

Vegetation Management Policy

2004



NETWORK DIVISION
FIJI ELECTRICITY AUTHORITY

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1 Introduction

Trees, shrubs and other vegetation enhance our lifestyles. They provide shade and privacy around our homes, offer a habitat for birds and wildlife, and add aesthetic value to our gardens. However vegetation touching powerlines is a proven risk to public safety, the environment and is one of the main causes of power supply outages. In short, powerlines and trees simply don't mix.

Effective management of vegetation around powerlines is essential for preservation of public safety, the environment and reliability of electricity supply. This can be best achieved through the planting of appropriate species near powerlines and the progressive replacement of vegetation that currently endangers public safety and the reliability of electricity supply.

Fiji is subject to extreme weather conditions, ranging from drought to cyclones. Dry conditions inflate the risk of fire. Strong winds and waterlogged ground can result in trees falling across powerlines and bringing them down, especially where inappropriate vegetation species are growing too close to powerlines. Fallen powerlines can kill.

The Fiji Electricity Authority maintains a fairly large electrical distribution system which consists of some 7,300 kilometers of poles and wires. Therefore, you may appreciate the Fiji Electricity Authority's investment in keeping vegetation clear of powerlines is immense.

Our vegetation management practices and strategies support the principles of the Fiji Electricity Authority's environmental policy.

In the scope of vegetation management, it is our intent to achieve a balance between our environmental responsibilities and ensuring a safe, reliable and economical electricity supply to our customers.

The Fiji Electricity Authority recognises that there are sites of significant vegetation near powerlines requiring special consideration and treatment because of their importance to the community and the environment.

1.1 Objectives of Policy

The objectives of the Policy are to:

- Ensure public safety;
- Minimise vegetation related interruptions to electricity supply;
- Reduce the risk of fire ignition;
- Establish management practices which balance electrical safety, reliability of the electricity system and community costs, with ecological and conservation values; and
- Communicate the Fiji Electricity Authority's commitment and endeavours to secure public safety and responsible vegetation management practices to the community.

1.2 Application of Policy

The Vegetation Management Policy applies to any powerlines owned by the Fiji Electricity Authority.

1.3 Purpose of Policy

The purpose of this policy is to set out:

- the minimum safety clearances that must be maintained between vegetation and powerlines, as determined by the Fiji Electricity Authority;
- the practices **fea** will employ to ensure that the safe clearances are maintained;
- **fea's** obligations to its customers and the community in the maintenance of safe clearances; and
- vegetation management and planting practices **fea** customers and the community should adopt to minimise the risk of vegetation contacting powerlines

This code of practice for powerline clearance (Vegetation) provides a clear statement of **fea's** obligations and commitment to its customers, as well as an outline of its vegetation management practices. As such this policy does not fully detail all the plans, procedures and other activities and initiatives that support the achievement of the policy objectives.

1.4 Legal Responsibilities

1.4.1 The Fiji Electricity Authority

The Fiji Electricity Authority has legal powers and responsibilities under the Electricity Act to maintain safe clearances between vegetation and powerlines. Section 37-1(b) of the Electricity Act reads:

Section 37.-(1) In exercise of powers conferred upon the Authority or a licensee by the provisions of this Act, the Authority or the licensee, as the case may be, may, by their officers, agents or servants, do all or any of the following:

- (b) cut and remove from any Crown, native or private land any tree or any branch, bough or other part of a tree growing on such lands within 30 meters of any main or sub-main used for conducting energy and which may in any way affect or interfere with the works;

Vegetation management activities are subject to a range of other statutory requirements that take precedence over this policy.

1.4.2 Landowners

The Fiji Electricity Authority must ensure/arrange that vegetation around powerlines is maintained.

In most situations, electricity is supplied to a property by a service cable. This is attached directly to a dwelling or building. Where the distance to the attachment point is too far for direct connection, an intermediate pole is erected. This pole and subsequent poles and wires form an electric line, normally the property of the landowner.

There are other situations where powerlines emanate from a building on the property and carry the electricity supply to pumps or other buildings or equipment on their property.

If landowners or occupiers are unsure of the ownership of electric powerlines, they should contact the Fiji Electricity Authority.

Landowners must exercise care in assessing the safety clearances and conducting pruning work. The relevant clearances and practices in this Policy should be used for guidance and only persons appropriately trained and accredited should undertake these works.

2 Customer Charter

2.1 General

The Fiji Electricity Authority recognises that the vegetation it manages is the property of landowners. Accordingly, the Fiji Electricity Authority will carry out its responsibilities in an informative and consultative manner, providing all landowners every opportunity to inquire or comment on proposed clearing and pruning.

The Fiji Electricity Authority has established processes and guidelines to ensure that those affected by clearing and pruning activities are:

- notified of impending works,
- consulted about changes in practice, and
- where applicable, party to the agreement of how the works will be conducted.

Having experience and knowledge of electricity networks, the Fiji Electricity Authority will assist and provide general advice to customers and the public on management, planting and maintenance of vegetation in the vicinity of powerlines. The Fiji Electricity Authority will make every effort to ensure public safety and integrity of the electricity network.

2.2 Notification and Consultation

The Fiji Electricity Authority will notify and consult, when and where applicable, with landowners and land managers.

The Fiji Electricity Authority will notify by written notice:

1. persons occupying or managing private land affected by programmed clearing or pruning at least 3 days prior to the work;
2. Local Government authorities or any other relevant body responsible for management of public land affected by programmed clearing or pruning at least 3 days prior to the work, or as per stakeholder agreements

When proposed pruning or clearing will differ from established practices for specific locations, **fea** will consult:

1. Landowners and managers of public and or private land; and
2. Landowners or land managers whose property may be affected by proposed clearing on adjacent public land.

The Fiji Electricity Authority will consult with:

- a. Landowners or land managers, arrangements for access to powerline easements;
- b. Landowners and managers of public and or private land, arrangements for the introduction of chemical treatment of vegetation on their land;

- c. Landowners and managers of public and or private land in urban areas, arrangements for removal and disposal of mature vegetation on their land which could endanger the powerline; and
- d. Landowners and land managers in rural areas, where the removal of the vegetation may affect the use of the land.

2.3 Assistance to the Public

The Fiji Electricity Authority will assist persons responsible for vegetation management to ensure that any pruning or clearing conducted near powerlines can be done safely. When requested **fea** will:

- a. Assess and advise of safe working distances for pruning or clearing activities around powerlines; and
- b. Recommend safe methods for removing vegetation near powerlines.

Note. This may require The Fiji Electricity Authority to de-energise powerlines, do preliminary pruning to enable safe access, or take other precautions to ensure the safety of those working near the powerline.

When requested, **fea** will provide landowners and land managers advice on clearing and pruning alternatives, such as powerline relocation or conversion to an insulated system, and any associated costs which have to be borne entirely by the landowners and land managers.

2.4 Emergency Clearing

In emergencies, **fea** must remove vegetation that pose an immediate risk to public safety and security of the electricity network. In such circumstances, pruning may be undertaken without consulting landowners or land managers where impracticable. However, **fea** will notify these persons as soon as feasible after removal of the vegetation.

2.5 Disputes

Disputes may arise from decisions made by **fea** in carrying out its responsibilities to maintain safe clearances. The Fiji Electricity Authority will endeavor to resolve any dispute with those affected through its corporate dispute resolution processes.

Notwithstanding the nature of the dispute and the need to resolve the dispute in an amicable manner, **fea's** responsibility to maintain safe clearances cannot be compromised.

3 Electricity Systems and Vegetation Clearance

3.1 Introduction

The Fiji Electricity Authority electricity network is primarily comprised of bare wires strung between poles. Sections of the **fea's** network include insulated, overhead and underground systems.

3.2 Bare Wire Systems

Traditionally powerlines have been comprised of bare conductors supported by insulators on poles and towers. The insulating medium for the live wires to ground, other structures, or buildings and

vegetation is the surrounding air. This relatively low cost type of construction has enabled the vast expanses of Fiji to be reticulated with electricity.

The space surrounding bare wire system conductors must be kept free of vegetation to avoid discharge of electricity from the conductors to the vegetation and the ground. The dimensions of the necessary 'clearance space' around conductors vary, and are dependent on a number of factors, as outlined in Section 6.

When planning the construction of a new powerline, **fea** will ensure that:

- The selection of a system is the optimal cost alternative and meets statutory requirements;
- The route of the line avoids unnecessary and recurrent clearing and pruning of remnant vegetation; and
- Where practicable, vegetation species suitable for growing near the powerlines are not removed.

In selecting the route of the line, the Fiji Electricity Authority will establish the most economical, technically acceptable option, taking into account the ongoing costs of vegetation management, the objectives of our environmental policy, and maintenance of the distribution network. Appropriate approvals will be sought from relevant bodies responsible for the management of any land the route may pass through.

3.3 Underground Cables

The cost of underground cable systems has decreased, but remains more expensive than overhead lines. Greater economy is achieved if the underground system is installed as part of general civil works. The investment in an underground system is reflected in the sale price of the allotments.

Clearly underground cables will overcome most of the ongoing vegetation issues associated with overhead bare wire lines. However, the cost to retrofit existing high voltage and low voltage lines

underground in established roadways cannot be justified. The expense could not be funded under current regulated financial arrangements.

Generally, **fea** will not replace bare conductor systems with underground cables to avoid the clearing and pruning of vegetation, unless others fund the cost of the works.

3.4 Insulated Overhead Line Systems

The various types of insulated overhead line systems commonly used are; Aerial Bundled Conductors (ABC), covered conductors and service cables. ABC is an insulated cable layed up in a bundle and supported on poles. A service cable is the insulated wire connecting the customer's installation to the **fea** network.

These systems being insulated require reduced clearance space to that of bare conductors. The design of ABC and service cable allows occasional contact with vegetation without any transfer of electrical potential, or disturbance to the electricity supply. However, continual rubbing by limbs will

damage the cable insulation causing it to fail. For this reason, some clearance space must be maintained to substantial vegetation.

ABC has proven expensive for **fea** and therefore not economical for use in Fiji however if any customer prefers ABC then the customer will have to pay for the cost of installation.

However as a rule, the Fiji Electricity Authority will not replace mechanically sound, or suitably sized bare conductors solely to allow reduced clearances to vegetation. This expense cannot be funded without increasing the cost to supply electricity.

4 Managing Vegetation near Overhead Lines

4.1 General

The Fiji Electricity Authority's electricity network consists of a high voltage transmission and sub-transmission system that connects cities and rural areas, and high and low voltage distribution systems that delivers electricity to customers' homes and businesses.

The Fiji Electricity Authority's objective for the management of vegetation around this network is to achieve a safe and reliable electrical system, based on management practices that will eliminate the need for recurrent clearing and pruning of vegetation.

Vegetation growing on public land and private properties in urban areas is generally planted and nurtured by the landowner or manager. However, vegetation in rural areas is generally naturally occurring and indigenous to the area. The Fiji Electricity Authority's objective is to create a corridor clear of any vegetation that may grow into or fall onto powerlines.

All vegetation management activities are undertaken with regard to Vegetation Management Policy. The Fiji Electricity Authority has a legal obligation to notify landowners and land managers of proposed vegetation management activities.

The conservation value of vegetation in areas of Fiji is also recognised and protected by legislation. The Fiji Electricity Authority supports the conservation of these areas and will comply with all legislative requirements and associated Codes of Practice.

The Fiji Electricity Authority recognises the importance of safe work practices when working near overhead electric lines and utilises Sections 63 and 66 of its Electrical Safety Manual as a minimum safety standard for managing vegetation near overhead lines.

The Fiji Electricity Authority will clear vegetation using trained and skilled personnel adhering to Sections 63 and 66 of the FEA Electrical Safety Manual.

The Fiji Electricity Authority will consult with landowners and land managers for the removal of unsuitable species and vegetation that endangers the safety or the reliability of the powerline. This will be conducted taking into consideration Important Vegetation as detailed in section 4.3.

The extent and number of powerlines in rural areas requires a different management approach to that used in urban areas. Response times to incidents of vegetation affecting the electricity supply will generally be significantly greater than the time taken in urban areas. Lines can be extremely long (up to 80 kilometres) and access can often be difficult, particularly in adverse weather conditions.

Indigenous saplings whose mature height could endanger the line are ideally removed at an early growth stage to minimise future cost and disruption to the area. Low growing vegetation that poses no threat to the reliability and safety of the powerline will not be removed, except to provide maintenance access, or to reduce fire potential through fuel build up.

In some areas, creating a corridor may not be appropriate, for example through rainforests. Due to the mature height of the trees and rainforests conservation value, the principles of important vegetation (section 4.3) may be adopted.

4.2 Transmission and Sub-transmission Lines

Transmission lines transport electricity from Wailoa Power Station to our main load centers. Sub-transmission lines are the arterial links between regional centres. Consequently, the reliability of these powerlines is critical for all customers. Incidents such as vegetation falling on sub-transmission and transmission powerlines can have dramatic consequences and possibly cause 'blackouts' to large areas of the Fiji.

The Fiji Electricity Authority's objective is to create a corridor clear of any vegetation that may grow into or fall onto transmission and sub-transmission lines.

Sub-transmission powerlines are present in both urban and rural areas and situated on roadways, and easements created for their passage.

4.3 Important vegetation

This is vegetation identified in liaison with relevant and recognised authorities or bodies such as local government councils, Government departments, etc., as requiring special attention to preserve its condition. This includes:

- botanically, historically or culturally important vegetation;
- vegetation of outstanding aesthetic or ecological significance; and
- the habitat of rare or endangered species.

The Fiji Electricity Authority will work with government, city and town councils, and other recognised groups to establish a management plan for identified important vegetation.

5 Residents' and Landowners' Responsibilities

5.1 General

Members of the community can assist in achieving a safer and more reliable electricity supply by taking care when planting and maintaining vegetation near powerlines and service lines.

The majority of vegetation that interferes with the safe and reliable operation of powerlines in urban areas is planted by residents and landowners. Obviously, they do this unintentionally without understanding the consequences of their actions.

The Fiji Electricity Authority aims to raise the community's awareness of these issues.

5.2 Planting of Vegetation

When anyone is selecting plants to grow near powerlines the first question must be, how tall will this plant grow?

Species with a mature height greater than two metres should not be planted under or near powerlines. Taller species that have a short life span, or are easily blown over in storms should not be planted where they could fall onto powerlines. As a rule, taller trees **should be planted at least the height of the mature tree away** from powerlines.

Farmers in cane farm areas are hereby advised to ensure when lighting fires in sugar cane farms that the fire does not spread to **fea's** power poles and damage them. In the event these fires damage **fea** poles, the farmers shall have to pay for the damages.

Most people will not be aware of potential tree heights, and safety around powerlines without advice. Most plant nurseries have staff who can provide such advice.

Coconut trees are a common sight in Fiji, however, their rapid growth, height and shedding of fronds make them unsuitable for growing near powerlines. As such they should not be planted in the vicinity of powerlines.

5.3 Service Lines

Service lines are the cables that connect the **fea** powerline to the property. This will generally be a single span of insulated cable from the roadside pole to an attachment on a building.

Service lines are generally insulated, however, continual rubbing by vegetation can damage the cable. Contact with vegetation during storms may bring the service line down. Damage and subsequent repairs to service lines is a substantial and avoidable cost to the customer.

A fallen service line usually affects only one property. So in severe storms a damaged service line is generally made safe and fixed later after repairs to network faults that may have caused loss of supply to large areas. So to minimise personal inconvenience and safety, all residents and landowners should ensure that vegetation is planted and maintained clear of the service line.

5.4 Maintaining Vegetation near Powerlines

Landowners and residents sometimes carry out maintenance on vegetation in the vicinity of powerlines. Before tackling any such tasks, individuals must be without any doubt that there is no risk of any person, machinery or equipment touching powerlines, or foliage falling onto powerlines.

If residents or landowners considering pruning of vegetation have even the slightest safety concerns, they should consult a suitably trained and accredited contractor. The Fiji Electricity Authority is able to provide details of local accredited contractors.

6 Powerline Clearance Standards

Vegetation that cannot fall onto the powerline can remain.

- Vegetation with a mature height less than two metres may remain under the powerline.
- A canopy of low growing vegetation will allow connectivity of wildlife habitat.
- In fire prone areas, density of vegetation will be managed to prevent accumulation of fuel.

Powerline Voltage	Vertical Clearance	Horizontal Clearance
240/415V	2 metres above ground	30 metres on either side
11kV	2 metres above ground	30 metres on either side
33kV	2 metres above ground	30 metres on either side
132 kV	5 metres above ground	25 metres on either side

Table 1 – Powerline Clearance Distances

Note: For transmission lines, a corridor of 25 metres on either side is recommended with trees under the transmission lines no higher than 5 metres at mature height above ground. For sub – transmission, a clearance of 30 metres on either side with trees under sub – transmission lines no higher than 2 metres at mature height above ground. The latter also applies for distribution lines.

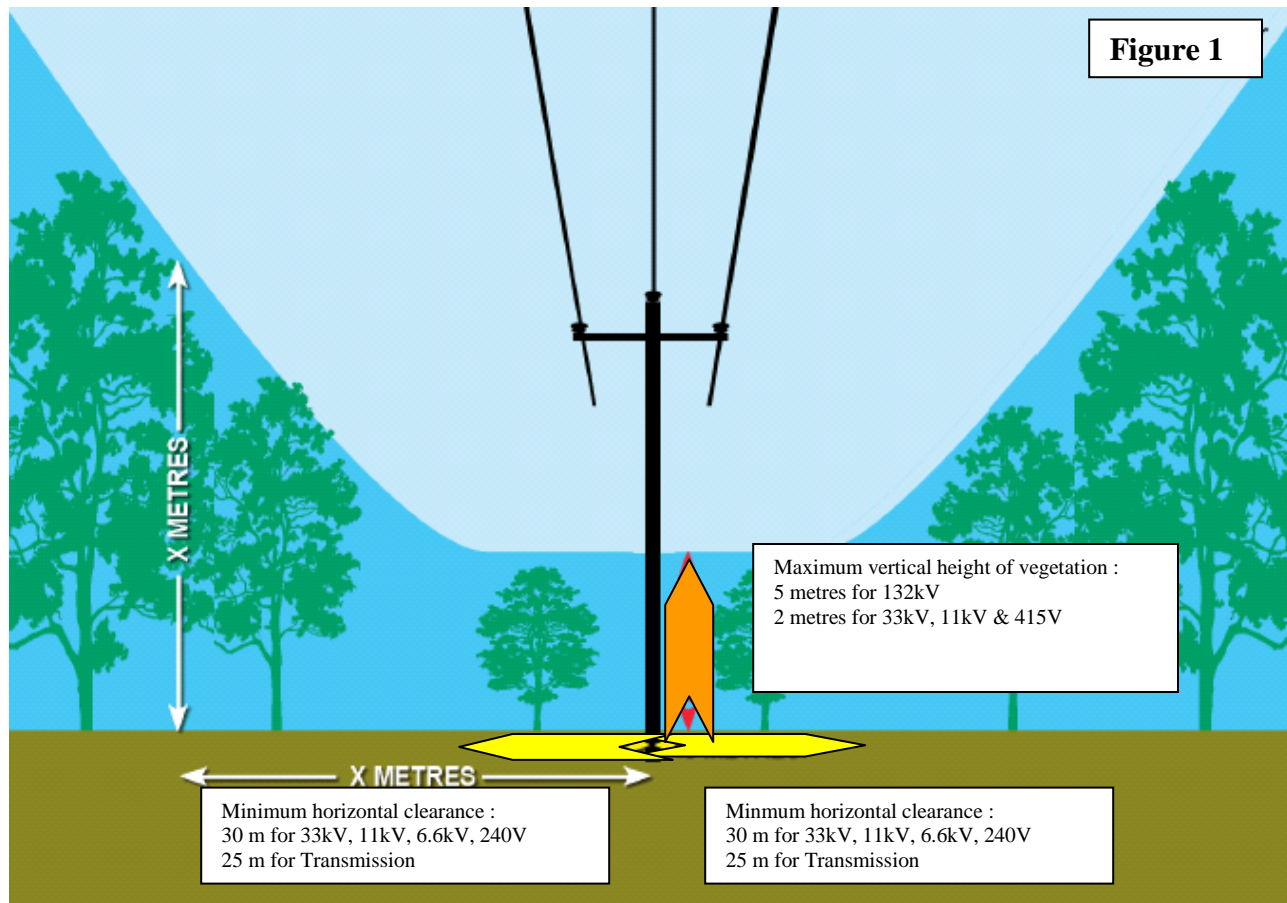


Figure 1 – Transmission, Sub-Transmission and Distribution Clearances.

7 APPENDIX – GLOSSARY OF TERMS

To assist people to understand pruning or clearing practices and to provide a consistent and measurable approach to the management of vegetation near powerlines the following basic term, concepts and principles have been adopted.

‘aerial bundled cable’	means an insulated cable manufactured to Australian Standard AS 3560 or AS 3599 Part 1 or AS 3599 Part 2 used in substitution for multiple bare conductors.
‘clearance space’	means a space surrounding a powerline that must be clear of vegetation at all times.
‘easement’	means an easement or corridor for transmitting, distributing or supplying electricity, whether registered or unregistered.
‘electric line’	means a wire, conductor or associated equipment used for transmitting, transforming or supplying electricity.
‘hazard space’	means the space outside the clearance and regrowth space in which unstable trees or limbs pose a risk. These may be due to factors such as disease, fractures, dead wood and erosion or failure risk in adverse weather conditions.
‘insulated service cable’	means a low voltage, multi-core cable insulated by a medium other than an air space as defined in Australian Standard AS 3000-1991 - SAA Wiring Rules and used for the purpose of conveying electricity through a service line.
‘low voltage’	means voltage not exceeding 1000 Volts
‘occupier’	in relation to land, means a person who is in actual occupation of the land or if no one is in actual occupation of the land, the owner of the land.
‘point of supply’ (consumer’s terminals)	means the point where a customer’s electrical installation is connected to a service line.
‘powerline’	means an electric line, which ordinarily operates at a voltage of 132,000 volts or less and includes sub-transmission lines.
‘public land’	means-- (a) Crown land; (b) land vested in any Minister of the Crown; (c) land vested in any public statutory authority or council; or (d) land (whether privately or publicly owned) used for public purposes.
‘regrowth space’	means the space beyond the clearance space that must be cleared to allow for anticipated vegetation regrowth in the period between pruning and or clearing.
‘rural area’	means an area that is not an urban area.
‘service line’	means an electric line, including a connection to the service fuse, servicing a customer’s premises from the point of supply on fea Energy’s works to the consumer’s terminals.
‘transmission and sub-transmission line’	means a powerline that operates at a nominal voltage of 33kV and not more than 132kV

<p>'urban area'</p>	<p>means an area of land which is predominantly:</p> <ul style="list-style-type: none"> (a) subdivided into residential allotments or lots which in the case of land used; or to be used for residential purposes are not greater than .4 hectares and; (b) able to be used or developed under a planning scheme for residential, industrial or commercial purposes; and (c) provided with constructed streets and public utility services; and (d) provided with street lighting, installed at not less than three lanterns in every 500 metres.
<p>'vegetation management cycle'</p>	<p>This is the frequency of successive pruning or clearing which fea Energy judges optimal for maintaining clearance between powerlines and vegetation. It is based on practical factors including the strategic importance of the reliability of the line to the electricity network, the local climate, regrowth rate, the size of the clearance and regrowth space, recurrent costs, and conservation considerations.</p>