

# **CDM, Climate Change and the Bioenergy Sector**

**Mr. Vilimone Wairara Vosarogo**

**Ministry of Energy  
P. O. Box 2493  
Government Buildings  
Suva  
Fiji Islands**

**Ph: (679) 338-6006  
Mobile: (679) 927-3983  
Fax: (679) 338-6301  
E-mail: [vvosarogo@fdoe.gov.fj](mailto:vvosarogo@fdoe.gov.fj)**

## **Executive Summary**

### **Bioenergy Development**

**The purpose of the Bioenergy Plan is to organize and develop Technological Research, Innovation, Biofuel Development and transfer with a view of**

- **Guaranteeing the sustainability of Bioenergy Chain**
- **Guaranteeing the competitiveness of Biofuel and Agro-energy chain**

**The program should also call for establishment of Institutional and Regional arrangement to structure Bioenergy Consortium and new unit. This will indicate National / Government pro-action in the International Biofuel Market and in other spheres.**

### **1. Introduction**

- ❖ **Under the current Energy Policies, ‘Rising Economic Prosperity’ equals ‘Rising Climatic Threat’, to human development today and well being of future generations tomorrow. Climatic Change and Global Warming are a scientifically established fact of life today – a result of CO<sub>2</sub> emitting industrial countries, like America and China. Strict changes to Energy Policy and Technology, with International Cooperation is fundamentally regarded:**
  - **World needs to address Green Houses Gas Emissions**

- **Industrialized Countries need to make emission reductions**
- **Engagement of Developing Countries**
- **Safeguard Economic Growth and efforts to eradicate poverty**
- **Viable Bioenergy technology to combat Climate Change**
  
- ❖ **The United Nations Framework for Climate Change (UNFCCC) conference in Bali, Indonesia from 3 – 14 December 2007 calls for stronger actions in mitigation and adaptation to Climate Change at Policy level. Bioenergy Sector or specifically, Biofuel Production has the greatest potential as an effective means to achieve such mitigation and adaptation. It has become top priority in Asia and Fiji and the Pacific due to apart from the above;**
  
- **Wealth of natural raw materials for Biofuel**
- **Increasing oil prices – FD\$1.2 billion in 2007 for Fiji**
- **Diminishing oil reserves**
- **Environmental Improvement**
- **Availability of clean green fuel technologies**
- **Increase energy security, reduce dependence on foreign petrol fuel**
  
- ❖ **Bioenergy Development must therefore take into account the full spectrum of:**
  
- **Agricultural – loss of food in other agricultural output**
- **Ecological – impacts on Environment and Ecosystem**
- **Socio-economic – overall improvement of well being of the farmer**

## **1.1 Next Generation Bioenergy**

### **Strategy**

- **Formation of Clean Development Mechanism**
- **Capacity building programmes for policy makers, development practitioners and Clean Development Mechanism Projects or Bioenergy Sector**
- **Platform for exchange of best practices and innovative solutions**
- **Foster Public Private Partnerships that will promote Bioenergy Development in trade, and investment**
- **The best Framework under which it is currently being implemented in Fiji is Public Private Partnerships Bill.**

## **2. Current Situation and Outlook of Bioenergy**

### **2.1.1 Current Status**

❖ **The Fiji Department of Energy, which is the umbrella body of the Biofuel Unit is responsible for:**

- **Bioenergy Sector Planning**
- **Bioenergy Policy Formulation**
- **Bioenergy Development**

❖ **Biofuel Unit set up in 2006 to:**

- **Establish Fiji Fuel Standards**
- **Blend trials in transport fuel and Power Generation**
- **Advise on the feasibility of Biofuel Production in Fiji**
- **Look for funding assistance for developing a sustainable and affordable Biofuel Industry in Fiji**

❖ **Currently, Fiji has no Bioenergy Sector but have only Department of Energy.**

- **Does not have Petrofuel source, so relies solely on imported fuel.**

❖ **Ethanol: FT 11/01/08**

- **Interested parties, to build and operate an Ethanol Plant in Fiji, will be submitted to Government after Fiji Sugar Corporation Board sits later this month. There is a public outcry calling for the Government to speed up Ethanol Production. The actual construction should begin in a few months.**

❖ **Current Energy Situation**

- **Hydro - 80MW (47.8%)**
- **Diesel - 98MW (49.6%)**
- **Ind. Power Prod- 4.5MW (2.6%)**

❖ **Transport**

- **Diesel - 21%**
- **Unleaded Petrol -17%**
- **LPG - 3%**
- **Aviation - 59%**

**There are 37 windmills in Sigatoka (1.5 MW each) and 8 in Bua**

- ❖ **There have been small scale attempts at Biodiesel Production; however no Biodiesel Production is present in Fiji at the moment.**
- ❖ **Coconut Natural Oil in transport has been applied successfully in blends with kerosene and diesel in Vanuatu during the past years, in adapted vehicles.**
- ❖ **Communities in Fiji have had experience with the use of Coconut Natural Oil as a fuel for remote electrification. The experience has shown that the technology works, however specific attention needs to be paid to the socio-economic setting in which fuel from coconuts takes place.**

### **2.1.2 Future Outlook of Bioenergy**

- ❖ **Beginning in 2008, 20% of Total Transport fuel demand target to be met by Biofuel replacement in 2010.**
  - **40 million liters of Ethanol fuel per annum**
  - **10 million liters coconut fuel / Biodiesel Plant**
- ❖ **Palm oil, Jatropha oil in 2020 at large scale industry level.**
- ❖ **Biomass, Fiji Sugar Corporation, Tropic Energy, utilizing energy trees.**
- ❖ **Policy conducive to Bioenergy – incentives, tax concessions and other preferential conditions.**
- ❖ **Awareness Campaigns**
- ❖ **Start off with 10% blend in fuels and increase as time goes on.**
- ❖ **On the Planning stage other generation facilities for supply to National Grid and Rural Consumers.**
  - **Wind - 10MW**
  - **Hydro - 38MW**
  - **Biomass - 58MW**
  - **Geothermal –20MW**

### **2.2 Challenges and Opportunities**

## **2.2.2 Opportunities**

**1. Fiji has got a wealth of natural resources for Renewable Energy, capable to cater for Fiji's domestic needs.**

**2 Electricity Consumption - of 194MW (14 Power Stations) supplied by Fiji Electricity Authority (FEA) of which 84MW is from Hydropower, 37MW from windmill, 1.5MW each was currently launched in October 2007.**

**3 Biomass: - Lautoka and Rarawai Mill are projected to produce 39MW where 248,000 tonnes of wood at 35% moisture content. This requires 9300 hectares of energy trees.**

- Fiji Sugar Corporation (FSC) and Tropic Energy projected to produce 19.5 MW each (39 MW) with other Independent Private Partnerships (IPP) such as Tropic Energy**

**4 Bioethanol**

**89.6 million liters Unleaded Petrol in 2007**

**(a) In 2007 Fiji Sugar Corporation produced 157,000 tonnes of molasses. Directly that volume can produce potential volume of - 39.5 million of ethanol which is 44% of Total National Unleaded Petrol Consumption of 89.6 million in 2007.**

**(b) Similar figures can be achieved from other crops, like cassava,dalo, breadfruit.**

**5 Biodiesel**

**Diesel consumption last year: (900.3M litres)**

**Aviation – 303M litres (34%)**

**Industry-409,834M litres (45%)**

**Automotive –102.5M litres (11%)**

**Others - 85M litres (9.56%)**

- ❖ Fiji's main oil produces is Copra Millers – oil from coconut oil (CNO). It managed 4.5 million liters in 2007. The mill has the capacity to produce more then double that figure for the full value realization of Total number of coconuts in Fiji.**
- ❖ Jatropha is another crop under implementation at Ministry of Agriculture Research Station in Wainigata, Savusavu District. It is envisaged to be the major contributing raw material to large scale Biodiesel Production.**

## **2.2.1 Challenges**

- ❖ **Sugar Industry is the source industry for Bio - ethanol Production. Overall, the biggest constraint for Fiji's case in its desire to fully utilize the great potential of a resourceful Biofuel / Bioenergy Program is Money.**
- **Bio – ethanol Refinery Plants and 6 Biodiesel Processing Plants and total investment of F\$26 million.**
- **Raw – materials supply has to improve efficiency farm roads, rail system, and sucrose content, mechanized.**
- **Mill and Refinery efficiency to be improved**
- **Too many small inefficient farm supplies**
  
- ❖ **Biodiesel**
- **Requires revitalizing the Coconut Industry which will be the source industry for Biodiesel**
- **Farmers prefer other income generating farm products then cutting copra**
- **Lack of incentives / subsidies etc to rural farm**
- **High logistics costs make copra farming not only labor intensive but cost intensive**

## **3. National Policies and Action Plan**

### **3.1 Policies**

- ❖ **Current Policy**
- **In 2006 the Government Cabinet approved the national Energy Policy to address Renewable Energy, Energy Efficiency and Affordability, and Environmental Sustainability.**
- **The National Energy Policy (NEP) provides a guideline for decision makers to select ways to meet the energy needs of the country. The National Energy Policy takes a broad approach, but provides specific policy statements on what the Government intends for the energy sector as a whole.**
  
- ❖ **National Policy**

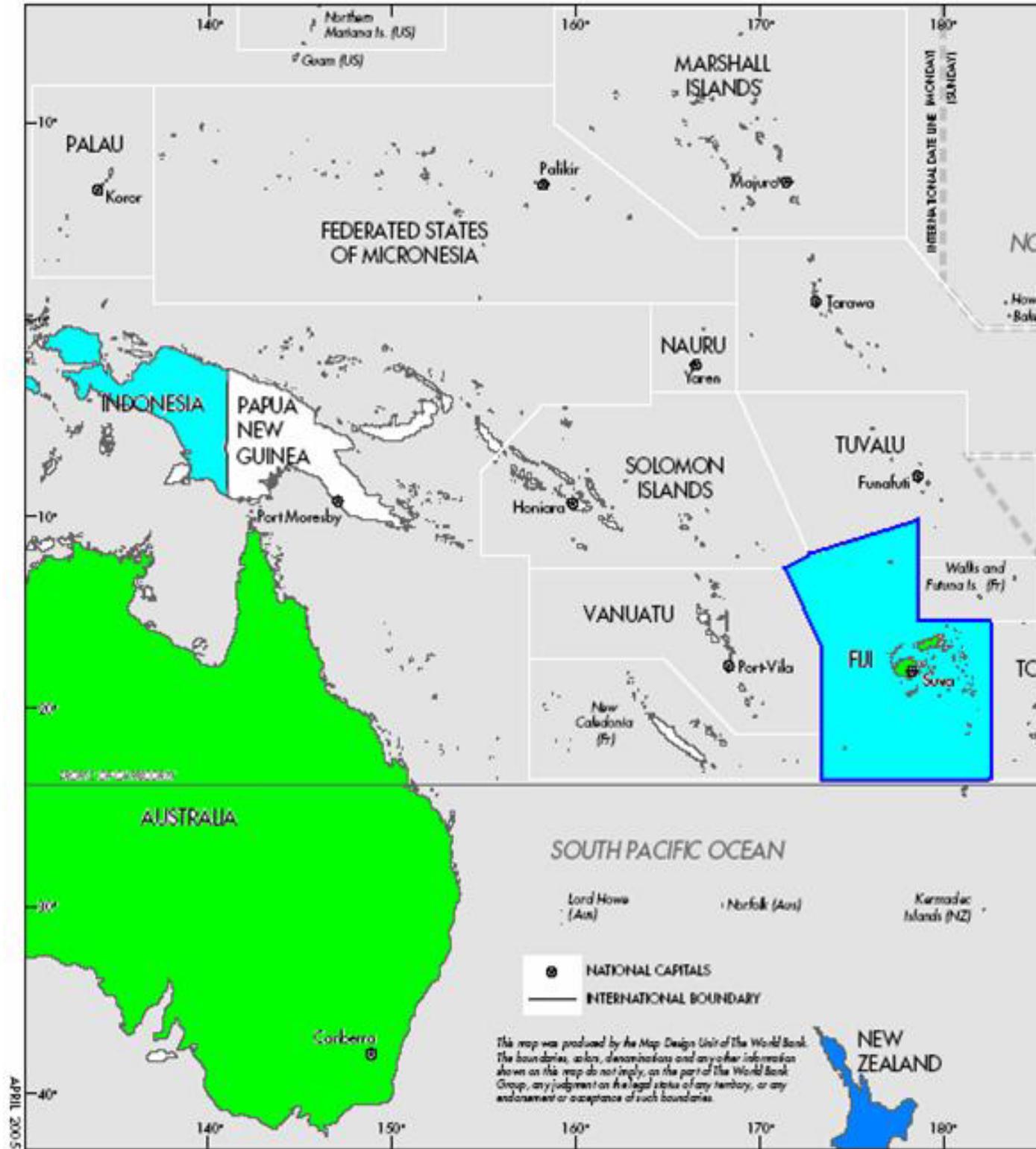
- **Currently, there is no specific National Bioenergy Sector Policy but Bioenergy is considered in the overall Energy Policy. Biofuel Standard in transport and power generation**
- **Increase awareness on Biofuel Production and the need for its widespread usage in Fiji.**
- **Development program planning of Biofuel at Policy Level to create enabling Environment to attract investments into the Bioenergy Plan.**
- **The best scenario of any Policy regarding the program must satisfy two vital points:**
  - **Majority – National ownership**
  - **Majority National consumption**
- ❖ **Only surplus to requirement can then be allowed to be exported.**
- ❖ **Institutional Partnerships – dynamic business sector with supportive regulating authorities.**

#### **4. Conclusion & Recommendations**

- ❖ **At Regional and National level, as has been successfully implemented in countries like Brazil, Philippines, India, Argentina, etc; the following driving factors common to all;**
- ❖ **For the Bioenergy Sector Development to be successful there must be most of all a National Commitment, National Will and National Ownership.**
- ❖ **As has been proven in successful green fuel countries like America, UK, Argentina, Brazil, there must be massive investments in the infrastructure of Biofuel Development Program.**

#### **References**

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- ❖ **Fiji Electricity of Authority Statistics, 2007**
- ❖ **Brazil Agro energy Plan, 2006-2011**
- ❖ **Biofuel Unit Cabinet Submission, October, November, & December, 2007**
- ❖ **Fiji – Energy Policy Framework**
- ❖ **New Scientist, December 2007**
- ❖ **Coconut Industry Development Authority, Fiji, Annual Report, 2007**
- ❖ **Fiji Sugar Corporation, Annual Report, 2007**





# BIOENERGY SECTOR DEVELOPMENT

## STUDY PAPER

### **Agriculture:**

Agriculture and rural development strategies are a critical component of an inclusive growth strategy for Asia and the Pacific region. In particular, the production and use of bioenergy in its modern forms can have a major and positive impact on agricultural development and the environment. If bioenergy becomes a major source of energy, it could have a profound influence in many rural areas of developing countries. It could possibly speed up socio-economic development, and a large number of farmers could increase food production and their own energy in a sustainable manner.

The world biofuel production is on a sharp rise since 2000; biomass currently supplies about a third of energy in developing countries. It is now increasingly realized that there is considerable potential for the modernization of biomass fuels to produce convenient energy carrier, such as electricity, gas, and transportation fuels, while continuing to provide for traditional uses of biomass. The potential socio-economic benefits of modern biomass energy arise from the fact that agriculture could face enormous demand for feedstock. The feedstock will need to be produced, harvested, transported, converted into biofuels, and distributed for final utilization. The modernization of biomass and the necessary industrial investment are already happening in many countries. Since the biomass-based energy is a labour-intensive sector, particularly favourable for rural development, agro-energy employment could be a large source of employment in the future. It is important, however, to note that the future use of bioenergy must be strongly linked to high energy efficiency, environmentally-sustainable production and use.

Policy-makers must assess the impact of producing biofuels on food security due to potential change in land use and switch in plantation of agricultural crops; that is, economic and environmental tradeoffs in terms of food/feed/fuel production and security should be carefully assessed. Furthermore, the processing and conversion technology dimension of biofuel development and production is another important aspect to be considered by the policy-makers at the country level. Future bioenergy technologies may rely on dedicated energy crops and agricultural and timber wastes instead of food crops. Second generation technologies of bioenergy production and processing could potentially make a higher contribution to energy security and climate change mitigation.

As countries move to strengthen their energy security by increasing their use of biofuels, they should also work to ensure poor people's and small farmers' participation in the creation of a more sustainable energy system. With sound technology and trade policies, win-win solutions are possible with bioenergy in developing countries and positive outcomes for the poor as well as for energy efficiency.

Innovative economic instruments such as the Clean Development Mechanism (CDM) and the carbon market trading should be more utilized in order to leverage additional private and public funding for bioenergy production in developing countries under the Kyoto Protocol, and to reduce the greenhouse gas emissions causing climate change. In addition, supportive measures for the establishment of a CDM infrastructure and the creation of CDM-friendly regulatory and business environments are required to leverage carbon finance and payments for ecosystem services and sustainable agriculture development.

### **Objectives**

The objectives of the Forum are:

1. To address cross-cutting issues in bioenergy development, including policy strategies and institutional framework, financing and investment; and environmental sustainability and food security;
2. To review current bioenergy processing and conversion technologies for biofuels, biogas and biomass, and the next generation technologies;
3. To explore possibilities for developing this new energy source while ensuring a balance between its potential benefits and its risks;
4. To formulate the viable policies strategic and frameworks, and the way forward for the bioenergy sector development.

### **Expected Outcomes**

The expected outcomes of the Forum are:

1. Information and experience to be shared among participating organizations and countries on existing policies, current and future programmes, projects and other initiatives related to bioenergy;
2. Identification of policy, strategies and regulatory frameworks, guiding principles on bioenergy to enhance competitiveness, and minimizing the risks of bioenergy development for small-scale producers;
3. Establishment of a regional bioenergy network to promote ecological information sharing on bioenergy-related technology, grade, investment, environmental ecological issues, and regional/sub regional cooperation.

## **Factors for Consideration:**

1. CDM, climate change and the bioenergy sector
  - CDM market trends and overview; identifying CDM opportunities for carbon mitigation in the bioenergy sector
  - CDM finance and investment opportunities in the bioenergy sector
  - Towards next generation bioenergy: The potential for biofuel in CDM projects
  - Next generation bioenergy: Understanding the true market potential and opportunity of next generation biofuels.
2. Biofuels (biodiesel; bioethanol and biomass)
  - Exploring the tremendous growth opportunities for biofuels in Asia and the Pacific.
  - Next generation biofuel applications using the dedicated energy crops
  - The next generation biomass opportunities in Asia: The role of thermo-chemicals vs enzymatic cellulose ethanol
  - Case studies on large/small scale biofuels
3. Biogas
  - Biogas market potential in Asia from available waste streams and energy crops; Turning (food) waste into bioenergy opportunities
  - Promoting biogas development for green business case studies. Generating methane-rich biogas from agricultural and food industry waste
  - Lessons from large/small producers in Asia.
4. Green economic opportunities
  - Finance and investment investing in the biofuels of tomorrow
  - Strategies for the development of green business opportunities
  - Investment activities by UN agencies and regional/bilateral development partners in relation to bioenergy

## **Stakeholders**

1. Policy-makers in charge of agro-industry and bioenergy from the Asian and Pacific countries Bangladesh, Cambodia, China, Fiji, India, Indonesia, Iran, Lao PDR, Malaysia, Mongolia, Nepal, Pakistan, Philippines, Republic of Korea, Russian Federation, Sri Lanka, Thailand and Viet Nam;
2. Experts from UNESCAP, the United Nations agencies (FAO, UNIDO, ADB, IFAD), and bilateral development organizations (GTZ, SNV), and national institutions;
3. Selected representatives from the private sector energy producers, venture capitals, automotive industries, entrepreneurs, farmers Associations.

## **Funding**

APCAEM has some funding resources to support the participation of experts and government officials from selected member countries of UNESCAP. They will provide in-kind support such as conference venue, transportation, technical visit and other logistic arrangements.

V.W. Vosarogo  
**Biofuel Engineer, Fiji**