

Policies and Regulations Affecting Biomass-Related Energy Sector Development in Sri Lanka

Summary

The future predictions of energy demand, limitations of hydro expansion and inadequate fossil fuel supplies in Sri Lanka suggest the requirement for a diversity of power sources in the future. It has been recognized that renewable energy (particularly biomass, hydro, wind and solar) will have an important role in meeting future energy demands. The investigation of the Sri Lankan context indicates that, nearly 47% of the present energy need is met by biomass and there is a high potential for developing the biomass energy sector to be used as commercial energy resources. Therefore, the government of Sri Lanka, public interest groups and other devel-

opment agencies have been attempting to develop this sector as part of the solution for energy security and energy independence. Consequently it is high time a biomass energy policy for Sri Lanka was put into place. This will require several investigations, surveys and a gap analysis to evaluate the current status of the biomass energy sector in order to form recommendations that can develop a biomass energy policy for the country. The main objective of this policy brief is to discuss the current status of the biomass energy sector of Sri Lanka and to lay a foundation for a process of further studies and consultations leading towards a well-integrated energy policy.

Introduction

The need for renewable energy to meet energy requirements in full or in part is created by limitations of fossil fuels and global environmental concerns. In this context, biomass-based strategies hold great promise for sustainable solutions and are presently being developed worldwide to contribute significantly to the future mix of energy sources. Plants provide a major source of organic substances to our planet, converting sunlight into chemical energy. They include relatively under-utilized forms such as cellulose, hemicelluloses, starch, lipids and lignin that have major potential for use as raw

materials for energy and industrial feedstock. A significant impact is expected from biomass energy with respect to mitigation of climate change, development of rural areas and employment options, and provision of alternative energy forms.

So as to make biomass energy a sustainable alternative, an holistic approach is needed. This includes consideration of the full biomass supply chain, the quality and quantity of biomass production, conversion of biomass into other energy forms, and management of bioenergy production systems in a sustainable manner with minimal impact on the

environment. Therefore, it is high time to look at polices, targets, strategies and practices specific to the biomass sector within the context of general energy policies of Sri Lanka.

Important areas to be considered include: existing National Energy Policy and Strategies of Sri Lanka (NEP&S), national policies of other sectors, the role of the Sri Lanka Sustainable Energy Authority (SLSEA) and the Public Utilities Commission of Sri Lanka (PUCSL), as well as the legal structure relevant to biomass and the institutional arrangements of the government organizations affecting the energy sector.

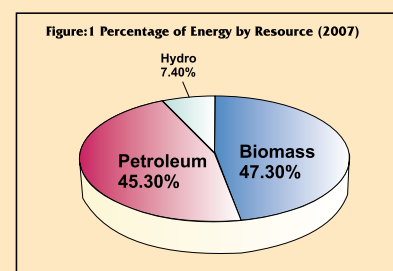
Current Status of the Sri Lankan Biomass Energy Sector

2-1. Energy supply

Sri Lanka's total energy supply is mainly based on three primary resources, namely: biomass (47.3%), petroleum (45.3%) and hydroelectricity (7.4%) [1]. Looking at the national biomass consumption, 70% is in the informal sector dominated by household cooking, small commercial and industrial applications.

Biomass use in industry is growing as a result of price increases in petroleum fuels and as a response to climate change promoting use of green energies both as a marketing tool and discharging corporate social responsibilities. A significant number of agricultural processing systems (particularly in tea processing) are switching over from oil to

biomass for thermal energy requirements. In addition to some power plants, which have been in operation for some time, using waste sugar cane from the sugar industry, one power plant rated at 1MW is already commissioned



by the private sector which is designed to use grown biomass for power generation. The government has declared 'Gliricidia Sepium', a commonly grown biomass crop in Sri Lanka, as the fourth national plantation crop following tea, rubber and coconut, and an incentive scheme is already operational to grow biomass as an under-crop in coconut plantations.

2-2. National Targets – Aspirations

There is no specific national target to increase biomass utilization. According to the NEP&S, the government will encourage commercial development of biomass as a new rural industry. Furthermore, it indicates that the government will endeavour to reach a level of 10% of grid electricity using Non-conventional Renewable Energy (NRE). The target year to reach this level of NRE penetration is 2015.

2-3. National Energy Policy & Strategies (NEP&S)

The NEP&S indicate that the Sri Lankan government has already considered development of the biomass energy sector to a commercialized level. The following policy elements in the documents can be considered as proactive policies for developing the bioenergy sector of Sri Lanka:

- Ensuring Energy Security: Energy resources used in the country will be diversified and the future energy mix will be rationalized (Section 2.2)
- Promoting Indigenous Resources: Indigenous energy resources will be developed to the optimum levels to minimize dependence on non-indigenous resources, subject to resolving economic, environmental and social constraints (Section 2.4)

NEP&S indicates expectations that 10% of grid electricity will come from NRE resources by 2015 and that the commercial development of biomass will be encouraged and facilitated as a new rural industry, allowing the rural poor to engage in fuelwood farming and participate in mainstream economic activity by supplying electricity to urban load centres. The following can make the NEP&S more realistic in the implementation of policies and strategies:

- Clearly defining the institutional responsibilities and implementing the strategies resulting in greater impacts in achieving the policy implications
- Defining strategies to achieve the target of generating 10% of grid electricity using NRE resources, including assessments of potential and site identifications

2-4. Contribution of Key Linkage Institutions

According to the NEP&S, SLSEA and PUCSL are the main two organizations that have responsibility of promoting biomass-based energy sector development activities. However, it is essential to have the involvement of several government agencies for biomass sector development including national research institutions, the Central Environmental Authority (CEA) of Sri Lanka, the Industrial Development Board, agro plantation institutions, forestry sector government bodies, and local government bodies. Examination of the current operational activities of these organizations indicates that there are different types

of related activities undertaken by these organizations. However, they lack coordinated effort and each has no specific institutional policy decisions regarding facilitation of the biomass energy sector of Sri Lanka.

2-5. The involvement of SLSEA

SLSEA is the key government body established under Act number 35 of 2007 by the parliament of Sri Lanka. It was established to develop the renewable energy sector of Sri Lanka. According to the powers and duties stated in the Act, SLSEA has the capacity to implement biomass energy projects and is able to contribute positively to technology development, technology transfer and to recommend policy implementations. The board of management consists of the Director General of the Public Utilities Commission of Sri Lanka and secretaries to the ministries of Local Government and Provincial Councils, Industries and Investment Promotion, Lands, Agriculture, Plantation Industries, Environment, Irrigation and Mahaweli Development, Transport, Finance, Science and Technology, or to their nominees. However, the expected contribution of each of above government bodies is not clearly defined and neither are their required internal policies to support the SLSEA activities. This wide representation does ensure linkages with different ministries and government organizations required for renewable energy sector development, but currently there is no specific master plan for biomass energy sector development.

2-6. Contribution of PUCSL

The PUCSL was established by Act number 35 of 2002 by the parliament of Sri Lanka as a multi-sector regulator to regulate certain physical infrastructure industries in the country. It came into operation in mid 2003 with the appointment of the first group of Commissioners and its Director General. Initially this Act was provided for regulation of the electricity and water service industries. Later, in March 2006, petroleum was also added to the list of industries to be regulated by the PUCSL.

The examination of national energy policy indicates that PUCSL has a key responsibility in the local energy sector. It is mandated to facilitate government energy policy directions. This includes promoting indigenous resources, adapting pricing policy, consumer protection in the energy sector, enhancing the quality of energy supply and protecting against adverse environmental impacts.

2-7. National Legal Structure

The key pieces of legislation expected to impact on the biomass energy industry includes: the national forestry ordinance 1979/12/2 and its amendments, National Environmental Act and its amendments, National Institute of Plantation Management Act number 45 of 1979 and its amendments, Agrarian Development Act number 46 of 2000, Tea and Rubber Estates (control of fragmentation) (amendment) Act number. 20 of 2005, Fauna and Flora Protection Ordinance Act number 44 of 1964 and Sri Lanka Land Reclamation and Development Corporation (amendment) Act No. 35 of 2006 among others.

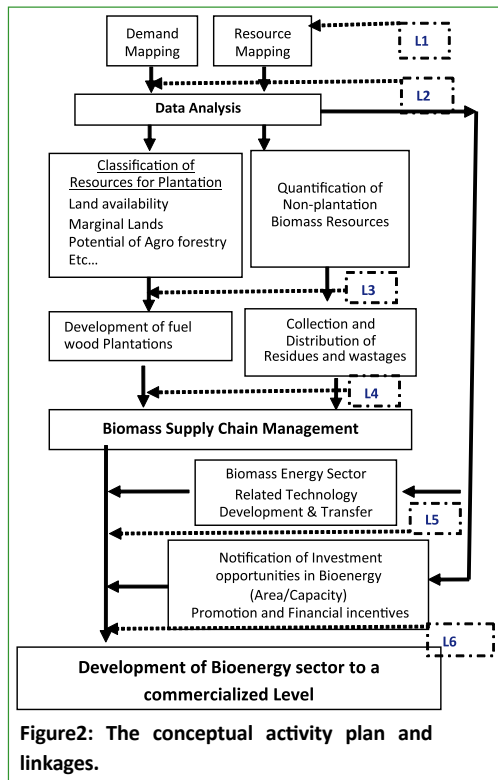
Conceptual Representation of Bioenergy Sector Required Development Activities and Linkages

A rationally structured development plan is needed for developing a biomass-based renewable energy sector of Sri Lanka. Demand and resource mapping of biomass, development of the energy plantation sector, promotion of waste energy conversions, efficient supply chain management, development of biomass-based energy generation technology and encouragement of biomass-based energy generation for the industrial sector investments are the key activities to be accomplished with this development plan. The diagram in Figure 2 shows the conceptual representation of key activities. In

the diagram, six main types of ("L") linkages have been marked that mainly represent the involvement of different types of ministries, departments, statutory bodies, research and development (R&D) institutions and others as explained below.

L1: Institutions needed for biomass resource mapping

Ministry of Land and Land Development, Ministry of Livestock Development, Ministry of Fisheries and Aquatic Resources, Ministry of Plantation Industries, Ministry of Rural Industries and



Self Employment Promotion, Ministry of Environment and Natural Resources, The Forest Department, State Timber Corporation, Ministry of Agricultural Development and Agrarian Services, and others.

L.2: Institutions needed for demand mapping

Institutions under Ministry of Power and Energy and Industrial Development.

L.3: Research and development institutions (General)

The institutions under the plantation sector and post-harvest technology sector, local government bodies and others.

L.4: Private and Public sector participation

Private sector institutional participation, local government institutions contribution, biomass supply chain management agencies operating in the private sector and others.

L.5: Research and development institutions (Biomass energy conversion technology development)

National Engineering Research and Development Centre of Sri Lanka, National Science Foundation, Industrial Technology Institute, Small Industries Corporation, SLSEA, PUCSL, CEA.

L.6: Institutions related to investment promotion

Industrial Development Board, Board of Investment Sri Lanka, Banks and other Financing Institutions such as rural banks, micro finance institutions.

Recommendations to develop a National Policy Framework

A biomass energy sector development plan should be supported by appropriate national energy policies. Also, institutional policies of government institutes which have direct linkage for supporting this sector need to be changed. Furthermore, any rules and regulations of the country which may act as barriers for developing this sector must be identified. Some of the policy and implementation elements required in the national energy policies and strategies for the development of the biomass sector are as follows:

(A): Biomass energy resources are explored to ensure energy security

It is necessary to carry out resource and demand mapping to quantify resource availability and increase the efficiency of the biomass supply chain. The SLSEA is responsible for collecting necessary data and carry out renewable energy resource planning and assessments. Although SLSEA is responsible for collecting required data, there are several government organizations that should be responsible for providing relevant data. This includes the Ministry of Agriculture (Agro forestry information)/ Institute of Post Harvest Technology, Ministry of Land and Land Development, Ministry of Forestry (forest/ renewable forest/ marginal land plantation/ monoculture plantation), local government bodies (information

about biomass from residues and waste), Ministry of Industries and the Ministry of Power and Energy. However, examination of internal policies and operational objectives of organizations relevant to the above ministries suggest that there are no specifically targeted activities to provide necessary data to SLSEA. Therefore, it is necessary to change the institutional policies of the above ministries and institutions to facilitate SLSEA's activities.

(B): Biomass energy consumer protection

Lack of well-organized biomass supply chains are one of the main barriers for developing a biomass-based energy sector in Sri Lanka. Therefore, it is essential for the government to strengthen biomass supply chains and protect consumers. Decentralization of SLSEA's present activities, involvement of local government bodies and development of coordination agencies in many parts of the country are necessary to facilitate the development of the biomass sector.

(C): Enhancing biomass energy production

To promote commercial fuelwood plantations, incentive schemes should be introduced to encourage agro-forestry and institutional development. The local governmental institutions should facilitate biomass energy sector development.

Integration of forest-related institutions and development of a network of information infrastructure to transfer, develop and retain technological know-how are some necessary implementation activities required to enhance biomass energy production.

Changes to current legislation are also needed to enhance biomass production and utilization. Land Ordinance No: 8 of 1947 and the National Forest Ordinance No. 56 of 1979 need some amendments to facilitate the biomass energy sector development while the Government Gazette Extra Ordinary No. 1380/30 of 18th February 2005 and the cabinet paper – 05/0914/021/035 of 30th June 2006 are some important government policy documents that affect the biomass sector.

(D): Promoting biomass energy technologies

There are many institutions engaged in R&D and technology transfer. Most are either operated under Ministry of Science and Technology or the universities. The research should positively contribute to local technological developments including biomass energy technologies (BET). Currently their contribution to BET development and transfer is low. Researchers should be pro-active and research institutions should adopt policies in favour of local value addition to the technologies that use indigenous resources such as biomass. They

should define their contribution to biomass-related technology development and transfer. As an internal policy, they can allocate a specific percentage of their budget for bioenergy-sector-development-related activities each year.

(E): Adopting an appropriate pricing policy

A main barrier to the biomass energy sector development is the fluctuation and uncertainties of fossil fuel prices. It is important to have a suitable pricing formula for biomass to protect both suppliers and consumers. The SLSEA and PUCSL could act as the responsible organizations. Market norms on competitive pricing have to be developed in an open economic environment.

(F): Boost biomass energy utilization

It is needed to promote the use of improved biomass energy for both domestic and industrial applications. The immediate implementation activity for this task is to carry out promotion programs to encourage biomass utilization in more efficient appliances. Commercial

development of biomass has to be encouraged and facilitated as a rural industry. The investment risk for shifting to biomass for energy generation has to be minimized. SLSEA is responsible for providing technical guidance and support to biomass energy projects and for carrying out R&D to minimize indoor air pollution. The PISCES Project works on this respect with the SLSEA. Although SLSEA has the responsibility to promote renewable energy, the expected contribution is not clearly defined in its act. Some NGOs work on these subject areas and SLSEA could work with them.

(G): Promoting biomass energy sector investments

Presently, the biomass-related energy sector lacks required investments. The investors have problems in finding available financial resources since most of the lending institutions are reluctant to support the sector. Perceived financial risk due to lack of reliable biomass supply appears to be the main factor affecting this situation. Therefore, government direct investments or incentives to the private sector investors are essential to develop the biomass energy sector.

Key References [1]. National energy policy documents [2]. <http://www.gov.lk>

Conclusion

The biomass energy potential in Sri Lanka has not been accurately quantified by any institution so far. However, the local experts believe that Sri Lanka has the potential to meet local energy demands from biomass. Biomass is a lower energy density source, but its development brings in many

benefits to the countries including creating employment opportunities and reducing dependence on imported fuels which are impacted by fluctuating foreign exchange rates, among other benefits. To develop the biomass energy sector, a good master plan supported with a clear framework for sector

development leaving room for entrepreneurship and market functioning to meet defined national targets is required. There should be government policy directions and other methods of support for this master plan. The policies of linkage institutions should change to support biomass energy sector activities.

Authored by:

The Sri Lanka Sustainable Energy Authority, Practical Action Consulting and the PISCES Sri Lanka Biomass Policy Working Group.



Contributing members of the Policy Working Group: Dr. Krishan Deheragod (SLSEA), Eng. Chandana Samarasinghe (SLSEA), Eng. Harsha Wckramasinghe (SLSEA), Mr. Sulakshana Jayewardena (Ministry of Power & Energy), Eng. Namiz Musafar (Practical Action Consulting), Dr. Vishaka Hidellage (Practical Action), Eng. Ms. Ramani Nissanka, Eng. Dr. Tusitha Sugathapala (University of Moratuwa), Eng. P G Joseph (Ministry of Science & Technology), Dr. Jayantha Gunathilake (Coconut Cultivation Board), Ms. Kanthi de Silva (Central Environmental Authority), Eng. Kapila Subasinghe (RERED Project of World Bank), Mrs. Gayathri Gunaruwan (The Ceylon Chamber of Commerce), Prof. Anoja Wickramasinghe (ENERGIA Network), Eng. T. A. Wickramasinghe (NERD Centre of Sri Lanka).

PISCES

Policy Innovation Systems for Clean Energy Security (PISCES) is a five-year Research Programme Consortium funded by the UK's Department for International Development (DFID) to develop new knowledge for the sustainable use of bioenergy to improve energy access and livelihoods in poor communities. PISCES is led by the African Centre for Technology Studies (ACTS), Kenya with lead partners Practical Action, M.S. Swaminathan Research Foundation (MSSRF), the University of Dar es Salaam and the University of Edinburgh, together with a network of national and international partners and collaborators.

Policy Working Group (PWG)

The Policy Working Group (PWG) of PISCES is an expert working group whose objective is to develop a consultative and participatory policy methodology to discuss the policy issues and guide policy statements on bioenergy. The group, with focus on Kenya and Sri Lanka, aims to achieve this by bringing together policy makers, stakeholders and experts to develop a combined methodology on participatory policy dialogue and apply the same in developing bioenergy policy.

For further information contact:

Project Manager, Dr. Bernard O. Muok

E-mail: b.muok@acts.or.ke, info@acts.or.ke, Website: www.pisces.or.ke

Phone: +254 20 712 68 90/94/95, Fax: +254 20 233 90 93