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Item 4 of the provisional agenda
Development and transfer of technologies

SUBSIDIARY BODY FOR IMPLEMENTATION
Twenty-ninth session
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Item 7 of the provisional agenda
Development and transfer of technologies

Developing performance indicators to monitor and evaluate the effectiveness of the implementation of the technology transfer framework

Interim report by the Chair of the Expert Group on Technology Transfer

Summary

The Conference of the Parties, by its decision 3/CP.13, annex II, requested the Expert Group on Technology Transfer (EGTT) to develop a set of performance indicators that could be used by the Subsidiary Body for Implementation to regularly monitor and evaluate the effectiveness of the implementation of the framework for meaningful and effective actions to enhance the implementation of Article 4, paragraph 5, of the Convention, complemented with the set of actions set out in annex I to decision 3/CP.13, considering the related work under the Convention and other relevant bodies. This interim report presents the progress made by the EGTT in conducting this work, including preliminary findings.

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Annex

I. Introduction

A. Mandate

1.   The Conference of the Parties (COP), by its decision 3/CP.13, annex II, requested the Expert Group on Technology Transfer (EGTT) to develop, as part of its future programme of work, a set of performance indicators that could be used by the Subsidiary Body for Implementation (SBI) to regularly monitor and evaluate the effectiveness of the implementation of the framework for meaningful and effective actions to enhance the implementation of Article 4, paragraph 5, of the Convention (the technology transfer framework[1]), taking into consideration related work under the Convention.

2.   The Subsidiary Body for Scientific and Technological Advice (SBSTA), at its twenty-eighth session, endorsed the terms of reference for this work.[2,3] As requested by the terms of reference, a first interim report with a draft set of candidate performance indicators should be made available to the subsidiary bodies for consideration at their twenty-ninth sessions, followed by a second interim report with a proposed set of performance indicators for consideration at the thirtieth sessions of the subsidiary bodies and a final report with recommendations for using the performance indicators to be made available to the COP at its fifteenth session.[4]

B. Objectives and scope of the work

3.   The overall objective of this work is to develop and test a balanced and robust set of performance indicators that could be used by the SBI to monitor and evaluate the effectiveness of the implementation of the technology transfer framework.

4.   As indicated in the terms of reference, the outcome of this work could provide inputs to:

     (a)   The work of the SBI on reviewing and assessing the effectiveness of the implementation of Article 4, paragraphs 1(c) and 5, of the Convention, in accordance with decision 13/CP.3;

     (b)   The work of SBI on considering the role of new financing mechanisms and tools for scaling up development and transfer of technology;

     (c)   Negotiations under the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA), particularly on the activities mentioned in paragraph 2 (c) of the terms of reference.

5.   The work is divided into three tasks:

     (a)   Task I: develop a set of candidate performance indicators (June to October 2008).

     (b)   Task II: test the set of performance indicators (December 2008 to May 2009).

     (c)   Task III: prepare recommendations for using the indicators (June to December 2009).

6.   The specific objectives of this interim report are: (1) to present the approach in developing and testing a set of performance indicators to monitor and evaluate the effectiveness of the implementation of

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[1] Contained in decision 4/CP.7, annex, complemented with the set of actions set out in decision 3/CP.13, annex I.
[2] FCCC/SBSTA/2008/6, paragraph 82.
[3] FCCC/SBSTA/2008/INF.2, annex I.
[4] FCCC/SBSTA/2008/INF.2, annex I, paragraph 16 and FCCC/SB/2008/INF.1, annex I, activity 1.

the technology transfer framework; (2) to make the components of the five key themes[5] of the technology transfer framework less abstract in order to design metrics and performance indicators that best reflect the vision and goals of the Convention on technology transfer; and (3) to present an initial list of performance indicators and check them against earlier proposals made by Parties in their submissions.[6]

7.   This document is intended to report to the subsidiary bodies at their twenty-ninth sessions on the progress made by the EGTT in conducting this work, including on generating a common understanding among the key stakeholders of the terminology and the process in conducting this work. Interaction with the key stakeholders within the framework of the Convention is important for the continuation of the work.

C. Possible action by the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation

8.   The SBSTA and the SBI may wish to review the progress of the work and, if necessary, to provide further guidance to the EGTT.

II. Background information

A. Developing and testing indicators: a participative design process

9.   It was noted in Agenda 21[7] that: "The need for information arises at all levels, from that of senior decision makers at the national and international levels to the grass-roots and individual levels."[8] This point was also stressed by the Brundtland report.[9] This information can be provided through indicators and form a solid basis for decision-making: "Today, communities, governments, businesses, international agencies, and non-governmental organizations are increasingly concerned with establishing a means to monitor performance and to assess progress toward sustainable development."[10]

10.   In response to this challenge, for each topic of sustainable development, dozens of lists of indicators have been published, some of which were offered as being the universal set of key indicators.

11.   The International Institute for Sustainable Development organized in 1997 in Bellagio, Italy, a meeting of an international group of measurement practitioners and researchers in order to review progress and to synthesize insights from practical ongoing efforts. "Rather than debating the choice of ideal indicators of sustainable development, the discussion that ensued was oriented to a more basic level. Overarching principles were sought that would provide a link between theory and practice."[11] The so-called Bellagio Principles for Assessment[12] were unanimously endorsed. Since then those principles have been guiding several exercises of developing and testing indicators.

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[5] Technology needs and needs assessments, technology information, enabling environments, capacity-building and mechanisms for technology transfer.

[6] FCCC/SBI/2008/MISC.1 and Add.1 and FCCC/SBI/2008/7.

[7] <http://www.un.org/esa/sustdev/documents/agenda21/index.htm>.

[8] Agenda 21: Chapter 40 – Information for decision-making. Available at: <http://www.un.org/esa/sustdev/documents/agenda21/english/agenda21chapter40.htm>.

[9] World Commission on Environment and Development. 1987. *Our Common Future*. London: Oxford University Press.

[10] Hardy P and Zdan T (eds). 1997. *Assessing Sustainable Development: Principles in Practice*. Winnipeg: International Institute for Sustainable Development.

[11] As footnote 10 above.

[12] According to Hardy and Zdan (1997): "These principles deal with four aspects of assessing progress toward sustainable development. Principle 1 deals with the starting point of any assessment establishing a vision of sustainable development and clear goals that provide a practical definition of that vision in terms that are meaningful for the decision-maker. Principles 2 through 5 deal with the content of any assessment and the need to

12.   Performance indicators are among the most commonly used methods, tools or approaches to monitor progress. Based on different definitions and descriptions in the literature,[13] performance indicators can be defined as a set of measures enabling to monitor performance, to track progress towards the achievement of objectives, to demonstrate results and to take corrective action. They can be expressed as qualitative or quantitative measures and as financial and non-financial metrics, formulated in a specific, measurable, achievable, relevant and time-bound (SMART) manner.

13.   Developing and testing a set of performance indicators for monitoring and evaluating the implementation of the technology transfer framework is an ex post exercise mandated by the COP. When the COP took this decision, the Parties were informed about the current situation regarding the development and transfer of technologies under the Convention, the stakeholders involved and the identified problems as well as the defined objectives[14] of the technology transfer framework. When developing and testing a set of indicators within this context, it is important to follow a systematic and coherent approach with a feedback mechanism. The Bellagio Principles can be applied in this process.

Figure 1. Process for developing a list of performance indicators[15]

Abbreviations: DTT = development and transfer of technologies.

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merge a sense of the overall system with a practical focus on current priority issues. Principles 6 through 8 deal with key issues of the process of assessment, while Principles 9 and 10 focus on the necessity for establishing a continuing capacity for assessment."

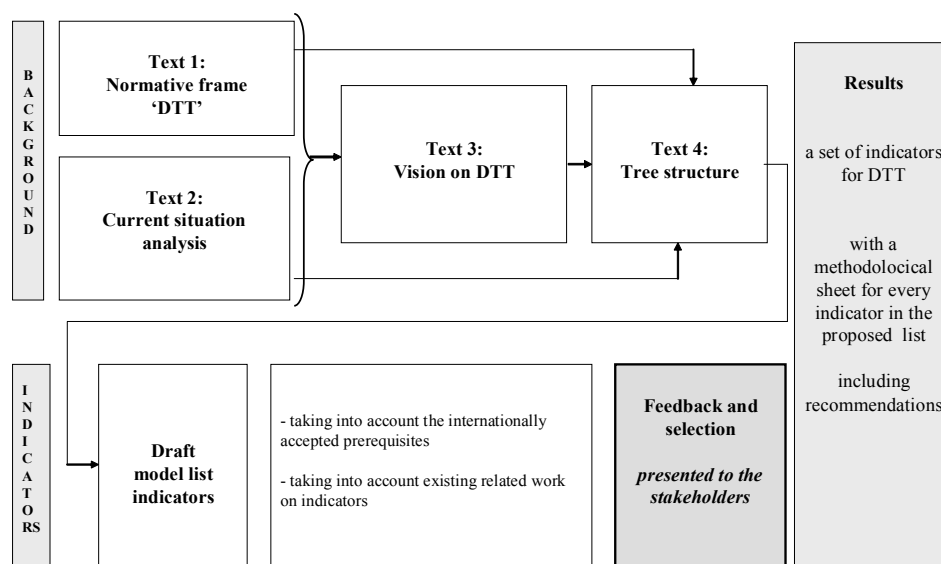[13] Hardy P and Zdan T (eds). 1997. *Assessing Sustainable development: Principles in Practice*. Winnipeg: International Institute for Sustainable Development; Parmenter D. 2007. *Key Performance Indicators: Developing, Implementing, and Using Winning KPIs*. Hoboken: John Wiley & Sons; Nichols D and Martinot E. 2000. *Measuring Results from Climate Change Programs: Performance Indicators for GEF*. Washington: Global Environment Facility.

[14] Note that these are the steps to be followed in a logical framework approach.

[15] Adapted from the methodological framework developed at the Centre for Sustainable Development (Ghent University) during the multiyear project "A city monitor for liveable and sustainable cities in the Flemish region".

14.   Similar processes, aimed at developing and testing indicators, usually start from zero (i.e. a discussion with stakeholders on the normative frame and an analysis of the current situation, leading to a vision). This is not the case here, because the normative frame on the development and transfer of technologies (text 1 in figure 1), the analysis of the current situation (text 2) and the vision on the development and transfer of technologies (text 3) will be taken for granted.

15.   In the following paragraphs the practical steps in this participative design process for developing and testing a set of performance indicators, as shown in figure 1, will be explained.

1. Normative frame[16]

16.   The Rio Declaration on Environment and Development, Agenda 21 and the UNFCCC, particularly the references to the development and transfer of technologies within the context of sustainable development, reflect the normative frame for developing and testing a set of performance indicators to monitor and evaluate the effectiveness of the implementation of the technology transfer framework. In figure 1 this is referred to as text 1.

2. Current situation analysis

17.   Several decisions, reports, and technical papers on the development and transfer of technologies have been published. Most publications focus on one of the key themes of the technology transfer framework, while some give an overview or an in-depth analysis to explain the current situation on the development and transfer of technologies under the Convention, including:

    (a)   Chapter 5, "The promise of technology" of the UNFCCC publication *United Nations Framework Convention on Climate Change: The First Ten Years*;[17]

    (b)   "Recommendations of the Expert Group on Technology Transfer for enhancing the implementation of the framework for meaningful and effective actions to enhance the implementation of Article 4, paragraph 5, of the Convention";[18]

    (c)   The UNFCCC publication *Expert Group on Technology Transfer: Five Years of Work*.[19]

18.   The analysis of the current situation is referred to in figure 1 as text 2.

3. Vision on the development and transfer of technologies

19.   The technology transfer framework expresses the guiding vision and goals (principle 1 of the Bellagio Principles) as defined by the COP. It consists of the framework for meaningful and effective actions to enhance the implementation of Article 4, paragraph 5, of the Convention (decision 4/CP.7, annex), complemented with the set of actions set out in decision 3/CP.13, annex I. Both annexes together form text 3 as referred to in figure 1.

4. Tree structure leading to a draft model list of indicators

20.   The different elements in the vision on the development and transfer of technologies need to be translated into less abstract intentions or objectives. This translation will form the basis upon which to formulate a draft list of indicators. In line with the Bellagio Principles 2 through 5 the exercise should deal with the need to merge a holistic perspective (principle 2) with a focus on essential elements

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[16] Within this context normative refers to the overall set of principles, goals and definitions which have been accepted by the international community to frame sustainable development.

[17] <http://unfccc.int/resource/docs/publications/first_ten_years_en.pdf>.

[18] FCCC/SBSTA/2006/INF.4.

[19] <http://unfccc.int/resource/docs/publications/egtt_eng.pdf>.

(principle 3), adequate scope (principle 4) and practical focus (principle 5). This should be ensured by going through several rounds of selecting a model list of indicators.

21.   In a first round, the less abstract intentions and objectives, derived from the vision, would each be linked to the formulation of an indicator without preconditioning the ultimate selection. This extensive list of indicators would form the basis for a discussion with the stakeholders in order to ascertain whether the list has the potential to be holistic. At this stage an initial selection can be made to exemplify what is important.

22.   During the next phase of the exercise for each of the selected indicators a methodological sheet will be completed. This sheet consists of different fields, each reflecting a set of criteria (e.g. SMART) to be checked. The result will be a reduced list of indicators. This does not mean that an indicator without, for example, the possibility of collecting data is deleted immediately, but it is put aside for deliberation later on in the process. This information needs to be discussed again with the stakeholders to see if there is still a balanced approach reflecting all concerns in an equal way.

23.   Based on this discussion a draft final set of key indicators each with a methodological sheet is presented and eventually completed with some of the indicators put aside, with recommendations on how to develop a strategy to collect the lacking data. As a result of this iterative process, the stakeholders could agree on the balanced list of indicators.

24.   Before drafting the model list of indicators, a more detailed understanding of the concept of indicators is required. This will be outlined in the following paragraphs.

25.   In the last 10–15 years, much research has been carried out to improve the monitoring and evaluation of the effects of policymaking at all levels. It has been reported that the questions posed in most evaluations fall into three basic categories:[20]

   (a)   Descriptive – questions intended simply to observe and measure changes (i.e. what happened after the measure was put in place?);

   (b)   Causal – questions that seek to analyse what happened in terms of cause and effect (i.e. to what extent are these observed changes attributable to the measure, and why did that particular measure have those particular effects in those particular circumstances?);

   (c)   Normative – are these results satisfactory? Normative questions require a judgment to be made against some prior explicit objective or benchmark.

26.   The category 'descriptive' is not the focus of this exercise. Nevertheless, a description would be given in each methodological sheet.

27.   To answer the questions in the category 'causal', the policymakers should be identified. It is important from the start to be as precise as possible in describing the causal relationship between objectives formulated by X and the outcomes/impacts on Y, influenced by external factors Z. It is also important to note that objectives of policymaking can be to target plans, processes or instruments. The technology transfer framework addresses all three of these and sets objectives for different levels and groups responsible for policymaking.

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[20] European Environment Agency (EEA). 2000. *Towards a new EU framework for reporting on environmental policies and measures (Reporting on environmental measures – 'REM'). Paper I: Defining criteria for evaluating the effectiveness of EU environmental measures.*

28.   All of the categories referred to in paragraph 25 above are important, but those related to the category 'normative' require more detailing. Figure 2 reflects in this regard the relationship between the needs of society, the policymaking, the evaluation of the policy and the effects on society.
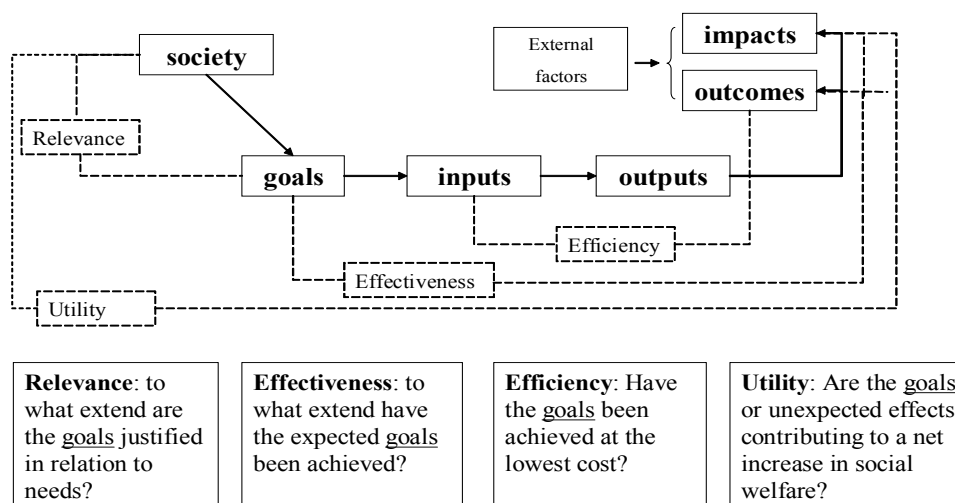
29.   Policymaking aims at changing the outside world, based on the needs of society. Starting from a vision, objectives are formulated. The inputs that are required to reach expected outputs are decided upon. Despite the influence of positive and negative external factors, policymaking results in outcomes (effects on target groups/human behaviour) and impacts (regarding social welfare). As a feedback, the overall evaluation should influence and adjust policymaking.

30.   Monitoring and evaluating the effectiveness of the implementation of the technology transfer framework, as intended by this exercise, is one part of the overall evaluation that tries to answer the question of to what extent the expected objectives have been achieved. The selected indicators will measure means (methods to achieve objectives) or ends (achievement of objectives) or a combination at any point along the continuum (inputs, processes, outputs, outcomes and impacts).

31.   The set of key indicators will target priorities as expressed by the existing vision and the actual formulated objectives. A chain of causality needs to be developed that links impacts, outcome and output with objectives. When the causal relationship is not clear, a feedback could be given for adjusting vision and objectives in the long term.

32.   In fact the process for developing and testing performance indicators could allow an audit of the whole chain, from decisions made by the COP up to the expected sustainable development outcomes and impacts in countries, with recommendations for redefining the vision on the development and transfer of technologies and the necessary ingredients (capacity, continuity, etc.). Therefore, participation of the key stakeholders of the COP in defining indicators is crucial because they are then more likely to use indicators for future decision-making, including corrective action towards objectives.

Figure 2. Framework for monitoring and evaluating the effects of policies[21]

Relevance: to what extend are the goals justified in relation to needs?	**Effectiveness**: to what extend have the expected goals been achieved?	**Efficiency**: Have the goals been achieved at the lowest cost?	**Utility**: Are the goals or unexpected effects contributing to a net increase in social welfare?

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[21] Adapted from figure 6 in: EEA. 2001. *Reporting on Environmental Measures: Are We Being Effective?* Environmental issue report no. 25. Copenhagen: European Environment Agency.

B. Experiences and lessons learned from monitoring and evaluating effectiveness outside the Convention: summary of the major findings

33.   Experiences with performance indicators under the Convention are rather limited. Outside the Convention, there are several approaches for defining and structuring performance indicators, with differing points of emphasis (e.g. the emphasis placed by organizations on measuring outcomes and impacts). Many organizations (international organizations, donors and governments) have developed their performance indicators around similar general structures, but terminology often differs; thus the development of performance indicators for the development and transfer of technologies needs to be streamlined across countries and stakeholders.

34.   The general framework that most organizations use as a basis for developing their performance indicators is similar to that shown in figure 2. Performance indicators are seen as measures of project/programme impacts, outcomes, outputs and inputs that are monitored during and after implementation to assess progress towards or achievement of project/programme objectives. Most of the tools, methods and approaches present variations of this format.

35.   Some organizations favour a broad suite of monitoring and evaluation tools and methods, depending on the emphasis (e.g. performance indicators, rapid reviews, impact evaluations, performance audits).[22] Some countries focus on public service wide or sectoral monitoring and evaluation systems, while others have developed performance indicators for international initiatives, such as Poverty Reduction Strategy Papers and the United Nations Millennium Development Goals.

36.   Some donors and agencies, for example the European Union and the Global Environment Facility base their evaluation on so-called efficacy indicators that include relevance (alignment with the development objective), significance (of issues addressed and lessons derived), efficiency (ratio of outputs/inputs), effectiveness (outputs per outcome), and/or sustainability (persistence of benefits over time after the end of project/programme).

Learning curve

37.   Developing and testing performance indicators can be a long process; based on experience gained, the set of performance indicators can then be improved. This can be seen as a continuous feedback loop. It could also be seen as a participative design process involving key stakeholders, taking into account the Bellagio Principles.

38.   However, creating monitoring and evaluation systems with a set of performance indicators is not adequate, unless such systems become established, through, for example, government involvement. This is necessary to ensure the sustainability of the performance measurements at all levels, in particular at national level.

Framework with causal relationship

39.   It is important not to lose the causal relationship when monitoring and evaluating the effects of policies. Sometimes performance indicators do not follow the logical framework and there is a tendency to proliferate indicators that may not eventually be measured. Therefore there is a need for a comprehensive structure for presenting the performance indicators.

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[22] Mackay K. 2006. *Institutionalization of Monitoring and Evaluation Systems to Improve Public Sector Management*. Washington: World Bank.

Performance indicators

40.   Most experiences are related to input, processes/activities, output, some outcome, little impact, and quantitative as well as qualitative indicators. Attention should be paid to the measurement of outcomes and impacts, but performance indicators related to sustainable development should also be guided by well-structured objectives.

41.   The outcomes of the implementation of the technology transfer framework should reflect the effects on the target groups (Parties included in Annex II to the Convention (Annex II Parties), Parties not included in Annex I to the Convention (non-Annex I Parties), intergovernmental organizations (IGOs) and the secretariat) and (the change of) their behaviour should be reflected in the performance indicators. For example, based on preliminary findings of the 'unravel' exercise,[23] an outcome indicator can be given for technology needs assessments (TNAs) could be the number of technology needs implemented in a country (Party) or by a programme (IGO).

42.   Impact indicators to monitor and evaluate the effectiveness of the implementation of the technology transfer framework should cover the three pillars of sustainable development (environmental, social and economical), in addition to reflecting the institutional dimension. Impact indicators should reflect the contribution made to social welfare.

43.   The 'unravel' exercise might benefit from regrouping the performance indicators by category (input, process, output, outcome or impact indicator), which would enable an overview to be given, demonstrating to which category of indicators the agreed objectives can be related.

44.   One of the lessons learned from the experiences with performance indicators is that an indicator might have different meanings for different countries, as the meaning will depend on the state of development of a country, the nature of the economy, its geography, resource base, etc. Hence it is important to take disparity into account when dealing with cross-country comparisons.

45.   There should be an emphasis on making indicators specific, measurable, achievable, relevant, and time-bound.

Data availability

46.   The final selection of the set of performance indicators depends on data availability, time constraints, and cost–benefit considerations. Attention should be paid to arrangements for data collection and monitoring and evaluation capacity that matches demand for the development and use of the indicators.

47.   The use of baseline data, the setting of targets, data collection systems and quantitative and qualitative analysis should be included in performance measurements. The resulting monitoring plan should include information on data sources, the method of data collection, the frequency of data collection and analysis, who is responsible for the data collection and analysis and who will use the information.

Stakeholders

48.   The exercise might benefit from regrouping the performance indicators by stakeholder (Annex II Parties, non-Annex I Parties, and IGOs). An overview could thus be given that demonstrates the expectations towards the stakeholders, according to the objectives. A rating/weighting system could help

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[23] An exercise where the components of a vision are made less abstract in order to design metrics and performance indicators that best reflect the intentions of the technology transfer framework.

to compare results across stakeholders, but a balance would be needed between indicators that target specific stakeholders and indicators that are generic enough to be effective at various levels.

49.   Lack of appreciation of the usefulness of monitoring and evaluation results leads to low demand, so awareness becomes crucial. While the supply side (e.g. training, manuals, etc.) is necessary, the demand side for results will ensure utilization. Monitoring and evaluation should then link up with the budget process, national planning, the management of institutions, and the programmes to be appreciated, supported and sustained.

Capacity-building

50.   Ensuring continuity requires capacity to be built for undertaking monitoring and evaluation and utilizing results. The creation of robust data systems and procedures for sharing information and reporting involves capacity-building and the institutionalization of monitoring and evaluation systems. In introducing performance indicators, it is best to start with what is available by building on current monitoring and evaluation practices and capacities.

51.   Developing countries might experience specific challenges in implementing monitoring and evaluation systems, in terms of both creating data systems and utilizing results, which would have resource implications for setting up and maintaining monitoring and evaluation systems. Development associations – national and regional – are known to be useful vehicles for creating awareness and sharing knowledge of monitoring and evaluation. Country ownership is crucial for sustainability.

III. The technology transfer framework in detail: relating a set of candidate performance indicators to clear objectives

52.   The EGTT has followed the approach described in chapter II A to develop a set of possible performance indicators to monitor and evaluate the effectiveness of the implementation of the technology transfer framework. The results are presented below.

1. Synthesized objectives of the technology transfer framework

53.   The technology transfer framework consists of the following elements:

(a)   Key themes and areas for meaningful and effective actions, each of which is divided into definition, purpose and implementation (decision 4/CP.7, annex, paras. 3–28);

(b)   The set of actions set out in decision 3/CP.13, annex I (paras. 8–24).

54.   Taken together they express the vision of the COP regarding the key themes, from means (methods to achieve objectives) or ends (achievement of objectives) or a combination at any point along the continuum from ends to means (impacts, outcomes, outputs, processes and inputs). This vision needs to be rendered in less abstract intentions and objectives, in order to create a proposed list of objectives indicating the Parties/organization/group responsible for the objective and the characteristics of the time frame of the objective.

55.   The next step is to identify overlaps in the objectives and to combine similar intentions or objectives of the different parts of the technology transfer framework, in order to produce synthesized objectives (box 1). For each of the synthesized objectives one or more indicators have been suggested at this stage.

Box 1. List of the synthesized objectives derived from the technology transfer framework

The synthesized objectives derived from the technology transfer framework are listed below for each key theme except 'Mechanisms for technology transfer'.[a]

Technology needs and needs assessments
1. To undertake technology needs assessments (TNAs);
2. To provide resources;
3. To build capacity;
4. To update and to disseminate the TNA handbook;[b]
5. To make available information on the TNAs;
6. To implement the results of technology needs (identified in TNAs);
7. To share lessons learned, success stories, good practices;
8. To consider the synthesis report;
9. To organize a meeting to identify TNA methodologies;
10. (to ensure that) Expert Group on Technology Transfer cooperates with the CGE.

Technology information
1. To establish a technology transfer information clearing house (TT:CLEAR);
2. To maintain, update and further develop TT:CLEAR;
3. To network with technology information centres;
4. To increase the number of users (of TT:CLEAR);
5. To built capacity;
6. To make available information through national communications.

Enabling environments
1. To enhance legal systems (including those related to trade and intellectual property rights;
2. To promote joint research and development;
3. To promote transfer of publicly owned technologies;
4. To strengthen regulatory frameworks;
5. To utilize tax preferences;
6. To integrate technology transfer into national policies;
7. To create an environment conducive for investments;
8. To explore preferential government procurement;
9. To explore transparent and efficient approval procedures;
10. To prepare technical studies for developing enhanced enabling environments;
11. To cooperate closely with public and private partnerships.

Capacity-building
1. To report on capacity-building needs and experiences for the development, deployment, diffusion and transfer of technologies of the developing country Parties;
2. To implement/support capacity-building activities for the development and transfer of technologies (DTT) in developing country Parties;
3. To establish/strengthen capacity for the DTT in institutions of developing country Parties;
4. To increase/enhance/improve awareness/knowledge on environmentally sound technologies (ESTs) in developing country Parties;
5. To provide training on ESTs in developing country Parties;
6. To develop and implement standards and regulations for ESTs.

[a] Regarding this key theme, except for the establishment of the EGTT, there are no other activities/actions for implementation in the annex to decision 4/CP.7. In annex I to decision 3/CP.13, there are four sub-themes under the key theme mechanisms for technology transfer.

[b] Gross R, Dougherty W and Kumarsingh K. 2004. *Conducting Technology Needs Assessments for Climate Change*. Available at: <http://unfccc.int/ttclear/jsp/TNAHandbook.jsp>.

2. Regrouping by stakeholder and indicator category

56.   In theory, each key stakeholder of the COP (Parties, IGOs, etc.) could have a similar policy vision on the development and transfer of technologies (with related strategic and operational goals, supported by policy instruments). Therefore the selected indicators within the context of this work will be in line with the vision and goals of each of these key stakeholders. If a key stakeholder goes beyond this common vision under the Convention, it might be necessary to use additional performance indicators to monitor and evaluate the effectiveness of their related policymaking.

57.   For the institutions and bodies within the framework of the Convention (COP, the subsidiary bodies, EGTT, etc.) it is taken for granted that the objectives and indicators are in line with what is or was feasible in terms of vision and goals at the time. This does not mean that in the recommendations of the final report no changes can be suggested (in line with Bellagio Principle 9 – ongoing assessment).

58.   It is important to regroup the suggested indicators by stakeholder, in order to identify what would be expected from each stakeholder according to the technology transfer framework. To complete the overview of performance indicators, another regrouping by indicator category (input, process, output, outcome, impact) could be presented. It could then be observed where the emphasis has been put within the technology transfer framework, from means (input, process) to ends (output, outcome, impact).

59.   These steps in the process – regrouping performance indicators by stakeholder and indicator category – have been carried by the EGTT. The list of candidate performance indicators is contained in the annex. These steps have resulted in the following number of indicators derived from the objectives as outlined by the technology transfer framework:

      (a)   20 indicators for the key theme technology needs and needs assessment;

      (b)   Nine indicators for the key theme technology information;

      (c)   75 indicators for the key theme enabling environments;

      (d)   34 indicators for the key theme capacity-building;

      (e)   23 indicators for the key theme mechanisms for technology transfer.

60.   Some of these indicators are no longer relevant (e.g. whether a TNA workshop was organized in 2002). Furthermore, at a later stage, it remains to be seen if it will be possible to formulate the indicators in a specific, measurable, achievable, relevant, and time-bound manner.

61.   Table 1 provides an overview of the number of indicators by category for each key theme of the technology transfer framework; it is evident that the number of indicators vary widely across the key themes.

62.   The input indicators column shows a large number of indicators for the key theme enabling environments. It is not surprising that there are so many potential indicators, since this theme is vast and covers several arenas of regulatory enforcement, trade, law, governance, and economic and fiscal policymaking. It is also related to the fact that enabling environments are inputs into and provide the impetus for technology transfer. In that sense, several of the output indicators can also be considered input indicators or process indicators, depending on how these terms are defined. Regarding the outcome indicators, it can be observed that there are little or no outcome indicators for the key themes technology needs assessments, technology information and mechanisms.

Table 1. An overview of the number of indicators by category for each key theme of the technology transfer framework

	Input indicator	Process indicator	Output indicators	Outcome indicators
Technology needs assessments	7	3	9	1
Technology information	2	4	2	1
Enabling environments	30	3	28	14
Capacity-building	6	7	11	10
Mechanisms	3	1	19	-

63.   Summarizing the regrouping by stakeholder is harder, because the identification of stakeholders under the different key themes in the technology transfer framework is diverse. There will be a need at a later stage to assign responsibilities in a unique way.

3. Considerations about the causal relationship chain, as set out in decision 4/CP.7

64.   The annex to decision 4/CP.7 provides a definition and a purpose for each of the key themes of the technology transfer framework. It will be useful to reflect on this initial overall vision for each of the key themes of the technology transfer framework, as it is a starting point for looking at the causal relationship chain.

65.   The final set of key indicators needs to target priorities as expressed by the existing vision and the actual formulated objectives. A chain of causality needs to be developed and discussed, linking impacts, outcome and output with objectives. When there is no clear causal relationship, feedback could be given for adjusting vision and objectives for the long term.

66.   Taking these considerations into account goals have been derived from the definition and the purpose of decision 4/CP.7 (box 2).

Technology needs and needs assessments

67.   It can be observed that in the definition in decision 4/CP.7 the focus is mainly on Parties not included in Annex II to the Convention (non-Annex II Parties), with input from Annex II Parties, IGOs and the secretariat. A causal relationship chain can be designed from this input through process to output and outcome.

68.   However, the link between output (a TNA) and outcome (TNA technologies implemented) is rather weak. This is one of the reasons why in decision 3/CP.13 under the key theme mechanisms, the sub-theme innovative options for financing has been formulated.

Technology information

69.   From the definition in decision 4/CP.7 it is clear that the focus is on the means that serve to establish an efficient information system. Furthermore, it can be concluded from the objectives in the technology transfer framework that the main responsibility is with the secretariat to operationalize the information system, and not directly with the Parties, IGOs or other stakeholders. However, since Parties direct the actions and activities of the UNFCCC, there is a necessary interrelationship. Therefore, it presents a challenge to see whether a system for monitoring and evaluating the performance of the technology information component can be set up without targeting the stakeholders. It is from these stakeholders (Parties, IGOs) that the institutions and bodies within the framework of the Convention (COP, subsidiary bodies, EGTT, secretariat) expect inputs.

70.   Taking these considerations into account a causal relationship chain could be envisaged with related indicators for the stakeholders within the framework of the Convention (COP, subsidiary bodies, EGTT, secretariat) and for the stakeholder IGOs and Parties.

71.   The overall quality and efficiency check, as reflected in the purpose in decision 4/CP.7 (paragraph 9), could be monitored and evaluated through the indicator "(yearly) report with information on maintaining, updating and developing TT:CLEAR, addressing gaps and user needs" (see process indicators under key theme technology information in the annex).

Box 2. Goals derived from the annex to decision 4/CP.7

Technology needs and needs assessments
A set of country-driven activities to identify and determine the mitigation and adaptation technology priorities of Parties not included in Annex II to the Convention (non-Annex II Parties).

Technology information
Generation and flow of, access to and quality of technical, economic, environmental and regulatory information.

Enabling environments
Government actions, such as fair trade policies, removal of technical, legal and administrative barriers to technology transfer, sound economic policy, regulatory frameworks and transparency, to create an environment conducive to private- and public-sector technology transfer.

Identification and removal of barriers at each stage of the process.

Capacity-building
Process to build, develop, strengthen, enhance and improve existing scientific and technical skills, capabilities and institutions in non-Annex II Parties, to enable them to assess, adapt, manage and develop environmentally sound technologies.

To strengthen capacities of non-Annex II Parties to promote the widespread dissemination, application and development of environmentally sound technologies.

Mechanisms for technology transfer
To facilitate the support of financial, institutional and methodological activities.

Enabling environments

72.   From the goal formulated in box 2, it is clear that the focus is on government actions, all of which create an environment conducive to private- and public-sector technology transfer. Furthermore, it can be concluded from the objectives in the technology transfer framework that the main responsibility is with the Parties and not with the IGOs, the secretariat or the other stakeholders. A long list of indicators can be linked to a complex causal relationship web. It remains to be seen whether and how a simple system for monitoring and evaluating the performance of the enabling environments can be set up.

73.   It is imperative that this long list of indicators be narrowed down to a smaller subset of useful and measurable indicators. Most of the outcome indicators measure volume of technology transfer, either in terms of numbers of technologies or dollar value. It may not always be feasible or possible to

separate out the various modes of technology transfer. In addition, measuring governance within a country – as indicated by degree of political and economic freedom, for instance – is in itself a complex task with six sub-indicators (e.g. World Bank's country governance indicators) involved. The same goes for measuring the degree of business friendliness (as measured by the World Bank's business environment indicators).

Capacity-building

74.   From the goal formulated in box 2, it is clear that the focus is on strengthening the capabilities in non-Annex II Parties, through the support of existing scientific and technical skills, capabilities and institutions. Furthermore, it can be concluded from the objectives in the technology transfer framework that the responsibility is with various stakeholders.

75.   Regarding the set of indicators derived from the objectives in the technology transfer framework, the following remarks can be made:

    (a)   There are objectives which could be moved to other key themes (e.g. objectives relating to TNA reports could be moved to the theme of technology needs and needs assessment and those relating to standards and regulations could be moved to enabling environments);

    (b)   There are various outcome indicators relating to the improved adoption of energy efficiency and renewable energy technologies, and to adaptation projects or the adoption of development and transfer technologies in general that can be merged into one indicator.

Mechanisms for technology transfer

76.   From decision 4/CP.7 and decision 3/CP.13, it is clear that the objective of the mechanisms theme is to mobilize and integrate the other four sub-themes[24] to operationalize the framework by facilitating the support of financial, institutional and methodological activities. In the technology transfer framework, there is a reference to the establishment of the EGTT as an institutional arrangement for technology transfer.

4. Check against earlier proposals

77.   Document FCCC/SBI/2008/MISC.1 and Add.1 contains proposals from Parties of possible performance indicators, which are summarized in document FCCC/SBI/2008/7. A review of these performance indicators revealed that they:

    (a)   Are included in the list of candidate performance indicators and will be checked later against specific, measurable, achievable, relevant and time-bound criteria;

    (b)   Target the very short term;

    (c)   Emphasize a number of (new) objectives;

    (d)   Need to be rendered in clearly formulated separate objectives.

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[24] Innovative options for financing the development and transfer of technologies; possible ways and means to enhance cooperation with relevant conventions and intergovernmental processes; promotion of endogenous development of technology through provision of financial resources and joint research and development; promotion of collaborative research and development on technologies.

78.   It is clear that later in the process a check against indicators already proposed through experiences within and outside the Convention could help to finalize the set of performance indicators.

<div align="center">5. <u>Linking with the analysis of financial flows</u></div>

79.   In the terms of reference for this work on performance indicators, it is requested that an analysis of possible influences of financial flows for supporting the development and transfer of technologies be included. There is a more comprehensive effort under way to document financial flows that are advancing technology transfer, on which this exercise will be built at a later stage.

IV. Preliminary findings, proposals and next steps

A. Preliminary findings and proposals

80.   This section summarizes the initial selection of performance indicators for the five key themes, taken from the list of candidate performance indicators (annex) derived from the objectives stipulated in the technology transfer framework. These performance indicators will be subject to testing against specific, measurable, achievable, relevant and time-bound criteria (including methodological sheets) during the next phase of this exercise and therefore could be modified, based on the results of this testing stage.

Technology needs and needs assessments

The following six indicators have been selected:

(a)   Amount of financial resources provided for the TNA process (expressed in United States dollars per Annex II Party and in total);

(b)   Number of programmes/projects for capacity-building on TNAs in non-Annex I Parties per Annex II Party, per IGO and in total;

(c)   Number of targeted non-Annex I Parties (including percentage of least developed countries) per Annex II Party and per IGO;

(d)   Number of published TNAs completed or updated by non-Annex I Parties;

(e)   Synthesis report made available by the secretariat and discussed at the subsidiary bodies;

(f)   Number of technologies from TNAs implemented by non-Annex I Parties.

Technology information

The following five indicators have been selected:

(a)   Number of training programmes and workshops for building capacity;

(b)   Number of national communications with information on technology transfer activities;

(c)   Number of reports with information on maintaining, updating and developing TT:CLEAR, addressing gaps and user needs;

(d)   Number of technology information centres and networks connected to TT:CLEAR;

(e)   Number of users of TT:CLEAR from developing countries.

Enabling environments

81.   The enabling environment theme of the technology transfer framework is vast, essentially encompassing every other theme of the technology transfer framework (and beyond); this resulted in the formulation of many performance indicators.

82.   The goal derived from the definition and purpose in decision 4/CP.7 focuses on government actions, but indicators based purely on these kind of actions would not be sufficient for monitoring and evaluating within this context; the technology transfer framework is more nuanced than that, assigning specific roles to particular governments, as well as leaving room for private-sector actions. Thus, a balanced set of indicators needs to be identified that could capture these complex relationships.

83.   The initial selection of a limited set of performance indicators from the long list (see annex) was guided by the following considerations:

(a)   It is important to cover all 11 synthesized objectives, which means that from the long list of indicators at least one indicator for each synthesized objective should be selected;

(b)   When proceeding with the selection, international accepted indicators should have priority, indicators should correspond as closely as possible to the synthesized objective and indicators could be aggregated to reflect the importance of the synthesized objective.

84.   This results in reducing the number of performance indicators to the following 12:

(a)   Performance on each of the six World Bank's governance indicators (can be done for one country, a selection of countries or an entire region);

(b)   Total volume (number and dollar value) of joint research and development opportunities for environmentally sound technologies (ESTs) by governments;

(c)   Presence of clear policy guidelines to the recipients of public funding on how to move from research and development stage to commercialization stage of technologies;

(d)   Number of bilateral or multilateral programmes that have helped developing countries develop and implement regulations promoting the use, transfer of and access to ESTs;

(e)   Presence of tax preferences and incentives on imports/exports for ESTs;

(f)   Volume (in United States dollars) of export credits to encourage the transfer of ESTs;

(g)   Presence of EST transfer in national (sustainable development) strategies;

(h)   Rating of investment climate according to World Bank's World Business Environment Survey;[25]

(i)   Percentage of government procurement budget spent on ESTs;

(j)   Degree of disclosure and transparency regarding the approval processes;

(k)   Counting and rating the studies carried out that explore barriers, good practices and recommendations for developing enhanced enabling environments (co-authorship from developed and developing country perspectives, co-authorship from government and industry representatives);

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[25] <http://info.worldbank.org/governance/wbes/>.

(l)   Percentage of participation of developing country Parties in partnerships.

Capacity-building

85.   Monitoring and evaluation of capacity-building, consistent with the framework for capacity-building in developing countries (capacity-building framework), is also being considered under the Convention. This framework has been reviewed and presents performance indicators at the three levels of human, institutional and systemic capacity. The capacity-building framework has been taken into account when selecting the following initial list of indicators (technology transfer is part of the scope of the capacity-building framework):

(a)   Amount of financial inputs (scholarships, institutional financing, technical assistance) by developed countries into capacity-building for development and transfer of technology in developing countries;

(b)   Reported needs and agreed priorities for capacity-building for development and transfer of technology;

(c)   Number of participants/experts in training programmes on the development and transfer of technologies, in particular on the development of standards and regulations;

(d)   Number of new and existing national and regional institutions, operating as centres of excellence, on the development and transfer of technologies.

Mechanisms for technology transfer

86.   The same approach has been followed to present an initial list of performance indicators for the sub-themes of the mechanisms key theme. Taking the objectives into account suggested performance indicators are shown in table 2.

Table 2. Performance indicators by sub-theme

Sub-theme	Performance indicators
Innovative options for financing the development and transfer of technologies	Number and volume (in United States dollars) of reported innovative public–private financing mechanisms and instruments in total and by Party
Possible ways and means to enhance cooperation with relevant conventions and intergovernmental processes	Report on the possible ways to enhance cooperation between the UNFCCC and other multilateral environmental agreements (MEAs)
	Report on the references to objectives of other MEAs in national communications
Promotion of endogenous development of technology through provision of financial resources and joint research and development (R&D)	Number of reported barriers and good experiences in total and by non-Annex I Party
Promotion of collaborative R&D on technologies	Report with guidance for technology needs assessment reporting on joint R&D needs

87.   It has also been suggested that indicators be developed and tested that relate to the essence of the goal of the key theme mechanisms as reflected in the definition of 4/CP.7 "to facilitate the support of

financial, institutional and methodological activities". The first step in this work would include an analysis of influences of financial flows.

88. Most of the priorities formulated by Parties in the submissions referred to in paragraph 77 above, are covered in the list of performance indicators.

89. Later on, when the methodological sheets are being developed, it will be important to see how the different key elements are linked and how this can be reflected in the objectives and by the indicators. A check against the framework in figure 2 will be important.

B. Next steps

90. The information contained in this report will also be presented at a side event to be organized by the EGTT at COP 14. The second interim report would contain the outcomes of task 2 of this work (test the set of performance indicators) and will be made available for consideration by the subsidiary bodies at their thirtieth sessions.

91. The EGTT discussed the contribution this work on performance indicators could possibly provide to the work under the AWG-LCA on matters relating to "measurable, reportable and verifiable", as referred to in paragraph 1 (b) (ii) of the Bali Action Plan. The group noted that a workshop on paragraph 1 (b) (i) and 1 (b) (ii) of the Bali Action Plan will be organized at AWG-LCA 5 and that discussions on the concept of measurable, reportable and verifiable are still at an early stage.

92. Taking into account the methodological approach described in this report, the following observations about possible common elements can be made:

(a)   The performance indicators will be formulated in a specific, measurable, achievable, relevant and time-bound manner;

(b)   A methodological sheet will be developed for each performance indicator in order to be reportable and verifiable.

93. The EGTT will further explore how experiences and lessons learned on developing performance indicators could contribute or relate to ongoing work on the concept of measurable, reportable and verifiable under the AWG-LCA.

<div align="center">Annex</div>

List of candidate performance indicators

Below a list of candidate performance indicators is provided. This list is the result of the step-by-step exercise referred to in chapter III of this document; each of the indicators is linked to an objective in the technology transfer framework. The indicators are presented taking into account the different categories. Next to each indicator the targeted stakeholder is mentioned in parenthesis.

Technology needs and needs assessment

Input indicators:
- Amount of financial resources provided for the technology needs assessments (TNA) process (expressed in United States dollars (USD) per Party included in Annex II to the Convention (Annex II Party) and in total) (Annex II Parties);
- Number of programmes/projects per Annex II Party and in total (Annex II Parties);
- Number of targeted Parties not included in Annex I to the Convention (non-Annex I Parties) by Annex II Parties, including percentage of least developed countries (Annex II Parties);
- Number of programmes/projects per organization and in total (intergovernmental organizations (IGOs));
- Number of targeted non-Annex I Parties by organizations, including percentage of least developed countries (IGOs);
- A meeting to identify TNA methodologies (yes/no) (UNFCCC);
- Number of meetings per year between the expert groups (UNFCCC).

Process indicators:
- Number of reports on lessons learned (IGOs);
- Synthesis report on good practice (yes/no) (IGOs);
- Number of workshops on lessons learned (IGOs).

Output indicators:
- Updated handbook[1] available in English by 2009 (yes/no) (IGOs);
- Updated handbook available in the six official United Nations languages (IGOs);
- Number of handbooks disseminated through downloads and hard copies (IGOs);
- Number of handbooks disseminated per United Nations region (IGOs);
- Synthesis report each x years available (yes/no) (UNFCCC);
- Number of concrete joined programmes/projects per year between the expert groups (UNFCCC);
- Number of TNAs completed by non-Annex I Parties (non-Annex I Parties);
- Number of TNAs publicly available (non-Annex I Parties);
- Number of technology needs in total and per (sub-)sector (evolution in time) (non-Annex I Parties).

Outcome indicator:
- Number of technology needs implemented (non-Annex I Parties).

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[1] Gross R, Dougherty W and Kumarsingh K. 2004. *Conducting Technology Needs Assessments for Climate Change*. Available at: <http://unfccc.int/ttclear/jsp/TNAHandbook.jsp>.

Technology information

Within the context of the technology information key theme only the secretariat is identified as a stakeholder. However, according to the formulated objectives the secretariat would be expected to collaborate or coordinate with Parties and their national and regional technology centres, relevant United Nations agencies and other international organizations and institutions, and the Expert Group on Technology Transfer (EGTT), the Climate Technology Initiative and the private sector.

Input indicators:
- Number of training programmes and workshops;
- Number of national communications with information on technology transfer activities.

Process indicators:
- To organize an expert workshop (yes/no);
- To provide a report (yes/no);
- Number of reports with information on maintaining, updating and developing TT:CLEAR, addressing gaps and user needs;
- Reports on the pilot project on TT:CLEAR.

Output indicator:
- TT:CLEAR has been established (yes/no);
- Number of technology information centres and networks connected to TT:CLEAR.

Outcome indicator:
- Number of users of TT:CLEAR from developing countries.

Enabling environments

Input indicators
- Existence of directory/list of environmentally sound technology (EST) vendors (yes/no) (all Parties);
- Existence of law incentivizing or mandating government agencies to procure carbon–mitigating (e.g. energy efficiency) appliances and other ESTs (yes/no) (all Parties);
- Rate of participation in bulk purchasing of carbon-mitigating technology projects sponsored by the Global Environment Facility or other international agencies (all Parties);
- Total volume (number and dollar value) of joint research and development (R&D) opportunities listed on TT:CLEAR by governments (all Parties, particularly developed country Parties);
- Total volume (number and dollar value) of joint R&D opportunities listed on TT:CLEAR by firms (all Parties, particularly developed country Parties);
- Number of government agencies that regularly access and utilize TT:CLEAR or similar databases as a primary source of information on joint R&D opportunities (all Parties);
- Number of firms that regularly access and utilize TT:CLEAR or similar databases as a primary source of information on joint R&D opportunities (all Parties and the private sector);
- Presence of clearly defined procedures, steps, and terms of participation on TT:CLEAR for joint R&D activities (yes/no) (all Parties);

- Number of national and sub-national systems of innovation that have established linkages with organizations that focus on research, development, and deployment (all Parties);
- Presence of adequate intellectual property protection as judged through qualitative surveys of private industry that might act as potential provider of eligible ESTs (all Parties);
- Number of studies produced exploring barriers, good practices and recommendations for developing enhanced enabling environments (UNFCCC and relevant international organizations);
- Number of such studies with co-authorship from developed and developing country perspectives (UNFCCC and relevant international organizations);
- Number of such studies with co-authorship from government and industry representatives (UNFCCC and relevant international organizations);
- Number of distinct partnerships operating in the country that focus on improving enabling environments for ESTs (all Parties);
- Percent participation in partnerships from developing country Parties (all Parties);
- Value of incentives provided to encourage private firms to sponsor the development of expertise in developing countries (all Parties);
- Number and sources of financing for subsidies for covering risk associated with the development and transfer of ESTs (all Parties);
- Presence of 'smart' subsidy schemes that encourage the private sector to co-finance new and potentially risky investments in ESTs (yes/no) (all Parties);
- Performance on each of the six World Bank's Governance Indicators (can be done for one country, a selection of countries or an entire region) (all Parties, particularly developed country Parties);
- Whether patent, trademark, copyright, and other intellectual property laws are in compliance with World Trade Organization (WTO) TRIPS (Trade Related aspects of Intellectual Property Rights) (yes/no) (all Parties, particularly developed country Parties);
- Whether – and the extent to which – intellectual property right protection laws are actually enforced (developing country Parties);
- Presence of trade policies in compliance with WTO agreements that promote the transfer of ESTs (yes/no) (all Parties, particularly developed country Parties);
- Presence of laws that restrict the transfer of publicly owned technologies (yes/no) (all Parties, particularly developed country Parties);
- Number of countries that explicitly list EST as a sub–category in publicly funded R&D programmes (all Parties, particularly developed country Parties);
- Annual public funding invested in R&D for ESTs (all Parties, particularly developed country Parties);
- Presence of clear policy guidelines to the recipients of public funding on how to move from the R&D stage to commercialization stage of technologies (yes/no) (all Parties, particularly developed country Parties);
- Presence of government support for moving ESTs from the R&D phase into the commercialization phase (all Parties, particularly developed country Parties);
- Percentage of publicly funded technologies available to private industry to license and sell (all Parties, particularly developed country Parties);
- Number of bilateral or multilateral programmes that have helped developing countries develop and implement regulations promoting the use, transfer of, and access to ESTs (all Parties, particularly developed country Parties);
- Existence of policies for preferentially transferring ESTs with publicly held patents (yes/no) (developed country Parties).

Output indicators:
- Total volume (number and dollar value) of joint R&D programmes for ESTs in which governments are participating (all Parties);
- Total volume (number and dollar value) of joint R&D programs for ESTs in which private firms are participating (all Parties);
- Number of vendors from which the government procures that manufacture ESTs (all Parties);
- Percentage of government procurement budget spent on ESTs (all Parties);
- Rating of investment climate according to the World Bank's World Business Environment Survey[2] (all Parties);
- Number of annual technical conferences and meetings on ESTs bringing private sector and government together (all Parties);
- Number of patents registered annually for ESTs (all Parties, particularly developed country Parties);
- Number of patent licensing agreements that have allowed the transfer of ESTs (all Parties, particularly developed country Parties);
- Percent of publicly funded R&D programmes that have established linkages with industry (all Parties, particularly developed country Parties);
- Participation rates by private firms in publicly funded programmes supporting ESTs (all Parties, particularly developed country Parties);
- Presence of policies or guidelines that require the adoption of adaptation and mitigation technologies that have taken into account developing country circumstances (all Parties, particularly developed country Parties);
- Number of domestic carbon emissions limiting policies (overall) (all Parties, particularly developed country Parties);
- Presence of low carbon emissions transportation fuel standards (yes/no) (all Parties, particularly developed country Parties);
- Presence of vehicle fuel efficiency standards (yes/no) (all Parties, particularly developed country Parties);
- Presence of renewable electricity portfolio standard (yes/no) (all Parties, particularly developed country Parties);
- Presence of policy incentives for renewable energy generators, such as renewable electricity portfolio standard, lower interest rates for financing, preferential buy-back tariffs, etc. (yes/no) (all Parties, particularly developed country Parties);
- Presence of policy incentives for renewable energy or energy efficiency customers, such as tax rebates, staggered payments for upfront cost, etc. (yes/no) (all Parties, particularly developed country Parties);
- Presence of standards for industrial energy efficiency (yes/no) (all Parties, particularly developed country Parties);
- Presence of voluntary energy efficiency and labelling programmes (yes/no) (all Parties, particularly developed country Parties);
- Presence of tax preferences on imports for low-carbon goods and services;
- Presence of tax incentives for domestically produced low-carbon goods and services (including differential preferences based on carbon benefit) (all Parties, particularly developed country Parties);
- Presence and number of mentions of EST transfer in the objective statement of national R&D policies (all Parties, particularly developed country Parties);

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[2] <http://info.worldbank.org/governance/wbes/>.

- Presence and number of mentions of EST transfer in the objective statement of national environmental policies (all Parties, particularly developed country Parties);
- Number of annual technical conferences and meetings on ESTs bringing private sector and government together (all Parties, particularly developed country Parties);
- Presence and number of mentions of EST transfer in the objective statement of national R&D policies (all Parties, particularly developed country Parties);
- Presence of export credit programmes to encourage the transfer of ESTs (developed country Parties);
- Number of export credit agencies that facilitate and promote the transfer of ESTs (developed country Parties);
- Presence of policies or guidelines that require the adoption of adaptation and mitigation technologies that have taken into account developing country circumstances (developing country Parties).

Outcome indicators
- Total volume (number and dollar value) of ESTs transferred as a result of joint R&D programmes (all Parties);
- Total volume (number and dollar value) of ESTs transferred as a result of TT: CLEAR or similar databases (all Parties);
- Reduced vulnerability to climate change impacts (all Parties);
- Total volume (number and dollar value) of ESTs transferred through government procurement (all Parties);
- Total volume (number and dollar value) of technology transfer projects conducted by government-related institutions (all Parties);
- Market share of ESTs in comparison with similar products as a result of government procurement programmes (all Parties);
- Total volume (number and dollar value) of ESTs transferred as a result of partnerships (all Parties);
- Total volume (number and dollar value) of ESTs transferred through private-sector investment (all Parties);
- Total volume (number and dollar value) of ESTs transferred through trade agreements (all Parties, in particularly developed country Parties);
- Total volume (number and dollar value) of ESTs transferred through licensing agreements (all Parties, in particularly developed country Parties);
- Total volume (number and dollar value) of publicly funded ESTs transferred (all Parties, in particularly developed country Parties);
- Volume (number and dollar value) of technologies transferred as a result of policies and incentives detailed above (all Parties, in particularly developed country Parties);
- Total volume (number and dollar value) of publicly owned ESTs transferred on preferential terms or licensing agreements (developed country Parties);
- Total volume (number and dollar value) of ESTs transferred out of the country annually with assistance from export credit programmes or tax preferences (developed country Parties).

Process indicators
- Average length of approval process associated with technology transfer projects (all Parties);
- Degree of disclosure and transparency about approval processes (would require establishing a rating system) (all Parties);

- Number of agencies from which approval is needed (measure of difficulty) (all Parties).

Capacity-building

Input indicators
- Reports on capacity-building needs and success factors (UNFCCC, IGOs, non-Annex II Parties);
- Finance/technical assistance provided for training (amount) (developed country Parties);
- Number of scholarships provided (developed country Parties);
- Number of seminars/workshops organized (UNFCCC, IGOs);
- Finance/technical assistance for awareness (amount) (UNFCCC, IGOs);
- Amount of support for capacity to develop standards and regulations (developed country Parties).

Process indicators
- Number of supported capacity-building activities for ESTs in developing country Parties (UNFCCC, IGOs);
- Number of supported new national and regional institutions for the development and transfer of technologies (developed and developing country Parties);
- Number of supported existing/established institutions for the development and transfer of technologies (developed and developing country Parties);
- Number of expert exchanges and cooperative research programmes to developing countries institutions (all Parties, IGOs);
- Reports on financial institutions and ESTs (UNFCCC, IGOs, developed country Parties);
- Number of supported awareness campaigns on energy efficiency and renewable energy technologies (IGOs, UNFCCC);
- Number of provided trainings for TNAs, adoption, installation and operation and maintenance of ESTs (training opportunities e.g. workshops) (IGOs, UNFCCC, developed and developing country Parties).

Output indicators
- Number of institutions on the development and transfer of technologies established in developing countries (national, sectoral, regional) (IGOs, developed and developing country Parties);
- Number of institutions on the development and transfer of technologies supported (by developed country Parties) (developed and developing country Parties);
- Number of participants of exchange programmes from developing countries (developed and developing country Parties);
- Number of participants of cooperative research programmes undertaken with developing countries institutions/participants (developed and developing country Parties);
- Number of participants from developing countries attending seminars/training/workshops (developed and developing country Parties);
- List of agreed priorities for capacity-building for the development and transfer of technologies for developing countries (reported) (UNFCCC, IGOs, developing country Parties);
- Number of successfully implemented capacity-building activities in developing countries (UNFCCC, developed and developing country Parties);
- Number of awareness programmes on financial flows (UNFCCC, all Parties, IGOs);

- Number of parties developing energy efficiency and renewable energy projects (developed and developing country Parties, IGOs);
- Trained participants from developing countries on TNA and the adoption, installation, operation and maintenance of ESTs (developing and developed country Parties, UNFCCC);
- Capacity for developing standards and regulations for ESTs in place (developing country Parties).

Outcome indicator
- Number of Parties in international cooperation on the development and transfer of technologies (all Parties);
- Number of development and transfer activities in developing countries (developing and developed country Parties);
- Number of effective systematic observation centres (developing country Parties);
- Number of adaptation projects implemented in developing countries (developing country Parties);
- Number of applications of development and transfer financing by developing country Parties (all Parties);
- Number of energy efficiency and renewable energy technology related projects implemented by developing country Parties (all Parties);
- Number of TNAs reports submitted (UNFCCC);
- Number of ESTs projects developed, implemented and sustained (developing country Parties);
- Number of adopted adaptation projects in developing countries (developing country Parties);
- Level of awareness of energy efficiency and renewable energy technology projects (all Parties).

Mechanisms for technology transfer

Regarding this key theme, except for the establishment of the EGTT, there are no other activities/actions for implementation in the annex to 4/CP.7. In the annex to 3/CP.13, there are four sub-themes under the key theme mechanisms.

Sub-theme 1: Innovative options for financing the development and transfer of technologies

Process indicators
- Yearly revised coaching and training programme (in total and per international organization) (relevant international organizations and initiatives)

Output indicators
- Number of disseminated UNFCCC practitioners' guides[3] (per language) (UNFCCC);
- The guide posted on TT:CLEAR (yes/no) (UNFCCC);
- Report on tools for the promotion of success stories (EGTT);
- Number of reported innovative public–private financing mechanisms and instruments in total and by Party (Parties);

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[3] UNFCCC. 2006. *Preparing and Presenting Proposals: A Guidebook on Preparing Technology Transfer Projects for Financing*.

- Establishment/institutionalization of a multi-stakeholder forum for dialogue (yes/no) (Parties);
- Reports on the dialogue (Parties);
- Report on the implementation of key theme mechanisms (EGTT).

Sub-theme 2: Possible ways and means to enhance cooperation with relevant conventions and intergovernmental processes

Output indicator
- Report on the possible ways to enhance cooperation between the UNFCCC and other multilateral environmental agreements (EGTT);
- Report on synergy with other intergovernmental processes (EGTT);
- Report with clear objectives for cooperation (EGTT);
- Report on the references to objectives of other multilateral environmental agreements in national communications (UNFCCC).

Sub-theme 3: Promotion of endogenous development of technology through provision of financial resources and joint research and development

Input indicator
- Number of lessons learned on TT:CLEAR (Parties)

Output indicator
- Number of reported barriers in total and by non-Annex I Party (non-Annex I Parties);
- Number of good experiences in total and by non-Annex I Party (non-Annex I Parties);
- Report with options for encouraging the setting up of institutions leading to the development of endogenous technologies (EGTT);
- Yearly report on endogenous technology development (EGTT).

Sub-theme 4: Promotion of collaborative research and development on technologies

Input indicator
- Report with guidance for TNA reporting on joint R&D needs (EGTT);
- Report indicating opportunities for reporting joint R&D agreements (EGTT).

Output indicator
- Report with information on supported R&D activities by intergovernmental and international organizations (UNFCCC);
- Report with options for promoting regional research platforms (EGTT);
- Number of stocktaking papers on status, opportunities and needs for further R&D (EGTT);
- Number of research programmes to address climate-friendly technologies and to promote investment in climate change (Parties).

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