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**Item 4 of the provisional agenda**  
Development and transfer of technologies

**SUBSIDIARY BODY FOR IMPLEMENTATION**  
Thirty-first session  
Copenhagen, 7–18 December 2009\*

**Item 7 of the provisional agenda**  
Development and transfer of technologies

**Performance indicators to monitor and evaluate the effectiveness of the  
implementation of the technology transfer framework**

**Final report by the Chair of the Expert Group on Technology Transfer\*\***

*Summary*

This document provides an executive summary of the final report by the Chair of the Expert Group on Technology Transfer on performance indicators to monitor and evaluate the effectiveness of the implementation of the technology transfer framework (FCCC/SB/2009/4).

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\* Exact dates within the sessional period are subject to confirmation.

\*\* This document was submitted after the due date owing to the need for further consultations.

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## Executive summary

### A. Background

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<sup>1</sup>), taking into consideration related work under the Convention.
2. The overall objective of this work was 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. The work on this matter was divided into three tasks:
  - (a) Task I: develop a set of candidate performance indicators;
  - (b) Task II: test the set of performance indicators;
  - (c) Task III: prepare recommendations for using the indicators.
3. The final report presents a set of 40 performance indicators, the results of their testing and the results of task III, including:
  - (a) Recommendations based on the outcomes of tasks I and II and the consideration of the outcomes of other relevant activities (including a list of indicators, the methodology and data sheets used and examples of how the indicators are used);
  - (b) Analysis of possible linkages of this work with other relevant work under the Subsidiary Body for Scientific and Technological Advice (SBSTA), the SBI and the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA).

### B. Methodology

4. For the task of monitoring and evaluating past and present performance in the implementation of the technology transfer framework, it is essential to develop a set of performance indicators that are aligned with the framework's defined objectives. A systematic and coherent approach to linking objectives and indicators has been taken, so that decision makers can consider the relevance and appropriateness of the objectives and the related activities being monitored and evaluated.
5. The EGTT has followed a participative design process to develop a set of possible performance indicators to monitor and evaluate the effectiveness of the implementation of the technology transfer framework. The involvement of the stakeholders, i.e. the constituent groups of the UNFCCC, has been crucial for creating a sense of ownership. Another key element of this approach is the causal relationships that need to be taken into account when designing a set of performance indicators. The figure below illustrates the relationships between the needs of society as reflected by the stakeholders, the policymaking process, the evaluation of the policy and the effects of policy on society.

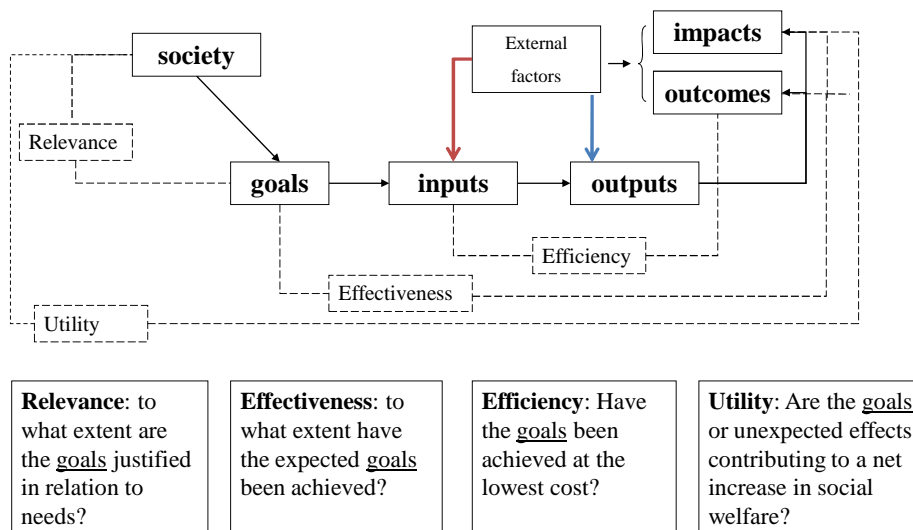
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<sup>1</sup> Contained in decision 4/CP.7, annex, complemented with the set of actions set out in decision 3/CP.13, annex I.

6. Monitoring and evaluating the effectiveness of the implementation of the technology transfer framework, as intended by this work, aims to understand the extent to which the expected objectives have been achieved. Thus a chain of causality needed to be developed that links objectives of the framework with impacts, outcomes and outputs. The performance indicators will measure means (i.e. methods to achieve objectives), ends (i.e. achievement of objectives) or a combination at any point along the continuum (inputs, processes, outputs, outcomes and impacts).

7. The set of indicators will target priorities as expressed by the existing vision and the formulated objectives. When the causal relationship is not clear, this should be clarified to assist the SBI in evaluating the effectiveness of the technology transfer framework. When there is no clear causal relationship, feedback could be given for adjusting the vision and objectives for the long term.

### Framework for monitoring and evaluating the effects of policies



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

Note: The “goals” in this figure are equal to the vision, including the objectives, expressed in the technology transfer framework.

## C. Major findings and recommendations

### 1. General observations

8. The participative design process that was used for developing and testing the performance indicators resulted in the following major findings, which confirm the findings of similar activities undertaken within and outside the Convention:

- (a) The process of developing and testing performance indicators is on a learning curve;
- (b) It is important that any performance indicators used to monitor and evaluate the effectiveness of the implementation of the technology transfer framework are designed to analyse causal relationships – in other words, to what extent observed changes can be attributed to technology transfer policies or measures;

- (c) The performance indicators need to be formulated in a specific, measurable, achievable, relevant and time-bound (SMART) manner;
- (d) The major constraint in using performance indicators is the availability of data;
- (e) The involvement of stakeholders<sup>2</sup> in the process of developing and testing indicators is important for creating a sense of ownership in the final result among those who are involved in carrying out activities and actions under the technology transfer framework;
- (f) Capacity-building is needed at both the national level and the international level for operating a monitoring and evaluation system, including data systems and procedures for sharing and reporting information.

9. Although the formulation of the performance indicators was relatively easy for some key themes (technology needs, technology information and mechanisms) of the technology transfer framework, it could be observed that other key themes (enabling environments and capacity-building) are vast, essentially encompassing every other theme of the technology transfer framework and beyond, which resulted in the formulation of either a large number of indicators (in the case of enabling environments) or indicators that are highly aggregated (in the case of capacity-building).

10. During task I, a set of 161 possible performance indicators was identified. From this, 40 indicators were identified as a possible subset to measure the implementation of the technology transfer framework under the Convention (see box below). Within this group, indicators were assessed according to the feasibility of collecting the required data and to their relevance to the synthesized objectives of the technology transfer framework.

11. The integrity of the technology transfer framework, as reflected by the synthesized objectives, has been respected in identifying this limited set of performance indicators. It should be noted that the selection is indicative and does not prejudice any post-2012 arrangement.

## 2. Data availability

12. In order to set up a system for monitoring and evaluating the effectiveness of the implementation of the technology transfer framework, the data required for quantifying specific performance indicators will need to be obtained. Preparatory work undertaken during the testing period indicated that many of the data required for the initially selected indicators are currently not available, and that further work on data collection may be needed (the sources of data required for each indicator are given in the annex). This may require coordination between the secretariat and relevant intergovernmental organizations (IGOs) and other international organizations to ensure that data are provided regularly to support the monitoring and evaluation.

13. Furthermore, lessons learned from the work of the EGTT suggest that a template may be needed to facilitate reporting in national communications so that the data required from Parties for specific performance indicators are received.

14. The timeline for obtaining data for the different performance indicators could range from one to three years or more (the provision of data by Parties not included in Annex I to the Convention (non-Annex I Parties) may depend on the timing of their national communications).

15. Considering that many of the data required are currently not available, that substantial effort and resources would probably be needed to obtain the data and that developing templates to facilitate reporting in national communications has proved challenging in the past, it might be an option to reduce the number of performance indicators to include only those that can be easily determined with the data available. This could be done through further testing of the indicators. It would mean,

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<sup>2</sup> Within the context of the Convention, this includes Parties and admitted organizations.

however, that only part of the technology transfer framework would be covered by performance indicators.

### 3. Financial flows

16. Country-level data are very useful for understanding the national distribution of financing for climate-friendly technologies. These data may indicate where the barriers to financing are most pronounced and may help focus capacity-building efforts and support for the creation of enabling environments. Such information is important for national policy planning (e.g. technology needs assessments (TNAs) and national adaptation programmes of action) and may assist countries in maximizing the potential for investment in climate-friendly technologies.

17. Each source of finance may be influenced by many different factors and if indicators are developed to monitor these influences, the number of performance indicators required may grow significantly. Some of the main influencing factors may be suited to the use of indicators, but there is a range of alternative evaluation techniques that may be better suited to this task. The evaluation methodologies used by the Global Environment Facility and the World Bank may provide examples to draw upon.

18. The EGTT recommends that the SBSTA and the SBI draw upon the advice within this report and the lessons learned to inform future consideration on this matter at subsequent sessions.

### 4. Potential linkages of this work with other relevant work under the subsidiary bodies

19. The SBSTA and the SBI, at their thirtieth sessions,<sup>3</sup> concluded that the set of indicators to be presented in this final report of the EGTT could be used by the SBI as one of the tools to conduct the review and assessment of the effectiveness of the implementation of Article 4, paragraphs 1(c) and 5, of the Convention, as well as to regularly monitor and evaluate the effectiveness of the implementation of the technology transfer framework.<sup>4</sup>

20. The experiences and lessons learned from the development of performance indicators by the EGTT may also contribute to the ongoing deliberations by Parties under the AWG-LCA on matters relating to the concept of ‘measurable, reportable and verifiable’ as referred to in paragraph 1 (b) (ii) of the Bali Action Plan (decision 1/CP.13). The SBSTA and the SBI invited the AWG-LCA to consider, as appropriate, the report once it is finalized.<sup>5</sup>

21. Taking into account the methodological approach described in this report, the following points from the work of the EGTT may be relevant to the deliberations by the AWG-LCA:

- (a) The performance indicators were developed as a participative design process involving key stakeholders;
- (b) The performance indicators have been formulated in a SMART manner;
- (c) A methodological sheet was developed for each performance indicator in order to ensure that any use of the indicator could be reported and verified;
- (d) The performance indicators related to finance and capacity-building might be relevant for operationalizing paragraph 1 (b) (ii) of the Bali Action Plan;
- (e) The indicator PI-TNA-06, “Number of technology programmes/projects from TNAs implemented by non-Annex I Parties”, may be relevant to nationally appropriate mitigation actions (NAMAs).

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<sup>3</sup> FCCC/SBSTA/2009/3, paragraph 24, and FCCC/SBI/2009/8, paragraph 68.

<sup>4</sup> To support this review and assessment, the SBI requested the secretariat to prepare a list of data gaps relative to the performance indicators once they are finalized (FCCC/SBI/2009/8, para. 74).

<sup>5</sup> FCCC/SBSTA/2009/3, paragraph 25, and FCCC/SBI/2009/8, paragraph 69.

22. Once the outcomes of the discussions on the concept of ‘measurable, reportable and verifiable’ under the AWG-LCA are known, the EGTT could further explore how experiences and lessons learned from developing performance indicators could contribute or relate to discussions on this matter in the future.

### Set of performance indicators for the technology transfer framework

The Expert Group on Technology Transfer initially identified the following set of 40 indicators to measure the effectiveness of the implementation of the technology transfer framework. The indicators have been grouped under the five key themes of the framework; the sixth group would be used to assess trends in financial flows for technology transfer.

#### *Technology needs and needs assessments*

1. Amount of financial resources provided for the TNA process (PI-TNA-01)<sup>a</sup>
2. Number of programmes/projects for capacity-building on TNAs in non-Annex I Parties (including percentage of least developed countries) (PI-TNA-02)
3. Number of targeted non-Annex I Parties to build capacity on TNAs (including percentage of least developed countries) (PI-TNA-03)
4. Number of published TNAs completed or updated by non-Annex I Parties (PI-TNA-04)
5. Synthesis report on technology needs made available by the secretariat and considered by the subsidiary bodies (PI-TNA-05)
6. Number of technology programmes/projects from TNAs implemented by non-Annex I Parties (PI-TNA-06)

#### *Technology information*

1. Number of training programmes and workshops for building capacity in technology information (PI-TI-01)
2. Number of national communications with information on technology transfer activities (PI-TI-02)
3. Synthesis report with information on maintaining, updating and developing TT:CLEAR, addressing gaps and user needs made available by the secretariat and considered by the subsidiary bodies (PI-TI-03)
4. Number of technology information centres and networks connected to TT:CLEAR (PI-TI-04)
5. Number of users of TT:CLEAR from developing countries (PI-TI-05)

#### *Enabling environments*

1. Performance against each of the six World Bank governance indicators (PI-EE-01)
2. Total volume of joint R&D opportunities for ESTs provided by (primarily developed country) governments (PI-EE-02)
3. Presence of clear policy guidelines for the recipients of public funding on how to move from the research stage to the commercialization stage of the technology transfer process (PI-EE-03)
4. Number of bilateral and multilateral programmes that have helped developing countries in developing and implementing regulations that promote the use and transfer of and access to ESTs (PI-EE-04)
5. Presence of tax preferences and incentives for imports/exports of ESTs (PI-EE-05)
6. Volume of export credits to encourage the transfer of ESTs (PI-EE-06)
7. Whether mention of transfer of ESTs is made in national sustainable development strategies (PI-EE-07)
8. Rating of investment climate according to World Bank business indicators (PI-EE-08)
9. Proportion of budget for public procurement of ESTs (PI-EE-09)
10. Degree of disclosure and transparency regarding the approval processes of technology transfer projects (PI-EE-10)
11. Number of technical studies that explore barriers, good practices and recommendations for enhancing enabling environments (PI-EE-11)
12. Percentage of partnerships with thematic foci on climate change and sustainable development with meaningful participation by developing country Parties (PI-EE-12)

#### *Capacity-building*

1. Amount of financial resources provided for capacity-building in the development and transfer of technology (PI-CB-01)
2. Synthesis report on national capacity needs and priorities for capacity-building for development and transfer of technologies in line with the technology transfer framework (PI-CB-02)
3. Number of participants/experts in training programmes on the development and transfer of technologies, in particular on EST-related activities (PI-CB-03)
4. Number of new and existing national and regional institutions operating as centres of excellence in the development and transfer of technology (PI-CB-04)



**Box** (continued)*Mechanisms for technology transfer*

1. Number and volume of reported innovative public–private financing mechanisms and instruments (PI-MECH-01)
2. Report on possible ways to enhance cooperation between the Convention and other multilateral environmental agreements (PI-MECH-02)
3. Report on references made in national communications to objectives of other multilateral environmental agreements (PI-MECH-03)
4. Number of reported barriers to, and good experiences in, the development of endogenous technologies (PI-MECH-04)
5. Report with guidance for reporting on joint R&D needs (PI-MECH-05)

*Indicators for financial flows*

1. Total annual global investment and financial flows in climate change mitigation technologies (PI-FIN-01)
2. Total annual global investment and financial flows in climate change adaptation technologies (PI-FIN-02)
3. Total annual investment and financial flows in climate change technologies – Convention financial mechanism (PI-FIN-03)
4. Total annual investment and financial flows in climate change technologies – Kyoto Protocol flexibility mechanisms (PI-FIN-04)
5. Total annual investment and financial flows in climate change technologies – bilateral sources (PI-FIN-05)
6. Total annual investment and financial flows in climate change technologies – national sources (PI-FIN-06)
7. Total annual investment and financial flows in climate change technologies – multilateral sources (PI-FIN-07)
8. Total annual investment and financial flows in climate change technologies – private sources (PI-FIN-08)

*Key:* COP = Conference of the Parties, ESTs = environmentally sound technologies, non-Annex I Parties = Parties not included in Annex I to the Convention, R&D = research and development, TNAs = technology needs assessments, SBI = Subsidiary Body for Implementation, SBSTA = Subsidiary Body for Scientific and Technological Advice, TT:CLEAR = the technology information clearing house.

<sup>a</sup> This is a unique code given to each performance indicator. PI = performance indicator; XXX = key theme of the technology transfer framework; YY = number of the performance indicator.

Annex

**Brief summary of the testing process for the performance indicators**

<b>Code (ID)</b>	<b>Performance indicator – name (in short)</b>	<b>Related synthesized objective</b>	<b>Data sources</b>	<b>Parties' direct involvement in providing data</b>
PI-TNA-01	Financial resources for TNAs	'to provide resources'	GEF, UNDP, UNEP	None
PI-TNA-02	Programmes/projects for capacity-building on TNAs	'to build capacity'	GEF, UNDP, UNEP	None
PI-TNA-03	Targeted non-Annex I Parties through financial support	'to build capacity'	GEF, UNDP, UNEP	None
PI-TNA-04	Published TNAs completed or updated	'to make available information on TNAs'	Secretariat, GEF, UNDP, UNEP	None
PI-TNA-05	Synthesis report on technology needs	'to consider the synthesis report'	Secretariat	None
PI-TNA-06	Technologies from TNAs implemented	'to implement the results of technology needs (identified in TNAs)'	Secretariat, GEF and implementing agencies	Non-Annex I Parties
PI-TI-01	Training programmes and workshops for building capacity in technology information	'to build capacity'	GEF, UNDP, UNEP, UNIDO	None
PI-TI-02	National communications containing information on technology transfer activities	'to make available information through national communications'	NCs	All Parties
PI-TI-03	Information on maintaining, updating and developing TT:CLEAR	'to maintain, update and further develop TT:CLEAR'	Secretariat	None
PI-TI-04	Technology information centres and networks connected to TT:CLEAR	'to network with technology information centres'	Secretariat	None
PI-TI-05	Users of TT:CLEAR from developing countries	'to increase the number of users (of TT:CLEAR)'	Secretariat	None
PI-EE-01	Performance against World Bank governance indicators	'to enhance legal systems (including those related to trade and intellectual property rights)'	World Bank and/or WIPO	None

Table (continued)

Code (ID)	Performance indicator – name (in short)	Related synthesized objective	Data sources	Parties' direct involvement in providing data
PI-EE-02	Volume of joint R&D opportunities	'to promote joint research and development	Mitigation: IEA (or consolidated via TT:CLEAR)  Adaptation: CGIAR (or consolidated via TT:CLEAR)	All Parties
PI-EE-03	Presence of clear policy guidelines to recipients of public funding on how to move from R&D to commercialization of ESTs	'to promote transfer of publicly owned technologies'	NCs	Non-Annex I Parties
PI-EE-04	Bilateral and multilateral programmes that have helped developing countries develop and implement regulations for promoting ESTs	'to strengthen regulatory frameworks'	NCs	All Parties
PI-EE-05	Presence of tax preferences and incentives on imports/exports of ESTs	'to utilize tax preferences'	NCs	Non-Annex I Parties (Annex I Parties)
PI-EE-06	Volume of export credits	'to utilize tax preferences'	NCs	Annex I Parties
PI-EE-07	Mention of transfer of EST in NSDS	'to integrate technology transfer into national policies'	UN-DESA or secretariat	None
PI-EE-08	Rating of investment climate according to World Bank business indicators	'to create an environment conducive to investment'	World Bank	None
PI-EE-09	Percentage of government procurement budget allocated to ESTs	'to explore preferential government procurement'	NCs	Non-Annex I Parties
PI-EE-10	Degree of disclosure and transparency in the approval process	'to explore transparent and efficient approval procedures'	NCs	Non-Annex I Parties

**Table** (continued)

<b>Code (ID)</b>	<b>Performance indicator – name (in short)</b>	<b>Related synthesized objective</b>	<b>Data sources</b>	<b>Parties' direct involvement in providing data</b>
PI-EE-11	Studies that explore that explore barriers, good practices and recommendations for ESTs	'to prepare technical studies on developing enhanced enabling environments'	Secretariat	None
PI-EE-12	Percentage of participation in partnerships	'to cooperate closely with public and private partnerships'	UN-DESA or secretariat	None
PI-CB-01	Financial resources for capacity-building	'to implement or support capacity-building activities for the development and transfer of technologies in developing country Parties'	Multilateral: IGOs	None
PI-CB-02	Report on needs and priorities for capacity-building	'to report on capacity-building needs and experiences of developing country Parties relating to the development, deployment, diffusion and transfer of technologies'	NCSAs, NCs, NAPAs, TNAs	Non-Annex I Parties
PI-CB-03	Participants and experts in training programmes for the development and transfer of technologies	'to provide training on ESTs in developing country Parties' and 'to develop and implement standards and regulations for ESTs'	NCSAs, NCs	Non-Annex I Parties
PI-CB-04	National and regional institutions operating as centres of excellence for the development and transfer of technologies	'to establish or strengthen capacity for the development and transfer of technologies in institutions of developing country Parties'	NCs	Non-Annex I Parties
PI-MECH-01	Innovative public-private financing mechanisms and instruments	NA, but the sub-theme is labelled 'Innovative options for financing the development and transfer of technologies'	NCs	All Parties

Table (continued)

<b>Code (ID)</b>	<b>Performance indicator – name (in short)</b>	<b>Related synthesized objective</b>	<b>Data sources</b>	<b>Parties' direct involvement in providing data</b>
PI-MECH-02	Report on cooperation between the Convention and other multilateral environmental agreements	NA, but the sub-theme is labelled 'Possible ways and means to enhance cooperation with relevant conventions and intergovernmental processes'	Secretariat	None
PI-MECH-03	Report on references to objectives of other multilateral environmental agreements	NA, but the sub-theme is labelled 'Possible ways and means to enhance cooperation with relevant conventions and intergovernmental processes'	NCs	All Parties
PI-MECH-04	Barriers to and good experiences in the development of endogenous technologies	NA, but the sub-theme is labelled 'Promotion of endogenous development of technology through the provision of financial resources and joint research and development'	NCs, NAPAs	Non-Annex I Parties, LDCs
PI-MECH-05	Report on guidance for reporting on joint R&D needs	NA, but the sub-theme is labelled 'Promotion of collaborative research and development on technologies'	Secretariat	None
PI-FIN-01	Total global - mitigation technologies	NA	Secretariat	All Parties
PI-FIN-02	Total global - adaptation technologies	NA	Secretariat	All Parties
PI-FIN-03	Convention financial mechanisms	NA	GEF, secretariat	All Parties
PI-FIN-04	Kyoto Protocol flexibility mechanisms	NA	UNEP, secretariat	All Parties
PI-FIN-05	Bilateral sources	NA	OECD	All Parties
PI-FIN-06	National sources	NA	NCs	All Parties

**Table (continued)**

<b>Code (ID)</b>	<b>Performance indicator – name (in short)</b>	<b>Related synthesized objective</b>	<b>Data sources</b>	<b>Parties' direct involvement in providing data</b>
PI-FIN-07	Multilateral sources	NA	World Bank, regional development banks, OECD	All Parties
PI-FIN-08	Private sources	NA	UNCTAD, OECD, UNEP	All Parties
<p><i>Abbreviations:</i> DTT = Development and transfer of technologies, ESTs = environmentally sound technologies, GEF = Global Environment Facility, IGOs = intergovernmental organizations, LDCs = least developed countries, NA = not applicable, NAPA = national adaptation programme of action, NCSA = national capacity self-assessment, NSDS = national sustainable development strategy, OECD = Organization for Economic Cooperation and Development, R&amp;D = research and development, TNAs = technology needs assessments, TT:CLEAR = technology information clearing house, UNCSD = United Nations Commission on Sustainable Development, UNDP = United Nations Development Programme, UNEP = United Nations Environment Programme, WIPO = World Intellectual Property Organization.</p>				

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