Joint Implementation in the Baltic Region – a Finnish perspective

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Synopsis

The article discusses the possibilities and position of Joint Implementation as a part of Finnish climate policy, with special focus on Baltic Sea countries

Abstract

The Baltic region is an excellent area for Joint Implementation, since it encompasses both wealthy and less wealthy but energy intensive nations, while common interests are broadly acknowledged. Despite this favourable starting position there are a lot of obstacles when moving from experimental actions to a steady use of Joint Implementation projects.

The article discusses the possibilities and position of Joint Implementation (JI) as a part of Finnish climate policy. The aims of JI are to enhance cost efficiency and to facilitate the spread of clean and efficient technologies: governments and companies can complement national policies and implement JI-projects where the cost of abatement is lowest. Transaction costs of JI-projects can be high, notably when experience is still scarce. The international scene is still uncertain and only crude estimates of benefits and potentials are achievable for Finland.

The article is based on an inventory study as well model simulations assessing the position of Joint Implementation compared to other – domestic – instruments.

The article confirms that the best opportunities for JI for Finland are in the Baltic countries and Poland. Notably for energy companies the potential seems significant. Finland has recently launched a JI/CDM Pilot Programme which aims at gaining experience and providing guidelines for JI and CDM projects. Although the position of JI in the Finnish ministerial climate policy arena is still indistinct, we claim that JI should receive sufficient attention, considering its potential, reasonable cost level and other benefits compared to other instruments. Beneficial co-ordination with the domestic climate programme is feasible.

1. Introduction

Due to the upsurge of liberal or even libertarian philosophies policy intervention has undergone deep cutting reassessments. In general the trend is toward interventions that are using market mechanisms instead of obstructing them. In the original working title of this article there was a reference to De Mandeville's statement on private vices and public benefits (Ekelund and Hebert, 1975). De Mandeville was a steadfast, if not extreme, libertarian, who vigorously believed that only an unhampered pursuit of self interest (private vices) would eventually result in the largest achievable public benefit (i.e. highest GNP). In the working title it was reversed into private benefits and public vices, because a blind faith in market conformity without wondering about the actual performance of markets in terms of transparency, accessibility, and efficiency may indeed result in a confusion of what or to whom accrue the benefits and costs. In this light one can also try to assess Joint Implementation (and similarly the Clean Development Mechanism) in comparison to generic international emission trade. This consideration lingers on the background in this paper.

In the case of climate policy market based instruments could be regarded as the tools that should turn private vices (unwillingness or inability to internalise external effects) into public benefits (reduced emissions against minimal cost). The more inadequate and inequitable public decision making is, the longer it takes before private vices transformed into less damaging versions. Furthermore the narrow view of welfare as GNP (per capita) which comes along with strict libertarian views hampers an adequate assessment of public benefit in the sense of welfare gains. Last but not least this philosophy, which allegedly favours free markets so much, is often unaware of its boundaries beyond which the market doesn't operate adequately, but which are crossed by all kinds of environmental and social effects.

The stress on market conformity of policy instruments is in principle a good thing, as long as there is an eye for the inadequacies of markets and there are checks for fairness. When the idea of emission trade was put forward in the international climate negotiations, it was soon evident that pure trade of emission permits would risk to leave some problems untouched or postponed, such as technology transfer. In principle Joint Implementation[1] has the capacity to cater for technology transfer while at the same time countries (and companies) can search for lower cost solutions and thereby avoid unnecessary harm to their economies. It depends on the approach of the involved parties whether the technology transfer capacity is actually used. At any rate project based emission transfers create new problems, since the required kind of evaluation including the concept of 'additionality' raise the transaction cost of such projects.

Starting from an originally market conform concept Joint Implementation still needs sufficient public intervention. In the first place only public intervention can create a secure environment for JI transactions. In the second place public funds are needed for 'help desks' etc. in order to reduce the transaction cost (including search cost, etc.), and for funding systems inter alia to reach also large potentials spread out in many smaller projects or in complicated projects. The justification to regard JI as more than only an opportunity to obtain cheap emission permits depends on the generic philosophy with which the permit buying country is approaching JI *and* on the approach of the host country.

For Finland the consideration of the use of Joint Implementation started fairly late, but now steps are taken to come to an active JI policy (Pollari, 2000). This paper will focus on the possibilities of the JI in the framework of the Finnish climate policy. For Finland the focal area is the Baltic. We will furthermore pay attention to the position of energy efficiency in the assessment of Joint Implementation, both regarding energy conversion and energy use, though with more stress on the latter. Chapter 2 discusses some institutional aspects relevant for the Finnish JI opportunities. Chapter 3 points out some obstacles for JI projects. Chapter 4 pictures trade and energy linkages in the Baltic sea area. Chapter 5 focuses on the potential of JI for Finland and its economic and energy efficiency implications.

2. The basis for Finnish JI projects

The first commitment period for the Kyoto Protocol stretches out over the years 2008-2012. The years prior to that have a kind of experimental or sometimes pre-emptive[2] status. For example, for the time being activities with a Joint Implementation character have been carried out the framework of the programme Activities Implemented Jointly in the Pilot Phase, in short AIJ. In the past decade co-operation between countries around the Baltic Sea has been extended substantially. The Nordic countries, notably Denmark, Sweden and Finland have been paying particular attention to Estonia, Latvia, and Lithuania. In addition also Poland is an important country for the Nordic countries.

[1] . This applies also to the Clean Development Mechanism (CDM) the other *project based* flexible mechanism.
[2] . Depends on the possibilities for early action crediting and banking.

In the framework of the Council of Baltic Sea States (CBSS, see figure 1) also several energy related initiatives emerged. One is the Baltic Ring project (BALTREL), in which the electricity systems of all Baltic sea region countries get better connected. Another initiative is the working group on energy efficiency (BEEG, connected to IEA). The council decided in 1998 that the Baltic area provided a good testing ground for Joint Implementation. Already before that time some countries had been co-operating in AIJ pilot projects, but activities intensified after this council decision. For Finland it meant the development of a Finnish Joint Implementation Pilot Programme which aim is to create guidelines for JI projects. However, because of many uncertainties in the rules of Kyoto Protocol, slightly conservative and careful approach still remains in the Finnish ministerial climate. (Pollari, 2000).

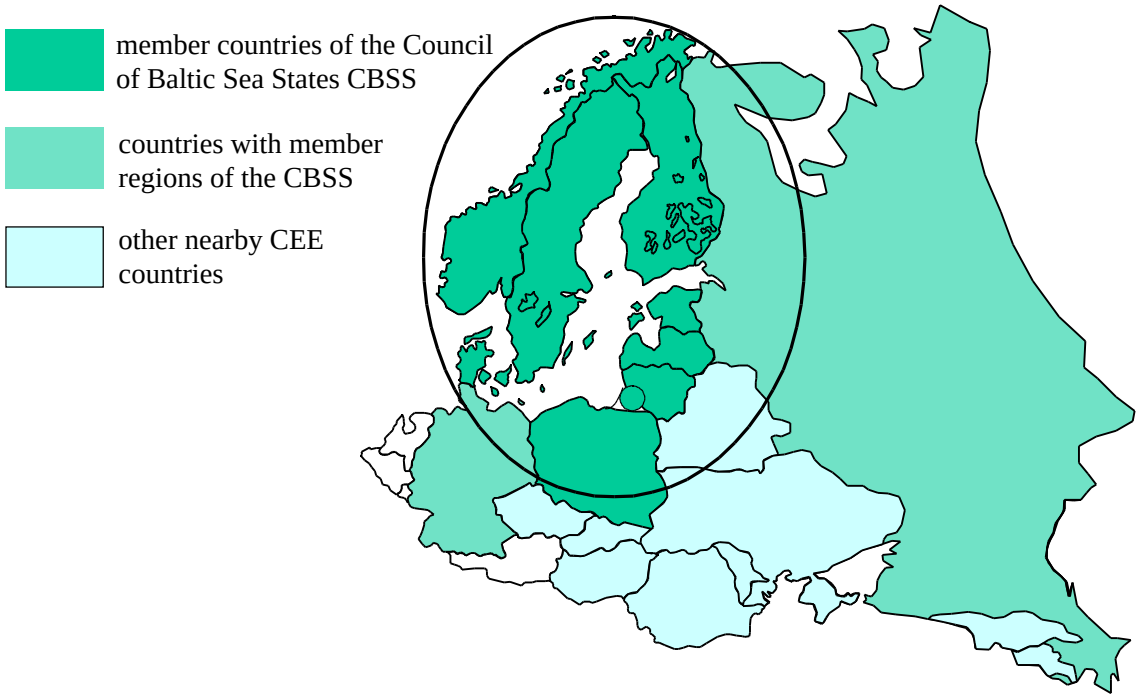

Figure 1. *Map of Baltic area and co-operating countries and regions*

Nevertheless, the significant interest of Finnish energy companies towards JI can be explained by the better opportunity to spread Finnish technology to the global markets. For example, the development of combined heat and power technology and use of biomass as energy source are well advanced in Finland.

Potential JI projects which help to cut down global GHG emissions can be found in many different sectors:

1. the energy conversion sector (electricity generation and district heat systems)
   - upgrading conversion efficiency in existing plants
   - substituting boiler and turbine for new technology
   - loss reduction in networks
   - switching to bio-fuels
2. industrial installations (furnaces, machinery)
   - industrial CHP
   - improving/substituting installations
   - energy management systems
3. the building stock (notably heating)
   - insulation and generic renovation of existing buildings
   - loss reduction in heat and hot water supply
   - design and planning
4. landfill and energy utilisation of biogas (methane)
5. afforestation

The last category is still fraught with difficulties regarding its acknowledgement in the international climate negotiations. Although export of sound forest management techniques would certainly be a relevant alternative for Finnish pulp and paper companies, current interests of Finnish companies and the Finnish state focus on the items 1-3.

3. Obstacles to implementation of JI projects

Notwithstanding these initiatives the institutional framework is still one of the weak points for efficient, equitable and extensive exploitation of the potential of Joint Implementation. In this section we will discuss in particular discuss those issues that stood out in the survey and interviews related to the implementation of the Finnish programme for AIJ in the Pilot Phase (based on Pollari, 2000). All obstacles are one way or the other connected to financing and organisation problems:

a) Additionality
b) Uncertainties in the host countries
c) Small projects
d) The slow start of Finland, companies faster than the government

Additionality means that a JI project needs to be additional to a so-called baseline development. In other words one can only claim a JI status for project based abated emissions that would not have been realised anyhow in the same period. The otherwise not abated emissions either result from an entirely new project (not substituting something else) or from a planned project in which however the achieved abatement is evidently a new feature. If for example an industrial company in the present EU has already formulated a strategy in which expansion through purchase of companies in Eastern Europe is clearly planned, one might wonder about the additionality of emission reductions reported in an acquired firm. However, if such an acquired company is undergoing a very rigorous renovation including installation of state of the art energy technology (i.e. beyond a level that would suffice, given the relative costs of labour, capital and energy), than a kind of 'surplus energy efficiency improvement' could be estimated that would be eligible for a JI scheme. Obviously, many projects leave room for discussion. Various agencies (IEA, UNEP, etc.) offer example assessment procedures to facilitate standardisation and improved project comparability, but there remains an element of risk of either overestimating the additional savings or applying in vain for JI recognition. Overestimation constitutes a risk for the seller of the ERU's[3] resulting from the project. Apparent (ex post) futile application is a risk for the project participants (any combination of host company, foreign company and foreign country).

Given the realisation of the project which leads to a reduction of emissions compared to a baseline, the project financiers and owners are entitled to an amount of emission reduction units (ERU) However, one should bear in mind that both the companies and the countries involved are parties, and *all* of them should acknowledge the transaction and commit to it irrevocably. In current national and international trade law this is not yet sufficiently secured. For example, when the permit selling country discovers that it has been too optimistic in estimating its ERU sales potential, it may be tempted to refuse delivery of ERU's. Please, bear in mind that non-compliance may result in hefty fines or other kind of harming sanctions.

Another problem is connected to the investment climate and conflicting interests due to differences in priority setting in the host countries. The societal instability in countries such as Russia and Ukraine increases the risks of investments. Energy related investments are usually long-term investments which need stable conditions in the host country. Furthermore, the governments of host countries may have their priorities elsewhere due to the bad economic situation. As a consequence capacity building in the public administration may not even meet minimum standards for a proper handling of emission reduction programmes including the legal and administrative support for Joint Implementation. The administrative framework for approving JI projects can be complicated and unclear in some host countries. For example, the complicated bureaucracy in Poland delayed many potential AIJ projects and led to the dismissal of them.

Small JI projects can be regarded as a problem. As an aggregate they represent a significant reduction potential, but the transaction cost to get small JI projects organised and acknowledged are often prohibitive. The relevance of this problem depends on the generic philosophy one wishes to follow in JI projects. The permit buying country may be purely interested in the purchase of emission permits as cheaply as possible. There are however also countries, including Finland, that recognise the importance of other benefits as well. In the first place the promotion of up-to-date

[3] . Permits obtained in JI are emission reduction units (ERU), for generic (non project related) emission trade based on a country's original Assigned Amount, are called Assigned Amount Units (AAU). Once owned by a third country, this country is allowed to effectively interchange the permits. In that sense that it can sell AAU's, in case the total amount of permits exceeds its assigned amount.

technologies in host countries supports the export opportunities of industries in the permit buying country[4]. In a more generic sense the creation of larger markets for efficient energy technology lowers prices which is also a benefit to investors in richer countries. Also the occurrence of ancillary benefits can be a decisive reason to justify extra efforts to allow for a larger exploitation of the small projects potential. For example, the improvement of living conditions in residential areas can be a side effect of combined district heat and home renovations. All in all the plea for small projects is especially relevant when it coincides with an otherwise large under-exploitation of the reduction potential in a certain sector or area. Generally spoken this seems to apply to the built environment in many host countries.

Avoidance of small projects hurts relatively often energy efficiency and saving projects. There are several ways to circumvent this problem. One way is by establishing an intermediate agency that makes package deals by adopting several smaller (preferably similar) projects. This approach is followed in several countries after earlier complaints about neglect of the EBRD, the EIB and other western funding agencies. Some of these have now a special facility for small projects. Another way is by combining district heat improvement projects with housing renovation projects. Basically, such an approach is anyhow recommendable, since it will significantly influence the assessment of the optimal capacity of the district heat plant. In reality however, such an extension of the project may look less attractive from a management point of view. Extension with a renovation scheme increases the number of stakeholders, brings in also much more diverse stakeholders, and introduces a much wider range of technologies to be mastered.

Finally a specific Finnish aspect, namely that this country started quite late with design and implementation of a Joint Implementation policy, despite its fairly fortunate geographical position to exploit this option. For several years Finland has already been running a so-called neighbouring areas programme (‘Lähi-alue-ohjelma’), meant for supplying several kinds of aid and co-operative projects concerning medical facilities, environment, capacity building, et cetera. The recognition in the framework of the Baltic Council to intensify efforts for Joint Implementation, incited Finland to start up a JI Pilot Programme, which will be embedded in the neighbouring area programme. Finland's aim is to launch 5 - 10 Pilot JI Projects within the next three years (2001-2003). The pilot programme focuses is on small and safe projects. These will render experience concerning the evaluation of emission reductions (the additionality problem) and contract settlements. Companies can apply for governmental support, which amounts to 10% - 20 % of the total project funding. It is meant in particular to cover the extra transaction costs. Pilot projects are supposed to be converted into real JI projects in the first commitment period (2008 - 2012). (Pollari, 2000).

Several Finnish companies, notably in the energy sector, are in fact ahead of the governmental initiative and did already inventory studies and market scans (Pollari, 2000). For example, the energy company Fortum has already established an internal fund for experimenting with Joint Implementation projects. Indeed the companies interviewed by Pollari (2000) indicated that they would appreciate swift and determined steps of the government regarding the establishment of a clear organisational facility for JI including adequate funding for project support. As for any other country companies are keen on lowering of the transaction cost of the JI procedures. Despite these current setbacks notably the Finnish energy companies regarded Joint Implementation very relevant for them and assessed the obtainable potential significant compared to the Finnish reduction task (see also chapter 5).

Energy companies seem to focus more on Russia and the Baltic countries and they consider JI mainly as a tool in the acceleration of clean technology take-up in countries in which they are operating already. Other companies (paper, basic metals) and the ministries look also to other countries such as Poland, Hungary, the Czech Republic, and Romania. As regards energy efficiency the interest of energy companies does not extend beyond efficiency in generation (in which there are interesting gains to make). Especially the large but scattered energy efficiency in homes, which often related to energy efficiency in district heat systems at large, seems to need attention from state agencies or other third party financing to get selected. There is however interest from the side of large engineering consultancy companies and building companies. In case of new investments or purchase of an existing plant by Finnish industries the degree to which state of the art technology would be installed may vary. Generally a significant improvement can be expected.

4. Trade and energy linkages in the Baltic

In the previous chapter it was already clarified that different sectors will apply different criteria when judging Joint Implementation projects. Whereas projects in the built environment will usually depend on government supported initiatives, e.g. connected to social objectives, companies have to tie in Joint Implementation with their other interests.

[4] . In order to claim rightfully any net benefit, there should be a reasonable balance between the effect on export volume and extra cost of promoting small projects.

Therefore, the interest of companies in JI in a particular country will focus on countries in which they have invested already or will possibly invest. As a consequence the European countries interested in facilitating JI possibilities may find guidance in the trade relations and involvement in foreign investment of their home based companies. At least that seems to be the philosophy behind the development of the Finnish JI programme[5] up to now. On the basis of this philosophy Central and Eastern European countries near the Baltic sea seem to be the most relevant countries for Finland to focus on initially. From the point of view of economic connections Russia (notably the neighbouring areas), Estonia and Poland seem to be most relevant as is illustrated in tables 1, 2 and 3.

Table 1. Finnish import and export with selected central and eastern-European countries in 1999 (in million Euro) and the share in total Finnish import and export (source: Pollari, 2000).

Country	**Import to Finland**		**Export from Finland**	
	Million Euro	%	Million Euro	%
Russia	2135	7,2	1594	4,1
Estonia	539	1,8	1180	3,0
Poland	217	0,7	713	1,8
Latvia	35	0,1	255	0,7
Czech Republic	178	0,6	216	0,6
Hungary	122	0,4	257	0,7
Lithuania	36	0,1	155	0,4
Ukraine	14	0,0	79	0,2

Table 2. *Accumulated foreign direct investment by receiving country up to 1998(source: Pollari, 2000)*

Country	**Billion Euro**	**Per capita, Euro**
Poland	28	725
Hungary	21	2015
Russia	9	64
Czech republic	8	798
Romania	3	153
Croatia	3	552
Ukraine	2	47
Slovenia	2	1097
Estonia	2	1199
Latvia	2	695
Slovakia	2	292
Lithuania	1	401
Bulgaria	1	152

Table 3. *The five most important trade partners for Estonia, Latvia and Lithuania in 1998 (share in trade flows between brackets, source: Pollari, 2000)*

Estonia		Latvia		Lithuania	
Import	**Export**	**Import**	**Export**	**Import**	**Export**
Finland (22.6)	**Finland (18.7)**	Germany (16.8)	Germany (15.6)	Russia (21.2)	Russia (16.5)
Russia (11.1)	Sweden (16.5)	Russia (11.8)	UK (13.5)	Germany (18.2)	Germany (13.1)
Germany (10.8)	Russia (13.4)	**Finland (9.5)**	Russia (12.1)	Poland (5.5)	Latvia (11.1)
Sweden (9.0)	Latvia (9.5)	Sweden (7.2)	Sweden (10.3)	Italy (4.4)	Belarus (8.8)
Japan (4.9)	Germany (5.5)	Estonia (6.6)	Lithuania (7.4)	**Finland (4.2)**	Ukraine (7.8)

Next to trade in general, energy linkages are important in this case. Finland imports approximately 6TWh electricity per year from Russia[6]. In addition Finland is importing natural gas and oil from Russia. The volume of natural gas amounted to approx. 4 billion m^3 in 2000. In relation to JI especially electricity is relevant. From the point of view of achieving low cost *domestic* emission reductions, the increase of electricity import notably from Russia is interesting. If it were only a transfer of emissions from Finland to Russia, it is quite likely that various parties inside and outside

[5] . One can also choose a strategy in which the facilities are explicitly open to companies from any country, but in which the delivery of ERU's to the facilitating country is ensured. The Netherlands follows by and large such an approach.

[6] . And another 5 TWh from within Nordpool

Finland would object top such an approach. However, if an increase of Russian power import would be accompanied by Joint Implementation projects, these effects may be largely neutralised. A part of the Russian capacity has low conversion efficiencies and high specific emissions, also for non greenhouse gas agents. Refurbishment of the plants will reduce all emissions significantly. Given these energy connections and opportunities, it is no surprise that especially the largest power companies in Finland, being Fortum and PVO, are interested in the implementation of Joint Implementation projects in Russia and maybe Estonia.

The intensified co-operation around the Baltic sea also includes the earlier mentioned Baltic Ring project. It means that transmission capacity between countries around the Baltic sea has been or will be increased. Reinforcement of the transmission capacity between Russia and Finland has just been completed. Also a sub-sea connection between Finland and Estonia is considered. In addition Fingrid, the national grid company, is planning further reinforcements, in the first place within the Nordpool area.

Reliability is a criterion for country and project selection, particularly if large investments are required. For example, this can be a limiting factor for the use of Joint Implementation in connection with power production, as the relevant power is mostly imported from Russia. All in all, Russia has important JI potential for Finland, notably but not exclusively in relation to electricity production and import. The main obstacle remains however that Russia rates low in terms of investment reliability. Estonia on the other hand is attractive due to its nearness and accessibility, despite the small size of the total potential. Poland, finally, constitutes at first sight a larger potential and rates also better in reliability terms. A disadvantage might be the competition from other countries and companies looking for JI potential. There are also examples of co-operation though, e.g. refurbishment of a co-generation unit from which the resulting flow of ERU's is distributed over the financing parties (various EU member countries, among others Finland).

5. Joint Implementation potential for Finland and its share in the reduction commitment

5.1 Estimating the potential

The estimation of the potential of Joint Implementation with special reference to Finland is not straightaway available. There are several tentative estimates. Firstly, the inventory study of Pollari mentions a cautious value of 1 Megaton CO_2 equivalent in 2010 (about 6% of Finnish reduction target for the first commitment period). This based on the information from the interviews concerning average size and likely number of projects as is experienced so far in the pilot projects. It should be noted that both average size and number of projects could be higher, therefore 2 Megaton obtained in JI may still be feasible.

More overview information can be obtained from several studies that have tried to estimate the size of the permit market. A summary of this is provided in table 4 in which the reduction requirements of the current EU countries plus Norway and Switzerland and the expected sales potential of permits in selected Baltic and Central and Eastern European (CEE) countries is given.

Table 4. *Emission reduction targets and tradable potentials*

Country / Region	Amount of CO_2 equivalents to be reduced (in MT)	Domestic part of reduction (in MT)	Remaining * sales potential (in MT)	Remaining purchase requirement
Finland	16	8 ~ 10	-	6 ~ 8
Poland	0 ~ 10	40 ~ 60	30 ~ 50	-
Estonia	0 [1]	3 ~ 5	18 ~ 20 [1]	-
Russia	0 [2]	10 ~ 30 [3]	20 ~ 50 [2]	-
Rest of CEE	0		100 ~ 200	-
Rest of Annex1 Europe	387	254	-	133

1) 'hot air' approx. 15 MT; 2) 'hot air' approx. 600 MT; 3) rough estimate for neighbouring area; *) relevant for Finland
Sources: EU countries Sijm et al, 2000; Estonia and Russia IEA – BEEG, 1999; Finland Perrels, Kemppi and Lehtilä 2001; Poland and Estonia own adaptations based UNFCCC + IEA-BEEG.
For Poland is assumed that the emission/GDP ratio continues to decrease at a pace of 2.9% per year, with an average growth of 3.8% between 2000 and 2010 leads that to the potentials as indicated above. For Estonia a similar approach has been used. The emission/GDP ratio decreased at a pace of 8.2% per year between 1990 and 2000. Yet, the closure of power stations used for export to Russia cause a very strong bias, therefore it is assumed that no change occurs in the remaining potential as published in IEA-BEEG.

The question remains what share of the potentials as indicated in table 4 will be made accessible through general emission trading and which part through Joint Implementation. The heavy industries and the energy sector would have directly or indirectly access to general emission trade. The built environment will depend much more on Joint Implementation. Depending on whether district heating systems will be renovated in the context of an energy supply project or a built environment project (probably both options will be used) the share of Joint Implementation in the trade potential may vary between 20% and 40%. However, on top of that an insufficient reduction of transaction cost may reduce the share of Joint Implementation even further to for example 10%. A counter argument is that the host countries will prefer JI over IET, given the positive spill-over effects of JI for the host country[7]. Consequently, host countries will try first to sell by means of JI projects (see also Liski and Virrankoski, 2000). This would even hold when prices for JI permits are slightly lower than AAU's, since more spill-over effects are to be expected from JI.

Observing an expected demand for permits of Finland of 6 to 8 Megaton (Perrels et al, 2001) and observing that a third of the permits in Baltic part of the CEE countries already constitutes 50 – 60 Megaton, we may conclude that it seems feasible that Finland would purchase Joint Implementation based permits in a volume of 2 megaton CO_2-equivalent. However this raises the question to what extent the use of JI (and IET and CDM) leads to adaptations in the domestic programme. We will return to this issue later on in this section.

5.2 Is the use of JI eventually conducive to the progress of energy efficiency ?

In the first place it should be noted that JI, at least in the short to medium term, is likely to facilitate technology transfer more than general emission trade. This assertion is based on the observations that:

- a part of the IET based permit trade may represent hot air, at least in initial years of trade
- a part of the means that the host country (or the permit selling company) obtains in exchange for the emission rights are not necessarily invested in abatement technology or in better energy technology, especially in early years the cost for abatement reduction in the host country will be in most cases well under the IET price as the IET price is supposed to reflect *marginal abatement cost in an international setting*; the character of JI projects often automatically brings about technology transfer, therefore we conclude that only if the opportunity cost of more expensive JI project based permits would cause that the emission trade volume *and* economic growth are significantly smaller, there may occur a situation where on the aggregate less (energy) technology transfer has taken place[8].

In the long run the trends of unit cost and of technology transfer should converge for JI and IET (and CDM). Given the probable selectivity biases in each of the flexible mechanisms it is however important to realise that a strongly IET dominated international permit trade will imply a somewhat different technology trajectory than in case of significant contribution from JI and CDM. The cumulating dynamic effects of this may also have more lasting impacts on the quality of energy efficiency in various sectors.

Next we like to consider the impacts on domestic measures both in one country *and* the aggregate of all national programmes. The following effects can be taken into consideration:

1. the purchase of JI permits is a direct substitute of domestic energy saving measures
2. the investment in the host country that comes along with the JI permits is a substitute for a change in the domestic production capacity and hence the emission growth potential may have been reduced
3. the technology transfer that comes along with the JI project spills over to other plants in the same sector and to other sectors (depending on the technology) and hence the original savings volume is gradually augmented
4. the investment that comes along with the JI permits is an addition of the production capacity in the host country and hence the emission growth potential may have been increased
5. the generic cost reduction effect of the flexible mechanisms implies slightly higher economic growth rates and consequently slightly higher emissions
6. the development of efficient energy technology markets is greatly enhanced by the JI facility, this stimulates a further penetration of such technologies and invites to increase R&D budgets in this sector, in other words JI (and other flexible mechanisms) generate new dynamics that is able to speed up a transition toward sustainable production and consumption

[7] . This refers to both economic spill-over effects, e.g. due copying behaviour in other sectors, and to social and environmental benefits, e.g. a substantial reduction of other pollutants and improvement of living conditions.

[8] . The usual (implicit) assumption is that international permit trade including JI is a buyers market, notably in initial years of trade. It is however not impossible that things work out differently.

Comments to the above arguments:
The first argument depends on the structure of the cost pattern of the so-called greenhouse gas abatement supply curve for domestic measures (in permit buying countries). If a lot energy savings options happen to be more expensive than the permits, it is likely that such an effect will occur *in first instance* (see later points) depending on the share of compulsory measures in the national climate policy.
As regards point two once again this may be correct *in first instance*, but in the long run the economic dynamics count. The shift of capacity towards another country is supposed to be commercially attractive, and consequently global economic growth is – on the margin – larger than otherwise would be the case. The latter effect erodes at least a part if not all of the reduction effect.
The third point is indeed important given the larger emission reduction (cost)effectiveness in the host country. This is supposed to outweigh the two previous points and consequently there starts to be a perspective for a net gain in energy efficiency compared to a baseline, albeit on a global level and not necessarily in every (Annex 1) country.
The fourth point shouldn't happen. Additionality refers to efforts in relation to emission reduction, and obviously not to any effort that adds to economic activity. In other words a proper handling of JI applications should filter out this effect. Nevertheless, as clarified in chapter 2 this cannot be 100% ensured.
Number 5 is a valid point, which is in fact already answered in the comment for point 2.
The sixth point is at least as important as the third and complements and boosts its effect, also in the Annex 1 countries that are buying JI based permits and potentially suffering from the setbacks mentioned in point 1. It is for his reason that it is also important *what kind of technology* is transferred to the JI (and CDM) host countries. As indicated earlier there tends to be a – understandable – bias towards energy supply systems. For the built environment co-operation between public authorities and the availability of small project facilities will help. The most difficult part is to influence foreign direct investment (FDI). One contribution to this issue will be RD&D programmes that explicitly address the development of energy saving technology in relation to market enhancement in both the JI host country *and* the country of origin.

All in all we dare to conclude that the penetration of energy efficiency does not need to suffer from Joint Implementation, and at a continental or global scale such a setback seems indeed less likely (but not a priori impossible). A global slow down in energy efficiency progress would only happen if other options would offer such large potentials that they can supply sufficient permits e.g. up to 2020. This would only happen when there is a maximum use of 'hot air', broad definitions of sinks and their acceptance in JI and CDM and vigorous marketing of nuclear and fossil fuels use in combination with CO_2 storage. Yet, from these options only 'hot air' is guaranteed cheap, but its extent of availability will depend on emission reporting compliance of countries involved and on their economic growth. Sinks and nuclear will in some cases be cheap, but can also be expected to run into trouble due to unfit societal embedding of these options in various countries. Finally, CO_2 storage is for the time being not cheaper than a lot of energy efficiency options.

Test on possible impacts on the domestic programme
Depending on the energy mix and the remaining part of a domestic programme the progress in energy saving may be halted in some Annex 1 countries that are buying permits, at least temporary. Moreover, in case of extremely one sided JI project portfolio's, there may be lack of progress in energy efficiency in some JI host countries.

Some of the points can be tested for Finland thanks to the sensitivity analysis that has been carried out for the assessment of the national economic effects of implementing a domestic climate programme in Finland (KIO; see Perrels et al 2001). There are two main variants of the programme. One version assumes that the current moratorium on adding nuclear capacity is continued, while the other version assumes that one extra nuclear unit of 1300 MW will be allowed. The Finnish domestic programme consists of :

- measures for reducing non-CO_2-gases;
- more or less mandatory programmes for building performance;
- a renewable energy (notably biomass) promotion programme;
- voluntary agreements with industry and transport sectors, with various energy efficiency items;
- limitations on the use of coal after 2010 (in the option without extra nuclear);
- raising energy taxes (a near carbon tax).

The resulting energy mix and the initial costs for the energy system have been calculated by VTT Energy with the EFOM model, subsequently VATT calculated the macro-economic effects by means of the KESSU model. One of the sensitivity analyses concerned the combined impacts of the relaxation of the default assumption of limited power import[9] plus the purchase of permits (5 Megaton in 2010) from abroad against an assumed competitive price[10].

[9] . In the Baseline scenario a somewhat contestable reduction of power import from 12TWh towards 6TWh in 2010 is assumed. The assumption in fact necessitates the construction of more domestic (baseload) generation capacity.

A model assessment showed that the implications of the relaxation + permit trade for the supply mix are modest, apart from an obvious increase of power import, which means that power import is competitive under normal circumstances. However, the cost implication are not modest at all as is shown in figure 2 below. The 5 bars on the left hand side represent the default programme (KIO1), whereas the bars in the middle and on the right hand side depict the cost effects for the sensitivity alternatives ('KIO1-SEF without' and 'KIO1-SEF with'). The alternative KIO1-SEF *without* refers to the situation in which possible impacts of more electricity import and permit trade are not cushioned by demanding minimum achievements in other segments of the climate programme and the total amount abated or purchased represents the target 16 Megaton.. In the other alternative (KIO-SEF *with*) it has been stipulated that the carbon/energy tax rate should not go below the current level and the extra total revenue should be high enough to recover the cost of the centrally purchased permits, while the mandatory parts of the programme where allowed to be reduced by a maximum of 10% in case the reduction target was exceeded by more than 2 Megaton.

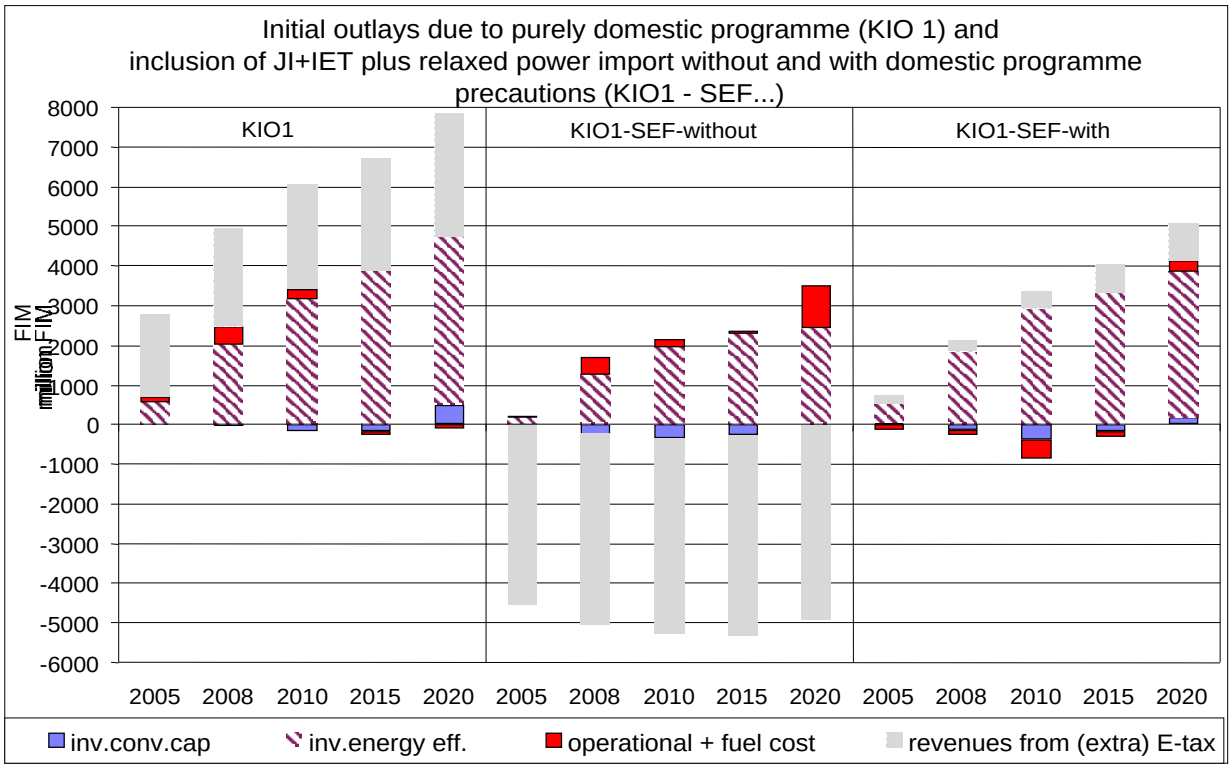

Figure 2. *Initial outlays caused by three different climate policy packages (source Perrels, Kemppi, Lehtilä, 2001)*

In the sensitivity alternative '*without*' (middle section of figure 2) occurs a reduction in energy efficiency outlays of about 22% in the years 2010 and 2015 compared to the default KIO1 programme[11]. The biggest difference is in collected energy taxes. The revenues go up with 2.5 ~3 billion FIM in KIO1, but we witness a decrease of almost 5 billion FIM in KIO1-SEF (1 billion FIM ≈ 0.16 billion Euro). This reduction in energy tax revenues is large enough to cause a need for recouping instead of the usual recycling of tax (i.e. income tax has to be increased instead of allowing it to be lowered which happens in default KIO1). The recouping also causes a significant deterioration of the macro-economic effects. The other alternative 'KIO1-SEF *with*' (on the right hand side of figure 2) shows a situation in which the investments in energy efficiency are reduced by about 10% in 2010 and 2015. Since these were the marginally effective investments the energy efficiency impacts reduced with less than 10%. In this alternative the emission target is exceeded by about 2 Megaton. Because the incited investments and other costs are slightly lower the overall macro-economic effect is slightly better than in default KIO1, notably in the year 2010.

In the first place we can conclude that indeed energy efficiency efforts would go down in Finland, though the effect is for about 20% attributable to the relaxed power import. In case the domestic programme and the JI projects would be

[10] . The permit price is set at 80 FIM (approx. 15 Euro) per ton in the period 2005 – 2010 and 120 FIM (22 Euro) in 2015-2020. The macro-economic abatement cost (reduced GDP) per ton vary between 160 and 240 FIM..

[11] . The 'KIO-SEF *without*' results are based on older runs, involving a somewhat different baseline and some changes in other parts in the programme. The figures used for comparison in the text are referring to the old KIO1 results.

tried to be as much as possible complementary (which could not be tested here apart from the prevention of tax recouping), while also maintaining a reasonable energy efficiency investment effort at the domestic level, it appears to be possible to achieve net benefits compared to a default domestic programme. The reduction of energy saving efforts in the sensitivity alternatives concentrates in the industry, however with very mild decrease of efforts in the paper & pulp industry. Assuming that JI projects have increased energy efficiency efforts outside Finland it would mean that on balance (globally) not or barely any slow down of energy efficiency efforts would occur

Another reason to raise energy/carbon taxes than to prevent recouping is the funding of a RD&D scheme that especially enhances energy efficiency technology market take-up both nationally and in JI target countries. A recent report of Statistics Finland (Tilastokeskus, 2000) clarified that the Finnish energy technology industry, notably in relation to energy efficiency, renewable energy and abatement technology has a very healthy position, also on export markets. Therefore allocating some taxation revenues to a further boosting of that sector may even pay back economically. Furthermore, the increase of sales volume will lower the price somewhat and thereby contribute to a larger use of these technologies in Finland itself. Therefore – to our opinion - JI, energy/emission taxation and other climate policy elements should not be seen as separate almost competing elements but on the contrary get better integrated.

Many national governments have mixed intentions with climate policy and may pursue various obvious and less obvious objectives. If JI is pursued purely by means of lowest cost criteria[12] it may turn out in the medium to long term that a country is lagging behind in energy efficiency technology and get relatively more exposed to price shocks. The enticing public and private benefit of short run lowest cost, later on turns out to be a vice of short-sightedness. Similarly, if JI (and power import) are seen as competitors for domestic energy self-sufficiency (security of supply considerations) one may indeed end up with the remarkable situation in which the confluence of private and public benefits is traded for public vices regarding a misconceived conception of market surveillance.

6. Concluding Remarks

The assessment of Joint Implementation as regards its benign effects on both host countries and investing (permit buying) countries is still under development. Potential estimates are constantly moving, whereas the markets are much less homogenous than often assumed. Consequently, both for host countries and buying countries, country specific studies in an international setting are necessary.

Joint implementation (and the other flexible mechanisms as well) should not be treated separately from the domestic programmes. On the contrary, both during preparation and during implementation combinations of mutually reinforcing policies are necessary.

Joint Implementation is a relevant option for Finland, which in all likelihood is capable of covering 5% - 10% of the Finnish reduction target for the first commitment period. Furthermore, Joint Implementation offers good opportunities for technology export and targeted extension of energy technology markets relevant for Finnish manufacturers.

If the flexible mechanisms are implemented in a detached short sighted way (picking ‘low hanging fruit’ quickly) the potential global benefits of notably JI and CDM, may materialise much slower and halt energy efficiency progress in various permit buying Annex 1 countries for a decade or so. This is however not necessary. Preliminary exercises in this paper show that a proper fitting of JI (and CDM) projects in a way that complements well with the domestic programme, results in preserving momentum in energy efficiency progress while reducing the cost of achieving the reduction target.

Such beneficial policy co-ordination requires however that both the host country and the permit buying country abide to priority setting inside their climate policy area and beyond in a way that is consistent with the promotion of welfare in a broad sense even if that would touch vested interests of particular groups or sectors.

[12] . In climate discussion jargon so-called ‘low hanging fruit’.

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