UNEP

Application of the Sustainability Assessment of Technologies Methodology: Guidance Manual

United Nations Environment Programme

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Preface / Foreword

There has been a significant development of the paradigm of sustainability through various global deliberations and conferences over the past years. However, the dominant system of decision making in technology selection for development has focused on economic considerations and tends to disassociate social and environmental factors. Policy makers and stakeholders increasingly recognized that there is a need to take environmental and social concerns into account on decision making for investments. This led to the promotion of Environmentally Sound Technologies (ESTs) in the context of sustainability. Highlighted within the Agenda 21 at the United Nations Conference on Environment and Development (UNCED) in 1992, many initiatives have developed. ESTs include technologies for cleaner production processes, pollution prevention, end-of-pipe and monitoring technologies. ESTs function as total 'systems' that include knowledge and skills, as well as organizational and managerial procedures.

The world has also witnessed the rapid development of the Technology Assessment (TA) framework. TA is a process of assessing and evaluating environmental technologies to facilitate identification and selection of the best technology option.

The International Environmental Technology Centre (IETC) of the United Nations Environment Programme (UNEP) accordingly initiated the development of a methodology for the Environmental Technology Assessment (EnTA). EnTA is a systematic procedure whereby a proposed technology intervention is described and appraised in terms of its potential influence on the environment, implications for sustainable development and the likely cultural and socio-economic consequences.

Later, IETC transformed the EnTA methodology into a Sustainability Assessment of Technologies (SAT), with further improvements, including a focus on process and outcome and more attention to informed and participatory decision making. It was developed through an elaborate process of research and consultations with experts. This methodology has been used extensively in the field and the present guidance manual was developed based on feedback from various stakeholders, including policy makers and practitioners. The guidance manual also includes detailed case studies that show applications of the SAT methodology in different sectors and at different levels of decision making.

The SAT methodology is expected to be used by a diverse group of stakeholders in different situations and at various levels for strategic decision making. The methodology can also be applied at the operational level – primarily by the technical/engineering staff, designers, and consultants – to assess alternate technology systems.

This manual incorporates the SAT methodology for both strategic and operational level assessments while enabling it to be applied in any or all scenarios in the context of sustainable socio-economic development. SAT methodology can be adapted to the specific parameters and constraints of each country. Integration of economic, social and environmental considerations ensures resource efficiency and social acceptability. Hence, for policy makers, Governments and financial institutions, the methodology can be used with the objective of

strategic planning and policy making, and assessing projects for funding. For operating communities and enterprises, it can be used for assessment and comparison of collective alternative technologies.

This manual may also be of interest to interested parties/organizations supporting decision-makers on applying SAT methodology. These application areas may include:

- Environment and health related programs;
- Provision of basic infrastructure such as roads, power, water etc.
- Bio-diversity management;
- Land remediation/reclamation;
- End-of pipe water and waste management;
- Water and waste recycling programs;
- Process technology modernization at shop floors and at industrial clusters.

There were many steps involved to produce this guidance manual. Much effort went in to produce the SAT methodology through collaboration with internal and external partners. IETC, with the Environmental Management Centre (EMC) of India led by Dr. Prasad Modak, finalized the methodology through intensive expert-reviewed workshops. Later, IETC used the SAT methodology in its projects in water management and waste management sectors, involving various local and national partners such as Governments, academia, technical institutes and private sectors. Some of these projects were used as case studies for preparing this guidance. IETC also developed training materials on the SAT methodology and provided intensive training to partners and stakeholders. Based on the training feedback, this guidance manual was developed to accelerate the capacity building progress on SAT methodology.

This manual is intended to serve as a living document. Practitioners and policy makers are encouraged to provide feedback, which will be incorporated into the next edition. The coming edition will also have case studies from the beneficiaries of this manual. Therefore, we ask all policy makers and practitioners to actively send us case studies involving technology selection based on SAT methodology.

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List of Abbreviations

%	Percent
3Rs	Reduce, reuse and recycle
AHP	Analytic hierarchy process
Amp	Amperes
BDT	Bangladesh taka
BIMA	Biogas induced mixing arrangement
C/B ratio	Cost to benefit ratio
CDM	Clean Development Mechanism
CDMA	Chennai Metropolitan Development Authority
CERs	Certified emission reductions
CH_4	Methane
CLRI	Central Leather Research Institute
cm	Centimeters
CO	Carbon monoxide
CO_2	Carbon dioxide
DS	District Secretariat
EnTA	Environmental Technology Assessment
EST	Environmentally Sound Technology
ft	Feet
GEC	Global Environment Centre Foundation
GI	Galvanized iron
H	Height
H_2	Hydrogen
H_2S	Hydrogen sulphide
ha/h	Hectares per hour
HP	Horsepower
IETC	International Environmental Technology Centre
IOOI	Input-Output-Outcome-Impact
IRR	Internal rate of return
IWMS	Integrated waste management schemes
Kcal	Kilocalories
Kg	Kilograms
kg/ha	Kilograms per hectare
kg/hr-m^2	Kilograms per hour per square metre
kW	Kilowatt
kWe	Kilowatt electrical