Western Power’s Management of its Wood Pole Assets

Report 17 – November 2013
WESTERN POWER’S MANAGEMENT OF ITS WOOD POLE ASSETS

This report has been prepared for submission to Parliament under the provisions of section 25 of the Auditor General Act 2006.

Performance audits are an integral part of the overall audit program. They seek to provide Parliament with assessments of the effectiveness and efficiency of public sector programs and activities, and identify opportunities for improved performance.

The information provided through this approach will, I am sure, assist Parliament in better evaluating agency performance and enhance parliamentary decision-making to the benefit of all Western Australians.

GLEN CLARKE
ACTING AUDITOR GENERAL
20 November 2013
Western Power’s Management of its Wood Pole Assets

Contents

Auditor General’s Overview 4

Executive summary 5
Background 5
Audit conclusion 6
Key findings 7
Recommendations 9
Response from Western Power 10

Audit focus and scope 11

Western Power transmits and delivers electricity within a complex regulatory and financial environment 12
Western Power builds, maintains and operates the electricity network in the south west of Western Australia 12
Western Power is owned by government, reports to the Minister for Energy, is governed by an independent board and has two regulators 14
Western Power funds the maintenance and expansion of its network through borrowings 15

Western Power will take over a decade and billions of dollars to bring the network back to a stable condition 17
Western Power exceeded its 2012-13 target of replacing or reinforcing 63 000 wood poles, but over 300 000 remain to be treated by 2017 17
Western Power is mostly reinforcing instead of replacing poles which shifts the cost of replacements into the future 18
Western Power is changing its policies and practices to improve asset management, reduce risk and improve network performance 20
Bringing the network to a ‘steady state’ of maintenance will likely require at least an additional $1 billion and take until at least 2022 23

Western Power is improving its communication with regulators but will not meet the 2009 EnergySafety Order 24
Western Power did not effectively manage the requirements of its regulators 24
Western Power is now regularly briefing regulators 24
Monitoring compliance with regulatory requirements has become a higher priority for the Board and Executive of Western Power 25
Based on current plans Western Power will not fulfil all requirements of the 2009 EnergySafety Order by 2015, but is seeking to meet its intent 26
Western Power delivers a service that is both life saving and life threatening. Its operations require the input of huge resources and the sources from which that effort is funded is a matter of widespread debate. As a Government Trading Enterprise, Western Power has greater independence from government than standard agencies, but the significance of its service means that government interest is never far removed. It is also closely regulated by the Economic Regulation Authority and EnergySafety. Managing these push-pull factors, while delivering a safe and reliable service, is a serious challenge.

These factors have been highly visible in Western Power’s management of its wood poles in recent years. Western Power’s failure to respond adequately to an Order from EnergySafety in 2009 was a key driver of an inquiry by the Public Administration Committee which was reported in 2012. The inquiry highlighted an increasing loss of confidence in Western Power’s management of its assets and growing concern over the safety and reliability of the wood pole network. This performance audit focused on assessing Western Power’s progress in addressing the concerns of its regulators and Parliament.

Western Power has made progress. It has put in place plans to significantly increase the rate of renewal of the network through more wood pole replacements and reinforcements, and has exceeded its 2012-13 targets. This will reduce network risk and improve safety. Internally Western Power has begun to make changes to its asset management systems and processes and has increased its focus on complying with regulatory requirements. However, areas of concern remain.

Although Western Power has met a number of the requirements of the EnergySafety Order, it will not meet the requirement to reinforce or replace all unsupported rural wood poles by the end of 2015. In fact, Western Power estimates that it will fall well short. This reflects an ongoing difference of view between Western Power and EnergySafety over which poles represent the highest risk to public safety and therefore should be prioritised for action.

A solution to the deadlock may be Western Power’s new asset management system that identifies risk to the network and prioritises its resources to address the risk. While Western Power has worked cooperatively with EnergySafety in developing its new system, Western Power has not yet convinced EnergySafety that the system is robust. We noted that Western Power has arranged for independent experts to assess the system. Endorsement of the new system should give EnergySafety and the public confidence in Western Power’s wood pole reinforcement and replacement program.

The wood pole network has suffered from decades of under-investment. Reflecting this, the volumes and costs of wood pole replacements and reinforcements over the next five years will be well above normal ‘steady state’ cyclical maintenance levels. The $1 billion that Western Power will spend by 2017 will not return the network to a ‘steady state’ condition and estimates are that it will take a further $1 billion and until 2022 at the earliest. These levels of activity and costs are not sustainable and have the potential to affect long term maintenance cycles and investment. Putting in place robust plans to return to ‘steady state’ maintenance levels should be a priority for Western Power so it delivers a safe, reliable and economical network.
Executive summary

Background

Western Power is a Government Trading Enterprise, established in 2006, to transport and deliver electricity to the south west corridor of Western Australia. Its network covers an area of approximately 253 000 square kilometres reaching from Albany in the south, Kalbarri in the north and Kalgoorlie in the east.

Western Power’s network is made up of 42 000 transmission towers and poles that transport electricity from generators to substations, and 758 000 distribution poles that transport electricity from substations to consumers. Sixty-seven per cent of transmission poles and 83 per cent of distribution poles are made from wood.

A large proportion of Western Power’s network assets were built during the 1960s and 1970s. With an average useable life of 40 years for wood poles, these assets are now reaching the age where a higher proportion of replacement and repair work is needed. From a population of approximately 629 000 wood distribution poles in the network, 181 000 are currently older than the anticipated average in-service life.

Western Power’s management of its wood pole network has been subject to seven inquiries and assessments by regulators in the last five years (Figure 1 overleaf). A significant recent inquiry, completed in 2012, by the Public Administration Committee found:

“…Western Power has clearly failed to adequately manage its wooden pole asset base to an acceptable level. This is most obviously demonstrated by its ‘worst-in-class’ status throughout Australia.”

Western Power has also acknowledged the poor state of its network. In a media update released on 15 September 2011 Western Power said that its “…network was reaching the end of its useful and safe life…”, and “…20 years of accelerated investment was necessary…”

In its public response to the Committee’s report, Western Power accepted that it needed to take serious action to reinforce and replace wood poles to:

- reduce the risk in the wood pole network as quickly as possible
- reduce the unassisted pole failure rate as soon as possible
- comply with the EnergySafety’s Inspector’s Order 01/2009 to the fullest extent possible.
Executive summary

In Access Arrangement 3 (AA3) approved by the Economic Regulation Authority (ERA) in November 2012, Western Power outlined how it would achieve its licensing commitments which included proposing annual targets for wood pole asset management for 2012-13 to 2016-17. During this five year period Western Power is planning to replace or reinforce 370 000 wood poles, equating to over half of the total population.

Western Power anticipates this new approach will address key issues identified by EnergySafety and the Public Administration Committee.

Our audit assessed what progress Western Power has made since 2012 in improving the safety and reliability of its network of distribution and transmission wood poles. We focused on two main questions:

- Is Western Power implementing adequate strategies, plans and systems to improve the safety and reliability of its wood pole network?
- Is Western Power meeting the accountability requirements of its regulators?

Audit conclusion

Western Power has begun what will be a long process of improving the safety and reliability of its wood pole network. It has put a $1.35 billion plan in place, with clear targets for pole replacement and reinforcement between now and the end of 2016-17. It has exceeded its targets in the first year of the plan, which represents significant growth in delivery compared to previous years. However, 300 000 poles remain to be treated. Achieving this target will require Western Power to increase its annual rate of reinforcement or replacement even further, and it has a plan in place to do this.

The replacement and reinforcement of the 370 000 poles by the end of 2016-17 will not bring the wood pole network to a condition where it requires only ‘steady state’
maintenance. Western Power estimates that reaching ‘steady state’ will take until 2022 at the earliest and will cost at least another $1 billion. No plans or targets are in place yet for achieving ‘steady state’.

Reducing risk in the wood pole network, both now and in the longer term, will depend on Western Power being more effective in identifying risk to the network and prioritising its activity and resources to address the risk. Western Power is in the early stages of implementing important changes to its asset management systems and practices to achieve this.

Western Power has placed a higher priority on compliance and communication with its regulators and stakeholders. However, it will not meet the terms of EnergySafety’s 2009 Order to replace or reinforce all of the 279 000 unsupported rural poles that do not meet a specific safety guideline by December 2015.

**Key findings**

- Western Power’s rate of wood pole replacement and reinforcement over much of the last seven years has been low, resulting in a backlog of poles requiring treatment. Western Power estimates it will spend $1.35 billion to replace or reinforce nearly 370 000 wood poles over the next five years, but this is only the first step to bring the network back to a sustainable maintenance position. Western Power estimates that reaching a stable position is likely to cost at least a further $1 billion and will take until at least 2022.

- Western Power exceeded its 2012-13 target of replacing or reinforcing 63 000 of the 370 000 poles it identified as needing treatment. However, to achieve its overall target, Western Power’s output in the remaining four years will need to average 15 per cent more than in 2012-13. Achieving its target will require that Western Power maintains the necessary funding and capacity. It will also need to avoid compromising network reliability, which can arise from major maintenance work.

- Western Power’s replacement and reinforcement target of approximately 370 000 poles was driven by how much it believed it could achieve with its available resources, rather than based on an assessment of the condition of the wood pole network. Until recently, the pole inspection data used by Western Power to make decisions on its network was inaccurate and incomplete. This has been acknowledged by Western Power and its regulators. The inspection technique has now been improved, and more accurate and reliable data is gathered. However, a full inspection cycle, taking approximately four years, is needed before all pole data is collected.
• Approximately 70 per cent of the 370 000 wood poles are expected to be reinforced, with the other 30 per cent being replaced. Reinforcement will immediately improve the condition and reliability of the wood pole network, as it addresses the short term risk of pole failure by strengthening the pole. However, it does not remove it. These reinforced poles will still need replacing within 15 years, and Western Power will be faced with a spike in pole replacements. Pole replacement costs nine times more than reinforcement. Western Power will need to factor this additional replacement volume and cost into any future planning.

• Western Power is changing its policies and practices to improve asset management, reduce risk and improve network reliability. Improvements include a new method of pole inspections that collect more data and give a much better understanding of the condition of a pole, as well as a more comprehensive risk management approach for prioritising maintenance work. It is too early to tell if these changes will reduce risk, but Western Power is showing strong commitment to the changes. EnergySafety has advised us that the new method of wood pole inspection is satisfactory and meets the requirements of the Order it issued in 2009.

• EnergySafety is not yet supportive of Western Power’s new risk based approach to prioritisation of wood pole replacement and reinforcement, and believes that it should continue to be based on the age of poles until the new approach can be proven. Western Power has engaged independent experts to evaluate its new process.

• Western Power has significantly improved its efforts to comply with the requirements of its regulators, the ERA and EnergySafety. In the last 12 months it has made compliance a higher priority and is regularly reporting to EnergySafety, the ERA, the Public Utilities Office (PUO) and the Minister for Energy.

• Western Power has repeatedly expressed its commitment to meeting the EnergySafety Order, subject to funding availability and the capacity to deliver the required volume of pole treatments. Although Western Power has met many of the requirements of the Order, it will not fulfil the requirement that by 2015 it must replace or reinforce all unsupported rural poles that do not meet a specific safety guideline. On current estimates, Western Power believes that by 31 December 2015 around 170 000 of the 279 000 rural wood poles will not comply with the Order.

• Western Power is using its new risk management system to reduce the public safety risk posed by the aging wood pole population and believes it has identified wood poles that represent a higher risk to public safety than those identified in the EnergySafety Order. Using this system of work prioritisation, some poles covered by the EnergySafety Order will be replaced but a large number of other poles not
covered by the Order are being given higher priority by Western Power. Based on current funding and delivery capacity Western Power forecasts that it will take until around 2022 for all poles to be treated such that they fully comply with the Order.

- Western Power is improving its communication with stakeholders. Western Power and EnergySafety are in regular communication regarding the steps Western Power is taking to reduce overall risk in the wood pole network and its progress in meeting the EnergySafety Order. Should Western Power not comply with the Order, EnergySafety may take action, including prosecution, but EnergySafety has advised us that it will not decide on what, if any action, it will take until the expiry of the Order in December 2015.

**Recommendations**

Western Power should:

- complete a comprehensive analysis to confirm when a ‘steady state’ of wood pole maintenance can be achieved, and at what cost, by mid 2015
- continue its data quality improvement process to enhance capacity for future planning, and have the data integrity confirmed by late 2015
- ensure that for the Access Arrangement 4 (AA4) negotiations all Western Power wood pole plans and targets are matched to make the best use of the available resources and best address the immediate and long term needs and risks of the network.
Response from Western Power

Western Power accepts the findings of the Report and would like to express its thanks to the Office of the Auditor General for its efforts in the preparation of the Report. It will seek to implement the recommendations outlined in the Report by the due date, subject to appropriate funding being made available.

In September 2009, EnergySafety issued Western Power with Inspector’s Order 01/2009 in relation to the management of its wood pole network.

In January 2012, the Standing Committee on Public Administration issued Report 14 – Unassisted Failure, which was critical of Western Power’s response to the Order and its approach to the management of wood poles in the Network.

In May 2012, the Minister for Energy accepted the findings of the Standing Committee and required Western Power to take immediate action to address its concerns, stating:

“It is important that further progress be made towards meeting the obligations of the EnergySafety Order and improving Western Power’s asset management systems and compliance culture”.

Western Power has made significant changes to its operations to improve its compliance culture and respect for regulatory obligations. Western Power is committed to complying with the Order to the fullest extent possible taking into account delivery and funding constraints.

Prior to the release of the Standing Committee’s Report, Western Power did not take appropriate action to address the requirements of the Order. As a result of this delay, Western Power cannot comply with the requirements of the Order by the due date.

In responding to the Standing Committee findings, Western Power has sought to improve its asset management systems, particularly the quality of its data and its capability to assess and quantify risks associated with wood poles.

Western Power has also sought to improve the efficiency and effectiveness of its work practices in relation to the treatment of wood poles, which has led to an increase in the number of wood poles able to be treated. Western Power will seek additional funding from the State Government for these additional volumes.

Western Power has implemented a new operating model that enables it to continually improve its operations in order to better identify and manage network risks. This includes a new network risk management tool and a zone based asset management approach.

Western Power has also worked very closely with EnergySafety in respect of its approach to the treatment of all wood poles in the Network and will continue to liaise and share information with EnergySafety in respect of any new processes and systems.

Western Power has and will continue to prioritise the treatment of the wood poles described in the Order unless expressly advised otherwise by EnergySafety.
In 2009, Western Power initiated a program of work to address the issues raised in the 2009 EnergySafety Order. In 2012, Western Power initiated a further change management process to address the recommendations and concerns raised in an inquiry by the Public Administration Committee of Parliament into its wood pole network.

We assessed what progress Western Power has made since 2012 in improving the safety and reliability of its network of distribution and transmission wood poles. We focused on two main questions:

- Is Western Power implementing adequate strategies, plans and systems to improve the safety and reliability of its wood pole network?
- Is Western Power meeting the accountability requirements of its regulators?

The audit involved consultation with Western Power’s key regulators; EnergySafety and the ERA. The PUO was also consulted. We did not audit Horizon Power which also has a wood pole network.

The audit was conducted in accordance with the Australian Auditing and Assurance Standards.
Western Power transmits and delivers electricity within a complex regulatory and financial environment

Western Power builds, maintains and operates the electricity network in the south west of Western Australia

There are three Government Trading Enterprises (GTE) involved in providing electricity to the south west of Western Australia; Western Power, Verve Energy and Synergy. Each GTE has a specific and unique function in the process (Figure 2). Electricity is generated by Verve Energy then transmitted and distributed by Western Power. The retail and billing function is managed by Synergy. Horizon Power is responsible for all three of these functions in every part of the state outside of the south west corner.

<table>
<thead>
<tr>
<th>Generation</th>
<th>Transmission and Distribution</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity is made at power plants using a variety of fuel sources.</td>
<td>Electricity flows along the network from generators to customers. The network is made up of high voltage steel towers (transmission assets) and low voltage infrastructure such as suburban street power poles, conductors or wires.</td>
<td>The cost of generating electricity is recouped from customers.</td>
</tr>
</tbody>
</table>

- **Verve Energy**
  - Owns and operates power stations in the South West Interconnected System.

- **Western Power**
  - Is responsible for connecting people with electricity in the South West Interconnected System.

- **Synergy**
  - Is responsible for billing and collecting services charges from consumers within the South West Interconnected System.

- **Horizon Power**
  - Is responsible for generating, procuring, distribution and retailing electricity for 38 systems: the North West Interconnected System in the Pilbara and the connected network between Kununurra, Wyndham and Lake Argyle, and 34 stand-alone systems in regional towns and remote communities.

Source: Western Power and the OAG

Figure 2: Key GTEs involved in the generation, distribution and retailing of electricity
Western Power's network covers an area of approximately 253 000 square kilometres supplying electricity and electricity services to the south west, which includes a transmission and distribution network from Kalbarri to Albany and east to Kalgoorlie (Figure 3). The network transports electricity from generators to both residential and commercial customers.

Figure 3: Western Power’s area of operation (shown in orange)

Western Power’s network includes about 42 000 transmission towers and poles. These transport electricity from generators to substations. The network also includes approximately 758 000 distribution poles. Distribution poles enable electricity to be transported from the substation to consumers. Woods such as pine, jarrah and blackbutt are the main materials used for transmission and distribution poles. Sixty-seven per cent (28 000) of transmission poles and 83 per cent (629 000) of distribution poles are made from wood. Over half of these now require replacement or reinforcement under Western Power’s current strategy.
Western Power is owned by government, reports to the Minister for Energy, is governed by an independent board and has two regulators

Western Power is established under the *Electricity Corporations Act 2005*. As a GTE, Western Power generates income through the transmission and distribution of electricity in the south west of Western Australia. It is owned by the State Government and is accountable to the Minister for Energy.

Western Power’s governance structure involves a Board of Directors whose role is to set Western Power’s strategic direction and oversee its operational management and commercial activities. The Board and Chief Executive Officer are also responsible for keeping its shareholder, the State of Western Australia represented by the Minister for Energy, informed of corporate performance. Western Power is also subject to two key independent regulators. These are the ERA and EnergySafety (Figure 4). These regulators ensure that Western Power provides a safe, affordable and reliable service to its customers. The PUO develops state energy policies that influence how both the regulators and Western Power undertake their activities.

![Figure 4: The interaction between Western Power, its regulators and the state energy policy office](image)

The ERA is Western Australia’s independent economic regulator, regulating monopoly aspects of the gas, electricity and rail industries and licensing providers of gas, electricity and water services. The ERA’s responsibilities include helping to ensure consumers receive quality services, and the monitoring of compliance with licensing conditions.
EnergySafety promotes safety in the electricity and gas industries by setting and monitoring safety standards, licensing operatives and conducting accident investigations. EnergySafety is responsible for the technical and safety regulation of all of the electrical and most of the gas industry in WA. It covers the complete electricity supply chain. This includes production, transmission and distribution as well as utilisation. It also provides technical advice and support to the ERA, and at the request of the ERA it can investigate the performance of electricity and gas network operators with respect to energy supply reliability and quality.

The PUO is an office within the Department of Finance. It provides a range of services on energy matters to the Minister for Energy including setting guiding rules for the ERA and developing energy policies for the State Government.

**Western Power funds the maintenance and expansion of its network through borrowings**

**The Economic Regulation Authority acts to ensure that Western Power’s service charges are fair and reasonable**

In most industries competition heavily influences the setting of prices. However, Western Power operates in a natural monopoly. In the absence of competition in the market for electricity transmission and distribution, the ERA acts to ensure that Western Power’s charges are fair and reasonable.

Western Power’s Access Arrangement, which must be approved by the ERA, is the instrument that formalises what services are to be delivered, what service levels are to be achieved and the total amount of revenue Western Power can collect from customers each year. This amount of revenue, determined by the ERA, must be sufficient to cover efficient operating costs, depreciation of capital expenditure and a return on investment.

Western Power is currently operating under AA3 which covers a five year period from July 2012 to June 2017. Access Arrangement 1 and Access Arrangement 2 were set for a period of three years. Future access arrangements are likely to operate for five years.

**Government approves Western Power’s forward capital investment program**

Western Power provides details of its capital investment program as part of the Access Arrangement. This outlines how Western Power intends to spend its capital investment budget over the five year term of the Access Arrangement, including wood pole replacement and reinforcement expenditure. The ERA assesses, adjusts and approves the program to ensure it is efficient and meets the requirements of the *Electricity Networks Access Code 2004*. 
Western Power predominantly funds all capital investment through borrowings from the Western Australian Treasury Corporation. Each year a capital investment plan is developed by Western Power for submission to the Department of Treasury. However, the full capital expenditure proposed by Western Power and approved by the ERA is not always funded by Government during the state budget process.

In September 2012 as part of the last Access Arrangement process, the ERA recommended to Government that it approve a budget of $1.14 billion on wood pole replacements and reinforcements for the next five years. Government approved a budget of $1.09 billion as part of Western Power’s Strategic Development Plan (Figure 5).

In order to fully fund its forward plans, Western Power will present a business case for further capital investment during the 2013-14 Western Australian state budget mid year review. Preparations for the business case for the final three years of the AA3 period are currently underway. Western Power has advised that it will include a $263 million submission for the impact of the budgetary shortfall as well as the increase in the unit rates for the wood poles. Should its application for additional funding be unsuccessful, Western Power has advised it will not meet its five year targets outlined in AA3.

![Figure 5: The process for funding Western Power’s capital investment](image-url)

<table>
<thead>
<tr>
<th>Wood pole replacement investment</th>
<th>Wood pole reinforcement investment</th>
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</thead>
<tbody>
<tr>
<td>Wood pole replacement investment</td>
<td>Wood pole replacement investment</td>
</tr>
<tr>
<td>Initial AA3 Estimate</td>
<td>972.6</td>
</tr>
<tr>
<td>AA3</td>
<td>783.1</td>
</tr>
<tr>
<td>State Budget</td>
<td>728</td>
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<tr>
<td>Western Power’s Approved Works Program</td>
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</table>

Western Power and the Economic Regulation Authority negotiate the terms of the Access Arrangement when proposing annual funding for capital investment to Government.

On receiving funding approval from Government, Western Power allocates funding internally to operational areas.
Western Power will take over a decade and billions of dollars to bring the network back to a stable condition

In 2012 Western Power developed a five year Wood Pole Asset Management Plan. This plan is a suite of documents that together seek to articulate Western Power’s wood pole asset work program for 2012-13 to 2016-17. The cost of delivering the Asset Management Plan was approved at $1.09 billion in the 2013-14 State Budget. Western Power now estimates that it will cost approximately $1.35 billion due to the rising cost of materials and labour.

Western Power’s Wood Pole Works Implementation Plan, contained within the Asset Management Plan, commits it to reinforcing or replacing 369 210 wood poles, which is an average of 73 842 pole replacements or reinforcements each year.

The replacement and reinforcement targets were driven by how much Western Power believed it could achieve given its resources, rather than from an assessment of the condition of the wood pole network. Western Power does not have an accurate understanding of the network’s condition as much of its inspection data is out dated or incomplete. This has been acknowledged by Western Power and its regulators. Western Power has implemented a new inspection technique that results in better information, and is continuing to update and improve its asset data as inspections are completed. However, a full inspection cycle, taking approximately four years, is needed before all pole data is collected.

Western Power exceeded its 2012-13 target of replacing or reinforcing 63 000 wood poles, but over 300 000 remain to be treated by 2017

Western Power is making satisfactory progress towards meeting its targets of replacing and reinforcing 369 210 poles by 2017 (Figure 6). In the first year, Western Power reported that it exceeded its target by reinforcing or replacing 65 911 poles. This was 3 111 more than required. However, over 300 000 poles still need to be treated in the next four years. To meet its five year target, Western Power must increase its annual rate of replacement and reinforcement by an average of 15 per cent over what it achieved in 2012-13.

<table>
<thead>
<tr>
<th></th>
<th>2012-13 Target</th>
<th>2012-13 Actual</th>
<th>2013-14 Target</th>
<th>2014-15 Target</th>
<th>2015-16 Target</th>
<th>2016-17 Target</th>
<th>Total Target</th>
</tr>
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<tbody>
<tr>
<td>Wood pole replacement volumes</td>
<td>17 000</td>
<td>17 432</td>
<td>18 550</td>
<td>20 100</td>
<td>21 650</td>
<td>23 150</td>
<td>100 450</td>
</tr>
<tr>
<td>Wood pole reinforcement volumes</td>
<td>45 800</td>
<td>48 479</td>
<td>55 800</td>
<td>55 720</td>
<td>55 720</td>
<td>55 720</td>
<td>268 760</td>
</tr>
<tr>
<td>Combined reinforcement and replacement volumes</td>
<td>62 800</td>
<td>65 911</td>
<td>74 350</td>
<td>75 820</td>
<td>77 370</td>
<td>78 870</td>
<td>369 210</td>
</tr>
</tbody>
</table>

Figure 6: Wood pole replacement and reinforcement targets for 2012-13 to 2016-17
We undertook a data analytics exercise to assess the validity of the reported data and provide assurance on the accuracy of the data used by Western Power in its management reports. Our analysis showed Western Power is making improvements in providing a more complete data set and we are satisfied that the progress reported by Western Power reflects what is happening operationally.

**Western Power is mostly reinforcing instead of replacing poles which shifts the cost of replacements into the future**

Under the current Wood Pole Asset Management Plan, Western Power has committed to replacing 100,450 poles and reinforce 268,760 poles, by 2017 (Figure 7). This means 73 per cent of the total treatments are reinforcements rather than replacements. Reinforcement extends the life of a pole by up to 15 years. A new pole can have a life span of approximately 40 years, but must be reinforced at 25 years to reach this potential. However, replacements cost nine times more than reinforcements.

Pole reinforcement is an asset life extension strategy that addresses the short term risk of unassisted pole failure, but does not remove it indefinitely. Rather it shifts this risk and the cost of pole replacement into the future, as reinforced poles will still require replacement within 15 years.

![Figure 7: Western Power’s historical and proposed replacement and reinforcement program for 2006-07 to 2016-17](source: Western Power)
Western Power will take over a decade and billions of dollars to bring the network back to a stable condition

Pole replacement involves a like for like replacement, where an existing wood pole is replaced with another wood pole. Pole reinforcement is where a steel support is driven down the side of a pole and the support is then secured by bolts (Figure 8). Wood poles should be reinforced at 25 years of age. Reinforcement is used when a pole is found to have sufficient above ground strength but limited in-ground strength due to damage, decay or deterioration. Reinforcing increases the strength of the pole at ground level and extends its serviceable life.

Figure 8: A wood pole being reinforced

Reinforcement is a quicker, less disruptive and cheaper option to reducing risk than replacement. At $1,000 per pole, compared with $9,000 for a replacement, reinforcement allows for rapid reduction in risk. However, reinforcement only extends a pole’s life by up to 15 years, so it has the effect of deferring replacement cost. With 73 per cent of the current treatments in the Asset Management Plan being reinforcements rather than replacements, Western Power faces a large increase in replacements and cost between 2022 and 2027. Western Power must therefore get the balance between reinforcement and replacement right, as safeguarding current cash flow by delaying capital investment will have an impact in the foreseeable future.
Western Power will take over a decade and billions of dollars to bring the network back to a stable condition.

Western Power is changing its policies and practices to improve asset management, reduce risk and improve network performance

In taking steps to improve network performance it is crucial that Western Power comprehensively understands the extent of risk in the network. During its 2012 assessment of AA3, the ERA noted that:

“…Western Power still lacks a quantitative risk assessment tool and the application of risk management techniques to the prioritisation of expenditure appears unstructured and subjective…”

In response to this criticism, Western Power has set out to improve its inspection program and is collecting the necessary data to conduct an appropriate risk analysis. This effort has been complemented by the development of their new Network Risk Management Tool (NRMT). This tool takes the pole attributes that are collected and confirmed during inspection, and uses this data to assess the risk a wood pole poses. This data allows Western Power to identify geographical locations where there is a concentration of poles presenting an extreme risk, or individual high risk poles requiring treatment, and to then prioritise pole treatments.

Western Power has responded to the need to reform its inspection program to increase effectiveness and improve data quality

Western Power’s pole inspections program is used to determine pole condition. These inspections include checking for signs of termites, fungal rot or other damage. The overall condition and attributes of the pole are also confirmed and recorded in a mobile device that then updates this data to the Western Power information system. The outcome of the safety inspections is that poles are either found suitable for service or identified for reinforcement or replacement. Western Power inspects all 660 000 wood poles on a four year cycle. Between July 2011 and June 2013 Western Power planned to inspect 348 694 wood poles but inspected 360 137 poles.

In previous years EnergySafety has openly criticised Western Power’s inspection regime for being inadequate. Its criticism of the inspection method ranged from not appropriately assessing the strength of the pole to not addressing a backlog in treatments.

In response to this criticism, Western Power began modifying its inspection procedure in 2009 to better identify wood poles at risk of unassisted failure. The new wood pole inspection technique is broken into two steps. The first step is intended to find any obvious risk of unassisted failure. This includes:

- confirming that the attributes recorded for the pole are correct (such as species of wood, age, chemical treatment, presence or absence of reinforcement or stay systems, attached hardware and bay lengths)
identifying, assessing and recording the severity of any externally visible defects on stay or reinforcement system components, pole top hardware or attached conductors

identifying, assessing and recording the severity of any externally visible, above ground defects on the pole, for the purpose of determining if the pole is at risk of unassisted failure.

The second step in the process involves more thorough inspection and assessment. Step two gives detailed information about the pole, its condition and the presence and severity of any defects (including internal rot or termite activity) that are not picked up in the preliminary visual inspection. For poles already assessed as requiring remedial action due to attributes (age, species and reinforcement) or for poles identified as being at risk of unassisted failure in the previous visual inspection step, certain elements of the detailed inspection must still be undertaken. This is to assist in determining the appropriate remedial action and subsequent prioritisation of the work.

The amended inspection methodology also:

- identifies poles likely to fail due to structural defects (such as knots, splits or rot)
- identifies wood poles at risk of unassisted failure due to an inadequate serviceability index, which is a measure of the suitability of a pole to perform its intended function, and is the ratio of the pole strength to the total force exerted on the pole (pole load)
- assesses the likelihood of failure of such poles (based on defect severity or calculated serviceability index), to be used in a subsequent calculation of a risk score
- gathers additional data to assist in identifying and prioritising remedial action for all poles at risk of unassisted failure (which includes those already identified through the office assessment based on species, age and reinforcement type)
- identifies any defects on conductors and other pole mounted assets.

The new detailed inspection program covers above and below ground, as well as assessing internal and external conditions. This includes measurements, sounding, digging, probing, drilling and internal inspection. Western Power is also updating all pole information collected during an inspection to ensure the data kept on its network is reliable and accurate.

We reviewed Western Power’s wood pole data. Our analysis confirmed that more information is now being collected at each inspection and that data fields arising from recent inspections have been completed. Only 0.01 per cent of wood distribution poles are missing key geographical information and only 0.003 per cent are missing an equipment description.
Western Power has briefed EnergySafety on the modified inspection method and practice. EnergySafety has indicated to us that this method represents an improvement, and meets the requirements of the EnergySafety Order 01/2009 to improve its inspection method.

Western Power developed the Network Risk Management Tool as a comprehensive way of identifying network risk

Western Power recognised that its existing system of risk assessment was relatively unstructured, qualitative and subjective. To improve this, it has developed and is implementing a comprehensive risk management system known as NRMT. The NRMT will allow Western Power to calculate a risk index for significant assets on the network and to easily identify assets that pose the highest risk and to prioritise maintenance work.

The risk index scores every asset independently and allows a comparative review of different asset classes. The risk index is calculated using historic data, expert opinion and condition information. The main effort in calculating a risk index is identification of all the factors that influence asset failure. These include unassisted failure, such as age, operating conditions, environmental conditions and prior maintenance.

The ability for the NRMT to calculate the risk of individual wood pole assets to the network is reliant on the inspection data held in Western Power’s databases. In order for Western Power to use the NRMT to its full potential it must ensure that the data it collects during inspections is accurate and comprehensive. Western Power is making good progress in improving its data collection, but continued effort and quality assurance is required to ensure progress is maintained.

To efficiently prioritise maintenance work, Western Power adopted a Zone Based Asset Management approach

Previously, Western Power used a ‘sniper’ approach to maintenance work. This approach meant that each pole that required treatment was treated in isolation. To address the inefficiency and unnecessary service interruptions caused by the ‘sniper’ approach, Western Power developed the Zone Based Asset Management (ZBAM) approach.

ZBAM relies on the risk index allocated to each asset in accordance with the NRMT. From the risk index, ZBAM identifies geographical areas with the highest concentration of high risk assets. Maintenance efforts are then targeted to these high risk geographical areas. This targeting of maintenance efforts promotes the efficient use of resources and minimises service disruption. However, continuing use is made of the ‘sniper’ approach for any high risk or immediate fault work.

Western Power will take over a decade and billions of dollars to bring the network back to a stable condition
Western Power will take over a decade and billions of dollars to bring the network back to a stable condition

In practice, ZBAM has meant that Western Power is moving from working in 1,912 maintenance zones to focusing on 389 maintenance zones in 2013-14. The 389 zones were selected using an aggregated risk score, as calculated in the NRMT and an analysis of the mix of risky assets in the network. Western Power believes that the ZBAM method of asset maintenance will deliver a better risk and economic outcome to the state.

The implementation of the NRMT and ZBAM is still only recent. Western Power is not yet able to demonstrate if the implementation will reduce overall risk in the wood pole network more quickly or be a more efficient and effective method of asset management.

EnergySafety informed us that Western Power has not yet convinced them that NRMT and ZBAM are based on strong engineering foundations. It advised that it was comfortable with Western Power implementing its new system but only if the old system of replacing or reinforcing poles on an age basis was included within that system. Sole use of the new system should not occur until there is enough reliable data to prove that it reduces risk.

We note that Western Power is in the process of having independent experts evaluate the NRMT and it expects to complete its report in late 2013.

**Bringing the network to a ‘steady state’ of maintenance will likely require at least an additional $1 billion and take until at least 2022**

Western Power does not yet know precisely when a sustainable pole replacement and reinforcement rate will be reached or how much it will cost, but expects that it would be at least an additional $1 billion.

Currently it estimates that reaching a stable position is likely to take until at least 2022 which is the end of AA4. Achieving this timeframe is dependent on continued funding and delivery capacity. It also requires access to the network over this period as pole maintenance can require sections of the network to be shut down, which impacts upon Western Power’s obligations to ensure reliable electricity supply.

Western Power estimates that an additional $1 billion is required to bring the network to a ‘steady state’ of maintenance which will push the total cost to over $2.35 billion. That is, it will add to the $1.09 billion authorised by the Government in the 2012-13 state budget and the subsequent $263 million that Western Power will apply for in the mid year budget review to fund an increase in the unit cost of each pole replacement and reinforcement.
Western Power did not effectively manage the requirements of its regulators

In managing the network Western Power has to comply with the requirements of its regulators. This means satisfying the ERA’s licensing requirements for a reliable and cost effective distribution and transmission network, and EnergySafety’s requirements for a safe network. Western Power has failed to satisfy its regulator’s requirements in the past.

The requirements of one regulator can affect how Western Power goes about managing the network and complying with other regulatory requirements. For instance, to achieve a safe and reliable network, wood poles must be in good condition, requiring regular pole maintenance. Some pole maintenance, including pole replacements, cause interruptions to electricity supply. However, if planned maintenance is not undertaken then the likelihood of poles failing increases and could lead to unplanned outages. Western Power must maintain an appropriate balance between these requirements, rather than focusing on one to the detriment of the other.

As a consequence of frequent non-compliance with regulatory requirements between 2006 and 2009, Western Power was issued with an Order by EnergySafety and regulatory notices by the ERA. Additionally, it was concerns raised in EnergySafety’s Western Power’s Wood Pole Management Systems: Regulatory Compliance Audit 2005 report that led the Public Administration Committee to conduct its inquiry. This inquiry noted that Western Power lacked an appropriate compliance culture.

Since the Parliamentary Inquiry, Western Power has undergone a significant management restructure and is more focused on compliance and balancing the demands of its regulators.

Western Power is now regularly briefing regulators

Western Power has formalised interactions with regulators and is regularly meeting with them

Since January 2013, the Chief Executive Officer of Western Power and the Executive Director of EnergySafety have met regularly to discuss the status of Western Power’s major network safety programs and any other emerging issues. Western Power also provides a quarterly safety report to formally update EnergySafety of progress in safety across the network.

Both parties have acknowledged this recent initiative has improved relationships and increased transparency compared to when Western Power provided insufficient
Western Power is improving its communication with regulators but will not meet the 2009 EnergySafety Order

Information to its regulators. Western Power has acknowledged that the information gap did contribute to ineffective relationships.

EnergySafety advised us that although the relationship between the two bodies has improved, it remains concerned that Western Power may not comply with EnergySafety Order 01-2009 by replacing non-compliant wood poles in rural areas by December 2015.

Improvements have also been made in Western Power’s reporting to the ERA. Senior executives from Western Power and the ERA meet quarterly to discuss any emerging issues regarding network reliability and the Access Arrangement. Since the release of the 2012 Western Power Asset Management Review report by the ERA in early 2013, Western Power has provided the ERA with a monthly Wood Pole Dashboard report. The purpose of this is to allow the ERA to monitor Western Power’s progress in dealing with the backlog of pole treatments identified in the 2012 ERA Report.

With the improved inspection regime leading to more information being collected on the location and quality of wood poles, the dashboard reports can provide a more detailed snapshot of the state of the network to key stakeholders.

We reviewed the underlying data used to generate the dashboard reports to confirm its accuracy. The data reflected the outputs being reported by Western Power in most instances, however some variances were evident. This means Western Power still requires some progress to achieve a mature data management system. For example, it was difficult to confirm the number of pole replacements and reinforcements from the data set provided to the audit team, and additional analysis of other data sets was needed. The operational impact of this is that management may be prevented from making effective decisions in a timely manner.

Western Power’s relationship with the PUO has also improved, with the PUO stating that Western Power, of all the public utilities, is the most open in terms of provision of information. A frank and open dialogue has existed since the installation of Western Power’s new senior executive team. The PUO also meets monthly with the Chief Executive Officer and other senior officers of Western Power to discuss any emerging issues.

**Monitoring compliance with regulatory requirements has become a higher priority for the Board and Executive of Western Power**

The Western Power Board is now better informed about the requirements of its regulators. In response to the findings of the Parliamentary Inquiry, Western Power’s stakeholder engagement with EnergySafety, the ERA and the PUO is now contained in a quarterly
performance report to its Board. The Board and executive also have access to records of all formal interactions with its regulators through a document management system specific to the regulator. Each document management system holds file notes made for critical meetings with the regulator’s management and signed copies of all formal correspondence.

**Based on current plans Western Power will not fulfil all requirements of the 2009 EnergySafety Order by 2015, but is seeking to meet its intent**

In 2009 EnergySafety issued an Order to Western Power outlining its concerns with its wood pole network. Amongst the various requirements, the Order prescribes:

“... By 31 December 2015 replace or reinforce all unsupported rural poles that do not comply with HB C(b)1- 1999 Guidelines for the design and maintenance of overhead distribution and transmission lines and related technical and engineering, using maximum wind pressures specified in that guideline…”

Western Power has confirmed its continued commitment to meeting the Order, stating that “Western Power’s objective is to reduce the public safety risk posed by the aging wood pole population and is committed to work with EnergySafety to meet this objective”. However, based on the current prioritisation of work, Western Power will not treat all the poles covered in the Order by the December 2015 deadline.

Based on the current interpretation of the Order, Western Power estimates that around 241 000 poles require treatment. This is made up of approximately 200 000 replacements and 41 000 reinforcements. Western Power has met most of the other requirements of the Order, such as improving its wood pole inspection technique and developing a wood pole asset management plan, but has advised us that based on its current program approximately 170 000 poles will not comply with the Order by the 31 December 2015 deadline (Figure 9). Western Power forecasts that it will take until early in the Access Arrangement 5 period, approximately 2022, for these poles to be treated and to fully comply with the Order.
Western Power is improving its communication with regulators but will not meet the 2009 EnergySafety Order.

**Figure 9:** The number of wood poles currently covered by Western Power’s Wood Pole Asset Management Plan (until December 2015) and the number of wood poles requiring treatment under the EnergySafety Order.

Western Power is now applying its new NRMT asset management strategy to prioritise and allocate all wood pole treatments. This strategy was developed in consultation with EnergySafety. Using the NRMT, Western Power believes some poles not currently identified in the Order represent a higher risk than those in the Order. This means that while some poles explicitly identified in the EnergySafety Order will be replaced, a large number of other poles not identified by the Order are being given higher priority for replacement or reinforcement. Western Power considers these poles represent a higher risk in terms of likelihood and consequence of failure.

EnergySafety was involved in technical discussions with Western Power as it developed the NRMT. However, the application of the NRMT strategy means that Western Power will not fully comply with the EnergySafety Order regarding rural wood poles. EnergySafety has recommended to Western Power that it should, in parallel, be doing everything to meet the Order.

Western Power has indicated that significant additional funds, on top of the $1.35 billion required to meet the targets set in AA3, will be needed if Western Power is to comply with the EnergySafety Order and also treat the other poles identified as a priority by its asset management strategy.

EnergySafety has informed us that while it acknowledges that Western Power’s strategy supports its long term goal of decreasing overall risk in the wood pole network, its compliance with the Order is a legal requirement and that Western Power must comply by December 2015.
Western Power and EnergySafety are in regular communication regarding the steps Western Power is taking to reduce overall risk in the wood pole network and its progress in meeting the EnergySafety Order. Should Western Power not comply with the Order, EnergySafety may take action, including prosecution, but EnergySafety has advised us that it will not decide on what, if any, action it will take until the expiry of the Order in December 2015.
<table>
<thead>
<tr>
<th>REPORT NUMBER</th>
<th>2013 REPORTS</th>
<th>DATE TABLED</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Opinions on Ministerial Notifications</td>
<td>13 November 2013</td>
</tr>
<tr>
<td>15</td>
<td>Audit Results Report – Annual 2012-13 Assurance Audits</td>
<td>13 November 2013</td>
</tr>
<tr>
<td>14</td>
<td>Public Trustee: Administration of the Financial Affairs of Vulnerable People</td>
<td>18 September 2013</td>
</tr>
<tr>
<td>13</td>
<td>Sustainable Funding and Contracting with the Not-For-Profit Sector – Component I</td>
<td>18 September 2013</td>
</tr>
<tr>
<td>12</td>
<td>The Banksia Hill Detention Centre Redevelopment Project</td>
<td>7 August 2013</td>
</tr>
<tr>
<td>11</td>
<td>Information Systems Audit Report</td>
<td>27 June 2013</td>
</tr>
<tr>
<td>10</td>
<td>Supply and Sale of Western Australia’s Native Forest Products</td>
<td>26 June 2013</td>
</tr>
<tr>
<td>9</td>
<td>Administration of the Patient Assisted Travel Scheme</td>
<td>26 June 2013</td>
</tr>
<tr>
<td>8</td>
<td>Follow-up Performance Audit of Behind the Evidence: Forensic Services</td>
<td>19 June 2013</td>
</tr>
<tr>
<td>7</td>
<td>Fraud Prevention and Detection in the Public Sector</td>
<td>19 June 2013</td>
</tr>
<tr>
<td>6</td>
<td>Records Management in the Public Sector</td>
<td>19 June 2013</td>
</tr>
<tr>
<td>5</td>
<td>Delivering Western Australia’s Ambulance Services</td>
<td>12 June 2013</td>
</tr>
<tr>
<td>4</td>
<td>Audit Results Report – Annual Assurance Audits: Universities and state training providers and Other audits completed since 29 October 2012 – and Across Government Benchmarking Audits: Recording, custody and disposal of portable and attractive assets and Control of funds held for specific purposes</td>
<td>15 May 2013</td>
</tr>
<tr>
<td>3</td>
<td>Management of Injured Workers in the Public Sector</td>
<td>8 May 2013</td>
</tr>
<tr>
<td>2</td>
<td>Follow-on Performance Audit to ‘Room to Move: Improving the Cost Efficiency of Government Office Space’</td>
<td>17 April 2013</td>
</tr>
<tr>
<td>1</td>
<td>Management of the Rail Freight Network Lease: Twelve Years Down the Track</td>
<td>3 January 2013</td>
</tr>
</tbody>
</table>