

# ***Draft***

## **Vanuatu National Energy Policy Framework**

### **Introduction**

The development of a National Energy Policy Framework for Vanuatu is of high priority. Given the high dependence of Vanuatu on imported petroleum fuels and their associated escalating prices, it is imperative for the Government to put in place a national energy policy framework that not only address the adverse impacts of such high prices on the economy and the people but also provides a long term development plan for the energy sector. The ultimate goal is the provision of reliable and affordable energy services to all people in Vanuatu.

### **Background**

Vanuatu comprises of 80 islands with a total land area of 12,190 square kilometres. The islands are scattered over 710,000 square kilometres of ocean. The islands are divided into six provinces each having a provincial administrative centre where development programmes are administered. The capital administrative centre, Port Vila is located in Efate. There is wide disparity in the services available in administrative centres and rural communities. The disparity is also evident between the provincial centres and Port Vila where the services are of higher standard. It is estimated that about 51% of the population live below the poverty line of \$1 per day<sup>1</sup>.

The main driver for economic growth in Vanuatu is the agricultural sector with manufacturing and the services sector playing a complimentary role. While the above sectors have been seen as providing the opportunity for Vanuatu to improve its economic growth, Government under the Comprehensive Reform Programme (CRP) and the Prioritised Action Agenda (PAA) programmes has identified five priority policy areas to focus on and these include:

- improving governance and public service delivery via strengthened law enforcement and macroeconomic management;
- improving the lives of rural people through better access to markets and better management of natural resources;
- raising private investment by lowering obstacles to private enterprise;
- enabling greater stakeholder participation in policy formulation; and
- increasing equity in access to services and employment opportunities.

The provision of high quality, reliable and affordable energy services is key to achieving the objectives of the above key policy areas. Vanuatu is highly dependent on imported fossil fuels to support its economy. However, the escalating prices of imported fuel, has placed considerable burden on Government to meet its economic growth goals. This together with uncertain policy environment as a result of political instability exacerbates government's inability to provide the right environment for economic growth.

---

<sup>1</sup> ADB Country Strategy and Programme Update 2005 – 2006.

## **Challenges in the Energy Sector in Vanuatu**

Currently there is no National Energy Policy Framework that guides and directs energy sector development in Vanuatu. Energy sector planning that is supported by appropriate regulations appears to be focusing only on the supply of electricity in urban centres through UNELCO and the importation of petroleum fuels. Other areas such as the promotion of energy efficiency and conservation measures, promotion of renewable energy sources, the provision of electricity to rural and remote areas, etc only receive token attention and this is usually on an ad hoc basis.

The Energy Unit lacks the capacity to carry out proper planning due to staff shortage. The Unit has lost a number senior staff over the past years through migration and resignation. This trend ought to be addressed through appropriate policy incentives and an organisation structure that promotes a clear and transparent career path to its staff.

As highlighted above, the heavy reliance of the country on imported petroleum fuels is taxing the economy and a major contributing factor to increasing inflation. The associated increase in the price of basic food items and services especially in the rural areas have put a lot of pressure on the Government to put in place measures that will reduce hardships faced by the ordinary people. The small business operators are also trying to make ends meet as they are burdened with debts and high interest rates prompted by increasing fuel prices.

Vanuatu is an island country with many small islands scattered over a huge area of ocean. Accessing these islands is by boats and a few have airstrips that are serviced by small airplanes. Infrastructure development in the islands is minimal and in many cases is concentrated only around the provincial centres. Ironically, majority of the population live in the rural areas.

The absence of a regulatory framework to promote partnerships and private investments in the energy sector inhibits growth in the sector. Further, the current agreements between the Government and the sole power provider (UNELCO) in Vanuatu is seen by many as biased heavily in favour of UNELCO.

Vanuatu is well endowed with some renewable energy sources such as hydro, solar, biomass, wind, coconut bio-fuel and geothermal. These resources offer considerable potential to provide Vanuatu with a diverse energy supply sources and reduce its dependence on imported fossil fuels. However, the challenge is how to make a transition from the traditional energy supply source to the renewable energy sources.

## **Strategic Areas**

The following areas are considered strategic to energy sector planning in Vanuatu:

1. Institutional Strengthening/Energy Planning
2. Rural and Remote Areas
3. Rural Electrification
4. Petroleum
5. Power
6. Renewable Energy
7. Transport
8. Bio-fuel

9. Waste Management, Transportation and Control
10. Energy Efficiency and Conservation

### **Cross cutting Issues**

In considering the above policy areas it is also crucial to note that there are a number of issues that cut across them that are also important for policy considerations and these include:

- Environment
- Disaster Impacts
- Governance
- Gender
- Sustainability
- Energy security
- International conventions/agreements
- Research and development

### **Policy Statements**

#### **1. Institutional Strengthening/Energy Planning**

**Goal:** *An efficient and effective coordination and management of the energy sector.*

- 1.1 Ensure that the Energy Unit has the capacity to carry out energy sector planning.
- 1.2 Ensure effective coordination amongst government agencies, the private sector and non-state actors.
- 1.3 Promote gender equity in energy planning.
- 1.4 Ensure energy planning complies with international conventions ratified by the Vanuatu Government.
- 1.5 Mainstream risks in energy planning.
- 1.6 Ensure environmental issues are taken into consideration in all aspects of energy planning.

#### **2. Rural and Remote Areas**

**Goal:** *An effective and equitable rural and remote areas energy planning.*

- 2.1 Ensure the provision of appropriate, reliable and affordable energy services to rural and remote areas.
- 2.2 Ensure active participation and capacity building as integral components of community based energy projects.
- 2.3 Ensure community based energy projects underscore sustainability, consumer ownership and responsibilities.
- 2.4 Ensure sustainable use of fuel wood.

#### **3. Rural Electrification**

**Goal:** *The provision of electricity to 20% of the rural population by year 2017.*

- 3.1 Ensure government promotion and commitment in rural electrification programmes.

- 3.2 Encourage the use of renewable energy sources for rural electrification.
- 3.3 Promote partnerships in rural electrification programmes.
- 3.4 Ensure the provision of electricity to rural areas is transparent.

#### **4. Urban Electrification/Concession Areas**

**Goal:** *Reliable and affordable electricity supply to all consumers.*

- 4.1 Ensure the provision of reliable and affordable power supply to all consumers.
- 4.2 Encourage other private sector participants in the power sector.
- 4.3 Ensure an appropriate regulatory framework is in place.
- 4.4 Encourage the promotion of alternative sources of energy for power production.
- 4.5 Ensure the provision of electricity to urban areas is transparent.

#### **5. Petroleum**

**Goal:** *An efficient, affordable, reliable and high quality petroleum supply to all people.*

- 5.1 Promote energy efficiency and conservation.
- 5.2 Ensure a national fuel standard is in place.
- 5.3 Ensure fuel storage facilities, handling and transportation of petroleum fuels meet required national and international safety standard.
- 5.4 Ensure the reliable supply of fuels of petroleum fuels.
- 5.5 Ensure an appropriate regulatory framework is in place.
- 5.6 Ensure life-cycle approach to the management of imported fuel products.

#### **6. Renewable Energy**

**Goal:** *Increase use of renewable energy in Vanuatu.*

- 6.1 Promote the use and investments in renewable energy.
- 6.2 Ensure renewable energy projects adhere to environmental regulations.
- 6.3 Ensure an exit strategy is in place for all donor driven renewable energy programmes.

#### **7. Transport**

**Goal:** *An efficient, affordable, reliable and environmentally clean transport system.*

- 7.1 Ensure energy efficiency and conservation in the transport sector.
- 7.2 Ensure an effective regulatory framework is in place.

#### **8. Bio-fuel**

**Goal:** *Increase use of bio-fuels in both the electricity and transport sectors.*

- 8.1 Promote and encourage research, development and sustainable use of bio-fuels.
- 8.2 Ensure safe handling, transportation and storage of bio-fuels and derivatives.

#### **9. Energy Waste Management, Transportation and Control**

**Goal:** *A clean and safe environment.*

9.1 Ensure safe handling, transportation, storage and disposal of energy wastes.

## **10. Energy Efficiency and Conservation**

### **Goal:**

10.1 Promote and implement energy efficiency and conservation programmes.

---

## **Strategies**

### **1. Institutional Strengthening/Energy Planning**

Policy 1.1 Ensure that the Energy Unit has the capacity to carry out energy sector planning.

Issues: Organisational Structure, Budget, Training/Attachment, Skills/knowledge, Recruitment of staff, Equipment/Assets,

#### Strategies:

- 1.1.1 Review the existing structure of the EU.
- 1.1.2 Provide specialised energy training programme to staff.
- 1.1.3 Increase the national budget for energy programmes.
- 1.1.4 Recruit skilled personnel.
- 1.1.5 Provide appropriate equipment and office space.
- 1.1.6 Identify targeted skills training.
- 1.1.7 Develop bilateral, regional and multilateral partnerships.

Policy 1.2 Ensure effective coordination amongst government agencies, the private sector and non-state actors.

#### Issues:

- Networking amongst key stakeholders - Regulate sharing of information and expertise
- Lack of awareness/knowledge on energy issues
- Overlapping of responsibilities – unclear definition of responsibilities
- Lack of coordination
- Public Finance and Economic Management Act a barrier to implementing rural electrification programmes.
- Language barriers
- Commitment of Provincial governments

#### Strategies

- 1.2.1 Encourage networking amongst key stakeholders.
- 1.2.2 Facilitate and strengthen working relationship with stakeholders.
- 1.2.3 Establish a national energy working group.
- 1.2.4 Raise awareness on energy issues.

Policy 1.3 Promote gender equity in energy planning.

Issues:

- No female energy planners
- More female engineers needed
- Energy regarded as only male domain
- Customary and traditional roles of women and men

Strategies

- 1.3.1 Encourage female participation in the energy programmes.
- 1.3.2 Raise awareness on the roles and the energy needs of different gender groups.

Policy 1.4 Ensure energy planning complies with international conventions ratified by the Vanuatu Government.

Issues:

- Lack of Government commitment
- Increase participation in regional/international negotiation
- Capacity to meet requirements of regional/international commitment

Strategies:

- 1.4.1 Raise awareness on Government commitment under regional and international conventions.
- 1.4.2 Build capacity to meet requirements of regional/international commitment

Policy 1.5 Mainstream risks in energy planning.

Issues:

- Natural disasters
- Human induced disasters – vandalism, thieving,
- Land issues and disputes
- Political interference
- Technology

Strategies

- 1.5.1 Incorporate disaster risk management into energy planning.
- 1.5.2 Strengthen the participation of landowners and politicians in energy projects.
- 1.5.3 Collaborate with other key stakeholders including government agencies and the private sector in energy planning.

Policy 1.6 Ensure environmental issues are taken into consideration in all aspects of energy planning.

Issues:

- Environmental Management and Conservation Act (2002)
- Emission
- Waste disposal and management

Strategies:

- 1.6.1 Incorporate EIA in major energy projects.
- 1.6.2 Promote the use of environmentally friendly technologies.
- 1.6.3 Maintain a national inventory of GHG emissions.

## 2. Rural and Remote Areas

**Goal:** *An effective and equitable rural and remote areas energy planning.*

Policy 2.1. Ensure the provision of appropriate, reliable and affordable energy services to rural and remote areas.

Issues:

- Appropriate technology and sizing
- Geographical constraints
- Variation in population amongst islands
- High fuel price
- High transportation costs and irregularity of schedules
- Lack of infrastructure development
- Fuel-wood supply

Strategies

- 2.1.1 Promote the use of appropriate energy technologies.
- 2.1.2 Promote sustainable harvesting of fuel wood.
- 2.1.3 Encourage the use of alternative/renewable energy sources.
- 2.1.4 Provide appropriate level of subsidy to rural energy programmes.

Policy 2.2. Ensure active participation and capacity building as integral components of community based energy projects.

Issues:

- Active involvement of communities
- Partnerships with private sector and non state actors
- Management and technical training
- Awareness of responsibilities – related to land and other customary issues

Strategies:

- 2.2.1 Encourage the active involvement of communities in energy projects.
- 2.2.2 Encourage partnerships with private sector and non-state actors in rural energy programmes.
- 2.2.3 Provide management and technical training on energy projects.
- 2.2.4 Provide technical assistance to the management of energy projects.

Policy 2.3. Ensure community based energy projects underscore sustainability, consumer ownership and responsibilities.

Issues:

- Awareness of responsibilities
- Community capacity to manage energy projects – skills/knowledge
- Involvement of women and other community groups e.g. churches
- Lack of coordination amongst project developers
- Disputes arising from differences amongst community

Strategies:

- 2.3.1 Encourage active participation of women and other community groups in energy projects.
- 2.3.2 Encourage training in project management, including financial and technical skills.
- 2.3.3 Encourage coordination amongst project developers at all stages of project development.
- 2.3.4 Encourage the establishment of a formal energy management structure.
- 2.3.5 Raise awareness on stakeholder responsibilities.

Policy 2.4. Ensure sustainable use of fuel wood.

Issues:

- Long distances to walk to collect fire wood
- Unsustainable harvesting of fuel wood
- Access to fuel wood is difficult
- High consumption of fuel wood –
- Lack of awareness in energy efficiency in the use of fuel wood –
- Open fire cooking – impacts on health and environment
- Efficient stoves

Strategies:

- 2.4.1 Raise awareness on sustainable harvesting of fuel wood.
- 2.4.2 Encourage the planting of local fuel wood species and their efficient use.

### **3. Rural Electrification**

**Goal:** *The provision of electricity to 20% of the rural population by year 2017.*

Policy 3.1 Ensure government promotion and commitment in rural electrification programmes.

Issues:

- Accessing funds for rural electrification – costly
- Identifying appropriate technologies – grid verses non-grid
- Taxes on renewable energy technologies
- High transportation costs between outer islands
- Access to electricity in remote areas difficulty

- Rural electrification - none

#### Strategies

- 3.1.1 Promote the development of a Government rural electrification policy.
- 3.1.2 Encourage both grid and off-grid electrification in rural areas.
- 3.1.3 Encourage tax incentives and subsidies for rural electrification projects.
- 3.1.4 Ensure Government funding support is provided for rural electrification programmes.
- 3.1.5 Ensure Government rural electrification programmes give priority to public services in rural areas.
- 3.1.6 Ensure the establishment of a dedicated rural electrification fund.

Policy 3.2. Encourage the use of renewable energy sources for rural electrification.

#### Issues:

- Limited research/assessment of renewable energy sources
- Demonstration projects
- Awareness of potential benefits

#### Strategies

- 3.2.1 Encourage studies and development of renewable energy sources for rural electrification.
- 3.2.2 Raise awareness on the potential benefits on the use of renewable energy sources.
- 3.2.3 Encourage the development of demonstration projects.

Policy 3.3 Promote partnerships in rural electrification programmes.

#### Issues:

- Processing of project initiatives too lengthy
- Contractual arrangements with communities – problematic
- Donors often impose conditions for funding – sometimes can be a barrier to sustainability of projects
- 

#### Strategies:

- 3.3.1 Ensure active participation of all stakeholders in project planning and implementation.
- 3.3.2 Promote private sector investments in rural electrification.
- 3.3.3 Ensure planning, implementation and management processes meet all stakeholder objectives.

Policy 3.4. Ensure the provision of electricity to rural areas is transparent.

#### Issues:

- Political interference
- Community involvement
- Absence of a formal rural electrification programme and master plan
- Provincial Governments involvement and commitment

#### Strategies

- 3.4.1 Ensure a formal rural electrification master plan is in place.
- 3.4.2 Engage all stakeholders in the planning and implementation of rural electrification programmes.
- 3.4.3 Encourage the establishment of a formal rural electrification management structure.

#### **4. Urban Electrification/Concession Areas**

**Goal:** *Reliable and affordable electricity supply to all consumers.*

Policy 4.1. Ensure the provision of a reliable and affordable power supply to all consumers.

#### Issues:

- High tariffs
- Communities in concession areas yet to be electrified
- Reliability and quality of supply
- Political interference
- Inefficiency in electricity supplies

#### Strategies:

- 4.1.1 Ensure transparency in planning and tariff setting.
- 4.1.2 Encourage bench marking and demand side management (DSM) programmes are in place.
- 4.1.3 Ensure a formal master plan for urban electrification including all concession areas is in place.

Policy 4.2. Encourage other private sector participants in the power sector.

#### Issues:

- Monopoly status of power supply
- Absence of framework to promote Independent Power Provider involvement
- Electricity supply contractual timeframe

#### Strategies:

- 4.2.1 Encourage competition in the power sector.
- 4.2.2 Ensure in-country capacity to negotiate equitable and fair contractual arrangements.

Policy 4.3. Ensure an appropriate regulatory framework is in place.

Issues:

- Electricity Act is restrictive
- High tariff rates
- In-country capacity to manage regulatory framework
- Availability of funds

Strategies:

- 4.3.1 Encourage collaboration with relevant stakeholders including government for the establishment of an energy regulatory authority.
- 4.3.2 Ensure availability of funds to support the energy regulatory authority.
- 4.3.3 Ensure the development of appropriate legislative framework.

Policy 4.4. Encourage the promotion of alternative sources of energy for power production.

Issues:

- Limited research/assessment on alternative energy sources
- Awareness of potential benefits
- Lack of funding
- Lack of government support
- High capital costs of alternative energy sources
- Lack of technical capacity

Strategies:

- 4.4.1 Promote research and assessment on alternative energy sources.
- 4.4.2 Encourage government support for the development of alternative energy sources.
- 4.4.3 Raise awareness on benefits of using alternative energy sources.

Policy 4.5. Ensure the provision of electricity to urban areas is transparent.

Issues:

- Political interference
- Stakeholder involvement
- Provincial Governments involvement and commitment

Strategies

- 4.5.1 Ensure transparency in planning and implementation of urban electrification.
- 4.5.2 Ensure active participation of all stakeholders in planning and implementation of urban electrification.
- 4.5.3 Encourage Provincial Government involvement and commitment in urban electrification.
- 4.5.4 [Encourage the dissemination and sharing of customer related information \[rephrase\].](#)

## 5. Petroleum

**Goal:** *An efficient, affordable, reliable and high quality petroleum supply to all people.*

Policy 5.1. Promote energy efficiency and conservation.

Issues:

- High fuel costs
- Inefficient use
- GHG emission

Strategies:

- 5.1.1 Raise awareness on the importance of energy efficiency and conservation measures.
- 5.1.2 Encourage efficient use of petroleum fuels.
- 5.1.3 Adopt and implement mitigation measures for GHG emission.

Policy 5.2. Ensure a national fuel standard is in place.

Issues:

- Absence of a national fuel standard
- Lack of technical expertise and facilities
- Lack of funding
- Lack of government support
- Lack of collaboration amongst players in the industry

Strategies:

- 5.2.1 Ensure the establishment of a national fuel standard.
- 5.2.2 Ensure in-country capacity in the management of fuel standard.
- 5.2.3 Encourage government support in the establishment of a national fuel standard.
- 5.2.4 Encourage active collaboration of players in the industry.

Policy 5.3. Ensure fuel storage facilities, handling and transportation of petroleum fuels meet required national and international safety standard.

Issues

- Lack of collaboration amongst players in the industry
- Lack of awareness of safety issues
- High costs
- Lack of technical expertise for monitoring and policing standards
- Location of storage facilities too close to residential areas
- Risks associated with hazards related to oil spill
- Unsafe handling and transportation methods

Strategies:

- 5.3.1 Enforce national and international safety standards on storage, handling and transportation of petroleum fuels and products.
- 5.3.2 Encourage active collaboration amongst players in the industry.
- 5.3.3 Promote awareness of safety issues.
- 5.3.4 Build capacity in monitoring and policing safety standards.

Policy 5.4. Ensure the reliable supply of petroleum fuels.

Issues:

- Inadequate supply and storage facilities
- Irregular shipping schedules
- High costs associated with transporting fuel to outer islands
- Lack of infrastructure in rural areas

Strategies:

- 5.4.1 Ensure adequate supply and storage facilities in both urban and rural areas.
- 5.4.2 Encourage participation of local entrepreneurs in the petroleum industry.
- 5.4.3 Encourage competition and fair pricing in retailing.

Policy 5.5. Ensure an appropriate regulatory framework is in place.

Issues:

- Absence of a regulatory framework
- Lack of technical expertise
- Lack of government support and commitment
- Overlapping of responsibilities amongst government agencies

Strategies:

- 5.5.1 Ensure a regulatory framework is in place.
- 5.5.2 Encourage active collaboration amongst government agencies and other stakeholders.
- 5.5.3 Ensure in-country capacity in the management of the regulatory framework.
- 5.5.4 Encourage the establishment of a regularity authority.

Policy 5.6. Ensure life-cycle approach to the management of imported fuel products.

Issues:

## 6. Renewable Energy

**Goal:** Increase use of renewable energy in Vanuatu.

Policy 6.1. Promote the use and investment in renewable energy.

Issues:

- High capital costs
- Lack of government support – political will
- In-country capacity
- Lack of research/assessment
- Awareness
- Issues related land ownership
- Competition with conventional technologies
- Lack of funding

Strategies:

- 6.1.1 Encourage tax incentives in the importation and use of renewable energy technologies.
- 6.1.2 Encourage partnerships with private investors, donors and other funding agencies.
- 6.1.3 Encourage training, research and development in renewable energy technologies.
- 6.1.4 Promote awareness and active involvement of communities in renewable energy programmes.
- 6.1.5 Ensure a sustainable financial and legal mechanism is in place.
- 6.1.6 Raise awareness on cost and benefits of renewable energy projects.

Policy 6.2 Ensure renewable energy projects adhere to environmental regulations.

Issues:

- Environmental impacts associated with renewable energy technologies
- Lack of expertise in the area of EIA for renewable energy projects
- Environmental Management and Conservation Act (2002)
- Commitment to international environmental conventions

Strategies:

- 6.2.1 Ensure all renewable energy projects complies with national and international environmental requirements.
- 6.2.2 Ensure in-country capacity in EIA for renewable energy projects.

Policy 6.3 Ensure an exit strategy is in place for all donor driven renewable energy programmes.

Issues:

- Non existence of mechanisms to ensure sustainability of projects
- Lack of commitment from project recipients
- Lack of awareness on the different roles of stakeholders
- Dependency syndrome
- Lack of capacity building on project management
- Lack of project appraisal during planning stage
- Cultural barriers
- Disputes amongst projects recipients

- Political interference
- Donor expectations in conflict with those of recipients

Strategies:

- 6.3.1 Harmonise objectives of donor and project recipients.
- 6.3.2 Build the capacity of project recipients in project management.
- 6.3.3 Raise awareness on the importance of project sustainability.

## **7. Transport**

**Goal:** *An efficient, affordable, reliable and environmentally clean transport system..*

7.1 Ensure energy efficiency and conservation in the transport sector.

Issues:

- Lack of collaboration amongst relevant stakeholders
- Lack of awareness on energy efficiency measures
- Quality standard on vehicle specifications
- Lack of data and information on fuel usage in the transport sector

Strategies:

- 7.1.1 Encourage the importation of efficient vehicles.
- 7.1.2 Promote regular inspection of vehicles.
- 7.1.3 Ensure compliance with international standards and recommended practices
- 7.1.4 Raise awareness on energy efficiency and conservation measures.
- 7.1.5 Promote alternate fuel sources.

7.2 Ensure an effective regulatory framework is in place.

Issues:

- Absence of an appropriate regulatory framework for land transport.
- Lack of technical expertise and the capacity to manage regulatory framework.
- Lack of funding
- Political will
- Responsibilities dispersed over a several agencies

Strategies:

- 7.2.1 Ensure the establishment of a regulatory framework for land transport.
- 7.2.2 Ensure that funds are made available to support the regulatory authority.
- 7.2.3 Ensure in-country capacity to manage regulatory framework.
- 7.2.4 Encourage collaboration amongst relevant stakeholders.

## **8. Bio-fuel**

**Goal:** *Increase use of bio-fuels in both the electricity and transport sectors.*

8.1 Promote and encourage research, development and sustainable use of bio-fuels.

Issues:

- Inadequate research facilities
- Lack of technical expertise
- Lack of incentives to use bio-fuels
- Lack of collaboration amongst stakeholders
- Lack of funding for bio-fuel programmes
- Competing uses of copra
- Bio fuel supply chain uncertainty
- Private sector interest in bio-fuel
- Lack of a national bio-fuel standard

Strategies:

- 8.1.1 Ensure collaboration amongst stakeholders.
  - 8.1.2 Ensure in-country capacity in bio-fuel technology.
  - 8.1.3 Encourage tax incentives in the use of bio-fuels.
  - 8.1.4 Promote awareness on the benefits in the use of bio-fuels.
  - 8.1.5 Ensure the establishment of a national bio-fuel standard.
- 8.2 Ensure safe handling, transportation and storage of bio-fuels and derivatives.

Issues:

- Absence of safety standards

Environmental impacts of bio-fuel products

- Lack of awareness on potential detrimental impacts of bio-fuels
- Lack of infrastructure for bio-fuel storage

Strategies:

- 8.2.1 Encourage the establishment of a national bio-fuel safety standard for handling, transportation and storage of bio-fuels and derivatives.
- 8.2.2 Promote awareness on safety measures and environmental impacts.

## **9. Energy Waste Management, Transport and Control**

**Goal:** *Clean, healthy and safe environment.*

- 9.1 Ensure safe handling, transportation, storage and disposal of energy wastes.

Issues:

- Lack of awareness on detrimental impacts of energy waste products.
- Lack of collaboration amongst stakeholders
- Lack of proper waste disposal facilities
- [Regional treaty \(Waigani Treaty\) a barrier to removal of waste batteries \[???](#)

Strategies:

- 9.1.1 Raise awareness on detrimental impacts of energy waste products.
- 9.1.2 Encourage active collaboration amongst stakeholders in energy waste management.
- 9.1.3 Promote the development of energy waste disposal facilities.
- 9.1.4 Encourage partnerships for recycling of energy wastes.

- 9.1.5 Ensure safe handling, transportation, storage and disposal of energy wastes.
- 9.1.6 Ensure compliance with nation, regional and international conventions.

## **10. Energy Efficiency and Conservation**

- 10.1 Promote and implement energy efficiency and conservation programmes.

### Issues:

- Lack of funding
- Lack of knowledge and technical skills – in-country capacity
- Benefits of energy efficiency programmes
- High Costs associated with energy efficiency programmes
- Energy efficiency is not included in schools curriculum
- Lack of collaboration amongst stakeholders
- Lack of awareness on energy efficiency and conservation measures/benefits
- Lack of coordination on energy efficiency programmes

### Strategies:

- 10.1.1 Encourage bench marking and demand side management (DSM) programmes are in place.
- 10.1.2 Raise awareness on the importance of energy efficiency and conservation measures.
- 10.1.3 Promote tax incentives for and importation of energy efficient appliances.
- 10.1.4 Incorporate information on energy efficiency and conservation into the schools curriculum.
- 10.1.5 Ensure all government premises adopt energy efficiency measures.