Annex I

ACTIVITIES IMPLEMENTED JOINTLY
REVISED UNIFORM REPORTING FORMAT (URF 01)

A. Governmental acceptance, approval or endorsement

- Date of this report: 15/03/2006

- This report is a *(please underline)*:
  - First report
  - Interim report (Sixth report. First report was submitted 1999)
  - Final report

- Please indicate here which sections were modified since the last report

(e.g. B.2, E.2.4, F.2): Report is newly completed on the Revised Uniform Reporting Format.

B. Summary of AIJ project

B.1 Title of project

Türi II, Combined fuel switching and energy efficiency project in Türi

B.2 Participants

Please describe briefly the role(s) of the main participating organization(s) and provide detailed contact information in annex 1:

- The donor country is Sweden, represented by a governmental institution – Swedish Energy Agency (STEM).
- The host country local organisation, which owns the facility, where investment is made is Türi Town Government.
- The host country local organisation, which operates the facility, where investment is made is DH company Terme Ltd.
- The host country primary institution responsible for the Framework Convention on Climate Change and all other climate related issues is The Ministry of Environment.
- The technical assistance during project implementation and follow-up activities were provided by STEM consultants (ÅF-International).
- Projects performance data collection and reporting activities are carried out by Regional Energy Centres in Estonia.
- Independent technical assessment of project performance was carried out by Tallinn University of Technology (Thermal Engineering Department).

B.3 Activity summary

B.3.1 General description

Türi is a town in the middle of Estonia with its 7 000 inhabitants and some 95 km south of Tallinn. Türi is well-known with garden and park areas. There are several boiler plants and district heating networks in Türi. STEM/EAES Programme has earlier implemented the connection of networks and closing down Haava coal-fired boiler house. In this project one oil-fired boiler house has been closed, two nets has been connected and the main boiler in the Vabriku street has been converted from heavy oil to bio fuels. The main boiler in one of the DH networks is already using wood fuels. The converted boiler with 4,5 MW heat output will be used to cover all heat load of the DH system.

B.3.2 Type of activity

Sector	Activity
Energy	Fuel-switching (from heavy oil to bio fuels) Improving energy efficiency

B.3.3 Location (e.g. city, region, state):

Türi town, Järva County, Estonia

B.3.4 Stage of activity *(Please underline the appropriate option)*:

- Pre-feasibility study completed
- Feasibility study completed
- In start-up or construction phase
  (e.g. ensuring financing, construction of site, purchase of land, installation of new equipment)

B.3.4 Stage of activity (continued)

- In operation
  (e.g. new windmill plant is connected, converted boiler reconnected, etc. and real, measurable and long-term GHG emission reductions or removals by sinks are generated)

B.3.5 Lifetime of AIJ project activity:

- Approval date: 05/07/1997 (Letter of Intent)
  (*Date at which the AIJ project activity was mutually approved by designated national authorities of **all** Parties involved.)*
- Starting date: October 1997 – heat substations, April 1998 – converted boiler (In operation from)
  (Date at which real, measurable and long-term GHG reductions or removals by sinks will begin or began to be generated.)
- Ending date (expected): 31/03/2007 (loan expire date)
  (Date at which AIJ project activity is expected to no longer generate GHG reductions or removals by sinks.)
- Ending date (actual): In operation
  (Date at which AIJ project no longer generated GHG reductions or removals by sinks or was terminated.)
- Ending of the operational life of the project if different from the ending date of the AIJ project activity: Expected technical lifetime is 15 years which means that the converted

boiler is expected to be in operation till 2013.

- Reasons for the choice of lifetime dates *(Describe briefly (up to half a page))*:

The lifetime criteria have been arranged in different groups depending on type of implemented activities. This classification assumes a level of operation and maintenance, which is normal in western countries.

Heat production plants (bio fuel)

25 years	New installation of all main equipment parts (fuel handling system, firing equipment and boiler) and modernisation of secondary equipment.
15 years	Conversion of existing boiler but new installation fuel handling system and firing equipment. Modernisation of secondary equipment.
10 years	Limited installation of new equipment (only one part of the three main parts, normally the firing equipment). Modernisation of other equipment.

Heat distribution systems and sub-stations

25 years	Pre-fabricated pipes and installations using certified contractors and supervisor according to EN norms and applicable district heating practise
15 years	Pre-fabricated pipes and installations without using certified contractors and supervisor
10 years	Modernisation of existing pipes.

Energy efficiency in buildings

25 years	Additional insulation roofs walls etc. with Scandinavian technology. New installed heating systems.
15 years	Renovation and balancing of heating systems including thermostat valves.
10 years	Weather stripping windows, doors etc.

* if a combination of measures is done a reasonable lifetime for the project have to be calculated.

B.4 Determination of the baseline

B.4.1 Date of completing the baseline determination: 1999 (first report)

B.4.2 Carried out by (name): STEM/ÅF-International
(Please provide detailed contact information in annex 1)

B.4.3 Type of baseline methodology applied and described in detail in section E.1
(Please underline the appropriate option(s))

- Project-specific by**:**
  - I. Simulating a likely situation that would have existed without the project
  - II. Taking an actual reference case project
  - III. Other (*Please specify (insert lines as needed)*)**:**

- Multi-project by using *(please specify briefly)***:**

B.4.4 Describe the scope of the project boundary *(Please summarize briefly the related information provided in section E. 2):*

The project activities are heat production in the Vabriku street boiler house and supply heat to the building with renovated heat substations and this includes emissions from combustion of fossil fuels and bio fuels in the Vabriku street boiler house. The project and baseline heat production activity is assumed to be equal in the case of boiler conversion. Heat consumption in the buildings will be reduced after heat substation renovation. The emission reduction from the project is based on the difference in fossil fuels consumption in the Vabriku street boiler house before and after boiler conversion and heat substation renovation.

B.4.5 Describe the degree of aggregation of the multi-project baseline *(Please summarize briefly the related information provided in section E. 1):*

C. General compatibility with and supportiveness of national economic development and socio-economic and environment priorities and strategies

Describe briefly, to the extent that information is available (up to one page) and refer to documents, decisions and laws, as appropriate:

The project meets the following objectives in the Act on Sustainable Development, Estonian National Environmental Strategy, Estonian National Environmental Action Plan, the Long-term Development Plan for the Estonian Fuel and Energy Sector, District Heating Act, Electricity Market Act and Energy Saving Programme:
- efficient and sustainable use of energy resources;
- to provide the sufficient and stable fuel and energy supply in conformity with the required quality and with optimal prices for the consistent regional development;
- to provide the political and economical independence of the state by the fuel and energy supply as a strategic branch of economy;
- to increase the share of renewable energy sources in the primary energy supply from present (2000) 10.5% up to 13% - 15% to the year 2010;
- by 2010 indicative target to produce 5.1% of gross consumption of electricity from renewables (including bio fuels);
- to reduce the environmental damage arising from fuel and energy production, transport, conversion and distribution;
- to create the reliable energy conservation system stimulating the implementation of energy conservation measures by consumers;
- creation and usage of energy efficient technologies, fuel/energy consuming and diagnostic equipment;
- stimulation of environmental awareness and environmentally friendly consumption patterns;
- to attract foreign investments for projects which ensure better use natural resources as well as environmental improvement;
- to develop co-operation between Baltic, Nordic and Central European countries

D. Environmental, economic and social and cultural impacts

D.1 Environmental impact (positive and/or negative)

The environmental impact for the project activity is mainly positive. Reduction on mazout consumption will considerably reduce the local pollution of SO_2 and NOx and the emission of CO_2 as shown below:

- Annual emission reduction:
  Projected: Actual 2005

7915 tons CO_2	5840 tons CO_2
127.7 tons SO_2	94.2 tons SO_2
11.7 tons NOx	8.7 tons NOx

- Emission measurements have been carried out on 1998

D.2 Economic impact (positive and/or negative)

- Decreased fuel costs per energy production approx. 5,5 EUR/MWh.
- Decreased import fuel costs approx. 80400 EUR per year.
- The economic impact issues are also including in the following reports:
  - Energy utilisation feasibility study for Türi town, 1996

D.3 Social and cultural impact (positive and/or negative)

- More stable energy supply, specially DHW supply in the summertime
- Improved working conditions, increased motivation
- More employment (new fuel and service companies)
- More stable heat price for consumers
- The social and cultural impact issues are also including in the following reports:
  - The efficiency of heat supply and consumption in Türi city, 1997 (Phare Multi-country Energy Programme)

E. Calculation of real, measurable and long-term environmental benefits related to the mitigation of climatic change, that would not have occurred otherwise

E.1 Assumptions and characteristics of the baseline

E.1.1 Assumptions of the baseline
(Describe (up to 1 page)):

The project based status quo baseline had been assumed to be static for the project. The key parameters for the used baseline are:

- Baseline fuel – heavy fuel oil (mazout);
- Baseline efficiency of the fossil fuel boilers;
- DH network total efficiency, including supply heat to the consumers;
- Total heat production of the boiler plant before boiler conversion;
- Heat consumption in the selected buildings before renovation of heat substations (degree-day corrected).

It has been assumed that these parameters used for baseline will not change during whole period. The numerical data are presented in section E.1.4.
For an energy efficiency project (renovation of heat substations) the decrease in emissions reflects the amount of fuel that is saved through the project. In the case that the system uses renewable fuels, the reduction is calculated comparing the amount of fossil fuels that was used before the conversion to renewable fuels.

E.1.2 Describe the baseline
(Please describe the baseline as well as leakage effects (up to 1 page)):

The project baseline is status quo baseline (total boiler plant heat production and heat consumption in the buildings heat substations to be renovated and corresponding emissions in the period before implementation of planned activities). The most important factors in calculation baseline emission are the annual efficiency of fossil fuel boilers and DH system total efficiency). Baseline efficiency of the fossil fuel boilers and DH system total efficiency have been derived from available heat production data, boiler house energy balance, technical specifications or expert judgement.

There was not assumed any indirect effects outside project boundary and leakages in the baseline emission calculation.

The project baseline boundary includes Vabriku street boiler plant emissions from heat production and supply heat to the buildings included in the project, i.e. emissions from combustion of fossil fuels. Emissions related e.g. to the transport of fuels to the project site are not included.

E.1.3 Reasons for selecting a baseline and its methodology
(Describe (up to 1 page)):

The project specific baseline as status quo case has been initially selected to start reporting on AIJ with the future plans to re-evaluate chosen baseline at pre-determined intervals in order to account for developments in the heating sector and indirect effects.

E.1.4 Calculation of values reported in 'Baseline scenario' in table E.5.1 column (A):

CO_2 emissions values are calculated according to the Regulations No. 94 of 16 July 2004 of the Ministry of Environment "The method of determination of the volume of emissions of carbon dioxide". Estonian Regulation is based on the IPCC Guidelines (1996). Carbon Emission Factors (CEF) are used to calculate CO2 emitted during fuel combustion. There is presented a table in the Regulation to calculate CO_2 emission (M_{CO2}). Instead of the table calculation it is possible to present a formula for this calculation as follows:

- in the case of boiler conversion:

$(M_{CO2})_{cb} = (Q_{fb} \times K_c \times 3{,}6 \times 44 \times q_c)/\eta_b \times 12 \times 1000)$ tons/year,

were,

Q_{fb}– boiler(s) heat production, MWh/year,
K_c - fraction of carbon oxidised,
q_c - carbon emission factor, tC/TJ,
η_b - annual efficiency of boiler(s), i.e. baseline efficiency of fossil fuel boilers.

- in the case of end-user energy saving:

$(M_{CO2})_{eb} = (Q_{eb} \times K_c \times 3{,}6 \times 44 \times q_c)/\eta_{DHb} \times 12 \times 1000)$ tons/year,

were,

Q_{eb}– heat energy consumption, MWh/year,
K_c - fraction of carbon oxidised,
q_c - carbon emission factor, tC/TJ,
η_{DHb} - annual efficiency of DH system, i.e. baseline efficiency of DH system.

The total CO_2 emission is calculated as:

Total CO_2 emission = CO_2 emission from boiler conversion + CO_2 emission from end-user energy savings.

Documentation box *(Please provide numerical data referred to in this section):*

The following data are used for calculation of the baseline scenario CO_2 emission reductions:

Total heat production of the boiler plant before boiler conversion – 22000 MWh/y
Heat consumption of the buildings before renovation of heat substations – 6620 MWh/y
Baseline efficiency of the fossil fuel boilers – 80%
Baseline efficiency of the DH system – 54%
Carbon emission factor for heavy fuel oil – 21,1 tC/TJ
Fraction of carbon oxidised – 0,99

E.2 Assumptions and characteristics of the project scenario

E.3.1 Assumptions for the AIJ project activity and its boundary

The project activities are heat production in the Vabriku street boiler house and supply heat to the building with renovated heat substations and this includes emissions from combustion of fossil fuels and bio fuels in the Vabriku street boiler house. The emissions from boiler conversion are under control of the boiler house staff. The project and baseline heat production activity is assumed to be equal. The emissions from end-user energy savings (renovation of heat substations) are depending on behaviour of the consumers and implementation of energy saving measures in the future. These factors are not taking into account in the calculations of the actual reduction of CO_2 emission.

E.3.2 Describe the project scenario

(Please describe the project scenario as well as effects occurring outside the project boundary (up to 1 page)):

The project scenario activities are heat production on bio fuels using converted boiler with 4,5 MW heat output and heat consumption in the 15 buildings with renovated heat substations. The annual heat production of the wood fuel boiler is projected to be 20000 MWh and end-user energy saving is projected to be 2000 MWh. The wood fuel boiler heat production is depending on the climate conditions as all heat load will be covered with this boiler. Indirect effects are not taken in to account in the emissions calculations. No direct leakage of any significance has been identified.

E.3.3 Please explain why the AIJ project activity would not have taken place anyway

(Describe (up to 1 page)):

As a party to the Climate Convention, Estonia has started to facilitate the transformation toward an ecologically sustainable energy system as subject to the conditions of the Convention. Several factors have been restrained implementation AIJ projects:

- Lack of investment capital for renewable energy sources and energy efficiency projects, allowing financing at reasonable costs as long-term loans at reasonable interest rates;
- Lack of sufficient institutional responsibility for implementation AIJ projects;
- A weak local tradition using wood waste from industry and from forest as a fuel in the boiler plants and applying an up to date technology for energy saving. The local technology for the wood fuels firing has largely been missing;
- Lack of wood fuels firing know-how.

During the implementation of the EAES Programme in Estonia these barriers have been over-come by transfer reliable wood fuels firing technology and know-how.

E.3.4 Calculation of values reported in 'Project scenario' in table E.5.1, column (B)

According to the section E.1.4 the following is used to calculate CO_2 emission:

- in the case of boiler conversion:

$(M_{CO2})_{cp} = (Q_{fp} \times K_c \times 3,6 \times 44 \times q_c)/\eta_b \times 12 \times 1000)$ tons/year,

were,

Q_{fp}– boiler(s) heat production, MWh/year,
K_c - fraction of carbon oxidised,
q_c - carbon emission factor, tC/TJ,
η_b - annual efficiency of boiler(s), i.e. baseline efficiency of fossil fuel boilers.

- in the case of end-user energy saving:

$(M_{CO2})_{ep} = (Q_{ep} \times K_c \times 3,6 \times 44 \times q_c)/\eta_{DHb} \times 12 \times 1000)$ tons/year,

were,

Q_{ep}– heat energy consumption, MWh/year,
K_c - fraction of carbon oxidised,
q_c - carbon emission factor, tC/TJ,
η_{DHb} - annual efficiency of DH system, i.e. baseline efficiency of DH system.

The total CO_2 emission is calculated as:
Total CO_2 emission = CO_2 emission from boiler conversion + CO_2 emission from end-user energy savings.

Boiler(s) heat production Q_{fp} is calculated as:

$Q_{fp} = Q_{fb} – Q_w$ (22000– 20000 = 2000 MWh).

Documentation box *(Please provide numerical data referred to in this section):*
The following data are used for calculation of the baseline scenario CO_2 emission reductions: Projected heat production on wood fuel boiler (Q_w) – 20000 MWh/y Projected end-user energy saving – 2000 MWh/y Baseline efficiency of the fossil fuel boilers – 80% Baseline efficiency of the DH system – 54% Carbon emission factor for heavy fuel oil – 21,1 tC/TJ Fraction of carbon oxidised – 0,99

E.3 Revision of the baseline for the project

E.3.1 Baseline revisions are planned (please underline)**:** Yes/ No
If yes, please complete the remainder of section E.3.

E.3.2 Revisions are planned at regular intervals (please underline): Yes/ No

- If yes, please specify date of first planned revision and the length of the intervals:

- If no, please explain revision schedule *(up to half a page)*:

The new data are planned to introduce in the baseline scenario, using international rules and guidelines for how such revision should be made. The time schedule is not yet specified.

E.3.3 Information on revisions

- If a baseline (and/or the project scenario) revision is covered by this report, describe briefly the nature of this revision, including parameters changed in the revision as well as the calculation of the new set of values in the column 'Baseline scenario' in a revision of table E.5.1, column (A): *(up to one page)*

- Date of last baseline revision: *(DD/MM/YYYY)*

- Date of next baseline revision: *(DD/MM/YYYY)*

Documentation box *(Please provide numerical data referred to in this section):*

E.4 Scope and performance of the actual project

Provide actual project data (E.5.2. Column B) and the calculations of the actual real, measurable and long-term emission reductions and/or removals as measured against the relevant (original/revised) baseline scenario values

Documentation box *(Please provide numerical data referred to in this section):*

The following data are used for calculation of the actual CO_2 emission reductions:

Actual heat production on bio fuels, MWh/y								
Year	1998	1999	2000	2001	2002	2003	2004	2005
Heat production	12352	15184	13177	15366	14219	14904	14484	14627

Actual end-user energy saving (degree-day corrected), MWh/y									
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
Energy saving	480	1110	1006	1041	1022	1088	1161	1508	1564

End-user energy saving = Baseline energy consumption – actual energy consumption

Other data used for calculations are presented in sections E.1 and E.2

E.5 Tables on real, measurable and long-term GHG emission reductions or removals by sinks (in CO_2 equivalent)

E.5.1 Projected real, measurable and long-term GHG emission reductions or removals by sinks

Projected real, measurable and long-term GHG emission reductions or removals by sinks over the lifetime of the AIJ activity
(Please underline and fill, as appropriate: **This is the initial table** or this is revision __ of this table)
(in metric tons of CO_2 equivalent[a])

Insert rows as need

Year	Baseline scenario[b] (A)				Project scenario[b] (B)				Projected real, measurable and long-term GHG emission reductions (-) or removals by sinks (+) ((B)-(A))			
	CO_2	CH_4[a]	N_2O[a]	Other[a]	CO_2	CH_4[a]	N_2O[a]	Other[a]	CO_2 (project total)	CH_4	N_2O	CO_2 (only fuel switch)
1997	3380				3084				-296			0
1998	10963				5358				-5605			-4584
1999	10963				3049				-7915			-6893
2000	10963				3049				-7915			-6893
2001	10963				3049				-7915			-6893
2002	10963				3049				-7915			-6893
2003	10963				3049				-7915			-6893
2004	10963				3049				-7915			-6893
2005	10963				3049				-7915			-6893
2006	10963				3049				-7915			-6893
2007	10963				3049				-7915			-6893
2008	10963				3049				-7915			-6893

2009	10963				3049				-7915			-6893
2010	10963				3049				-7915			-6893
2011	10963				3049				-7915			-6893
2012	10963				3049				-7915			-6893
TOTAL	**167827**				**51121**				**-116706**			**-101091**

[a] *Please convert values into global warming potentials, according to the IPCC (1995) conversion factors.*
[b] *Including effects occurring outside the project boundary (leakage) as described in sections E.1.4, and E.2.4, as applicable*

E.5.2 Actual real, measurable and long-term GHG emission reductions or removals by sinks

Actual real, measurable and long-term GHG emission reductions or removals by sinks of the AIJ activity
(in metric tons of CO_2 equivalent[a])

Please insert values assessed ex post i.e. after measurement. Insert rows as needed.

Year	**Baseline scenario[b c]** *(A)*				**Actual project[b c]** *(B)*				**Actual real, measurable and long-term GHG emission reductions (-) or removals by sinks (+)** *((B)-(A))*				**Values indicated are assessed independently (Yes/No)**
	CO_2	CH_4[a]	N_2O[a]	Other[a]	CO_2	CH_4[a]	N_2O[a]	Other[a]	CO_2 (project total)	CH_4	N_2O	CO_2 (only fuel switch)	
1997	3380				**3135**				**-245**			**0**	Yes
1998	10963				**6139**				**-4824**			**-4257**	Yes
1999	10963				**5216**				**-5747**			**-5233**	Yes
2000	10963				**5890**				**-5073**			**-4542**	
2001	10963				**5145**				**-5818**			**-5296**	

2002	10963				**5507**				**-5457**			**-4901**	
2003	10963				**5233**				**-5730**			**-5137**	
2004	10963				**5201**				**-5762**			**-4992**	
2005	10963				**5123**				**-5840**			**-5041**	
2006	10963												
2007	10963												
2008	10963												
2009	10963												
2010	10963												
2011	10963												
2012	10963												
TOTAL	167827				**46589**				**-44496**			**-39400**	

[a] *Please convert values into global warming potentials, according to the IPCC (1995) conversion factors.*
[b] *Including effects occurring outside the project boundary (leakage) as described in sections E.1.4, E.2.4 , E.3.4 and E.4, as applicable.*
[c] *Values that differ from those in table E.5.1 should be marked in* ***bold****.*

E.6 Mutually agreed assessment procedures

If the AIJ activity provides for mutually agreed assessment procedures, please fill subsections E.6.1 or E.6.2, as applicable.

E.6.1 Assessment procedures that use all or one of the following steps:

E.6.1.1 Initial independent assessment of the project activity:

- Has the project design been subject to such an assessment? *(Please underline)*: Yes/**No**
- If yes, what organization(s) is/are involved: (*Please indicate the type of organization(s) (consultancy, accredited certification body, government body, university, etc.) and provide their detailed contact information in annex 1 to this report).*

Only a set of principles for the selection and verification of projects was worked out by the experts of the implementing agency STEM in Sweden. The host country governmental representatives have had a rather modest role in launching the projects.

E.6.1.2 Monitoring

- Does the project have a monitoring plan? *(Please underline)*: **Yes** / No
- Summarize briefly the key elements of the monitoring plan *(i.e. which parameters are being monitored, with what frequency, providing sampling intensities if appropriate, methods and equipment; associated uncertainties, etc.) (not more than 1 page):*

STEM has continued its assistance in monitoring and reporting the projects in the host countries. Experts from STEM, as well as the Swedish consultancy company ÅF-International provided guidance in methodology. For the regular follow-up activities a special format has been developed to collect performance data from each plant for each heating season. The monitoring activities have continued by local experts for preparing Swedish AIJ reports.
The following monthly data are collected and monitored:

- ✓ Heat production on bio fuels;
- ✓ Heat production on fossil fuels;
- ✓ Total heat production of the boiler house;
- ✓ Bio fuels consumption;
- ✓ Fossil fuels consumption;
- ✓ Energy consumption in the buildings.

- Is the monitoring conducted by project proponents? *(Please underline)*: **Yes** / No
- If no, which organization(s) is/are involved: (*Kindly indicate the type of organization(s) (consultancy, accredited certification body, government body, university, etc.) and provide their detailed contact information in annex 1 to this report).*

E.6.1.3 Independent assessment of the project performance

- Is the activity subject to such an assessment? *(Please underline)*: **Yes** / No
- If no, is such an assessment intended? *(Please underline)*: Yes / No
- If yes, what organization(s) is/are involved: (*Please indicate the type of organization(s) (consultancy, accredited certification body, government body, university, etc.), and provide their detailed contact information in annex 1 to this*

report. Indicate the frequency of the assessments, how many assessments have taken place to date, and whether the assessment report(s) is/are publicly available if requested).

Projects are followed and evaluated from technical and economic points of view by local experts (Evaluation Report Estonia: Boiler Conversion Projects in Estonia, 1995). Special measurements (emissions) programs and performance tests were carried out of boiler conversion projects. These tests were carried out by Swedish specialists (ÅF-International) with assistance of local staff in the boiler houses. In addition some projects have been studied and reported on by international experts and by students at technical universities in Sweden, Germany, Estonia.

- Summarize briefly the key elements of the assessment activities: *(Please describe issues such as criteria used; the project design; project implementation; key project parameters being verified; the frequency of assessment/surveillance; sampling approach applied by the assessing organization) (up to one page)*:

E.6.1.4 Provision of written statement by an independent entity regarding the performance of the project activity

(Please note that such a statement is not a formal requirement under the AIJ pilot phase (see also the note at the beginning of section E.6). If the project has made provision for such a statement, please indicate the name of the independent body and attach a copy of the written statement(s)).

E.6.2 Other form of mutually agreed assessment procedure *(please specify)*:

Ministry of the Environment of Estonia is a central Estonian authority responsible on reporting of JI projects. This authority assigns a local institution, which is involved in to the evaluation of the climate effects of this project and takes the main responsibility to continue measuring, results collecting for JI-reporting.

E. 7 Cost (to the extent possible)

E.7.1 The cost information is *(Please underline)*:

- Provided below
- Not provided because the data are *(Please underline)*:
  - Not yet available
  - Classified as confidential

E.7.2 AIJ project activity costs

Country	Türi II, BC och EE	Türi II, BC och EE	1997 0	1998 1	1999 2	2000 3	2001 4	2005 8
A. Sweden	Investment	1. Loan/debt to STEM	4139000	595600	558379	489198	419428	1138088
		2. Added costs	0	256700	0	5262	8496	0
	AIJ/JI costs	3.Technical assistance	68000	0	0	0	0	0
		4. Follow up	0	0	2267	2139	1265	2852
		5. Reporting costs	0	2000	744	301	282	810
		6. Administration	31000	0	0	0	0	0
		7. Difference in interest	4%	23824	22335	19568	16777	45524

		8.Accum. costs for AIJ/JI	99000	25824	25346	22009	18324	21986
		9.Total costs	512900	621424	583725	511206	437752	1160074
B.Estonia	Investment	1. Investment/Instalment	0	75000	37222	74443	78266	0
	AIJ/JI costs	2. Reporting costs	0	0	0	0	0	0
		3. Other costs	0	0	0	0	0	0
		4. Accum. costs for AIJ/JI	0	0	0	0	0	0
		5. Total costs	0	75000	112222	186665	264930	
1 USD=	10	SEK						

F. Financial additionality

*Bearing in mind that the financing of AIJ shall be **additional** to financial obligations of Parties included in Annex II to the Convention within the framework of the financial mechanism, as well as to current official development assistance (ODA) flows (decision 5/CP.1):*

Please list sources and the purpose:

Source and purpose of the AIJ project activity funding *Including pre-feasibility phase* *(One line for each source)*	**Amount** *in thousand US$* (in Swedish crone, SEK)
Loan from NUTEK*	761.2 (SEK 5 709 020)
Grant from NUTEK* for technical assistance	90.7 (SEK 680 000)

1 USD = 7,5 SEK

* From 1 January, 1998, the new Swedish National Energy Administration was established – from 1 January 2002 the name in English has been changed to the Swedish Energy Agency - has taken over the responsibility for the Programme for an Environmentally Adapted Energy System in the Baltic region and Eastern Europe (EAES Programme) from NUTEK (Swedish National Board for Industrial and Technical Development.

G. Contribution to capacity building, transfer of environmentally sound technologies and know-how to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention. In this process, the developed country Parties shall support the development and enhancement of endogenous capacities and technologies of developing country Parties

G.1 Identification of environmentally sound technology and know-how

- Name of manufacturer: Saxlund AB (main contractor of the combustion equipment with Estonian subcontractor Tamult Ltd)

- Place of manufacture *(country)*: Sweden

- Model names and numbers of equipment *(where appropriate)*:

The main parts of the delivery have been:

- Fuel storage above the ground complete with hydraulic discharge scrapers;
- Fuel conveyor from storage to furnace;
- Prefurnace with gas channel and air system;

- Flue gas cleaning of multyicyclone type;
- Flue gas fan, air fans;
- Ash and slag removable system;
- Control and supervision system;
- Stairs walkways and railings for operation and maintenance;
- DH pipeline;
- Heat substations components (circulation pumps, regulation valves, controllers, shut-off valves, strainers, heat exchangers, control devices and other necessary components).

- Any other relevant key specific technology characteristics:

An existing oil fired DKVR 10-13 boiler has been converted to bio fuels firing through installation of an integrated movable inclined grate in the boiler. Furthermore, automatic fuel storage and flue gas cleaning are included in the project.

Boiler type:	DKVR 10-13 (hot water)
Boiler output:	4,5 MW
Pre-furnace:	Integrated in the boiler (with moving inclined grates)
Flue gas cleaning:	Multicyclone <300 mg/Nm3
Fuel type:	Wood chips, sawdust, bark, 35-55% RH
Previous fuel:	Mazout (high-sulphur content heavy fuel oil)

The connection of networks was also made. 15 substations with controllers for space heating and heat exchangers for domestic hot water has been installed in the buildings due to the conversion of one network to a 2- pipe system (not separate pipes for supply domestic hot water).

- Where applicable, name and location of provider and nature of training:

In-site training of local staff on operation and maintenance of the installed equipment provided by main supplier according to the Contract

G.2 **Characteristics of environmentally sound technology**

The technology is *(underline the option)*:

- At a research and development stage
- Being tested or demonstrated in similar conditions outside the host country
- At the initial stage of introduction into the world market
- At the initial stage of introduction into the host market
- Commercially available and deployed in the world market
- Commercially available and deployed in the host market
- Not characterized by the above options. *Please describe:*

G.3 **Impact of the AIJ project on capacity-building and transfer of environmentally sound technology and know-how** *(up to two pages):*

Systematically, the capacity building and transfer of know-how have involved the following activities over time and have taken place through:

i) Technology transfer through STEM technical specialist and co-operation between foreign supplier and local partner during the implementation of the project:

- Technical support of STEM specialist to the local project leader and municipality;

- Knowledge in negotiations to foreign companies;
- Knowledge in managing and planning of industrial projects;
- Transferring of environmental issues to the local parties;
- Transferring of knowledge in operation and maintenance issue;

ii) Conferences, seminars, documentation and training:

- Personal from boiler plant has been invited to different seminars and workshops and several presentations about company experience have made, documentation for training has been handed over;
- There were arranged seminars through close cooperation between STEM and Estonian partners:
  - ✓ Environmentally Friendly Energy Systems in the Baltic Region and Eastern Europe - seminar in Tallinn, 14-15 Aprill, 1994;
  - ✓ Environmentally Friendly Energy Systems in the Baltic Region and Eastern Europe - seminar and workshops in Tartu, 25 November, 1994 (prepared information by topics in Estonian over than 150 pages);
  - ✓ EAES Programme District Heating Day in Vändra, 27 July, 1995;
  - ✓ Environmentally Adapted Local Energy Systems - seminar and presentation of translated into Estonian booklet "Environmentally Adapted Local Energy Planning" in Rakvere, 11 November, 1998 and in Tartu, 12 November, 1998.
  - ✓ Exploitation of boiler houses on bio fuels. Practical experiences – international seminar in Narva-Jõesuu, 3 –5 April, 2001 (in Russian language);
  - ✓ Arrangement of operation of boiler houses on bio fuels – seminar in Essu, 19 – 21 September, 2001 in Russian language).

iii) Stimulate "net-working" for the exchange of experience between plant owners with similar problems, e g "bio-clubs":

- Activities have been supported by STEM to establish Estonian Bio Fuels Association: meetings representatives of plant owners and consultants were arranged in Haabneeme, Valga, Võru, Tartu, Pärnu and Viljandi;
- The boiler plant has been visited by specialist from another boiler plants (incl. Russia, Baltic Countries). The local staff has an exchange of experience with the staff from another boiler plants;
- Estonian Bio Fuels Association is established in 1998 (mainly by "bio-club" and local experts).

H. Additional comments

Complete as appropriate:

1) Any practical experience gained:

- Good training and experience of the staff is necessary to operate bio fuel boiler at full capacity. The motivation of the staff to learn is very important to get good results.
- The local project manager has got high experience in managing of industrial projects.
- The staff has got education in operating modern equipment.
- 0ne of the lessons learnt is that it is important to have persons responsible for the adjustment of the equipment for each building and that they have good understanding of the consequences of their actions
- Is very important to control temperature in the prefurnace and the temperature gauge must be installed in the suitable place to avoid lining damages.
- Maintenance service of heat substations is necessary to develop.

2) Technical difficulties:

- The maximum output capacity 4,5MW is not reached. Maximum output capacity 4,0 MW was reached during winter 2000. The flue gas fan capacity seems to be not enough. Problem with high CO emission, boiler efficiency is lover 80%. The boiler efficiency is improved in 2000 by reconstruction combustion air intake (to take warm air above boiler).
- Too big excess air factor, uncontrolled air will penetrate into combustion zone through slots between prefurnace wall and grates. The combustion air distribution is improved and some damaged grate elements are changed.
- There was no installed temperature gauge to control combustion temperature, which it is necessary to install. Installed in 2001.
- The flue gas system ducts are planned to reconstruct to reduce flue gas flow resistance. The reconstruction of flue gas dust has been done in 2001. The efficiency of boiler was improved.
- After reconstruction of the flue gas system ducts the maximum output capacity 4,5MW was reached and even exceeded (5,5 MW).
- There is planned some reconstruction of the combustion air distribution system.

3) Effects encountered:

- Several local companies have participated in the project (design, ground and constructions works).
- Execution of the follow up and monitoring activities for evaluation of the results of the different measures and get feedback to the programme
- In some building too much emphasis was put on reduction of heat consumption and limiting the heat bill and the domestic hot water consumption was decreased at least two times. The persons adjusting the equipment concentrated more on limiting the metered heat consumption than an maintaining an acceptable indoor temperature.
- In one residential building inhabitants have closed central domestic hot water system and they have installed individual electrical boilers.
- More reliable heat supply after connection of the networks

4) Impacts encountered:

- Better indoor climate in the most of the buildings with renovated heat substations and improved domestic hot water supply
- The value of the flats, when sold has been higher in the buildings with good energy management.
- The experiences from EAES Programme projects have formed the basis for a new policy as respect to increasing renewable energy sources in the total energy balance of Estonia.
- Reduced dependence on imported fuels.

5) Other obstacles encountered:

- Lack of a strong national focal point to support and promote biomass energy use
- Lack of wood fuel in the local market due to increased wood fuel (sawmills wastes, white chips, bark) export from 2001. The sawdust is mainly used now as raw material in pellet factories. The sawmills wastes have been the main wood fuel during latest years and the share of use of forest residues has not been high. But there is tendency to use more forest residues.
- Difficulties in wood chips supply in December 2001. The wood fuel price has increased.
- It is planned to buy raw material in summer for spare for chipping yourself (mainly logs) to overcome unstable wood chips supply. There is planned use more forest residue and stumps.
- Wood fuel quality has been become lower the share of forest residue has been increased in the total amount of used wood fuel.

6) Other:

- No subsidies to renewables, taxation policy is not in support of bio fuel use. Energy and fuel taxation is planned (on 2004) to establish with zero taxes for bio fuel to stimulate the wider use of bio fuels in the municipal heat production.
- About 60 % of the project costs have been spent locally.
- Calculations of the volume of emissions of sulphur dioxide and nitrogen oxide in the section D are calculated according to the Regulation No. 99 of 02 August 2004 of the Ministry of the Environment "The procedure and methods of determination of the volume of pollutants from combustion plants to the air".
- On 2000 a research project was started with Det Norske Veritas with the aim to develop methods for simplifying the verification of JI-projects based on the experiences from the Swedish boiler conversion projects in the Baltic countries. The project has been finished in 2001.
- On 2002 by the Ministry of Environment there was prepared draft National Programme for Reduction of Greenhouse Gases 2003-2012, which has been adopted by the Government on 2004.
- The National Allocation Plan (NAP) to the European greenhouse gas emissions trading scheme has been developed on 2004 according to the Directive 2003/87/EC, establishing a scheme for greenhouse gas emission allowance trading in the Community.
- New environmental taxes law has been enforced from January 2006. According to this law CO_2 tax has been implemented also for use fossil fuels in medium size burning equipment.

Annex 1 to the revised uniform reporting format (URF 01)

PARTICIPANTS' CONTACT INFORMATION

Please provide contact information for <u>each</u> organization. Add rows as required (by copying and pasting)

Name	Address [a]	Voice/Fax/E-mail
Organization(s) [b]: Swedish Energy Agency(* **Function(s) within activity[c]:** Financing/Project development		
Officer responsible:	The System Analysis Department, Climate Change Division Kungsgatan 43 BOX 310 S-63104 Eskilstuna SWEDEN http://www.stem.se	**Tel: +46 16 544 20 81** **Fax: +46 16 544 22 64** **E-mail:** **bengt.bostrom@stem.se**
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Name	Address [a]	Voice/Fax/E-mail
Organization(s) [b]: ÅF-International (Malmö) **Function(s) within activity[c]:** *Technical assistance*		
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Organization(s) [b]: Ministry of the Environment of the Republic of Estonia **Function(s) within activity[c]:** *Designated national authority/reporter*		

Officer responsible:	Department of Environment Management and Technology Narva mnt. 7A 15172 Tallinn ESTONIA http://www.envir.ee	**Tel: +372 62 62 802** **Fax:+372 62 62 801** **E-mail: min@envir.ee**
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Name	**Address** [a]	**Voice/Fax/E-mail**
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Officer responsible:	Kohtu 2 72213 Türi ESTONIA http://www.tyri.ee	**Tel:+372 384 8200** **Fax:+372 384 8248** **E-mail: vallavalitsus@tyri.ee**
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[a] *Address should include: department; street; postal code; city; country and the Internet address of the organization (if available).*

[b] *Organization includes: institutions, ministries, government agency closely following the activity, companies, non-governmental organizations, etc. involved in the activity.*

[c] *Function within activity: please use the following categories:*

Function	*Description of function*
Project development	*Designing/developing the AIJ project and/or submitting the AIJ project proposal*
Project operator	*Implementing and administering the AIJ project activities*
Government regulation/oversight	*Ensuring compliance of the project with laws and regulations*
Technical assistance	*Providing scientific or other technical guidance or support for the purposes of project development and/or project administration, implementation, training and education activities*
Financing	*Serving as a source of funding for the AIJ project*
Initial independent assessment of project activity	*Assessing whether the project activity meets a given set of criteria*
Monitoring	*Monitoring the environmental and/or socio-economic results of the project in accordance with a monitoring protocol*
Independent assessment of project performance	*Assessing the performance (environmental and/or socio-economic) achieved by a project against pre-set criteria*
Providing independent written statement on performance	*Providing written assurance that a performance is achieved and/or a set of criteria is met by an activity*
Designated national authority	*Entity authorized to officially accept, approve or endorse the AIJ project*
Other (please specify)	