Major Activities and Organizations on Cleaner Production in Turkey

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Establishment of National Cleaner Production Center in Turkey
Pre-Feasibility Study

Knowledge Sharing Programme
“Policy Planning for Productivity and Sustainable Industrial Development”

KNCPC
19 October 2012, Seoul
This presentation covers the summary of the "Project of Determination of the Framework Conditions and Research-Development Needs for The Dissemination of Cleaner (Sustainable) Production Applications in Turkey" carried out by Technology Development Foundation of Turkey with consultancy provided by Middle East Technical University.
Specific objectives of this project are:

• To present **conceptual framework** of the cleaner (sustainable) production approach,
• To determine the **existing capacity** on the cleaner (sustainable) production in our country,
• To determine the existing **incentive mechanisms** so as to induce the cleaner (sustainable) production in our country,
• To evaluate the **legislation** of our country with respect to the cleaner (sustainable) production and compare with the related EU legislations,
• To define the instruments to be used for the cleaner (sustainable) production inducement,
• To develop the suggestions regarding to necessary legislative framework to be used for the inducement of the cleaner (sustainable) production,
• To determine the priority sectors for the cleaner (sustainable) production in Turkey,
• To determine the **Research-Development needs** based on the cleaner (sustainable) production in Turkey.
This project is the first national scale investigation on the:

• Capacity
• Incentives
• Resources
• Legislation
• Research and development needs
• Priority sectors
• Etc.

on Cleaner (Sustainable) Production.

This project report was published both in Turkish and English and it can be found in http://www.ttgv.org.tr/tr/temiz-uretim
The assessment presented below is based on questionnaires which were sent to 128 institutions in the context of this project as well as the project workshop.

The questionnaires contained questions related to different aspects of cleaner production such as:

- Existing human resource
- Completed or ongoing studies and projects (national, international)
- Research and development studies
- Academic studies
- Publications (project report, article, thesis, manual, etc.)
- Existing and prescribed sources
- Dissemination and informative activities
- Relevant web sites
- International contacts
- Financial supports, funds, incentives, etc. available
- Plans and targets
- Training and resource demands
A total of 66 institutions provided their feedbacks.

All information coming from institutions (including late feedbacks) have been taken into consideration.

Coming information have been investigated and the ones which are not “directly” or “indirectly” related to “cleaner production”, ”eco-efficiency” “sustainable production and consumption”, “energy efficiency”, “life cycle evaluation” and so forth concepts and tasks have not been included in the assessments.

In order to classify and reflect the information correctly, further information has been requested from some institutions via e-mail and coming information have been reflected in the assessments.

The detailed tables containing all the information provided below can be seen in http://www.ttgv.org.tr/tr/temiz-uretim.
# LIST OF STAKEHOLDERS

## PUBLIC BODIES
- Parliamentary Environment Commission
- Republic of Turkey Prime Ministry Investment Support And Promotion Agency
- Ministry of Environment and Forests
- Ministry of Industry and Trade
- Ministry of Energy and Natural Resources
- Ministry of Agriculture and Rural Affairs
- The Ministry of Public Works And Settlement
- State Planning Organization
- Undersecretariat of Treasury
- Undersecretariat of the Prime Ministry for Foreign Trade
- General Directorate of Electrical Power Resources Survey and Development Administration
- Republic of Turkey Ministry of Finance-General Directorate of Budget and Fiscal Control
- General Directorate of State Hydraulic Works
- İzmir Development Agency
- Çukurova Development Agency
- KOSGEB (Small and Medium Enterprises Development Organization)
- National Productivity Centre
- TÜBİTAK (The Scientific and Technological Research Council of Turkey)
- TÜBİTAK-Marmara Research Center (Environment and Energy Institute)
- TSI (Turkish Standards Institution)
- Municipal Union of Turkey

## UNIVERSITIES
- Akdeniz University, Faculty of Engineering
- Aksaray University, Faculty of Engineering
- Gebze Institute of Technology
- Anadolu University
- Atatürk University
- Balıkesir University
- Boğaziçi University
- Boğaziçi University Sustainable Development and Cleaner Production Practices and Research Center
- Canakkale 19 Mart University
- Çukurova University
- Cumhuriyet University
- Dokuz Eylül University
- Erciyes University
- Firat University
- Hacettepe University
- Harran University
- İstanbul Technical University
- İstanbul University Faculty of Engineering
- Kocaeli University
- Marmara University
- Mersin University
- Namık Kemal University
- Middle East Technical University
- Pamukkale University
- Sakarya University
- Süleyman Demirel University
- Selçuk University
- Uludağ University
- Trakya University
- Yıldız Teknik University
- Zonguldak Karadeniz University
- Yüzüncü Yıl University
- 19 Mayıs University

## ASSOCIATIONS, CHAMBERS AND ORGANIZED INDUSTRIAL ZONES
- Turkish Industrialists' and Businessmen's Association-TİBA
- Young Businessmen Association of Turkey- TÜGİAD
- The Union of Chambers and Commodity Exchanges of Turkey- TOBB
- ABİGEM (EU Turkish Business Centres)
- Union of Chambers of Turkish Engineers and Architects - UCTEAT
- TİSK- Turkish Confederation of Employer Associations
- Adana Industry Chamber
- Ege Industry Chamber
- Eskişehir Industry Chamber
- Gaziantep Industry Chamber
- İstanbul Industry Chamber
- Ankara Industry Chamber
- Bursa Chamber of Commerce and Industry
- Kayseri Industry Chamber
- Kocaeli Industry Chamber
- Manisa Chamber of Commerce and Industry
- Mersin Tarsus Organized Industry Zone
- Mersin Chamber of Commerce and Industry
- Nigde Industry Chamber
- Ankara Industry Chamber 1. Organized Industry Zone
- Ankara Industry Chamber 2. ve 3. Organized Industry Zone
- Ostim Organized Industry Zone
- Ankara İvedik Organized Industry Zone
- Dilovası Organized Industry Zone
- Adana Hacı Sabancı Organized Industry Zone
- İstanbul İkitelli Organized Industry Zone
- İstanbul Dumulucu Organized Industry Zone
- İstanbul Tuzla Organized Industry Zone
- İstanbul Bevkikdüzü Organized Industry Zone
- Chambers of Geology Engineering
- İstanbul Chamber of Commerce
- Konya Chamber of Industry
- Chamber of Mechanical Engineers
- Antalya Chamber of Commerce and Industry
<table>
<thead>
<tr>
<th>SECTORAL UNIONS/ASSOCIATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkish Foundrymen’s Association</td>
</tr>
<tr>
<td>Turkish Cement Manufacturers’ Association-TCMA</td>
</tr>
<tr>
<td>Turkish Ceramics Federation</td>
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<tr>
<td>Ceramic Research Center</td>
</tr>
<tr>
<td>ABTI - Brick and Tile Manufacturers Association</td>
</tr>
<tr>
<td>The Glass, Cement and Clay Products Industry Employers’ Association of Turkey</td>
</tr>
<tr>
<td>Turkish Iron &amp; Steel Producers Association</td>
</tr>
<tr>
<td>TKSD - Turkish Chemical Manufacturers Association</td>
</tr>
<tr>
<td>KIPLAS - The Chemicals, Petroleum, Rubber and Plastics Industry Employers’ Association of Turkey</td>
</tr>
<tr>
<td>Pharmaceutical and Chemical Industry Research and Development Foundation</td>
</tr>
<tr>
<td>MESS - Turkish Employers’ Association of Metal Industries</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INTERNATIONAL ORG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Nations Development Programme (UNDP)</td>
</tr>
<tr>
<td>United Nations Industrial Development Organization (UNIDO)</td>
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<tr>
<td>The GEF Small Grants Programme</td>
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<table>
<thead>
<tr>
<th>NON-GOVERNMENTAL ORG.</th>
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</thead>
<tbody>
<tr>
<td>Greenpeace Akdeniz</td>
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<tr>
<td>WWF Turkey</td>
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<tr>
<td>Regional Environmental Center (REC-Turkey)</td>
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<tr>
<td>Business Council for Sustainable Development Turkey</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>MEDIA/PRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTV</td>
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<tr>
<td>Newsweek Türkiye</td>
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<tr>
<td>Küresel Ana Haber</td>
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<tr>
<td>Habertürk</td>
</tr>
<tr>
<td>Enerji ve Kojenerasyon Dünyası</td>
</tr>
<tr>
<td>Enerji Dergisi</td>
</tr>
<tr>
<td>Global Enerji Dergisi</td>
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<tr>
<td>Su ve Çevre</td>
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<tr>
<th>BANKS</th>
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<tbody>
<tr>
<td>Development Bank of Turkey</td>
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<tr>
<td>Industrial Development Bank of Turkey</td>
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<tr>
<th>OTHERS</th>
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</thead>
<tbody>
<tr>
<td>British Embassy</td>
</tr>
<tr>
<td>Yabaş Engineering</td>
</tr>
<tr>
<td>Optima Engineering</td>
</tr>
<tr>
<td>OTOKAR</td>
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<tr>
<td>Gent University</td>
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</tbody>
</table>
Based on the responses received to questionnaires from 66 institutions as well as the direct feedback received during the workshop of the project, two tables were prepared. Namely:

- STUDIES, SOURCES, INCENTIVES, PLANS AND DEMANDS ON CLEANER (SUSTAINABLE) PRODUCTION (45 pages)
- RESEARCH, RESOURCES, INCENTIVES, PLANS AND NEEDS IN FIELDS OF ENERGY EFFICIENCY AND RENEWABLE/CLEAN ENERGY (29 pages)

These tables included all the information submitted as a response to questionnaires and personal feedback during the workshop. All the relevant information was included in the project report.

The project workshop was conducted on 29 December 2009 with 125 participants from 62 institutions. The participants provided their feedback to the report which were then incorporated in the final project report.
## Sample Pages from the Annex Tables

### PUBLIC BODIES

#### Supported Projects:
- TUBITAK 1001 - Medium Sized Enterprises
- EU CIP-EIP Pro 2012

#### Research Studies:
- Cleaner Products
- Increasing Environmental Sensitivity
- Interaction between Eco-Efficiency in Enterprises (2007)
- Possible Effects
- Green Efficiency
- Environmental Safety

### Dissemination and Information Activities
- Education including world applications of which subject is "Environmental Sensitive Production: Eco-efficiency" regarding to Industrialists
- Radio programs which raise awareness on eco-efficiency
- Publications about the subject in printed and visual press

### Current and Proposed Sources
- Technical Support
- Consultant Support
- Related Specialist on the subject
- Literature studies prepared related specialists

### Plans and Targets
- Supporting the establishment of National Eco-efficiency Centre
- Providing generalization of the environmental sensitive applications such as eco-efficiency-cleaner production in industry for the development of the efficiency and competition
- Supporting the awareness studies on the eco-efficiency subject

### Education and Source Demands
- Collaboration with the related national and international stakeholders and education of the related specialists working on Eco-efficiency/Cleaner Production

### Web Site: [http://mpm.org.tr/ekovenmililik/](http://mpm.org.tr/ekovenmililik/)
<table>
<thead>
<tr>
<th>Studies and Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Environmental Technologies: Waste Management Conference” April, 20, 2009</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Environmental Management System Guidance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Provided Incentives and Financial Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>• There is support to the Centre for the establishment of the Bogazici University Sustainable Development and Cleaner Production Centre.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plans and Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>• In order to protect ecological balance; carry out studies to provide effective usage of energy and raw material, minimize the waste, recycle waste as possible as, reuse and suitable discharge of them, prefer environmental friendly production and product.</td>
</tr>
<tr>
<td>• Endeavoring for development and application of environmental friendly technologies, voluntary environment management systems and environmental standards, incentive of the SMEs to use cleaner technologies and prefer environmental friendly production and product, supporting the researches and development studies carried out on these subjects.</td>
</tr>
</tbody>
</table>

**Web Site:** [www.iso.org.tr](http://www.iso.org.tr) /*Our Environmental Activities*/

<table>
<thead>
<tr>
<th>Studies and Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Applications providing savings in Istanbul Chamber of Commerce and work processes (water saving; incentive for recycling of paper-plastics-glass, paper saving) (these savings shall be measurable and after these precautions one measurement institution will be authorized and provided savings will be determined.)</td>
</tr>
<tr>
<td>Sectors</td>
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<tr>
<td>---------</td>
</tr>
<tr>
<td><strong>Studies and Projects</strong></td>
</tr>
<tr>
<td>• Increasing Alternative Oil Consumption (Waste oil, tire, plastic, paint slush, contaminated waste, biosolid, etc.)</td>
</tr>
<tr>
<td>• Increasing Alternative Material Usage (Cinder, volatile ash of thermal plant, trass, limestone, chemical additives increasing cement strength and cement production)</td>
</tr>
<tr>
<td>• Emission and Air Quality of Cement Factory</td>
</tr>
<tr>
<td>• Making Cement Examination and CE Certification</td>
</tr>
<tr>
<td>• Studies on incentive of cement way usage</td>
</tr>
<tr>
<td><strong>Publications</strong></td>
</tr>
<tr>
<td>• Sustainable Cement Production (CEMBUREAU) (Translation and publication by TCMB)</td>
</tr>
<tr>
<td>• Trasses and Cement with trass</td>
</tr>
<tr>
<td>• Usage of the Solid Waste originated Oils in Cement and Concrete Kiln</td>
</tr>
<tr>
<td>• Cinder and Cement with cinder</td>
</tr>
<tr>
<td>• Sustainable Cement Production- Processing Alternative Oil and Raw material in European Cement Industry</td>
</tr>
<tr>
<td>• TCMB 3rd International Sustainability in Cement and Concrete Volume 1, Volume 2</td>
</tr>
<tr>
<td><strong>Dissemination and Information Activities</strong></td>
</tr>
<tr>
<td>• Environmental Permanent Committee Meetings</td>
</tr>
<tr>
<td>• Climate Change Permanent Committee Meetings</td>
</tr>
<tr>
<td>• II. Cement Industry Environment Declaration between TCMB and Ministry of Environment and Forestry</td>
</tr>
<tr>
<td>• Cooperation Protocol regarding to Usage of Waste as Alternative Oil in Cement Industry between Ministry of Environment and Forestry and Turkish Cement Manufacturers’ Association</td>
</tr>
<tr>
<td>• Trainings, scientific meetings, symposiums and conferences related to sectors</td>
</tr>
</tbody>
</table>
Summary of the Results

Evaluation of the Existing Capacity in Turkey

There is a very limited number of capacity building activities conducted on cleaner production with nationwide activity, covering different sectors, enterprise scales, stakeholders, etc.

Capacity building activities along with other measures will help all the stakeholders including the industry to realize the related benefits and thus accelerate the adoption process.

The Eco-Efficiency (Cleaner Production) Program carried out by TTGV between 2008-2011, in the context of the United Nations Joint Program, Enhancing the Capacity of Turkey to Adapt to Climate Change, is an important step towards capacity building in our country. The cleaner (sustainable) production capacity built through this program may provide many services directly or through universities, accredited consulting firms, etc. to all the stakeholders in Turkey.

The difference between the end-of-pipe approaches and cleaner (sustainable) production is not clearly known by many stakeholders. This is a very solid indication that the priority should be given to capacity building activities in Turkey.
There exists notable human resources in almost all the institutions which responded to the questionnaire. However, most of these experts possess education and expertise in “environmental” sector, and do not have formal training and/or experience in cleaner (sustainable) production.

When the universities are considered, several of our universities starting with Middle East Technical University, Bogazici University, Hacettepe University, and Istanbul Technical University have activities on the subject. However, the existing capacity based on quantitative performance criteria (publications in Citation Index journals, Research and Development, implementation and consulting projects, technology development and patent applications, etc.) is far from being sufficient to the needs of the country.

A limited number projects have been implemented in public institutions on the subject. Most of these projects were not carried out directly to enhance the cleaner (sustainable) production capacity in the country. They were implemented to comply with some commitments regarding international agreements, adoption to EU, etc. and mainly by international consultants. Thus, they did not create a significant capacity.
However, even though it is not systematic and nation-wide, the limited capacity created through these projects in some public institutions (MOIST, MOEU, MOPWS, DGP (former NPC), TUBITAK, KOSGEB, IZKA) should be used in future activities in Turkey. The competencies of the institutions (environment, industry, infrastructure, productivity, R&D, SME’s, etc.) and their networks should be used with effective and systematic coordination as well as planning.

The organized industrial zones and the chamber of industries in Turkey have a limited understanding of the subject. Most of their related activities aim EU adoption, health and safety issues, environmental management systems, etc. and lack an integrated vision.

There are many NGOs working on the environmental issues in Turkey, however they do not possess a significant capacity on Cleaner (Sustainable) Production.

Some sectoral organizations (e.g. cement, food) conduct some activities on the subject mainly through EU adoption process.
Evaluation of the Existing Legislation in Turkey

When the existing legislation on the subject in Turkey is evaluated, it is observed that the concepts related with cleaner (sustainable) production are frequently cited. Moreover, it is indicated that development of cleaner technologies, approaches, etc. is a need. However, Turkey does have a framework legislation which directly addresses the cleaner (sustainable) production.

The Ministry of Environment and Urbanization published the Integrated Pollution Prevention and Control (IPPC) Regulation for the textile sector on 14 December 2011. This is the first mandatory legislation related to cleaner production in Turkey. It is a very important development since it is foreseen that similar IPPC regulations will be developed and applied to other industrial sectors in the near future.

While the National Program of Turkey for the Adoption of the EU Legislation is considered, it is foreseen that the adoption regarding environmental legislation will be mostly completed in the years to follow. It is of imperative importance to take the sustainable consumption and production action plan of EU as an example. This is critical in terms of taking into consideration all of the integrated parts of this action plan such as eco-labeling and eco-design along with life cycle assessment, the regulations of which are not put into force in our country yet.
Development of a framework legislation similar to the Energy Efficiency Law in our country or the legislation in other countries on cleaner (sustainable) production is very important.

Meanwhile, it is very important to inform our industry about the best available techniques (BAT) and its reference documents (BREF) defined in the EU’s IPPC Directive which is being adopted to Turkish legislation. This should be done with active involvement of all the stakeholders through the use BREF’s as well as other related sectoral guides, handbooks, etc.
Evaluation of the Existing Incentive Mechanisms in Turkey

The incentive mechanisms available in Turkey, for cleaner (sustainable) production are quite limited and not even comparable to those in EU, in terms of variety and amount.

However, incentives for general purposes which have not been used for cleaner (sustainable) production so far, are assumed to be applicable in time, as the interest towards cleaner (sustainable) production increases in Turkey.

Especially bank loans for industry stress renewable energy and energy efficiency concepts recently. Even though there are some developments about providing SME’s with loans for small investments, it is believed that SME’s might have difficulty in accessing to the loans for cleaner (sustainable) production investments. This is mainly due to the assurance requirements, high interest rates, etc.
Possibilities of proper agreements and cooperation between TUBITAK, TTGV, and KOSGEB which already provide different supports in the area of energy efficiency, should be explored in terms of setting up specific funding programs for cleaner (sustainable) production projects.

The EU funds available for Turkey (EU accession funds, ISPA, SAPARD and PHARE, as well as CIP/EIP and FP 7) present a very important potential for future cleaner (sustainable) production activities in Turkey.
Evaluation of Sectoral Priorities

The sub-sectors of the manufacturing industry in our country are subjected to prioritization for cleaner (sustainable) production practices. The parameters used in this prioritization are water and energy consumption, amount of wastewater discharged, amount of solid waste and hazardous waste generated, air emissions, sectoral employment, export share and eligibility for cleaner (sustainable) production.

This prioritization is accomplished via Multi-Criteria Decision Making Method (MCDM) with the usage of recent available data and by taking feedback from the relevant institutions and organizations.

According to the results of this study, the top ten high priority industrial sectors are
1. basic metal industry,
2. food products and beverages,
3. chemicals and chemical products,
4. other non-metallic mineral products,
5. textile products,
Evaluation of Sectoral Priorities

6. coke and refined petroleum products and nuclear fuel production,
7. motor vehicles, trailers and semi-trailer manufacturing, machinery and
equipment manufacturing not elsewhere classified,
8. clothing manufacturing,
9. metal goods,
10. manufacture of electrical machinery and apparatus industries.

To perform a more precise and a more detailed prioritization for these sectors, an analysis with more data sets is required. However, as it is, this study which is based on the use of the most recent and available data and the feedback of relevant stakeholders, forms a basis for;

- Prioritization of industrial sectors of our country based for cleaner (sustainable) production activities,
- Providing an important input to the relevant policies that will be developed in future
- Similar studies that will be done with a more comprehensive data sets and feedback of stakeholder institutions/ organizations.
Evaluation of the Research and Development and Other Needs (Selected Examples)

Repeating the capacity and needs assessment and sectoral priorities assessment performed in this Project on a regional, sectoral, scale, etc. basis for the entire country with a wider stakeholder list

Implementation of demonstration and eco-innovation projects with different tools and strategies of cleaner (sustainable) production in companies from high priority sectors to form examples of efficient resource utilization and pollution prevention

Conducting case studies to reveal financial revenues of cleaner (sustainable) production

Conducting in-depth research on innovative cleaner (sustainable) production applications and products in high priority sectors

Formation of the databases for the application of specific cleaner (sustainable) production tools in Turkey
Establishing the necessary infrastructure necessary for environmental performance assessment studies in different sectors

Determination of the Best Available Techniques for cleaner (sustainable) production applications on a sectoral basis

Adoption of life cycle assessment as a tool of decision making in industry

Investigating the substitution potential of hazardous chemicals with non-hazardous equivalents in industry

Conducting research on bio-energy and bio-products formation from wastes

Conducting research and development activities on the potential application of industrial symbiosis concept in Turkey

Investigation and development of alternative financial models used in cleaner (sustainable) production suitable to the conditions of Turkey

Conducting “train the trainer” programs on cleaner (sustainable) production
All the needs were categorized based on the below chart
### Table 8.1. Policy Reforms

<table>
<thead>
<tr>
<th>1.</th>
<th>The need based on the Project Report / Suggested Activity</th>
<th>Proposed Relevant Institution(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>A policy on production project with below suggested activity</td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>A road maintenance and forest projects</td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>The roles must be distributed</td>
<td></td>
</tr>
</tbody>
</table>

### Table 8.2. Financial Mechanisms

<table>
<thead>
<tr>
<th>2.</th>
<th>The need based on the Project Report / Suggested Activity</th>
<th>Proposed Relevant Institution(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>To initiate the attempts to make sure that the Eco-Efficiency Center which will be established as one of the outputs of the Eco-Efficiency Program funded by UNIDO and carried out by TTGV is supported by all the stakeholders after the establishment period. Furthermore, invest in sources and needed capacities, provide technical industry, provide information, conduct a lead transfer, provide funding. Similar to the energy financial support to audits to determine important.</td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td>Alternative financial mechanism suitable to be investigated and developed</td>
<td></td>
</tr>
</tbody>
</table>

### Table 8.3. Information Networks

<table>
<thead>
<tr>
<th>3.</th>
<th>The need based on the Project Report / Suggested Activity</th>
<th>Proposed Relevant Institution(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>In relevance to the cleaner (sustainable) production applications mentioned in Section 7.5.1. the Best Available Techniques for cleaner (sustainable) production applications on a sectoral basis should be determined and made available through formation of a database.</td>
<td>MOEF, Universities, Sectoral Institutions, Efficiency Centers, etc.</td>
</tr>
<tr>
<td>3.2</td>
<td>Through the network of the Eco-Efficiency Center</td>
<td></td>
</tr>
</tbody>
</table>

### Table 8.4. Capacity Building

<table>
<thead>
<tr>
<th>5.</th>
<th>The need based on the Project Report</th>
<th>Proposed Relevant Institution(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>The Eco-Efficiency Center which will be established as one of the outputs of the Eco-Efficiency Program funded by UNIDO and carried out by TTGV, should be enabled to implement capacity building activities on nation-wide basis. The Center has to be active in cleaner (sustainable) technology development as well.</td>
<td>MOEF, MOIT, TTGV, UNIDO Eco-efficiency Program Advisory Board, Eco-Efficiency Centers, etc.</td>
</tr>
<tr>
<td>5.2</td>
<td>The capacity and related needs assessment performed in Section 3 of this Report should be repeated on a regional, sectoral, etc. basis for the entire country with a wider stakeholder list.</td>
<td>MOEF, MOIT, all other related institutions.</td>
</tr>
<tr>
<td>5.3</td>
<td>“Educate-the-educator” programs on cleaner (sustainable) production should be conducted.</td>
<td>MOEF, MOIT, Universities, etc.</td>
</tr>
</tbody>
</table>
| 5.4    | Demonstration and eco-innovation projects with different tools and strategies of cleaner (sustainable) production in companies from high priority sectors to form examples of efficient resource utilization and pollution prevention should be implemented. | MOIT, KOSGEB, Chamber of Industries, Sectoral Institutions, TTGV, NPC, Eco-
THANK YOU

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