling of enforced recommendation of AEER. Some emphasised that this was the only NGO type of player in the field, or the ONLY ONE altogether.

<sup>56</sup> The communication with ANRE exceeded well beyond expectations and the organization has been extremely helpful and proactive in providing feedback.



accumulated debts to Gazprom and Moldovagaz are keeping the country in a grid lock and cul de sac which enables Gazprom to lobby and influence political decisions through their price setting mechanisms.

### 6.3.2 Resource constellations

As a result of limited interaction between the actor webs in the energy sector, access to resources are limited and depends on what constellation an actor belongs to, if any. The resources seem to be scattered, hidden – or covered, and limited capabilities to utilise and combine unique, scarce resources.

Little knowledge is shared and few adaptations have taken place between the actors to combine their resources. A typical example is the common understanding and agreement of the importance of a wind map. Some think the map should be paid by the government, while the international community does not seem to understand why.

Funding appears to be central and most of the constellations for knowledge and capacity sharing evolve around allocated budget from the donor community. The government and the donor community appear very committed and have developed routines but there are others who want to gain from the available resources and try to gain access. Sometimes this is good as new innovations may evolve but it may also disturb and reduce the capabilities if the combined resources to develop joint benefits by using each actors unique resources.

Access to funding has not been highlighted as the real issues for why previous pilot projects have failed, although funding has run out. On the contrary, it has been expressed that funding is available, or at least possible to source, but it has not been clearly explained from where the funds come and for how long they are made available.

Like in the case of most European energy markets, the energy sector in Moldova needs to open up for competition to enable consumer choice of supplier and type of energy. The same process for deregulation that took place in the European telecom sector, and successfully so in Moldova as well, needs to be initiated to enable new actors to enter the market and the developments of new business models and offerings towards the energy users. Moldovans may want other alternatives than UF and Termocom but that is also the case in Sweden where one of the main drivers for consumer interest in micro-generation was the possibility to be able to reduce the dependency on energy companies. Deregulation is a prerequisite for a functioning market where energy users can choose suppliers and become both producers and consumers - prosumers – that micro-generate energy and produce electricity that is sold to, and accepted by, the grid. In theory, prosumers can be anyone who produce and consume energy, in reality it is likely to take much longer time for the less fortunate part of the population such as the unemployed or retired people. At least if the funding is not organised and covered from the very start and running over a longer period of time to enable more than a pilot project. A successful business model for sustainable development for the poorest would be a giant leap forward<sup>57</sup>. The change appears most likely to happen in the enterprise segments and among the high earners or richer part of the population and the younger generation with higher education that has spent time abroad and

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<sup>57</sup> Termocom is stalling the heating season this year until 90 percent of the bills have been paid, eight percent is still missing and perhaps the majority owner Chisinau municipality will cover the rest. In 2010, Termocom turned on the heat on October 7 according to allmodlova.md retrieved on October 16, 2011, from <http://www.allmoldova.com/en/moldova-news/1249051474.html>

accumulated some funds. The early adopters that perceive micro-generation as prestigious and that can afford the investments and maintenance.

When it comes to public procurement and spending tax money, there are strict rules that can be applied to ensure competition. Perhaps active measures need to be taken to help set up a competitor, but for the sake of the donors and people of Moldova this issue should be addressed. If one actor has been involved in many projects, most have failed, and since this is the only supplier it would be strange if there was no correlation. However, this situation can be addressed by applying standard professional business ethics. If the actors in the energy working group voice this and discuss it openly in a safe environment there may be many revelations. No need to stir things, just add competition and perhaps not give the contract to the lowest bidder, which is common when it comes to NGO services (Biermann 2006).

### 6.3.3 Activity patterns

Activity patterns form as actor webs that control certain resources gain access to other actor's resources through their activities across webs and networks. The key actors in the working group to transform the energy sector all have their roles and appear to develop interdependencies and something resembling trust or a common understanding. The majority of the activity patterns seem to be related to the government, donor community and ANRE and EEA. It is unclear to what extent the energy companies are involved apart from being informed of what is required or provided with funds that are strictly governed. The NGO-type of business and consultants are influencing the activity patterns.

There also seem to be a certain element by the actors who gain on being "preferred suppliers" to keep their "customers" busy. If that is the case, find activities that do not interfere and that keep them active instead. They have the time to create barriers and disturbances. There is no lack of productivity and after reviewing some of the material and information available. It appears that a lot of it is the same, repeated in different forums. The fact that the organisations web site is not working should be another indicator.

The reach of the activity patterns seems quite limited as the working group and international community is fairly new. The general society is unaware of their actions but campaigns and activities are beginning to happen to educate and involve the people of Moldova. The donor community seem to be crucial to trigger action. Actors representing different parts of the energy sector including donor community, entrepreneurs, MoE, MoE, entrepreneurs, regulators, academia all suggested different key priorities or barriers that needed to be removed to ensure an enabling environment for renewable energy. The areas were connected and sometimes overlapping, but often from a different perspective. Regulation and proven capabilities that help trigger investments in wind and solar energy, understanding the final cost and price tag and education of the energy users and consumers were highlighted.

During the interviews no one specifically mentioned Gazprom perhaps because it goes without saying or something else is making people hesitate. The comment made by Todos et al. (2002) in relations to the "whims of GAZPROM" is the most straightforward expression. Everyone referred to the lack of political stability. This may be a reflection of the outcome in rating certain parameters in relation to their importance for renewable energy deployment and if they currently exist in Moldova. Absence of fear was rated as not so important and does not exist

Enforcing regulation, tariffs and an enabling a functioning economic system are critical barriers to remove. The political instability appear to make people work very fast to make sure that enough change has been enforced towards EU-integration and resolving energy security that it is difficult to back-track.

A free electricity market is needed by 2015 to enable a renewable energy and smart energy users. To attract investors, business and foreign capital more energy needs to be produced by more producers to trigger investments to ensure energy reliable and sustainable energy supply to new businesses and enterprises.

By unbundling and opening up the market, all whole sale power can be acquired by a dispatch company, which may be the same as the transmission company. The long-term agreements are regulated and distribution companies buy the power at a standard price. (Ljung 2007)

#### 6.4 Comments and next steps

Moldova appears to have the resources in place for wind and solar deployment, yet little has happened. There are no obvious natural reasons, or limitations given the landscape and climate, to why wind and solar power have not yet been implemented in Moldova. It is environmentally sound, it supports energy independence and the foundation for sustainable development Moldova is suited for renewable energy with proven capabilities for wind and solar energy. This has been measured by the organisation for State Hydrometeorological Services. During the research process in Moldova, it became evident that creating an enabling environment for adopting renewable energy is not only about capabilities wind and solar power.

The international community is focusing heavily on Moldova to address sustainable development and energy security and efficiency (EU-delegation and SIDA, 2011). The timing appears to be beneficial with attention and funding from the international community, combined with the momentum and enthusiasm in Moldova. The role of the donor community plays an important role in triggering the developments for sustainable development and energy independence. Good governance is a priority for the donor community to enable sustainable development. Corruption and lack of transparency are still major issues. A corruption-free and open democracy is illustrated by the fact that the entire population can be involved and participate in the decision making process.

The free-rider phenomena is so integrated into society that it is a part of being, one example is the measures that Termocom and the government is taking now to make free-riders pay for heat and increasing the mandatory fee for non-heat customers four times to 20 percent of the total heat bill in a building. Common-pool resources and collective action feel far away after being on the ground, although the way people treat their fellow passenger's money with trust in the mini-busses, maxi taxis, may show some potential. As a result of the historical developments and given the current situation and slow development, self-interest is very present on all levels of society. The good news is that self-interest is individual and as an individual one can change. Politicians need to worry less about being re-elected and more about doing what is best for the country – that is a global phenomenon that becomes apparent across the world when it comes to sustainable development and addressing climate change though actions that requires un-popular decisions.

The preference and culture to focus on close family and friends, as mentioned in the literature section, may be one source of the problem to succeed with renewable energy projects and halt sustainable development in society. To succeed, cooperation is required. Keeping the close family circle influences both the outreach to other actor webs, the possible resources constellation and the development of activity patterns.

#### 6.4.1 Key-priorities until 2020 and beyond

The following key-priorities have been identified and the respondents seem to consider similar areas that need to be addressed in order to create an enabling environment for long term sustainable energy deployment and adoption of renewable energy sources.

**Now** the focus is on setting the legislation and the legal framework. Modify the existing legislation on renewables and provide clear incentives for investors in the renewable energy field. Enable the deployment of the renewable energy market. Analyse the possible economic impact of renewables on final consumers and check the affordability of considered schemes. Develop and share information and creating awareness across the society through campaigns.

**Medium term**, within the next five years or so, financing needs to be addressed as well as harmonisation with EU directives and elements, and the required institutional and technology developments. Moldova needs to remove existing legislative gaps by improving the existing primary and secondary legislation. In addition, existing incentives needs to be enhanced and new measures provided to enable further development of the energy sector. Targets set in the energy strategy needs to be followed and evaluated. The investment climate needs to be improved and developed to attract investors.

**By 2020 and beyond** Moldova needs achieve the indicative triple- twenty targets in the renewable field and develop the renewable energy market. Harmonize the national market with the EU market and to apply advanced technologies and take renewable energy into operation.

## **7 Discussion**

### **7.1 Unde este Moldova? Economic reality check**

So where is Moldova today and why? The potential of solar and wind power appears to be more than valid, but it has not yet happen despite the fact that it represents Moldova's only local energy resources. The complicated debt and political situation with Russia makes the deployment of renewable energy even more pressing, and there must be reasons for why there are no current commercial wind farms and very limited long-term solar micro-generation initiatives.

Given that people are fairly poor is it likely to expect that individual households will begin to micro-generate in 2015 when it becomes possible? Despite being very enthusiastic, the answer is probably not if not subsidies and a secure environment is set that enables the private consumers to take the step and become a prosumer without any – or little - risk. Will the individual people even have time to think about it while going through their daily struggles? For entrepreneurs, yes it is possible if the business environment enables long term focus and a stable environment. Long-term incentives, subsidies, support schemes, beneficial feed-in-tariffs such as in Germany where the energy companies pay four times the grid price for micro-generated renewable energy would help. Backed-up by firm policies and enforcing regulation are steps on the way. Large scale wind farms are being initiated and small scale solar project are being tested by different actors, some micro-generation is already happening. UNDP's biomass project with the ambition to replicate the model across renewable energy sources for small entrepreneurs or households appears promising.

So let say that large wind farms are established based on a reliable wind atlas that has been developed, where will the additional energy come from when demand and supply is not in equilibrium. If there is a way to store the electricity generated, then one major hurdle has been solved. Perhaps running the trolley-busses can be one option for wind power. The connection to the European, Romanian and Ukrainian grid with sufficient capacity is a prerequisite. The back-bone for secure energy supply needs to be complemented by the possibilities to import from Romania and Europe. Perhaps in the long-term it may be possible to rely 100 percent on renewable energy sources.

#### **7.1.1 Look to the Baltic States**

The relationship with Gazprom is not easy to solve and the accumulated debt would take the entire population almost 16 months to pay off. Moldova has a lot in common with the Baltics. As many former Soviet states, the Baltic States have been and are still largely dependent on Gazprom. This is about to change as Lithuania becomes the first country to implement EU's energy market liberalization laws. Estonia is considering to follow while Latvia's decision is still pending. In practice, this means that Lithuania will unbundle and separate the pipelines from Gazprom to drive a free market and remove monopoly. It is a test for the relation between Russia and EU in the energy sector. At the same time, Gazprom is taking action to maintain their monopoly in some European countries, supported by the Russian government.

The long-term outcome of three Baltic States effort to unbundle the pipelines and break Gazprom's monopoly by access global liquefied natural gas will influence the future of the

region. The cases will likely illustrate legal and political examples for future practices in the EU and determine likelihood of Gazprom's monopoly and possible expansion. As in Moldova, Gazprom and Russia have control over the national system in Latvia. The unbundling process is mandated by the EU law and one way may be to re-acquire existing pipelines from Gazprom as part of the process. Each actor may develop their own niche to develop competitive advantage and provide new energy services within EU to address the growing demand in Europe.

Once an EU membership is secured, Moldova will enjoy the same support as other former Soviet states but until then the country and its people deserves a better situation. Given the recent events in Ukraine where the opposition is threatened with imprisonment, the matter gets further complicated. Given the debt to Gazprom and Moldova being a fairly poor country, one way out is to attract and maintain foreign capital until the country has become "rich enough to manage on its own".

### 7.1.2 Business is the business

EU, SIDA and the rest of the donor community is investing heavily in energy security and efficiency but despite large sums, the amounts are by far too small and too short term to make the real change. This has to come from Moldova. Corruption is a hurdle and what seems to be the only way for Moldova to reach a certain level of "richness" in society. Given the challenges to make pilot projects work long-term locally, the hope is in attracting foreign capital and entrepreneurs to set up business in Moldova and employ people so that everyone together are involved in rebuilding the country. That is why SIDA's and EBRD's activities to support entrepreneurs and business development are promising. Charity is always temporary and reflects stakeholder interest, either way it is not a long-term solution. A critical mass of the population needs to become affluent and pay taxes.

### 7.1.3 A Moldovan tiger

The Moldovan Investment and Export Promotion Organisation, MIEPO, is responsible for attracting investors and promote Moldovan export. The organisation is hosted by the MoE. By developing a "tiger economy", Moldova can develop a favourable position to take charge of its own destiny. To succeed, there needs to be a stable environment where the entrepreneurs can rely on Moldova and focus on ramping up business in the country and provide job opportunities.

IDA Ireland enabled the "Celtic tiger" and the economic boom in the Republic of Ireland in the mid-nineties.<sup>58</sup> Moldova has a unique position to do the same as it is located in Europe. Foreign companies can invest and manufacture in Moldova and trade with EU without being subject to import taxes. Combined with similar measures that was provided for the large, and small, IT and telecom companies in Ireland with guaranteed low or no taxes during a long period of time, low social and employment fees and a mix of jobs requiring foreign languages, special skills or education and more basic manufacturing jobs, the society at large will benefit. The economic development is likely to increase the standard of living, health system and salaries. Ireland became affluent almost over-night. It used to be a country where kids grew up, knowing that they would migrate. Instead, they become "home-comers", attracted by the exciting opportunities and jobs. Despite that the Irish economy has dipped

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<sup>58</sup> The author truly believes that this is possible in Moldova after living and experiencing the Celtic Tiger in Ireland during 1996-2001.

due to overheated housing market among other things, people and society have reached a whole different level of welfare and affluence and many views the current dip as something that has to be done to arrive at a proper, sustainable economy and market.

#### 7.1.4 Sound business

The foreign businesses may be in renewable energy to support the initiatives to address the energy situation, but it may also be any feasible, professional and decent businesses. Many have pointed out that if there are business ideas, it is always possible to source funding. This, in a country without a mal-functioning financial system where interest rates are close to 20 percent and short pay-back times. So where does the money come from then? So far, many of the initiatives or pilot projects fail and very few become permanent activities because funding runs out. But money was not an issue? No one can really respond but most of the people that have been interviewed agree on that the funding has to be long-term and provided, and possibly managed, by reliable sources. Rather than NGO-type of business or social enterprises, focus on professional businesses with a long-term view and conscious. In the medium term, the economy needs to move from “fix the funds needed” to manage proper business and build the country by developing a white economy where people can live on their salaries, get welfare and healthcare, and pay their energy bills.

#### 7.1.5 Economic outlook

Both IMF and MIEP are slightly optimistic for Moldova’s economic development going forward and there are indications that the recent crisis is over. Foreign investments have dipped during 2009 and 2010 (MIEPO 2011). Moldova is open to trade and 89 different countries have invested in Moldova and 80 percent of the capital investments are from EU member states. The government provides equal rights for all investors, but it is unclear what happens in a dispute and if it is possible to buy land to avoid rent-seeking. Transparent and enforcing regulation that supports the business sector-Moldova is an entrance point to Europe, especially for North American companies to avoid import taxes into EU. Fiscal incentives include tax breaks including no corporate tax, customs and VAT exemption, and reimbursements for long-term investments. Infrastructure and availability of energy and water are critical. Specific initiatives have been taken to trigger industrial parks several free economic zones have been identified. The initiatives look good on paper and need to be tested. To attract foreign businesses, the foundation for a stable environment that is not depending on economic and political events needs to be ensured and if problems occur, a reliable justice system and regulatory framework needs to back up the foreign investors. The time-frame needs to be 30-40 years, which was the hook for Ericsson’s and IBM’s presence in Ireland.

## 7.2 Research design and methodology

The methodology to apply a multisource exploratory case study worked well in the field with little prior possibilities to know what to expect before arrival. The interviewees made substantial efforts to address the survey questions (see appendix 10.2). The respondents provided good, extensive responses that were in many cases followed up by further discussions and communications. A total of 19 interviews took place, with 15 different actors. The interviews delivered well beyond expectations and provided unexpected qualitative information. In addition, the rate it parameters (see appendix 10.3) was filled in by one third of the respondents. Despite being in the middle of the summer, many actors were available and the actors represented the majority of the energy sector. Still, the findings

represent their view of what they wanted to share, but many were open and very helpful. The actors include ministries, regulators, the meteorological services, academia, the international donor community, entrepreneurs and an energy company.

It appears difficult to find a suitable theory for a topic that covers governance, networking theory an individual choice. There is a challenge in balancing the scope, not to cut it too narrow and still make it relevant as everything that is going on around influences the direction. At the same time, the topic gets too broad. The theses on Moldova that I reviewed all seem to struggle with the same issue, too granular or too broad.

In the Republic of Moldova, there is proven and promising potential for wind and solar power but no real deployments or utilisation of wind and solar energy despite being cornered by Gazprom. What is the problem? How can these barriers be overcome to create an enabling environment for wind and solar energy? In addition, what is required to enable micro-generation and selling excess capacity to the grid?

The research question is very legitimate and has partly been answered in the sense that the answers exist but it is an on-going transition process where the outcome is yet to be seen. The main research question “what is the problem?” could possibly be rephrased – “what are the problems?” One of the problems is that actors are not connected, nor share resources or perform joint activities – hence, most exist in their own bubble. This may be a result of staying too close to the family and keeping the circle of friends and colleagues closed. Just by involving some actors in this project during the research to enable information sharing and connecting people may have contributed to one step further on the way. Another problem is the control and influence Gazprom has over Moldova, and other post Soviet countries.

This research would not have been possible as desktop research, being in the field enables an understanding of the culture and talking to people in person. This is crucial for the outcome, and in particular when language and cultural barriers are involved. However, the researcher is also exposed to manipulation and being influenced. The targeted respondents that respond are also a selection that impacts the outcome.

Some of the findings are applicable across Europe as many countries are working on implementing renewable energy and micro-generation. Others are specific to Moldova, or possibly another post Soviet society in transition.

### 7.3 Personal reflections

Initially, before I arrived on-site, the purpose of the research was set out to develop an understanding of what is required to successfully implement long-lasting, larger scale wind and solar power projects for sustainable development in the Republic of Moldova. In particular, explore what is required to enable a self-sustaining, revolving for renewable energy to be able to fund, deploy and maintain wind and solar power. The anticipated outcome was to identify gaps and point to possible solutions. Once on the ground, digging in the field, it became clear that the funding is not the actual issue, as the example of the revolving self-sustained fund for energy efficiency in building shows. There are several success stories from other similar countries that can be re-used for the actual funding, and in particular from EBRD and ENSI. When funds disappear, projects are cancelled or never get off the ground, or there is a lack of access to capacity in terms of people, knowledge and information, something else is at play. During the research, the reasons for this have been referred to as a



result of prioritising short-term gain before long-term benefits. Some have used the term “Soviet mentality”.

Locals wondered why funds were channelled through the government, some wondered why the international community was involved or why I was there. This indicates that the process is far removed from the general society, and that people lack trust. Given the political and economic system, the current government appear to be the only somewhat stable channel and in particular as they funds are coordinated by the donors with SIDA in the lead. Awareness campaigns are initiated so it is a start. The common language, apart from English, in the international community is Russian. This makes sense as it is major language that is spoken by many and is one of the languages spoken in Moldova. However, it may send mixed signals as Moldova is still struggling to develop from being a post Soviet country to a free, European country and 2/3 of the population have Romanian as their mother tongue.

What appears to be one crux of the matter to for sustainable development is a culture of lack of trust outside the closest circle and corruption for survival. It appears difficult to know who to cooperate with and how in such a complex environment and this appears to be part of the reason for why many projects have failed. During the research it became evident that some actors are present everywhere while others are seen nowhere. Some claim to be cooperating; others claim not to be cooperating. Nothing appears to be as it is intended to be perceived. From what I have seen, nothing happens by coincidence and too me that shows that many of the situations were “designed”. Disinformation, distractions and interferences took many different shapes and forms. Talented people are blocked by other’s personal gains. There is an expression that states “when in doubt - follow the money”.

There is a wonderful atmosphere in Chisinau, and to me, Moldova deserves a lot better than this. So while Moldova is working on getting the pieces together, go and take a look. It is a unique situation and a historical transition from post Soviet to EU – the vibe of change is in the air and it is very inspiring.

***Never doubt that a small group of thoughtful, committed people can change the world. Indeed, it is the only thing that ever has.***

Margaret Meade (1901-1978)

## 8 Conclusion

In the Republic of Moldova, there is proven and promising potential for wind and solar energy but no real deployments yet. The main reasons have been Gazprom controlling the country by keeping the energy dependence. Many have not been aware of the potential for wind energy generation, and those in the know have been hushed. Political and economic instability has contributed to the situation. Access to funding is seen as the real issue for why projects have failed in the past despite the fact that funding has run out. Most respondents highlighted other barriers than funding as the main challenges.

The major change in addressing the problem is strong government commitment, in close cooperation with international donor community and earmarked funds. Things are beginning to change. The well-functioning working group meets regularly to address the energy transformation, and they appear to proceed quickly. Actions are taken although it is difficult to judge how far the actual process has come and in particular when it comes to enforcing regulation that secures access to the network and creates a stable investments environment. Tariffs and payment schemes are among the most important factors to solve and guaranteed acceptance of capacity produced. Many pilot projects are on-going or being initiated in solar energy or biomass projects and the large 200 MW wind farm is very promising.

Key-success factors to speed up adoption of renewable energy, indicating order of priority:

- Enforcing regulation for acceptance and adoption of renewable energy
- Affordability of renewable energy and solar and wind power equipment
- Open energy market that enables competition, attract investors and new players
- Transparency in decision making, tariffs, bills, regulation
- Make it personal– involve people on all levels, create awareness and trigger commitment
- Equal justice for energy producers and consumers
- Free from corruption – promote and recognise steps in the right direction
- Knowledge and capacity of renewable energy and the promise of EU

Some of these are very complex matters, and well known by most of the actors in the sector. What needs to happen now is to start implementing and removing the barriers for real by working together to gain momentum and create a snowball effect. A start may be to:

***Enable wind projects*** to begin with by creating opportunities for investors and ensuring access to land at the heights of Igheciului, the high Nistru river banks, the Ciulueului hills, the central plateau of Moldavia and the regions Cahul and Iaraclia.

**Secure the wind map** to prove to investors that wind energy is feasible, possible to co-locate with telecom equipment. Earmark budget of 150,000-500,000 EUR for the wind map. Produce **trustworthy information** and material for investors on capabilities for renewable energy investments in solar and wind power together with SHS and WMO. Cooperate with telecom operators to explore opportunities for co-location and site sharing of the meter during a year.

**Attract investors** and international companies with beneficial tax breaks in the renewable energy sector to create jobs and gain good will. Improve peoples' lives while contributing to resolving the energy dilemma.

**Feed-in-tariffs and incentives** need to be transparent and easy to understand to trigger the deployment by enterprises and energy users, and in the longer run private consumers and households. Guaranteed access to, and acceptance by, the grid of micro-generated wind and solar energy needs to be clearly communicated in a straightforward, monitored manner.

**Open the energy market** through the same transition as took place in telecommunications to enable consumers to choose energy suppliers. Review public procurement policies of consultancy and NGO services.

**Reuse and replicate the experiences** from pilots performed so in apartment buildings to begin micro-generate electricity with wind-turbines or solar photovoltaic cells. Enable production of thermal heat generation with solar panels, either through leasing from energy companies that provides energy to the households with guaranteed quality of services. Or make it possible to add a small top-up price and transfer the ownership of the equipment to the association. Reuse experiences from Romania and wind electricity and solar heated water.

**Politically independent organisation** in parallel to the existing agency EEA, to ensure that there is an independent, self-sustained organisation to manage energy funds, capacity and information may be useful to consider given the political instability. There is a risk in EEA being hosted under the MoE<sup>59</sup>, if the political situation changes it is crucial that there is a back-up to ensure that all the resources are kept and not forgotten.

Attracting foreign capital and enabling a Moldovan tiger-economy is a very possible and unique opportunity to enable Moldova to reach a certain level of affluence. The Gazprom and Moldovagaz influence and control makes development difficult. Foreign capital and committed entrepreneurs can help trigger the change in the same manner as Ireland during the mid-nineties. A stable, beneficial business environment will benefit society at large and enable Moldova to take charge of its destiny.

There is a lot to be done and this thesis has generated several ideas for future research. One topic may cover the governance from a certain actor perspective, NGO, government or commercial business etc. Another may look at technology and real, physical deployment of wind energy and solar power as a real project. A third may be to analyse collective action in detail and focus on the users in a household. Another very interesting angle, once the time is right, is the implementation of renewable energy sources in apartment buildings that are managed by the housing association and micro generate for own consumption and for selling capacity to the grid. In addition, exploring an enabling environment to attract foreign capital

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<sup>59</sup> Once the energy market is deregulated, telecom players may look to expand their business offering to provide energy services.

for a Moldova “tiger-economy” would be an exciting topic. A topic that was requested by the national regulator, ANRE, was to perform an affordability study on renewable energy.

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## 9.2 Interviews and personal communication

AEER	communication over e-mail in Chisinau, August
ANRE	communication over e-mail
Borlänge Energi	personal meeting and e-mail communications prior to trip
EBRD	personal meeting and e-mail communications
ENSI	skype meeting
Entrepreneurs	personal meeting and e-mail communications
EU-delegation	personal meeting and e-mail communications
FORMIN	personal meeting planned and e-mail communication
MoC	personal initial discussion
MoE	personal meeting and e-mail communications
MoEn	personal meeting and e-mail communications
SHS	personal meetings twice
SIDA	personal meeting planned and e-mail communication
Termocom	personal meeting and e-mail communications
TUM	meetings with three separate departments
UNDP	personal meeting and e-mail communications
WB	personal meeting and e-mail communications

## 10 List of Appendices

### 10.1 Appendix: “No-comments” snapshot of news flow summer 2011

The purpose the news flow is to provide a snapshot of the political and economic environment in Moldova. The re-quoted news topics were selected according to relevance of the paper and structured according to release dates. Objectivity cannot be guaranteed as they are a selection of English news from the site allmoldova.md. However, the topics illustrate the environment that impacts the energy sector and the full news stories are available in the end notes. In July, the Ministry of Culture and Tourism issued a press release stating that foreign visitors now require an invitation. This was noted by several actors, as of August 30<sup>th</sup> the news are gone.

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August 25, 2011

Moldova's independence anniversary will be marked in Saint Petersburg as well<sup>1</sup>

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August 24, 2011

Sweden will help Moldova work out radio spectrum management policies<sup>2</sup>

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August 23, 2011

Moldovan Communists decide to return to parliament<sup>3</sup>

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August 18, 2011

The annual economic damage from land degradation in Moldova totals 3 bln leis (\$265 mln)<sup>4</sup>

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August 16, 2011

Average salary in Moldova in June 2011 amounted to 3,556.2 leis, up 20 percent over the same period last year<sup>5</sup>

Moldova's foreign state debt by the end of July this year totaled \$1,179.51 mln<sup>6</sup>

Russian sanitary service to send assessment mission to five Moldovan wineries<sup>7</sup>

Moldova exported wine in the total amount of \$11.9 mln to Russia in the first half of 2011<sup>8</sup>

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August 15, 2011

Moldovan power distribution grids to be sanctioned for poor quality<sup>9</sup>

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August 8, 2011

The Ministry of Economy initiated the procedure of checking electric power consumers' meters<sup>10</sup>

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August 5, 2011

Moldova's winemaking companies will be promoting their wines on foreign markets under the single national brand Moldova-Vin<sup>11</sup>

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August 2, 2011

Gazprom has no technical possibilities to stop natural gas supply to Transnistria that owes over \$2.7 bln<sup>12</sup>

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July 29, 2011

Moldovan Liberal Democrats advocate constitution's amendment to elect president<sup>13</sup>

Parliament goes on vacation<sup>14</sup>

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July 28, 2011

Two Communist MPs renounce seats<sup>15</sup>

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July 21, 2011

Democrats suggest preparing new law on government<sup>16</sup>.

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July 20, 2011

Moldovagaz projects the growth of natural gas prices for Moldova in the IV quarter of 2011 by 9.4 percent – to \$395.24 for 1,000 cubic meters<sup>17</sup>

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July 19, 2011

Moldova and Gazprom agreed to sign a new contract<sup>18</sup>

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July 15, 2011

Sergiu Cebotari: Moldovan capital market will not start working without developed economy<sup>19</sup>

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July 14, 2011

Early elections will mean a disaster, Vlad Filat<sup>20</sup>

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July 11, 2011

OSCE Parliamentary Assembly discusses Transnistrian conflict settlement at annual session<sup>21</sup>

Ukraine not going to change its stance on Moldova's territorial integrity<sup>22</sup>

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July 4, 2011

Moldova increased energy resources import by 50.6% in the first quarter of 2011 in comparison with the same period last year, to \$270.98 million<sup>23</sup>

## 10.2 Appendix: Survey questions

The survey was provided in both English and Romanian.

### **CONTEXT**

The aim of the research is to develop an understanding of what is needed to create an enabling environment for long term sustainable energy development, deployment and uptake of renewable energy sources such as wind and solar power in the Republic of Moldova.

### **SURVEY QUESTIONS**

1. Why have renewable energy sources like wind and solar power not been used until now?
2. To successfully deploy solar and wind power, what is most important in relation to
  - a) Technology?
  - b) Economic environment?
  - c) Location?
  - d) Regulation?
3. What are the key priorities in the short, medium and long term?
  - a) Now?
  - b) In the next 5 years?
  - c) By 2020 and beyond?
4. Why have performed feasibility studies with a positive outcome failed to be turned into projects? And when successful pilot projects have been carried out, why have they failed to scale to larger, permanent implementations? What is different now?
5. Who are the key actors and why in renewable energy implementation? What is the role of:
  - a) Central and local authorities?
  - b) Non-profit NGO and self-sustaining profitable NGOs (social enterprise)
  - c) Entrepreneurs and commercial sector
  - d) European Union
  - e) Financial institutions?
  - f) Energy service companies, ESCOs
  - g) Energy users?
6. What are the top 5 critical prioritised barriers that need to be removed?
7. What laws and enforcing regulation are required to enable production and consumption of wind and solar power?
8. How should financing be organised and secured for renewable energy projects?
9. How should a successful, self-sustaining revolving fund be organised?
10. Who are the renewable energy users? Consumers and producers, i.e. “prosumers”?
11. What is needed to enable individual private households use renewable energy?
  - a) Micro-generate and sell excess capacity to the grid?
  - b) Ability to self-organise to achieve common goals that will bring significant benefits over time?
12. Renewable energy is an opportunity and a threat for energy service companies, ESCOs, how will they address the new situation?

**Feel free to share other thoughts:**

**THANK YOU & MULȚUMESC for your participation!** Your support is greatly appreciated.

### 10.3 Appendix: Rate it

The rate it questionnaire was provided in both English and Romanian.

#### RATE IT

Please rate the *importance* of the following parameters for *successful renewable energy deployment* and *to what extent* these parameters *currently exist* in the Republic of Moldova in the three areas: **General society**, **Economic system and market**, and **Political system and authorities**, where **5 = very much so** and **1=not at all**

Renewable energy in relation to:	IMPORTANCE?	EXIST NOW?	COMMENTS:
<b>A. General society</b>			
1. Efficiency: Cost versus benefits	5 4 3 2 1	5 4 3 2 1	
2. Affordability of energy	5 4 3 2 1	5 4 3 2 1	
3. Equality and fairness between groups	5 4 3 2 1	5 4 3 2 1	
4. Energy service security - reliability	5 4 3 2 1	5 4 3 2 1	
5. Absence of fear - freedom	5 4 3 2 1	5 4 3 2 1	
6. Trust in others – individual people	5 4 3 2 1	5 4 3 2 1	
7. Political acceptance by society	5 4 3 2 1	5 4 3 2 1	
8. Cooperation – individual people	5 4 3 2 1	5 4 3 2 1	
9. Knowledge capacity	5 4 3 2 1	5 4 3 2 1	
10. Information sharing	5 4 3 2 1	5 4 3 2 1	
11. Awareness	5 4 3 2 1	5 4 3 2 1	
12. Willingness to pay	5 4 3 2 1	5 4 3 2 1	
13. Initiative groups for common goals	5 4 3 2 1	5 4 3 2 1	
14. Ability to self-organise	5 4 3 2 1	5 4 3 2 1	
15. Accessibility to funding and loans	5 4 3 2 1	5 4 3 2 1	
OTHER? Feel free to add			
<b>B. Economic system and market</b>			
1. Energy supply security	5 4 3 2 1	5 4 3 2 1	
2. Corruption-free	5 4 3 2 1	5 4 3 2 1	
3. Functioning financial institutions	5 4 3 2 1	5 4 3 2 1	
4. Free market – energy, banks, business	5 4 3 2 1	5 4 3 2 1	
5. Trust between actors and individuals	5 4 3 2 1	5 4 3 2 1	
6. Stability	5 4 3 2 1	5 4 3 2 1	
7. Ability to improve	5 4 3 2 1	5 4 3 2 1	
8. Credibility of financial institutions	5 4 3 2 1	5 4 3 2 1	
9. Straight forward energy contracts	5 4 3 2 1	5 4 3 2 1	
10. Licence for micro-generation	5 4 3 2 1	5 4 3 2 1	
11. Transparent tariffs	5 4 3 2 1	5 4 3 2 1	
OTHER? Feel free to add			
<b>C. Political system and authorities</b>			
1. Equal justice in front of the law	5 4 3 2 1	5 4 3 2 1	
2. Viable non-profit or public sector	5 4 3 2 1	5 4 3 2 1	
3. Openness	5 4 3 2 1	5 4 3 2 1	
4. Accessibility	5 4 3 2 1	5 4 3 2 1	
5. Transparency	5 4 3 2 1	5 4 3 2 1	
6. Trust	5 4 3 2 1	5 4 3 2 1	
7. Non-arbitrariness (not random)	5 4 3 2 1	5 4 3 2 1	
8. Legality or legitimacy	5 4 3 2 1	5 4 3 2 1	
9. Public acceptance	5 4 3 2 1	5 4 3 2 1	

10. Stability	5	4	3	2	1	5	4	3	2	1
11. Ability to improve	5	4	3	2	1	5	4	3	2	1
12. Law	5	4	3	2	1	5	4	3	2	1
13. Regulation to enforce legislation	5	4	3	2	1	5	4	3	2	1
14. Measures and mechanism	5	4	3	2	1	5	4	3	2	1
15. Monitoring and reporting	5	4	3	2	1	5	4	3	2	1
16. Cooperation and information sharing	5	4	3	2	1	5	4	3	2	1
OTHER? Feel free to add										

**THANK YOU & MULȚUMESC for your participation!** Your support is greatly appreciated.

<sup>1</sup> “A high-ranked delegation of the Republic of Moldova, led by Deputy Premier, Minister of Economy Valeriu Lazar, will fly to Saint Petersburg (Russia) on Friday to attend the celebration of the 20th anniversary of Moldova’s independence. On that day, the delegation will give a news conference for Russian and foreign journalists to review Moldova’s achievements over the said 2 decades. Directly on the Independence Day of August 27, an official reception will be organized in the city’s historic Mariinsky Park, to be attended by the leadership of Saint Petersburg. There, Moldova will unfold an exhibition of its goods and will organize a big Moldovan wine tasting session and a concert by Milenium Group from Chisinau. The celebration program will be crowned by a cruise along the Neva River on board a ship under the Moldovan flag.” Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/1249051210.html>

<sup>2</sup> “The respective agreement was reached at the bilateral talks of Moldova’s Information Technologies and Communication Minister Pavel Filip with the leadership of the profile ministry of Sweden and of the National Post and Communication Agency held in Stockholm. Pavel Filip said our country is on the threshold of significant changes in management of radio spectrum and development of services accessible for the whole population. The Minister also said Moldova lacks clearly expressed principles in radio spectrum management that would contribute to long-term planning both by the state and service suppliers. The Secretary of State for IT and Regional Development of Sweden Marita Ljung said her country is considered in the European Union as a telecommunication sector development model, the fact that had become possible thanks to the promoted policies and considered sector administration. In his turn, the director of the National Post and Communication Agency of Sweden Horan Marby said Sweden’s practice in radio spectrum management is based on the technologies and services neutrality principle, encouragement of competitiveness and accessibility. “This strategy is welcomed by local operators, enabling them to be flexible and provide services depending on the technologies opportunities”, said Horan Marby. Pavel Filip also visited central offices of the TeliaSonera and Ericsson companies, met the leadership of the leading ICT companies and discussed investment promotion opportunities and the IT development tendencies in Moldova with them. “ Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/economics/1249051205.html>

<sup>3</sup> “The opposition Party of Communists (PCRM) will return to the parliamentary plenary meeting in the autumn-winter session. According to the PCRM’s press service, the Political Executive Committee of the PCRM’s Central Committee took a decision to this effect on 22 August 2011. The source said that the decision stemmed from the precarious situation in the country and the protracted crisis. The PCRM voiced hope that after it resumes working in the parliament, its stance on development issues will enjoy wider support. The opposition Communist MPs have been boycotting the parliament’s plenary meetings since June, thus expressing their disagreement with the outcome of the mayoral election in Chisinau, which their representative, Igor Dodon, lost to Liberal Dorin Chirtoaca.” Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/politics/1249051194.html>

<sup>4</sup> “It was said by the agriculture and food industry minister Vasiliu Bumacov, noting that 50% of soils in the country are currently in the unsatisfactory state and 10% - in the critical one. The minister said the government had adopted the Program of preserving and increased soils’ fertility for 2011-2020 and the Plan of actions to realize it in the next three years in order to stop the land degradation process and to raise soils’ fertility. The document stipulates that Moldova will commit 54 mln lei (\$4.7 mln) to measures for preserving and raising soils’ fertility in the next here years. The program aims to modernize the existing land usage system, implementation of modern technologies and agricultural practices favorable for environment. Particularly, it provides for creation of the automated informational system of the state of soils’ quality based on scientific research, stopping soil corrosion, raising soils’ fertility. According to data of the Moldovan agriculture ministry, 40% of the country’s agricultural lands are currently damaged by ablation, 220,000 hectares – deprived of humus horizon and saline soils, 25,000 hectares are subject to landslides and 50,000 hectares have already become unfit. Vasiliu Bumacov stressed that Moldova’s soils had been used for many years but no protecting measures had been taken and no technologies that would help stop soil erosion had been used. It is planned to implement measures to protect Moldova’s biggest natural wealth. Experts believe this program will help minimize or even stop the main forms of soil degradation and create preconditions for raising soils’ fertility.“ Retrieved on August 30, 2011, from <http://allmoldova.md/en/moldova-news/economics/1249051169.html>

<sup>5</sup> “The average salary in the public sector amounted to 3,979.1 leis (+39.7 percent in comparison with June 2010), in the real sector of economy – 3,362.5.1 leis (+11.4%), according to the National Statistics Office. The 20-percent growth of the average salary in the country’s economy resulted from the 60-percent rise in the fund of remuneration of labor in education in connection with the vacation pay that made up half of the total labor remuneration fund in this sector. The highest salaries in June 2011 were registered in the financial sector – 6467.1 leis (+5.3% against June 2010), at the enterprises of the electricity-, gas- and water supply – 4,984.7 leis (+5.6%) and in the education – 4.584.8 leis (64.4%). The lowest-paid are still workers of the fishing industry, their average salary in June 2011 amounting to 1,563.7 leis (+10.9%), and the agrarian industry and forestry – 1,781.6 leis (+21.8%). “Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/economics/1249051139.html>

<sup>6</sup> “In January-July 2011, the debt grew \$161.14 million or 15.8 percent, according to the finance ministry’s data. The country’s foreign state debt as of January 1, 2011, totaled \$1,116.18 mln, by the end of July last year - \$1,018.37 mln. The debt grew in January-July 2011 due to the \$24.63 mln excess of foreign loan receipts in this period over the amount of foreign debt payments and due to the positive change in the US dollar’s exchange rate against other currencies in the amount of \$38.71 mln. In 2010, Moldova’s foreign state debt increased by \$342.5 mln (44.3%), making up 18.9 percent of the country’s GDP.” Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/economics/1249051138.html>

<sup>7</sup> “The Russian federal sanitary service Rospotrebnadzor will send a group of experts to Chisinau to check five Moldovan companies intending to export wines on the Russian market, according to a press release issued by Rospotrebnadzor. "With regard to the Moldovan Agriculture Ministry’s request to extend the list of wine exporters and alcoholic beverages shipped to the Russian Federation, the Russian authorities are considering an eventual assessment visit to Moldova by Rospotrebnadzor experts," the press release said, adding that the Russian Federal Sanitary Service is examining the applications submitted by five Moldovan enterprises. In 2011, Rospotrebnadzor assessed 2,490 samples of alcoholic beverages supplied by 27 Moldovan companies. As many as 2,110 consignments of wine, 281 consignments of brandy and 99 consignments of bulk wine amounting to 12.87 million liters in all were exported from Moldova to Russia. Rospotrebnadzor data also show that the amount of Moldovan alcoholic beverages turned down by the Russian sanitary authorities is much lower than in the year before. In 2011, Russia turned down over 59,400 litres of Moldovan alcoholic beverages for reason that they did not meet the quality standards. In 2010, Russia rejected over 2.2 million litres of Moldovan beverages for same reasons, which accounts for 1 per cent of the exported production. The Russian Federal Sanitary Service has also announced that about 307,995 liters of Moldovan bulk wine were imported to Russia via a customs point opened in Saint Petersburg on 28 February 2011. In the first six months of 2011, Moldova exported 53.7 million litres of wine, by 2.8 million liters less against the same period of the year before, according to the data put out by the Agriculture Ministry. The exports of sparkling wines soared by 38,100 liters, reaching 828,000 liters, whereas the exports of strong alcoholic beverages hiked by 0.3 million liters, standing at 2.6 million liters. Moldova's top sales markets in terms of wine exports were Belarus, Ukraine and Russia and Russia, Ukraine and Kazakhstan in terms of sparkling wines. As for the strong alcoholic beverages, Moldova's main sales markets in the first quarter of 2011 were Ukraine, Belarus and Germany.” Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/economics/1249051144.html>

<sup>8</sup> “Moldovan wine export to Russia in physical terms in January-June 2011 reduced 2.6 times in comparison with the same period last year – from 23.7 mln to 9 mln liters. Russian ranks the third among the largest Moldovan wine importers in the first half of 2011 after Belarus (19.3 mln liters) and Ukraine (15.5 mln liters).” Retrieved on August 30, 2011, from <http://allmoldova.md/en/moldova-news/economics/1249051146.html>

<sup>9</sup> “The power distribution grids that breach the quality standards of transport and delivery services will be sanctioned by levying lower electricity tariffs or by paying damages to the affected end consumers, in consistency with a regulation on the quality of power transport and delivery services, which entered into force on 12 August. The amount of compensation is to be established depending on the duration of the cut-off and will stand at 20-200 lei for household consumers, 200-2,000 lei for non-household consumers, with an installed capacity below or standing at 100 kW, and 500-5,000 lei for non-household consumers, with an installed capacity exceeding 100 kW. The power distribution grids will pay the same compensations if they exceed the annual cap of admitted cut-offs. The compensation will be paid at the consumer's request.” Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/economics/1249051134.html>

<sup>10</sup> “Since the Ministry of Economy has received about 1,000 complaints from consumers about the meters’ technical failures and, as a result, the increase in the electric power consumption indicators, the Ministry decided to set up a special

workgroup to examine the meters' state. The workgroup will consist of representatives of the industry's ministries, consumers and nongovernmental organizations in the field of consumers' rights protection as well as electric power distributors. The preliminary examinations have shown that some models of meters fix higher consumption volumes than the real ones, the Ministry of Economy reported. According to data presented by the electric power distributing companies, about 800,000 meters of different models had been installed in Moldova in 2007-2011. "According to the workgroup's decision, the Institute of Standardization and Metrology will check 1% of consumers' meters. if certain defects of the models are stated, they will be replaced free of charge at the expense of the electric power supplier", said the Deputy Minister of Economy Octavian Calmic." Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/economics/1249051087.html>

<sup>11</sup> "This Moldovan wine promotion concept was approved by representatives of the Ministry of Agriculture, winemaking companies and different winegrowing and winemaking associations of Moldova at the "round table" held in Chisinau on the subject "The sustainable winegrowing and winemaking sector management model on the basis of the public-private partnership". The agriculture and food industry minister Vasile Bumacov underlined the importance of promoting Moldovan wines on foreign markets under the single national brand, the fact that will enable to increase their export significantly. Australia was mentioned as an example – it increased its wine export 100 times in 5-10 years after it had established the Australian wines brand. The agriculture minister of Moldova said once foreign consumers learn Moldova as a winemaking country better and will start purchasing more Moldovan wines, they will be better in them and will differ them according to concrete producers, individual names and regions. For the time being, the ministry of agriculture's representatives and winemakers believe, it is more important to promote the country and the Moldovan wines brand (Moldova-Vin) for the general success. The Moldovan Winemakers Guild's President Nelli Sonnic said bigger investment is needed for Moldovan wines to enter new markets; the country needs to be promoted. She said that with the competent approach Moldovan winemakers have good changes to extend their presence on traditional markets and enter the new ones, particularly, the Chinese, Japanese, Australian, the US, Canadian markets, given the excellent quality of Moldovan wines and consumers' wish to try the new beverages. It is planned that Moldovan wines promotion under the single brand of Moldova-Vin with the symbol of stork and a bunch of grapes will be dealt with by the National Agency for Grapes and Wine that is planned to be established in the near future. The state will be responsible for the quality and safety of the wines promoted under the single national brand." Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/economics/1249051080.html>

<sup>12</sup> "The Russian gas holding's representatives said it to the Russia mass media, underlining that Transnistria takes gas from the transit gas pipeline supplying gas to the Balkan (Bulgaria, Turkey, Romania) and to the left-bank part of Moldova, that pay for gas in the 100-percent volume. "There is no alternative way of supplying them with the contracted gas, that means that gas supply to Transnistria cannot be stopped", said Gazprom representatives. They stressed that Transnistria's gas debt had exceeded \$2.7 bln and none of the states has ever allowed accumulation of such arrears. For example, Gazprom ceased gas supply to Ukraine and Belarus for much smaller debts. The Russian gas holding says Tiraspol tried to pay at least some part of the consumed gas till 2006. However, since then, the Transnistrian gas company Tiraspolitransgaz left the membership of the Moldovagaz (50% of which belong to the Gazprom) and stopped any relations with it, and now is acting ignoring Moldova and Russia, consuming gas and funds earned from its sale at its own discretion. The home gas fees in Transnistrian don't reflect the market cost of this fuel, while Moldova pays \$350 for 1,000 to Gazprom for Russia gas, selling it to its consumers even at a higher price. At the same time, Transnistrian prices for Russia gas is comparable with the prices fixed in Russia for home consumption. For instance, if in the Moscow region, wholesale gas prices for further sale to population vary between \$78 and \$85 for 1,000 cubic meters, and for sale to enterprises - \$113-\$123, then in Transnistria the prices are the following: population pays \$78 for 1,000 cubic meters; enterprises - \$140. " Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/economics/1249051047.html>

<sup>13</sup> The Liberal Democratic Party (PLDM) speaks in favour of amending Moldova's constitution to settle the presidential election issue. PLDM deputy head Valeriu Strelet said at a news briefing today that the discussions on the adoption of a new text of the constitution will be soon given a fresh impetus, depending on the evolution of the political situation next autumn. Strelet noted that there are two ways to carry out a constitutional reform to unblock the president's election. The first is to launch a legislative initiative in the parliament, the second to organize a referendum, he said. Strelet specified that



the amendment of the constitution to elect the head of state at nationwide polls might be the subject of the next national referendum. Strelet also said the current Moldovan constitution needs a more comprehensive improvement; nonetheless, he avoided saying what changes he was talking about, reasoning that it was premature to discuss this issue. Moldova marks the 17th anniversary of its constitution on 29 July. The constitution entered into force on 27 August 1994.” Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/politics/1249051026.html>

<sup>14</sup> “The lawmakers are on vacation from July 29. From August 25, they will be involved in the activities that will be organized to mark 20 years of the proclamation of Moldova’s independence. The autumn-winter session will start in September, Info-Prim Neo reports. After the August 28 sitting of the Parliament, which ended close to 8pm, Speaker Marian Lupu thanked the MPs for their work and said that the spring-summer session, during which there was constituted the Government and approved the joint work program, was hard. Marian Lupu also said that the legislature held only 137 of the 145 planned sittings and only eight did not take place because of the campaign preceding the local elections. Earlier, the Head of Parliament announced he will call an extraordinary sitting of the legislative body if the Government is ready to present the draft law on the budgetary-fiscal policy before August 25. If so, the lawmakers’ vacation will be shorter.” Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/politics/1249051020.html>

<sup>15</sup> “Two lawmakers representing the Communist, Party Elena Bodnarenko and Serghei Filipov, vacated their seats. Their applications were examined and approved in the July 28 meeting of the legislative body. The two MPs did not attend the sitting, Info-Prim Neo reports. Until the seats of the substitute candidates are validated, the Communist faction will have 40 lawmakers. The Communist MPs have boycotted the legislature’s sittings since June. “ Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/politics/1249051012.html>

<sup>16</sup> “The Democratic Party (DP) of Moldova has stood up with an initiative to work out a new Law on the Government – allegedly in response to Premier Filat’s complaints that the Government Presidium, institutionalized in 2010, is a serious hindrance to the executive power’s normal work. Following the AEI Council meeting on Wednesday night, DP Chairman Marian Lupu also offered an opinion that the current Law on the Government has been outdated. “This Law is about 15 years old. It needs to be changed and updated with an account of the current reality and European practices. At the AEI Council meeting, we discussed the possibility to form a working group to draft a new bill”, said Marian Lupu. Lupu stressed that the Democrats shall not agree to abolish the Government Presidium. “We do not think the Presidium is an obstacle to Government’s normal work. Last 6 months, the Government considered and approved about 500 regulatory acts, but only two or three of them had caused principal debates in the Presidium. This body remains exactly like it was stipulated in the AEI formation agreement, the more so that we have borrowed the experience of Sweden, Germany and other countries having coalition governments”, said Lupu. Infotag’s dossier: Recently, Premier Filat’s Liberal Democratic Party put forward a legislative initiative to liquidate the Government Presidium, which is responsible for drawing up agendas to Government meetings. The Liberal Democrats are insisting on passing the abolishment law yet before this August 1, when the Parliament is supposed to go traditionally on summer recess.” Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/politics/1249050945.html>

<sup>17</sup> “This gas price is forecasted for the IV quarter provided that the global oil products prices growth rates remain unchanged, InfoMarket Agency was informed at the administration of the Moldovan-Russian enterprise Moldovagas. It is planned that given the calorificity, the gas price will amount to \$401.06 for 1,000 cubic meters. According to Moldovagas, the average price of gas supply to Moldova as a whole for the year of 2011 is planned to amount to \$343.84 for 1,000 cubic meters given the calorificity. It will considerably exceed the parameters set by the National Power Regulating Agency into the current gas fee for final consumers. Taking into consideration the forecasts, under the current gas pricing methodology, Moldovagas will have reasons to address to the National Power Regulating Agency with a request to increase the current fee.” Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/economics/1249050934.html>

<sup>18</sup> “The agreements were reached during the meetings of the Moldovan delegation headed by the Deputy Minister of Economy Illarion Popa with the Deputy Chairman of Board of Gazprom, Director General of the Gazprom Export Alexandr Medvedev, InfoMarket was informed at the Moldovagas administration. The delegation that comprised specialists of the Ministry of Economy and Moldovagas arrived in Moscow to start discussing conditions of the new contract on gas

supply to Moldova starting 2012. Moldovagaz stresses that to discuss terms of the new contract on gas supply in details, the parties established a joint workgroup that is to coordinate all issues connected with terms of the new contract and with gas pricing. At its monthly meetings, the workgroup is to elaborate the draft contract on natural gas supplies that will be discussed in October during Alexandr Medvedev's visit to Moldova. Once the contract's terms are agreed on, the contract is planned to be signed by the end-2011. The current 5-year contract on natural gas supply to Moldova was signed on December 29, 2006. " Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/economics/1249050910.html>

<sup>19</sup> "The application of European guidelines on capital market creation by Moldova will not bring desired results without a developed economy, stated the Chair of the Moldova Stock Exchange (MSE), Sergiu Cebotari. In an interview with your Infotag correspondent, Cebotari said the real economy sector of Moldova must be able to generate financial flows. "And for that purpose, it should exist in the country some favorable economic and political conditions for attracting foreign investment that directly depends on and is closely connected to exchange transaction changes", he said. According to the Chair, in order to make existent financial instruments as well as those are provided by a new bill efficiently work, it is necessary not only an up-to-date trade ground, but first of all an intelligent business infrastructure. "Capital market participants need serious preconditions to put these instruments into practice, and for that purpose there is a need of attractive economic conjuncture with all developed business components", he said. Concerning the problem of main market player (stock exchange, central depository, investment companies) capitalization, which is required by the new bill on capital market, Sergiu Cebotari said that at first glance the intention is praiseworthy. "It is known that capitalization is the mover of enterprise development, strengthening of market possibilities and growing client trust. But capitalization must well correlate with potential of the market and companies that operate in different areas of the Moldovan economy. Any investment must be profitable, which guarantees receipt of dividends to investors", he said. The MSE Chair said that Moldovan capital market needs to awaken interest in it of domestic and foreign investment. Infotag's dossier: The draft law on Moldovan capital market presupposes that stock exchange and central depository must initially have regulated capital, which exceeds by 10 times the actual rate (625 thousand euros within a year beginning the law comes into force and 2.5 million euros after 7 years)." Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/economics/1249050894.html>

<sup>20</sup> "We must reach the necessary compromise and have an open and sincere dialogue. Early legislative elections will mean a disaster, Prime Minister Vlad Filat said in a program on the channel Publika TV, Info-Prim Neo reports. "The alliance should work on the basis of trust and the components of the AEI should stop trying to control each other. The parliamentary parties should have a dialogue so as to reach a compromise as regards the election of the head of state. We cannot elect the President without the vote of at least two Communists. I'm tired of seeing new heroes appearing in the fight against communism. The people expect solutions from us, not a continuous fight," said Vlad Filat. He also said that in order to break the impasse faced by the alliance, there should be signed a new agreement. He also said that the document is being drafted and it centers on Moldova's behavior in the European integration process. The Premier said there are to methods for overcoming the uncertain political situation – the AEI and the opposition can reach a compromise over the candidate for the presidency, or the Constitution can be amended by adopting an organic law allowing electing the head of state by popular vote. "It is natural to allow the people to decide when Parliament cannot find a solution. Not the regime, but the election method is changed," he stated." Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/politics/1249050871.html>

<sup>21</sup> "A Moldovan parliamentary delegation participated in the annual session of the OSCE Parliamentary Assembly on 6-10 July. The delegation was made up of MPs Simion Furdui, Stella Jantuan and Vasili Sova, the parliament's media relations department has said. One of the main subjects of the session was the Transnistrian conflict settlement. The OSCE PA adopted a resolution on this issue. At the meeting, the Moldovan parliament's delegation met the head of the Russian delegation to the OSCE PA, deputy chief of the Russian State Duma's committee on foreign affairs Aleksandr Kozlovski. The sides discussed subjects included in the OSCE PA's Resolution on Moldova, as well as the present stage of the talks on the Transnistrian problem. The Moldovan parliament's delegation also met the delegation of Italy, led by head of the Italian delegation to the OSCE PA, Deputy Speaker of the OSCE Parliamentary Assembly Riccardo Migliori. This was the first official meeting between the two delegations within the OSCE PA. The members of the Moldovan parliament's delegation informed their Italian counterparts about the evolution of the political events in Moldova, especially the issue of the

Moldovan president's election. The head of the Moldovan parliament's delegation, Simion Furdui, spoke out for the promotion of the Moldovan-Italian cooperation in many fields, as well as for attracting Italian investments into Moldova's economy. MP Vasili Sova reviewed the present phase and prospects for the Transnistrian problem settlement. He noted that the Moldovan side hopes that the official negotiations in the 5+2 format will be resumed in Moscow next September. For his part, Riccardo Migliori gave assurances that the Italian parliament will further back Moldova's European aspirations, and is open for the promotion of the Moldovan-Italian dialogues on the international stage. The sides supported the idea of an unofficial meeting of the parliament of Moldova and representatives of the Supreme Soviet in Stockholm on 2-3 October 2011, facilitated by the OSCE PA Parliamentary Team on Moldova.” Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/politics/1249050847.html>

<sup>22</sup> “Ukraine shall continue its support of the Republic of Moldova’s territorial integrity in the Transnistrian conflict settlement question, says the joint statement signed in Crimea (Ukraine) following the meeting, which Ukrainian President Victor Yanukovitch had with his Moldovan colleague this past weekend. The document said that any model of the conflict settlement must be based on using exclusively peaceful means within the existing format of 5+2 [Moldova and Transnistria as the conflicting sides, Russia, Ukraine and the OSCE as international mediators and guarantors; and the European Union and the United States as observers], with strict observance of the principles of sovereignty and territorial integrity of the Republic of Moldova with an account of the interests of Transnistrian region residents. Victor Yanukovitch voiced readiness to further render assistance in establishing a climate of trust between Chisinau and Tiraspol and in a soonest-possible re-starting of 5+2 official negotiations. Yanukovitch highly appreciated the decision, which the Moldovan side had taken concerning Ukraine’s ownership rights for the land plot under the Odessa-Reni Highway that runs through the Moldovan village of Palanca, and “which had blockaded the Ukrainian-Moldovan relations to a certain extent for so many years”. Lupu said, “Today we can announce a serious reloading of our relations and imparting a new dynamic and quality of our good neighborly relations between our neighbor states”.“ Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/politics/1249050839.html>

<sup>23</sup> Retrieved on August 29, 2011, from <http://allmoldova.md/en/moldova-news/economics/1249050781.html>