

Guide on Green Technology Needs Assessment and Appropriate Policy Tools

ESCWA project “Building Capacities in Developing Appropriate Green Technologies for Improving the Livelihood of Rural Communities in the ESCWA Region”

Economic And Social Commission For Western Asia

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Context

Appropriate green technologies

Appropriate

- Meet local needs,
- Maximize the use of human labor rather than machines,
- Exploit local resources thus minimizing transport needs,
- Strengthen resilience against external economic changes,
- Contribute to building local skill base which reduces external dependency.

Green

- Conserve natural resources,
- Limit negative environmental impact.

Context

Project approach

“By adopting AGETs to enhance productivity of the income generating activities in rural productive sectors, the technologies will be in tune with market forces and local communities will play an active role in contributing to the financing of these technologies”.

Introduction



Introduction

Sustainable economic development in rural areas is based on the efficiency of utilization of resources through appropriate green technologies (AGT) that address the limitations of resource availability.

The most essential of resources is **energy** which under many forms is at the heart of all **production processes**.

AGT implementation is sustainable if it generates additional “value” to rural businesses. Therefore any viable adoption of AGTs such as renewable energy technologies (RET) depends on the sustainability of the energy usage, from the level of individual production processes, up to the level of the value chain.

Guide on Green Technology Needs Assessment and Appropriate Policy Tools



Guide

Objective

Success and extent of implementation of AGT initiatives depend on economic dynamism of local SMEs, supported by sustainable energy practitioners and policy makers.

The objective of the guide is to assist

- Rural development practitioners on assessing green energy needs of rural productive businesses,
- Policy makers on using policy tools to promote a favorable environment for the dissemination of AGTs.

Guide

Guide structure

The guide is divided into three parts:

1. First part focuses on practical implementation of AGTs, and includes case studies,
2. Second part focuses on policy implementation,
3. Third part provides technical guidance on AGTs/RET.

Part 1 – Implementing AGTs

When a product moves from raw material to the final consumer, it goes through a “value chain”, a network of businesses with complementary skills. Each business in the value chain takes as input an intermediate product and adds value to it while consuming energy and other resources.

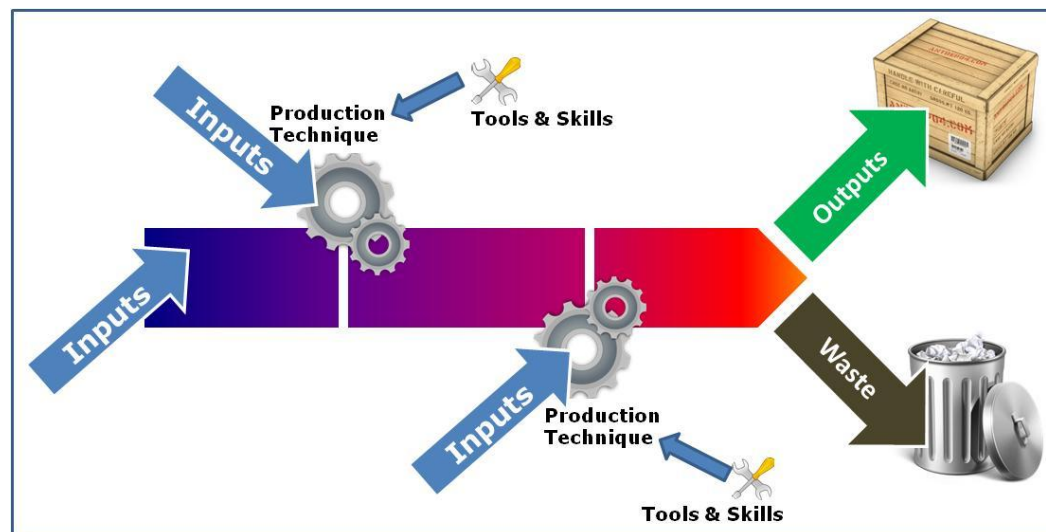
The implementation of AGTs is based on an “energy assessment”, a systematic overview of the energy flow across both (1) the small-scale production system of specific businesses, and (2) at the large-scale of the value chain.

Guide

Part 1 – Implementing AGTs

A- Mapping energy flows through the production process (energy audit). The main steps involved are:

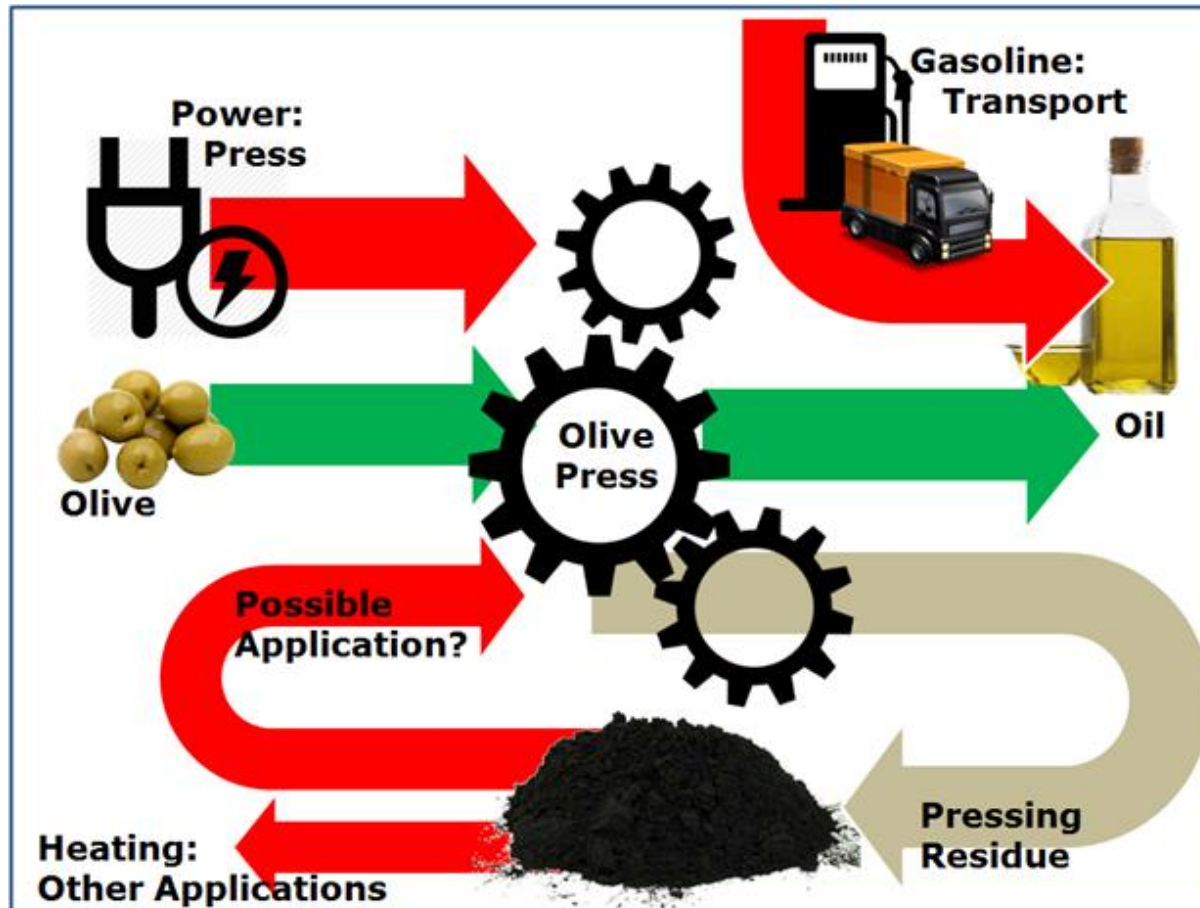
- How and where energy enters the system,
- Where energy goes and how it is used, taking into consideration temporal variances,
- How it can be used more effectively or efficiently.



Guide

Part 1 – Implementing AGTs

B- Mapping energy flows through the value chain.



Part 1 – Implementing AGTs

The main steps involved are:

- Verifying the sustainability of the entire value chain, to ensure it can be maintained in the long run.
- Identifying “Energy Management Opportunities” (EMO) in the interaction between the businesses of the value chain.
- Ensure that there are no “net negatives”, in the sense that any process changes do not undermine existing business relationships.

Part 2 – Appropriate policy tools

Enabling AGT/RET requires a policy environment with dual objective:

- Help overcome barriers to RET,
- Promote an enabling environment for RET.

Policy tools have 3 main elements:

1. Technical perspective, focused on a clear vision of **actively promoting sustainable energy and AGTs** in a context that **facilitates access to the wider market**,
2. Managerial perspective, designed to promote local engagement and **stabilize power equilibriums** among stakeholders.
3. Financial perspective **to facilitate financing and financial management** (short term upfront costs and long term maintenance expenses).

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Part 2 – Appropriate policy tools

A. Policy on promoting sustainable energy

Policy options should be designed to take into account the objective of development, which is directly linked to energy. Policy options for the promotion of AGTs/RET would focus on measures to help address issues that can be best dealt with at the scale of the local community. Those measures are related to:

1. Energy production (individual or RESCO)
2. Waste management (waste reduction or waste to energy)
3. The need for new skills, training and enhanced awareness to manage RET, and understand their usefulness and limitations.
4. Account for unforeseeable side-effects of new technology implementation in the rural context.

Guide

Part 2 – Appropriate policy tools

B. Policy implementation and sustainable local engagement

Policy implementation process should be a stepwise approach, in a collaborative framework that promotes an enabling environment.

Stable agreements between stakeholders on development road maps occur in situations where power is balanced and participation is active.

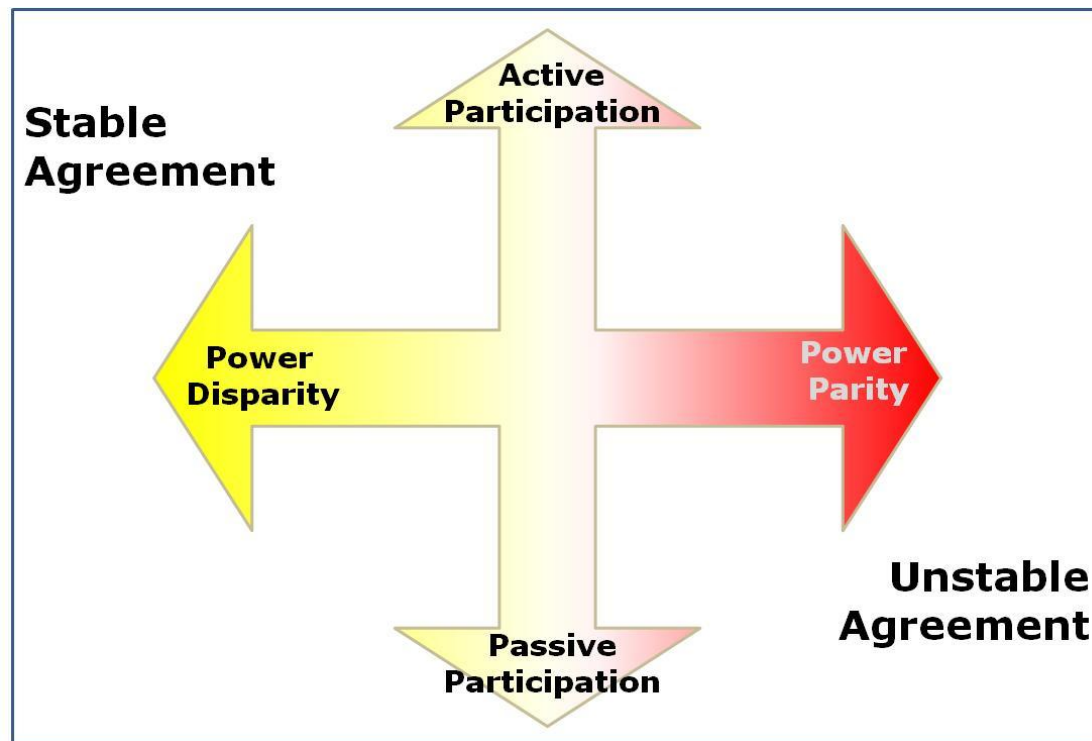
However, often this is not the case in rural areas; policies must be designed to take this into account.

Guide

Part 2 – Appropriate policy tools

B. Policy implementation and sustainable local engagement

One tool that gives guidance on how to proceed in finding stable agreement among stakeholders is the “Four Rs” framework developed by FAO and presented in the guide.



Guide

Part 2 – Appropriate policy tools

C. Policy on finance

Finance is a key element of a successful implementation of AGT/RET.

Instead of conventional banking which rarely caters to rural areas, often considered “unbankable” (i.e. not sufficiently profitable as bank customers), customers in those areas can rely on “micro-lenders” for small business purposes.

Policies should promote a form of banking that can be referred to as “social micro-lending”. This form of lending channels donor funds towards lending.



Part 3 – Technical guidance on AGT/RET

A. Types of sustainable energy solutions

Energy generation

- Power source that are **energy limited** generate a fixed amount of energy for a given production unit over a given period of time. To get more power out of the system, more units should be added (e.g. renewables)
- **Power limited** sources are more flexible; to get more energy, one can generally add more fuel (e.g. fossil fuel and biofuel generators),
- **Availability** is another factor determining the selection of an energy source (renewables are intermittent sources of power).

Guide

Part 3 – Technical guidance on AGT/RET

B. Types of sustainable energy solutions

Energy usage

The main **energy use** applications relevant for rural areas are lighting, pumping, ICT systems, as well as cooling and refrigeration.

Waste

There are cases when waste can be either (1) minimized, or (2) serve as a source of energy, such as waste to energy.

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Part 3 – Technical guidance on AGT/RET

B. Appropriate green technologies

The various technologies can be classified according to these three factors listed before. Table below summarizes characterizes different RET accordingly.

Energy Stage	Solar PV	Solar Heater	Wind Electric	Wind Pump	Small Hydro	Biogas	Conventional
Generation:							
Intermittent	✓	✓	✓	✓			
Limitation	EL	EL	EL	EL	EL	PL	PL
Availability (%)	20-30	30-40	20-40	30-40	30-40	50-60	70-90
Storage							
		✓		✓	✓	✓	✓
Use:							
Industry	✓			✓	✓	(1)	✓
Agriculture	✓			✓	✓	✓	✓
Household	✓	✓		✓	✓	(1)	✓
Waste:							
Generated						(3)	GHGs; Oil
Minimized	✓			✓	✓		
Waste-to-Energy						✓	
Skills Required	Advanced	Medium	Advanced	Basic	Advanced	Basic	Medim

- Notes:**
- (1) Requires large amounts of organic wastes of the type generated by agricultural operations.
 - (2) At the smaller scale, this can be a supplemental source of energy such as a heat pump.
 - (3) Solid sludge left over, part of which can be used as fertiliser.
 - (4) Drilling fluids, if other than non-toxic clays.
 - (5) EL: Energy Limited; PL: Power Limited.

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