

**Barriers and Recommendations for
Development of Joint Implementation (JI) in
End-use Energy Efficiency Projects in the
Residential Sector**

**Country Report
ROMANIA**



**The Danish
Ecological Council**

**Tomorrow's Environment
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Barriers and Recommendations for Development of Joint Implementation (JI) in End-use Energy Efficiency Projects in the Residential Sector

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1. Facts about Romania

Romania has an area of 238,391 km² and a population of 22 million. Romania is due to join the European Union on 1 January 2007. It will then have the seventh largest population and the ninth largest territory in the EU. Romania has been an active member of NATO since 2004. The official language is Romanian, while Hungarian is spoken by 20% of the population of Transylvania. Formerly, Transylvania also had a large German speaking population. Most of it left for Germany, either during World War II or in the 1990'ies. In recent years, Hungarians have also left the country. The population has been declining since 1990.

After Romania's communist regime was overthrown in late 1989, the country experienced a decade of economic instability and decline led in part by an obsolete industrial base as well as a lack of structural reform. Starting from the year 2000, however, the economy was transformed into one of relative macroeconomic stability, high growth rate, low unemployment and increasing foreign investment. Currently, it is among the most developed nations in south-eastern Europe. Economic growth since 2000 has averaged 4-5%, rising to 8.3% in 2004. This has characterised Romania as a boom economy and one of the fastest growing in Europe. In October of 2004 Romania was granted the much desired 'functional market economy' status by EU officials, and it is expected to join the EU in January 2007.

In the past, the International Monetary Fund (IMF) has criticized the Romanian government's fiscal, wage, and monetary policies. Meanwhile, macroeconomic gains have only recently started to spur creation of a middle class and address Romania's widespread poverty, while corruption and red tape continue to handicap the business environment.

2. The energy sector

During recent years, several important steps have been taken in the Romanian energy sector in changing the structure by deregulating the sector towards more market principles and free competition, as well as privatising the energy enterprises. The EU accession requires for Romania to work towards making the energy sector compliant with the EU directives on Energy [MEWM, 2005b]

The National Strategy for increasing energy efficiency is based on long-term objectives and aims to reduce the energy intensity of the Romanian economy by 40 % during the period 2004 – 2015, assuming an average annual growth in GDP of 5.4 % during the same period. Increased energy efficiency will add to the international competitiveness of the Romanian companies. [MEWM, 2005b]

The energy sector in Romania has been hampered by the specific problems faced by many countries with economies in transition:

1. High energy intensity combined with low energy efficiency
2. High marginal cost of energy production
3. Low level of legislation, institutional and regulatory infrastructure leading to high transaction costs
4. Consistent energy price increases above the rate of inflation
5. High level of non-payment, especially from industrial users, but also from individual consumers because of the high share of energy costs in total household expenditure.

6. Poor record on energy conservation and compliance with environmental requirements
7. Stagnation of the economy, high inflation rate and disappointing level of foreign investments

The most promising is the prospect of accession to the EU. [MEWM, 2005b]

The “Strategy for the Sustainable Development of Romania – Horizon 2025”, developed by the Romanian Government in April 2004, sets up the framework and indicates the objectives to be met within the national economy and in the energy sector implicitly by 2025. [Euroheat & Power, 2005]

2.1. Energy supply

Romania has significant fossil fuel and hydroelectric resources: It has crude oil reserves of about 1.4 billion barrels, proven natural gas reserves estimated at 335 Gm³, estimated coal reserves of 3.98 billion short tons. Most of these reserves are lignite and sub-bituminous coal. The total hydroelectric power potential is about 40 TWh per year of which 12 TWh per year has already been developed.

Domestic production supplies 70% of the primary energy demand.

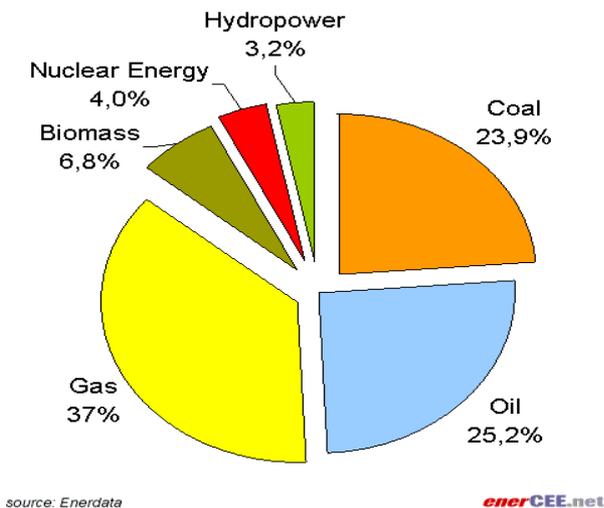


Figure 1: Primary energy consumption of Romania in 2003

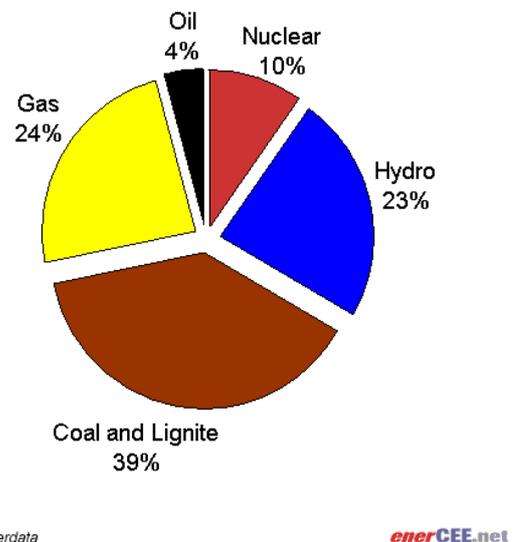


Figure 2: Sources of electricity production in Romania according to energy sources 2003

The share of gas in the country's primary energy consumption has dropped from 45% in 1990 to 35% in 2001. The share of imports of gas from Russia, via a pipeline through Ukraine, is increasing and now accounts for 20% of the country's consumption. [<http://www.eva.ac.at/enercee/ro/supplybycarrier.htm>]

2.2. National Strategy for Energy Development 2006-2009

The National Strategy for Energy Development aims at creating efficient energy markets, the development of which could be ensured in a durable way, in high quality and security conditions of the energy supply, observing the EU energy efficiency and environment protection standards.

The Strategy establishes three main directions of activity:

1. financial unblocking of the energy sector;

2. continuing the privatisation process in the distribution and then in the electricity production sector;
3. ensuring a functional and sustainable development in the medium term by stimulating new investments in the energy sector.

An essential objective of the National Strategy for Energy Development is the increase of energy efficiency throughout the entire chain of natural resources, production, transport, distribution, and consumption by an optimal use of market economy mechanisms by

- promoting private initiative and development of energy services,
- promoting new technologies with high-energy efficiency and
- international co-operation in the field of energy efficiency.

The energy consumption per GDP is high in Romania, so it is a political goal to decrease the relative energy consumption radically as can be seen in Figure 3 below. A comparison in Figure 4 with the EU-15 members in 2000 shows that even with these improvements, the energy intensity of Romanian Economy will be twice as high in 2030 as it was in EU-15 in 2000. During this period the EU-15 countries are also expected to have improved their energy systems, leaving Romania behind. Romania will thus need to target energy savings dramatically in order not to be too vulnerable to energy prices and emission restrictions. The energy consumption for space heating is crucial in this respect.

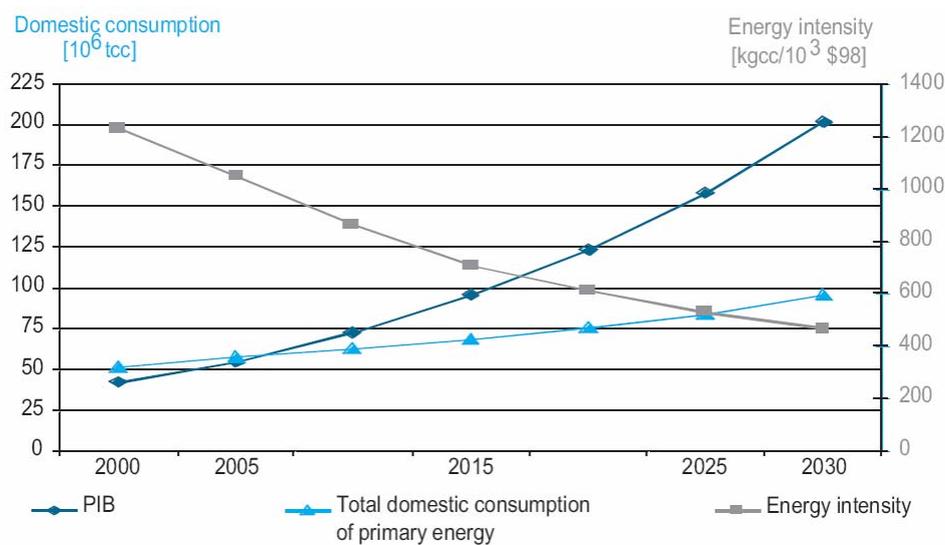


Figure 3 'Normative' development of Romanian economy in the period 2000-2030¹

¹ http://rbd.doingbusiness.ro/2005_02/raef_art_sec.pdf#search=%22energy%20intensity%20Romania%22

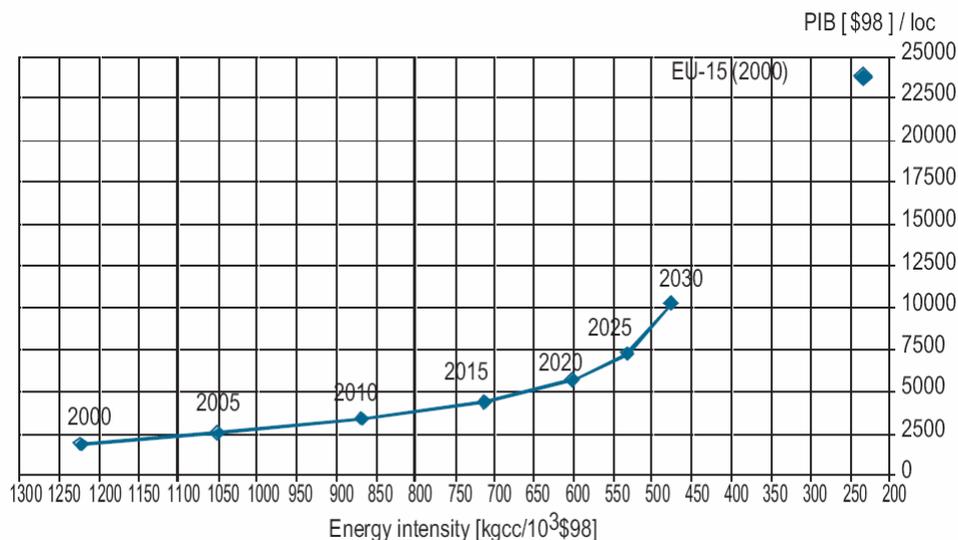


Figure 4 Romanian development scenario for energy intensity compared to the year 2000 status of EU-15.²

2.3. Renewable energy

The prospects for *hydro* development in Romania are very good. The hydro-electric potential is estimated at 40 TWh, where 12 TWh are utilised. This is equal to an overall installed capacity of 6,120 MW, which represent 27.9% of the overall installed capacity of the Romanian power system. However, there are no special incentives for the implementation of hydro projects.

40% of Romania is agricultural land and 27% is forest. The share of biomass in the total energy consumption of the country was about 11% in 1998. Currently, *biomass* is used only for heating purposes, where direct burning for cooking and heating of water constitutes the largest share.

Based on the available *wind* atlas, Romania has a very good technical potential for wind energy development. Nevertheless, there is only one wind energy demonstration project in Romania (4 kW). Two demonstration projects with over 100 kW each, in the Semenic Mountains and offshore in the Black Sea, are no longer in operation due to lack of funds.

Since 1979, a large scale program for various *solar* applications has been implemented: solar domestic hot water systems for hotels at the Black Sea and for blocks of flats, solar drying for agricultural products, and solar cooling for fish preservation. However, due to poor quality, lack of maintenance, and a stop of activities with the market reforming in 1990, only 10% of the installed 1 Mio m² of collector area is still in operation. Currently, some demonstration capacities, under 1 kW are installed.

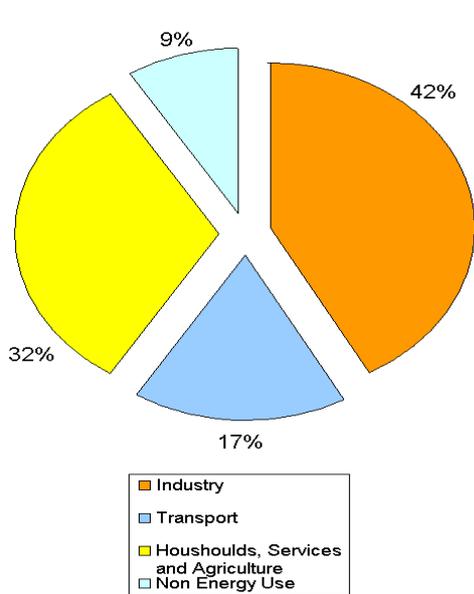
Geothermal resources have been used in Romania since the 1960s. At present, 137 MWh are used from 61 active wells producing hot water in the temperature range of 55-115°C. The geothermal water resources are public property according to the Romanian Constitution.

[<http://www.eva.ac.at/enercee/ro/supplybycarrier.htm>]

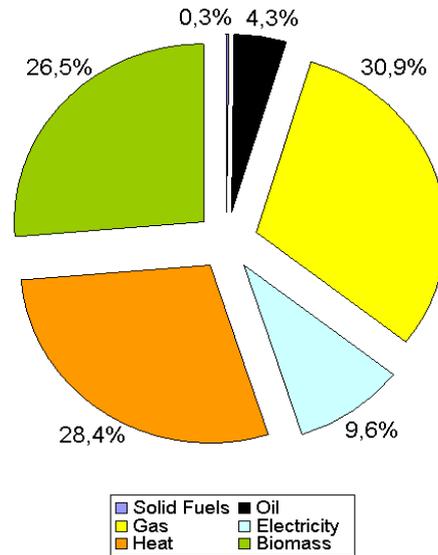
² Romanian Business Digest, <http://rbd.doingbusiness.ro/home.htm>

2.4. Energy demand

Primary energy consumption per capita is about 1.6 toe/67 GJ. Final energy consumption decreased sharply in the early 1990s, due to an economic crisis and changes in energy accounting methods. Since 1999, consumption has stabilized at 24.5 Mtoe/1,025,800 TJ. [<http://www.eva.ac.at/enercee/ro/supplybycarrier.htm>]



source: Enerdata
enerCEE.net
Figure 5: Final energy demand by sectors in Romania, 2003



source: Enerdata
enerCEE.net
Figure 6: Final energy demand of the residential sector of Romania, 2003. Heat refers to the delivery of district heating.

Energy consumption has stabilised due to improved energy efficiency in industry with large production, while especially households do not contribute to the energy efficiency, as there is no money for investments. Thus, the residential sector is lagging behind.

2.4.1. Energy tariffs

Two national authorities regulate the electricity and heat sector prices in Romania:

1. The Romanian Electricity and Heat Regulation Authority is a public institution overseen by the Ministry of Economy and Commerce. It was set up in order to create and implement an appropriate regulation system, to ensure that electricity and heating are produced properly in terms of efficiency, competition, transparency, and consumer protection
2. The National Regulation Authority of Public Services and Husbandry (ANRSC) was set up in order to ensure the legal framework for public services, including district heating systems owned by local authorities.

Progress is slow in the energy sector reform and tariff policies are flawed. Although direct subsidies from the central budget have already been abolished, the existing methodologies for calculating energy prices by traditional producers do not fully account (or do not account at all) for certain expenses. The government needs to develop a policy, which can manage the affordability issue for lower-income groups. Increasing

end-use efficiency, which has a long-term social impact by reducing the cost of public services, will help in this matter.

2.5. The district heating system

In recent years, the thermal heating systems have undergone major changes. Thus, until the years 2002-2003, the majority of the combined heat and power plants (CHP) were state-owned (one company) and local departments controlled by the municipalities managed the heat distribution systems. After 2003, the ownership of the CHPs were decentralised and this process has created conditions for merging heating



Picture 1 Residential building in Târgu Mureș. Note the exhaust pipes from individual gas boilers.

production and distribution activities. In June 2004 the “National Strategy for the Distribution of Thermal Energy to Consumers by means of Centralised Systems of Production and Distribution” was finalised and approved [Euroheat & Power, 2005]. “COGEN Romania” has played an important role in drawing up and seconding this strategy, which promotes the modern concepts of CHP/district heating (DH) development and efficiency.

In February 2003 25 members founded the national association “COGEN Romania”. Currently, the association has 30 members, which are mainly thermal energy production and distribution units in 30 large cities in Romania. [Euroheat & Power, 2005]

The main concern during this period has been to stop household customers from disconnecting from

the DH networks. Many households have decided to disconnect from the centralised DH systems due

to the increasing price of fuel and consequently of the supplied heat, the poor status of the entire heat distribution systems, together with the lack of measurement of individual heat consumption and lack of transparency in heat cost allocation by the heat distribution company. Instead of the DH heat, they buy individual gas boilers for only one apartment. Of the total number of 2,696,000 flats initially connected to the central heating/DH systems, 581,000 flats have been disconnected during the last 4 years. The majority of the disconnected flats were in small communities without CHP plants in the network but only boilers. The rate of disconnection in cities supplied by CHP/DH systems was between 3 and 18% of the total number of flats in the respective community. Unfortunately, most of the small heating units operating in towns with 2,000 to 20,000 inhabitants were closed down in 2003 and 2004 – before the investment programme for rehabilitation could be applied. Out of the 184 DH systems operating in 2002, more than 40 have been closed down in 2003 and 2004. [Euroheat & Power, 2005]

The DH production and demand have dropped dramatically during recent years: The demand in the residential sector has dropped from 24.65 TWh in 2000 to 15.83 TWh in 2003. Many district heating systems have already taken measures to increase efficiency by reducing losses and production costs. Old equipment has been renovated, updated or replaced with equipment with higher efficiency [Euroheat & Power, 2005]. Many DH companies have installed meters in the substations/boiler houses and at the level of the stairs of the blocks of flats, while others are more reluctant to do this as it makes the distribution losses more visible. Without metering a portion of these losses can be billed to the customers. The district heating sector mainly supplies heating to urban areas.

The DH system in Romania needs major renovations. The Ministry of Administration and Interior is starting a program to support the DH systems.

Renovation can, however, make heating costs go up, so consumers cannot afford being connected to the DH system. This is a general problem in Romania. Therefore, it is important to start on the consumption side in order to reduce heating costs for consumers, but also to minimise future investment costs for DH companies.

2.5.1. Ownership

There are three types of district heating operators:

1. public autonomous utility (district heating utility or public integrated utility with district heating activities)
2. trade company (mainly public, either joint stock or ltd.)
3. specialised department of the Local Council (municipality)

The most widespread organisational form is the public utility [Euroheat & Power, 2005].

For most of the large plants more than 70% of production costs are fuel costs, salaries and depreciation. For 60% of the large power plants fuel costs represent more than half of the overall production costs.

2.5.2. Legislative framework

District heating is considered to be a local public service under the provision of the Local Public Administration Law. “The National Strategy Regarding the Supply of Thermal Energy to Households by Centralised Production and Distribution Systems (DH)” defines the directions to be followed by the public services.

A social program can provide groups with lower income with a check to cover heating expenses.

The legislation making it compulsory to meter each building apartment in Romania is far from implemented.

The Energy Efficiency Law issued in 2000 foresees obligations and provides incentives for energy producers and consumers to improve energy efficiency and to promote new sources of energy. Government Resolution No. 163/2004 approved the “Energy Efficiency National Strategy”. The strategy’s main target is to identify possibilities and tools for increasing energy efficiency in the entire supply chain.

“The National Strategy regarding the Supply of Thermal Energy to Households by Centralised Production and Distribution Systems” creates the legal framework for the rehabilitation of buildings in order to reduce consumption (losses). [Euroheat & Power, 2005]

3. The residential sector

The residential sector in Romania has been privatised and homeowner associations have been established. These play a role in interactions with energy supply companies, e.g. regarding payment for electricity consumption in common areas and when deciding on maintenance of leaking roofs.

Since the homeowner associations are established as legal entities with members/owners, they also have the power to decide on common projects and force members to pay their share of costs. The decision making process is described in the statutes of the different associations, but as a default a decision will require simple vote majority to be legally binding. It must, however, be recommended that a decision on energy retrofitting of a block is supported by a vast majority of the owners, as this will reduce later non-payment problems.



Picture 2 Home for elderly people in Tîrgu Mureş. The building is owned by the municipality and is recently retrofitted with wall insulation and new windows.

Many of the flat owners are pensioners (sometimes 60%), who have worked their whole life to achieve their flat, and they are not going to risk anything. Their flat is their life dream. In most cases the flat was given to them after the fall of communism, and they do not want to move, not even a block away. So, they own their flats, but there is not really a market, because nobody sells their flat. If younger people live in the block of flats, it is because they have inherited the flat. However, there exists a program for younger people, where they can buy a flat. Over a period of time, they put the rent money into an account to be able to pay the deposit for the flat. As a rule, there is one association for each block of flats.

Romania started programs to revitalize the housing sector and help provide affordable housing. Private does not necessarily mean market, and the key question is how market mechanisms are introduced as a dominant integrating mechanism. In the area of water and heating etc. it was not possible to introduce market mechanisms (price liberalization, enforcement) because of the risk of social conflicts [Hegedüs, 2004].

Two main stakeholders in the Romanian residential sector are the Owners Associations League “HABITAT” and the Romanian Federation of Owners Associations. The majority of the population owns their flat.

3.1.1. Thermal Buildings Rehabilitation Law

Romania has a supportive Thermal Buildings Rehabilitation Law, modified in December 2005 for the benefit of end-users. The law has been changed several times due to low attraction to residents, so that the current version states that the cost of building thermal rehabilitation is divided in equal parts among owner, local authority and the Ministry of Transportation, Construction and Tourism (TECP). The state pays for an energy audit and for project development. The Ministry of Transportation, Construction and Tourism³ – the Thermal Energy Conservation Program is a Project Coordination Unit, which runs a multi-annual Thermal Buildings Rehabilitation Program for multi-family buildings. The unit also successfully finished a Thermal Energy Conservation Program (TECP – for power plants and pipe networks) in five Romanian cities, co-financed by EBRD. The unit arranged meetings and workshops for householders (owners and renters), in order to increase their awareness of energy efficiency and the long-term benefits, applying the domestic energy saving measures in multi-level buildings.

The law sets up the framework for annual thermal rehabilitation programs. The municipalities deliver substantiated applications for inclusion of specified buildings into the annual program, whereas the ministry decides within its budget limitations on which buildings to include in the annual program. Lack of funds may be a major constrain to the program, but it is open for additional funding if this can be attracted.

Legislative Background on Energy in Buildings

- ordinance 29/2000 and related Law 325/2002, on the thermal rehabilitation of the existing building stock and stimulating the energy saving
- ordinance 174/2002, and the related Law 211/2003 relating to the establishment of special measures for the thermal rehabilitation of multi-storeyed buildings – block of flats
- order no. 550/2003 approving the technical regulations “Guide to the authorisation of energy auditors for building and related installations”
- Law no. 372/2005 transposing the Directive on the energy performance of buildings (2002/91/EC)
- Ordinance 187/2005 regarding to modify Ordinance 174/2002 relating to the establishment of special measures for the thermal rehabilitation of multi-storeyed buildings - block of flats
- Law no.372 /2005 transposing the Directive on the energy performance of buildings (2002/91/E); regarding Energy Performance of Building and other further normative acts. (ARCE)

The amended Thermal Rehabilitation Law as of December 2005 includes the following statements⁴:

Article 6:

“(2) The coordinators of annual programs take the necessary measures to carry out the expertise and energy audit of the building, and to conclude conventions with the owners’ associations in the apartment buildings nominated in the annual programs in order to follow up on the actions regarding the design and execution of thermal rehabilitation of apartment buildings.

(4) The contracting of expertise and energy audit, design and execution of the thermal rehabilitation of apartment buildings nominated in the annual programs is done by the coordinators of the annual programs together with the owners’ associations, by observing the legal provisions in force on public acquisition.”

Article 8:

³ <http://www.mt.ro>

⁴ Translations of the laws into English provided by the USAID Romanian Energy Program, Phase III (Rep3) www.rep3.ro

“The necessary funds for financing expenditures of thermal rehabilitation of apartment buildings nominated in the annual programs are ensured, in equal parts, from the following sources:

- a) state budget allocation, up to the limit of annually approved funds with this destination in the budget of the Ministry of Transportation, Buildings and Tourism;*
- b) funds annually approved with this destination in the local budgets;*
- c) the repair fund of the owners’ association.”*

Article 9:

“The owners’ association in the apartment buildings included in the annual programs benefit from financing of expenses for design and execution of thermal rehabilitation work, according to Art. 6 and 7, provided they approve the decision of intervention with a majority vote of the members of the owners’ general assembly and sign the framework convention with the coordinator of the annual program for the unfolding, under the law, of the actions for the thermal rehabilitation of the building.”

It is especially interesting that the former law obliged owners to set up a mortgage credit, while this is not a requirement anymore. The program is, thus, more open for alternative financing models that could include JI and/or soft loans or supplier loans. The Thermal Rehabilitation Law saw its latest amendments on 23 June 2006. Unfortunately, it has not been possible to get the text in English within the limited timeframe of this report.

4. Non-governmental organisations (NGOs)

4.1. The Romanian Association for Energy Efficiency

SOCER is a technical and non-governmental association that has been established as a non-profit organisation with a professional body focusing on the efficient use of energy. Its activity is widely unfolded in Romania and the Republic of Moldova and it is oriented to help local and regional authorities, the state and private companies from all economic fields, public institutions and individuals. By its initiatives, SOCER is sustaining the Romanian Agency for Energy Conservation (ARCE), the governmental body for energy efficiency matters. SOCER is situated in Craiova and is suggested as a partner for projects there.

4.2. Romanian Energy Policy Association

APER is an independent professional organization (NGO, non-profit), established under EC SYNERGY program. APER provides energy information and knowledge to decision makers and experts with respect to energy policy development and analysis, acts as an independent forum for exchange of experience & opinions, and supports business development in the energy & environment fields.

5. Technical problems & solutions

The Thermal Rehabilitation Program described above gives the housing association the possibility to choose amongst several packages of energy efficiency measures from the energy audit report – but one of them has to be chosen as this is part of the agreement where the energy audit is paid for by the state. The packages will vary in costs so that the housing association can choose the package that best fits their members’ financial ability. The packages are defined by the auditor and will normally be standardised solutions based on

Romanian building tradition and known technologies to make it possible for local companies to conduct the work after public tendering. With this set-up it is not possible to employ newer and less known technologies.

An example of packages from an audit report is shown below.

Table 1 Example of energy efficiency measures proposed in an energy audit report

Measure number	Description
C1	Insulation of exterior walls with 8 cm expanded polystyrene
C2a	Thermal insulation of the roof with 10 cm polystyrene and a moisture barrier; and of the attic with 8 cm polystyrene.
C2b	Rise the roof with a lighth metallic unheated construction covered by polycarbonate.
C3a	Replace wodden window frames with windows frames in PVC with three chambers profiles and with low energy glass
C3b	Repair of exterior and sealing of joints/gaps
C4	Insulation of building entrance with 8 cm polystyrene
C5a	Immure wall openings of the loggia/basement
C5b	Insulation of all walls of the loggia/basement and installation of adjustable wooden shutters
C5c	Insulation of northern walls of the loggia/basement and installation of adjustable wooden shutters
I1	Cleaning of the radiators and the inner heating installations.
I2	Replacement of the heat and domestic hot water pipes
I3	Insulation of the heat pipes; insulation of the domestic hot water pipes
I4	Installation of heat meters and thermostatic radiator valves
I5	Installation of emptying and separation valves and installation of constant pressure valves

Table 2 Energy efficiency packages combining the energy saving measures described above

Package	Measures
Package 1	C4, I1,I2, I3, I4, I5
Package 2	C3b, C4, I1, I2, I3, I4, I5
Package 3	C3a, C4, I1, I2, I3, I4, I5
Package 4a	C2a, C3a,C4, I1, I2, I3, I4, I5
Package 4b	C2b,C3a,C4,C5a,I1,I2, I3, I4, I5
Package 4c	C2b,C3a,C4,C5b,I1,I2, I3, I4, I5
Package 5	C1, C2a, C3a,C4,C5c, I1, I2, I3, I4, I5

Table 3 Economic estimation of the energy saving packages for a sample building.

Package	Cost	CE	N	c (VAT incl.)	Δ Energy	Δ Energy expenditure	Payback time	Energy savings
	(Euro)	(Euro/year)	(years)	(Euro/kWh)	(kWh/year)	(Euro/year)	(years)	(%)
1	17421	6452.0	15.0	0.025	33614.3	856.3	13.3	13.3
2	21262	6452.0	15.0	0.025	87855.0	2238.2	7.4	34.7
3	62229	6452.0	15.0	0.025	96440.3	2456.9	15.5	38.1
4a	95708	6452.0	18.0	0.025	112765.3	2872.78	18.5	44.5
4b	148072	6452.0	18.0	0.025	143232.1	3648.95	20.8	56.6
4c	142281	6452.0	18.0	0.025	135021.2	3439.77	21.0	53.3
5	168315	6452.0	18.0	0.025	184739.8	4706.39	19.3	72.9

6. Financing

Romanian economy is improving and getting better and better integrated into the European Union with growing exports and improved standards of living for the majority of the population. This will improve further as EU funds will be targeted at improvements for the poorest part of the population.

6.1. Financing of energy saving measures

The economical development assessment up to 2020 includes increase of thermal insulation of buildings.

Financial institutions present in Romania are international financial institutions, commercial banks, investment funds, the Romanian Energy Efficiency Fund, the Romanian-American Enterprise Fund (RAEF), and the state budget with the special fund, the Environmental Fund, under ARCE. The mentioned organisations could be relevant for co-financing of a JI project together with a ministry and a local authority.

The banks in Romania are beginning to recognise the importance of this kind of investments. They try to find solutions to decrease the interest rate or to maintain it low for more than 5-7 years.

Until now, there are some associations which have used this kind of loans to replace the boiler plant for their own building, and 23 blocks of flats are prepared to be retrofitted in the mentioned thermal rehabilitation program managed by the Ministry of Transportation, Constructions and Tourism (TECP).

Other solutions are supplier loans as leasing systems for equipment, while mortgage credit loans are not common. This can be seen from the fact that the obligations to take up a mortgage loan in order to be included in the thermal rehabilitation program was withdrawn, as it made the program less attractive.

Besides that, Romania lacks knowledge and experience in preparing bankable feasibility studies, and has a shortage of investment capital. After accession to the EU, Romania will, however, receive grants from the EU's Regional, Structural and Cohesion Funds.

6.2. Affordability

Most inhabitants cannot afford an increase in heating costs or otherwise pay more for housing. But they know that they may have to do so if they want to improve their homes or even to keep the houses from further degradation.



Picture 3 Preparation for presentation of low energy windows at a trade exposition on the main street in Târgu Mureș.

The decrease in GDP and real income was accompanied by increasing income inequalities. The need for social housing has increased both in terms of helping households to pay housing services and in providing access to housing. The housing policy was faced with a huge affordability problem. In most cases, the cost of housing-related services has increased in real terms, but quite unevenly. Energy costs and the price of building materials increased the most, whilst others, mostly domestically produced services, followed the trend

shortly afterwards. The price of housing related services increased in a period of economic decline, which resulted in accumulated arrears.

6.3. Cost of living

The average income of a Romanian family of three with a medium salary is 250 € brut / 215 € net per month. Such a family spends approximately 80 % of its income on monthly expenses including rent, maintenance, food, transportation, clothes, telecommunication, fees, etc. During the winter season an average flat pays over 78 €/month for heating. The building administration divides the heating costs from the provider bill up among the flats, taking into account the heated area of the individual flats.

7. Joint Implementation (JI) in Romania

Romania was the first country from Annex I of UNFCCC to ratify the Kyoto Protocol. Romania's commitment is to reduce greenhouse gas emission in 2008-2012 with 8% compared to the emission level recorded in 1989⁵. The total greenhouse gas emission (without considering sinks) decreased by 48% in the period 1989-2001. With removals it was 51.8%. Based on these observations, Romania will have an emission level well below the cap in the first commitment period 2008-2012. Romania will thus be able to

⁵ The base year is 1989 and not 1990 to reflect the emissions before the economic collapse.

sell Assigned Amount Units and will thus also be able to transfer emission reductions from projects before 2008 and after 2012 into the commitment period. [MEWM, 2005]

7.1. Experience, administration and expectations

In Romania the JI system is already up and running and several projects have been approved and implemented. So far 13 JI projects in Romania covering areas as energy efficiency in industry, biomass energy, hydro power, landfill gas, geothermal, fossil fuel switch and afforestation have come to validation. Denmark is the investor for seven of the projects.⁶ The potential for these kinds of projects is large, so it must be anticipated that more projects will be carried out in the future. The good experiences with current JI projects and ambitious plans for further development ranks Romania as number one on the list of potential JI host countries with a rating of BBB+.⁷

As Romania is in an adaptation process towards EU legislation, it is also well under way in the process of complying with the Kyoto requirements for participating in Emission Trading. This is expected to be achieved in 2007. The government is in the process of defining JI First Track with nationally defined procedures. There are also many legal documents and strategies that indirectly affect JI projects, in particular on setting baseline GHG emissions. This is not only crucial for eligibility testing as a JI project, but also determines the amount of ERUs that can be generated by the project. The most important circumstances in this respect are no doubt EU accession, and the most relevant sectors to be examined are energy and environment (waste management in particular). As these instruments generally promote higher energy efficiency and stricter environmental standards, they push baseline emissions downwards. [MEWM, 2005b]

JI projects can only be implemented in Romania on the basis of a Memorandum of Understanding signed by the two countries. The Ministry of Environment and Water Management (MEWM) undertakes negotiations for a memorandum of understanding in the name of the Romanian Government. The memorandum is signed by the Minister of Environment and Water Management on behalf of the Romanian Government and ratified by the parliament. Romania has signed a bilateral agreement for JI projects development with Denmark [MEWM, 2005b]. Projects are registered by MEWM. These projects are analysed within the National Commission on Climate Change and, depending of the decision, proposed for further investigation in order to establish the proper documentation for approval. The National Commission on Climate Change - a consultative inter-ministerial body - promotes the necessary measures for unitary implementation in Romania of the objectives of the UNFCCC and the Kyoto Protocol, in coordination with the MEWM [RMEWM, 2005].

The Joint Implementation Mechanism of the Kyoto Protocol is considered an important mechanism for co-financing energy efficiency and rehabilitation projects at thermal power plants. [MEWM, 2005]

7.2. Energy retrofitting of residential buildings as JI

It is expected that Romania will participate in the European Union Emission Trading Scheme (EU ETS) from 1 January 2007. According to this system, installations that are more than 20 MW will be covered by

⁶ www.cd4cdm.org 10th of August 2006.

⁷ www.pointcarbon.com

the ETS. Installations are, e.g., boiler houses with several boilers. This could form a barrier for implementation of JI projects due to the implementation of the Linking Directive into national law. This will, however, not be a barrier for demand side JI projects in the residential sector in Romania. An indirect JI reserve has been set aside to cancel AAUs equal to the ERUs produced by these projects⁸. They will, thus, not affect the allocation of allowances to the district heating installations.

The Romanian Thermal Rehabilitation Program described in section 3.1.1 gives residents and a municipality the opportunity to attract third-party support for payment of their share of rehabilitation expenses. This



Picture 4 New district heating boiler in Târgu Mureş. Improved energy efficiency at the houses will reduce the number of boilers that needs to be installed and thus reduce investment costs for the company.

clause opens up for the use of JI as an integrated part of financing together with, e.g., EU funds etc. Additional funding from JI can thus be an incentive to choose a better energy standard of rehabilitation than otherwise achieved and/or increase support to the project amongst the residents.

The current regulations of the Joint Implementation does require a project by project evaluation and documentation which can be expected to give problems in relation to the administrative procedures, conditions and timeframes of the Thermal Rehabilitation Program, if it is utilised to a large extend. This

must be elaborated when developing the procedures of the Joint Implementation Track 1 that Romania shortly will be eligible to use. The Track 1 procedures are defined by the government of the host country and are open for more flexible procedures. It can, thus, be possible for the Romanian Government to make a tailored procedure so that a project under the Thermal Rehabilitation Program automatically is a JI project activity. These issues are described in more detail in the main report.

Depending on financing model and organisational set-up the use of Joint Implementation can have a social effect additional to the energy saving measures. This is due to the fact that energy savings result in cost savings that are not easy to percept, as the focus will always be on the actual cost and not on what the costs could have been. On the other hand, Joint Implementation results in the sale of Emission Reduction Units, which provides an income. If the Emission Reduction Units are generated to the project also after the loans have been paid back, this income can be used for common purposes such as maintenance of playgrounds or other facilities. There may, therefore, be a special social perspective in having at least part of the payment for

⁸ www.eu-ets.ro .

credits go beyond the payback time of the loans, while the financial situation suggests that payments are mostly made in advance.

With support from the Institute of Economic Forecasting by using their analysis tool and information on the various district heating systems and economic capabilities of the companies and municipalities, it can be possible to target larger scale JI projects on residential buildings, so that they can interact with the rehabilitation of the district heating systems. This will give more CO₂ abatement for the investments, as it recognises that any energy improvement in district heating systems should start with diminishing the demand.

8. Interesting places for JI projects

The technical potential for energy retrofitting in the residential sector in Romania is large. Homeowner associations are also in place and there is general awareness of energy due to the establishment of meters for heat consumption in the buildings and to increasing prices. The two sites for JI demonstration projects have, thus, been selected on the basis of feedbacks from requests in the spring of 2006. We suggest that the JI projects be combined with a national energy retrofit program. In that case it is likely that successful implementation locally will have a high diffusion effect on other areas.

8.1. Craiova

Craiova with 320,000 inhabitants is the capital of the county of Dolj, situated near the left bank of the river Jiu at approximately equal distances from the Southern Carpathians (north) and the Danube (south).

In 1395 Craiova was probably the scene of a victory over the ottomans. Frequently referred to as "a city" after the first half of the 16th century, the Craiova area was always regarded as an important economic region of Wallachia and Romania at large. A large part of the city was burned down in 1800. At the end of the 19th century, the city of Craiova, with its 40,000 inhabitants, had developed small factories (producing chemicals, farming utilities, and construction materials) and textile manufacturers.

After World War II, industry continued to develop. Since 1960 the city has become a powerful industrial centre featuring construction of machines and equipment, aeronautical industry, chemical industry, food industry, building materials industry, electro-technical industry, extractive industry, and power industry.

Around 260,000 of the inhabitants of Craiova live in blocks with a total of 4,223 staircases. The residents of the 3,200 buildings are organised in 368 homeowner associations giving several buildings per association. The homeowner associations are strong with power to go to court with people who reject to pay their share of commonly decided investments in, e.g., retrofitting of leaking roofs.

Craiova is the home city of The Romanian Association for Energy Efficiency (SOCER), which is able to coordinate central stakeholders in an organisational set-up that can be the formal JI project owner. SOCER



has several suppliers of relevant material for energy retrofitting of houses as members and sees their role as disseminators and coordinators.⁹

8.2. Târgu Mureş



Târgu-Mureş is the administrative centre of Mureş County in Transylvania and had a population of 150,041 inhabitants according to the last census in 2002. This was the first census to show Hungarians as a minority, following decades of immigration of Romanians into the city, while Hungarians have used the Hungarian EU-membership as a step stone to work abroad. The local economy has started to get stronger after various investors settled in the area.

The city was first documented in 1332 and became a royal residence in 1482. From 1616 and onwards Târgu-Mureş has been an administrative centre within Transylvania. After World War II, the communist administration of Romania conducted a policy of massive industrialization that completely re-shaped the community, and set up a Hungarian Autonomous Province based in the city, which lasted 15 years. Târgu-Mureş became the centre of economic and social life of the region. In March 1990, shortly after the Romanian Revolution of 1989 overthrew the communist regime, Târgu-Mureş was the stage of violent confrontations between ethnic Hungarians and Romanians.

There are two federations of homeowners' associations in Târgu-Mureş. The associations are well organised and some rely on technical expertise.

The contact with Târgu-Mureş was initiated by the district heating company that is interested in energy retrofitting of houses, as the company is in the process of changing their boilers and rehabilitating the district heating network. They can see that a lower demand will result in lower investment needs for the company and that the right timing of the rehabilitation projects can be beneficial to network rehabilitation. This interest from the district heating company is not the general rule in Romania or other places as the general view normally is to only look at the supply side.

According to Romanian law, public companies are not allowed to invest in private property. It will, thus, not be possible for the district heating company to invest directly in energy savings at their consumers – even if this could prove economically beneficial for the district heating company. The district heating company does see Joint Implementation projects at the end users as a possibility to overcome this and has management resources and lawyers that will be able to assist in setting up a system to manage and promote energy

⁹ <http://www.socer.ro>

efficiency using Joint Implementation. A successful pilot project will thus be implemented in the rest of the city and inspire others.

In the winter of 2005-2006, 10,000 consumers out of the total of 30,000 received social security benefits from the municipality to pay for the heat. So the municipality also has interest in heat expenses.

Târgu-Mureş is the host of a Danish landfill gas JI project under development that will deliver gas to the district heating company. Thus good connections that can ease a further process already exist between Danish Carbon, the local authorities and the District Heating Company.

In this project we have approached a number of homeowner associations. We have proposed that they contact the municipality to ensure that the municipality will be part of the Romanian Rehabilitation Programme in 2007.

9. Main barriers and recommendations for Romania

A discussion of the main barriers to energy retrofitting of multifamily houses in Romania must take, as a starting point, the fact that Romania will shortly become a member of the European Union. Thus Romania will need to comply with EU policy and legislation, including energy savings in the residential sector and improvement of living standards. Romania will receive financial support to achieve these goals from the Structural Funds of the EU.

Furthermore, the Thermal Rehabilitation Law was amended in May 2006. The formal legal set-up for large-scale rehabilitation says that the state, the municipality, and the residents each will pay 1/3 of rehabilitation costs. The Homeowner Associations that have been established to take care of the shared property of the buildings have decision structures and the legal power to decide on building rehabilitation projects by majority voting amongst the owners. Finally, a majority of the buildings have heat meters in each building and the remaining will get meters so that the energy consumption is visible for the owners. It can be expected that during the next few years the individual metering for each consumer in the blocks of flats connected to the district heating system will start to be used on larger scale.

These developments will, altogether, improve the conditions for energy conservation projects in residential areas.

9.1. Main barriers

Large barriers, however, still remain to be overcome. There are very few examples of energy retrofitting to build on. This means that homeowners and their associations have only a limited number of places to look to in order to be convinced to put their money at risk for a project.

The main barriers have been identified as:

- Lack of knowledge of technical solutions and their financial and economic implications
- Limited financial means due to generally low incomes and large shares of pensioners
- Short time horizons and uncertainty for the future

- Reluctance of taking up mortgage loans due to financial risk aversion
- Limited access to cheap loans due to the lack of financial guarantees

9.2. Findings and recommendations on Joint Implementation

The study shows that Joint Implementation can contribute to overcome the barriers stated above. The Thermal Rehabilitation Law makes it possible for residents to get supplementary funding to reduce their share. Thus the establishment of a Joint Implementation Project will be to the economic and financial benefit of the residents/homeowners and the owner associations. It will increase the likelihood of implementation and/or lead to projects with larger investments and greater energy saving.

As the individual energy efficiency projects are small seen from a CO₂ emission reduction perspective the most likely procedures to use is currently the Small Scale CDM Methodology on energy efficiency projects. It is recommended that pilot projects based on this methodology be developed.

But the methodology has some drawbacks seen in the larger-scale perspective of national rehabilitation of the residential sector. A project owner must be found for each project, and for many of these projects the same project owner/administrator cannot be responsible for projects above a certain limit of annual energy savings, in order not to challenge debundling rules.

At the climate summit (COP11/MOP 1) in Montreal in 2005 the ‘Programmatic Approach’ was decided. This project recommends that this approach also be adopted for Joint Implementation, so that the Thermal Rehabilitation Law can be registered as a JI Project.

The District Heating Companies play an important role in the realisation of the large energy-saving potentials, as thermal rehabilitation of buildings gives room for more cost and energy effective rehabilitation of heat supply systems with fewer or smaller boilers and smaller dimensions of the district heating networks that even may allow for lower temperatures in the system. Thus there is basis for the district heating companies indirectly to be beneficiaries of the demand side JI projects. In this case supply side energy efficiency projects can be even more profitable. It is strongly recommended that rehabilitation of the energy supply system is coordinated with rehabilitation of the demand side.

9.3. Capacity building and information dissemination

Awareness of the causes and effects of climate change and the possibilities of energy saving are not yet widespread in Romania due to a lack of capacity and financial resources. It is, therefore, essential that regional awareness and information centres be established, including the technical part of these issues for citizens and organisations.

Also the public administrations will benefit from capacity building and information centres. Activities such as rehabilitation will have considerable positive impacts on the social situation and the energy costs covered by municipalities for large portions of the population.

10. References

- *CMR (Comprehensive Monitoring Report)*, 2005, Romania
- Euroheat & Power, 2005: District heating and Cooling – Country by Country / 2005 Survey
- European Commission, 2005: Romania – 2005 Comprehensive Monitoring Report {COM [2005] 534final}
- European Commission, 2001 (Save II Programme): *Technical and Economic Assessment of Possibilities Improvements of Energy Efficiency of the Residential Building / Heating Systems in Poland*, Project No. XVII/4.1031/P/99-333
- Hegedüs, József, 2004: *Social housing experiences in East-European transition countries*, Metropolitan Research Institute, Hungary
- Institut Wohnen und Umwelt/European Commission 2003, *Energetic Refurbishment of Residential Buildings in Uzhgorod, Mihalovte and Darmstadt – Tacis Cross-Border Co-operation Small Project Facility*, TSP/UK/0103/055
- EUtech & ERM, 2005 (Energie & Management GmbH and Environmental Resources Management): *Title NA*, Project No. P2589 - KfW – Final Report Draft 050114
- Point Carbon and Vertis Environmental Finance Ltd., 2003: Ukraine Country Report 06.10.03
- Point Carbon, 2006: *CDM & JI Monitor 7 March 2006*
- MEWM (Ministry of Environment and Water Management Romania), 2005a: A Power Point Presentation – Romania Kyoto Protocol Implementation, Japan Carbon Investors Forum METI by Dr. Ionut PURICA
- MEWM (Ministry of Environment and Water Management), 2005b: Romania's Third National Communication on Climate Change under the United Nations Framework Convention on Climate Change.
- PADCO, NA: *PADCO Policy Report # 2*
- Rockwool, 2005: *Environment*
- Tacis, 1996: *Integrated regional energy plan for Odessa*, Tacis technical dissemination project Sc International ApS, Ekono Energy
- Tacis, 1997: *Demonstration projects on energy efficiency techniques in the building sector in Ukraine – Energy savings potential, demonstration projects engineering, market and feasibility studies, action plan*, Tacis technical dissemination project, Sogelerg, France
- UNFCCC, 1998: *The First National Communication on Climate – Ukraine*

10.1. Websites

- www.cd4cdm.org
- <http://www.cia.gov/cia/publications/factbook/geos/ro.html>
- <http://rbd.doingbusiness.ro/home.htm>
- www.eu-ets.ro
- <http://www.eva.ac.at/enercee/ro/index.htm>
- <http://www.mt.ro>
- www.pointcarbon.com
- www.rep3.ro
- <http://www.socer.ro>
- www.wikipedia.org

11. Definitions and abbreviations.

AAU	Assigned Amount Unit. The units of ton CO ₂ that is traded.
Additionality	The principle that Emission Reduction Units can only be claimed for emission reductions that are a direct effect of the project – i.e. must be additional to the most likely future and not included in the baseline.
Assigned Amount	The national emission limit. The Assigned Amount is established when there is knowledge of the emissions in 1990 (or other year).
Baseline	The emissions that would have occurred in the most likely future without the project.
Bundling/unbundling projects	The development of several projects that are established at the same time and with the same partners in order to lower transaction costs. The projects will have the same starting date and crediting period. Unbundling refers to the splitting up of a large project into smaller projects. It is not allowed to unbundle projects in order to meet small scale eligibility criterias
CDM	Clean Development Mechanism. Mechanism defined by article 12 of the Kyoto Protocol to conduct emission reduction projects in developing countries.
CER	Certified Emission Reductions. Units of 1 ton CO ₂ generated from CDM projects
CO ₂ credits	CERs and/or ERUs
Commitment Period	The period 2008-2012 for which the Kyoto Protocol defines specified commitments on emission reductions for countries mentioned in Annex B in the protocol. Also referred to as the first commitment period as there are negotiations on commitments after 2012.
COP	Conference of the Parties to the United Nations Framework Convention on Climate Change.
COP/MOP	Conference of the Parties to UNFCCC working as the Meeting of the Parties to the Kyoto Protocol
Crediting period	The period that a JI or CDM project is generating credits. This can be either 10 years or up to three 7 year periods after new calculations.
Double Counting	The situation that can occur if a Joint Implementation project is generating credits and the project result in emission reduction on an installation covered by the EU ETS without the allowance being reduced accordingly.
Emission Allowance	Allocation of rights to emit CO ₂ for companies included in the EU ETS
EUA	EU Allowance Unit. Unit of ton CO ₂ that are traded in the European Emission Trading Scheme.
EU ETS	EU Emission Trading Scheme
Emission Trading	A flexible mechanism defined in article 17 of the Kyoto Protocol that enables countries in Annex B of the protocol to trade emissions between them if they fulfil certain requirements on statistics, policy and registries.
ERU	Emission Reduction Unit – Each unit of 1 ton CO ₂ – ERUs are issued for verified emission reductions from projects that otherwise would not have been achieved
Flexible Mechanisms	The three mechanisms that allows a country to cooperate with another country in its effort to meet its commitments These are JI, CDM and ET.
GIS	Green Investment Scheme. A scheme for financing ‘green’ projects – i.e. projects that result in emission reductions. GIS allows for the trade of hot air in the form of AAUs without

	compromising the environmental integrity of the investor country – provided that the management of the GIS can be trusted.
Hot Air	The gap between the Assigned Amount and actual emissions that can be seen in countries with economies in transition. Hot air refers to the fact that sale of Assigned Amount Units in these countries will not automatically result in emission reductions in the countries. Countries are reluctant to buy hot air due to loss of environmental integrity.
Independent Entity	Independent third party that verifies the project and the emission reductions in JI projects.
JI	Joint Implementation. Projects defined in article 6 of the Kyoto Protocol that enables one country to achieve CO ₂ reductions in another country with emission reduction commitments. Joint Implementation is defined from 2008.
JI Track 1 (fast track)	Projects conducted according to nationally established bilaterally agreed procedures. In procedural matters JI first track are treated like Emission Trading and has the same requirements on the countries.
JI Track 2 (slow track)	Projects that are developed according to the rules established in the Marrakech Accords
JISC	Joint Implementation Supervisory Committee
Joint Commitment	The decision in Article 4 of the Kyoto Protocol that allows the European Union (EU-15) internally to make a burden sharing agreement and let the countries have differentiated internal commitments.
Kyoto Protocol	Protocol to the Framework Convention on Climate Change made in Kyoto in December 1997. It entered into force in February 2005
Leakage	Emissions from the project that is either outside the project area or occur as an indirect effect of the project- i.e. higher temperatures in retrofitted buildings and thus not achieving the full potential energy saving.
Linking Directive	The EU Directive that links EU ETS with the Kyoto flexible mechanisms and stipulates how CO ₂ credits can be imported into EU ETS
Marrakech Accords	Decisions made at the COP7 in Marrakech December 2001
Methodology	The recipe on how to calculate emission reductions.
MVP	Monitoring and Verification Plan for JI projects
NAP	National Allocation Plan – the allocation of emission allowances to installations that are covered by the EU ETS.
Programmatic Approach	A method for development of CDM projects that allows the governments to set up a policy where programmes under that policy can be acknowledged as a CDM project. The approach has not been fully developed yet. It is expected that it also will be adopted for JI.
Revolving Fund	A fund that provides loans for investments with short payback times so that the money (with or without interest) can be used for further investments. A revolving fund can be the intermediate between many small short term loans and one (e.g. international) long term loan.
Small Scale projects	CDM or JI projects of which energy efficiency projects can reduce energy demand up to 15 GWh (54 TJ) per year. They are eligible to simplified methodologies for baseline settings and monitoring/verifications.

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