Resilience at scale: Transforming the Essential Energy Network through Composite Pole Transition

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Essential Energy

About Essential Energy

95%

NSW and parts of southern QLD

One of Australia's largest electricity distribution networks.

900,000+

Customers

across the network

1.4M

Electricity Poles

194,000

Kilometres

of powerlines

162,000

Kilometres

of powerlines in bushfire prone areas

4.6

Customers/km

lowest in the National Electricity Market (NEM)

52%

Increase by 2090

total network impact on poles from bushfires (under RCP4.5)

RCP4.5-4.5 W/m^2 of radiative forces and considers 2.4˚C increase in global mean temperatures by the year 2100.

Pole Statistics

Our network in numbers

POLE POPULATION

- **~1.4M** Pole Population
- **1.2M** Timber Poles
  Remainder mostly concrete and steel.
  - Average pole age = **42yrs**.
- **300,000+** Natural Round timber poles
  - Average age = **62yrs**.

REPLACEMENT RATE

- **8,000-9,000** pole replacements per annum (**0.65%** of population).
- **2,000** pole reinforcements per annum (**0.15%** of pole population).

FAILURE RATE

- **150-180** Unassisted failures.
- **1.1 per 10,000** (150 failures) in FY26.
- Natural Round poles=**75%** of failures for 25% of population.
- **50%** termite related failures.
  Remainder various rot or decay types.

Our pole fleet represents a significant and ongoing asset management challenge.
These statistics provide insight into the scale of the network, the annual replacement and reinforcement effort, and the drivers behind investing in more resilient pole technologies.

Pole Strategy

Successful stakeholder engagement with suppliers, government and customers helped support the transition.

CHALLENGES

- Hardwood timber pole supply constraints
- **3,200** timber poles lost in 2019/20 Black Summer Bushfires
- **>$70M** remediation costs

EVALUATION

Assessed available pole types:

- Timber (hardwood & softwood)
- Steel
- Concrete
- Composite

DECISION

Composite poles became the preferred option:

- Superior technical performance
- Lower lifecycle costs
- Improved network resilience
- Local manufacture, stable supply

Composite poles selected as the future solution!

Leveraging **20 Years** of Composite Crossarm Experience

METRICS

750,000+
Composite crossarms in service

40%
Of Essential Energy's network population

Thrice the life of timber
Durable, lowest lifecycle cost, locally made

ZERO
Unassisted failures compared to timber crossarm failure rate of 38.5 per 100,000

Safety
Eliminated wires-down events caused by failed crossarms.
Non-conductive design reduces pole-top fires and flashovers.

Operational Efficiency
No routine inspection and lower maintenance costs.
Can hold conductors even when damaged due to assisted events.

Field Benefits
Approximately one-third the weight of timber or steel.
Reduced manual handling and easier installation.

Asset Performance
High strength and fire resistant.
Not susceptible to corrosion, rot or shrinkage.
Exceptionally long service life.

Lowest whole-of-life cost solution supported by nearly two decades of operational experience.

Our Composite Pole Journey

Building knowledge. Driving Innovation. Delivering Value.

2008
Trials

Commenced trials with RS Poles (supplied from North America).

Early versions had fibre blooming (UV) and large base diameter.

2014
Whalan / Poletech

First **locally made** composite poles installed on the Essential Energy network in Talbingo NSW.

2019-2020
Black Summer Bushfires

Composite poles **survived bushfire exposure** with eight impacted poles and only one needing non-structural repair to the outer surface.

2021
Source

Essential Energy source **3,000** composite poles (sizes 11m to 23m).

2022
Wagners

Wagners Composite Poles introduced.

Supply diversification with two local manufacturers on board.

2023
Bulk Installation

March 2023, bulk installation of **100+** Wagners composite poles in Moree NSW.

2026
Present date

~20,000 composite poles installed and in service on the network.

2029+
Future state

Composite poles used for **all** end-of-life pole replacements.

Supply Options & Usage

Contracts to supply **55,000** composite poles over the **2025-2030** period.

Distribution poles:

- Sizes: **9.5m**, **11m**, **12.5m** and **14m** – **6kN**, **8kN** and **12kN**.
- Deflection limits and economies of scale provide better value in using 6kN as a minimum rating.
- Now the standard material: Currently majority of annual usage, target is 100% of end-of-life pole replacements in the next few years.

Subtransmission poles:

- Sizes: **15.5m** to **23m** - **12kN** minimum.
- Standards will be finalised from 2027.

Operational Benefits

Delivering Better Outcomes in the Field

Handling and Installation

Light weight- lower fleet needs

Multi-piece options available.

Most poles supplied pre-drilled. Can also be drilled on-site.

Easy to install in difficult sites- National parks, sites with access issues.

Performance

Better insulation than timber.

Immune against rot and termites.

Fire resilient structure benefit for locations with burn off impacts.

Can be repaired in situ for most impact damage situations.

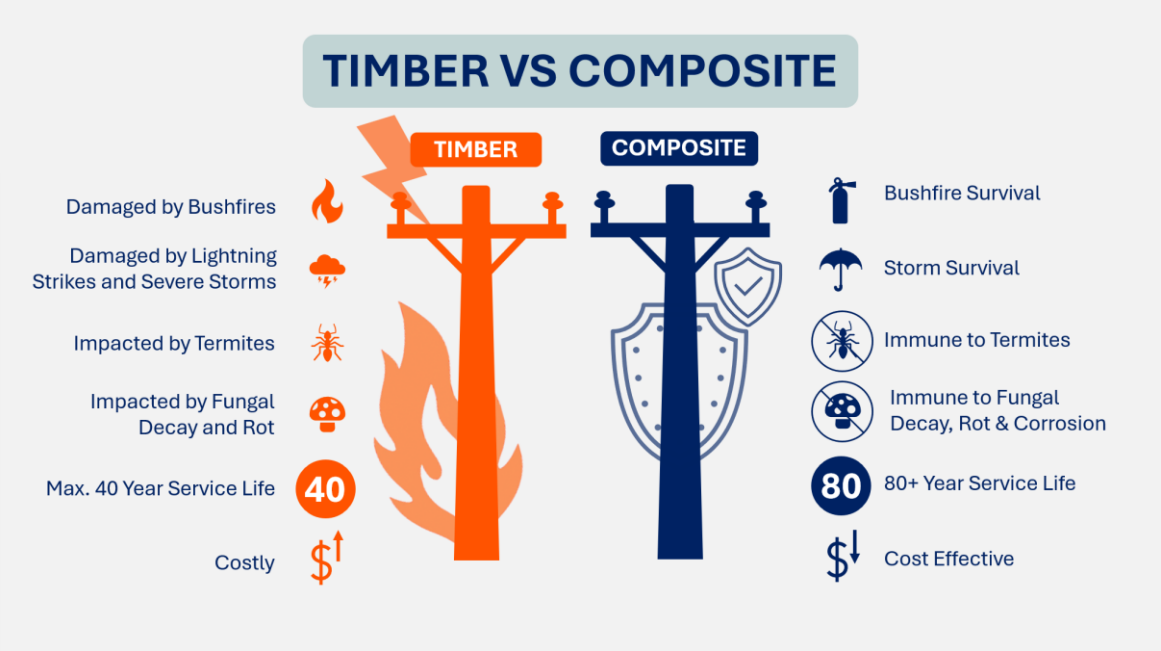
Safety

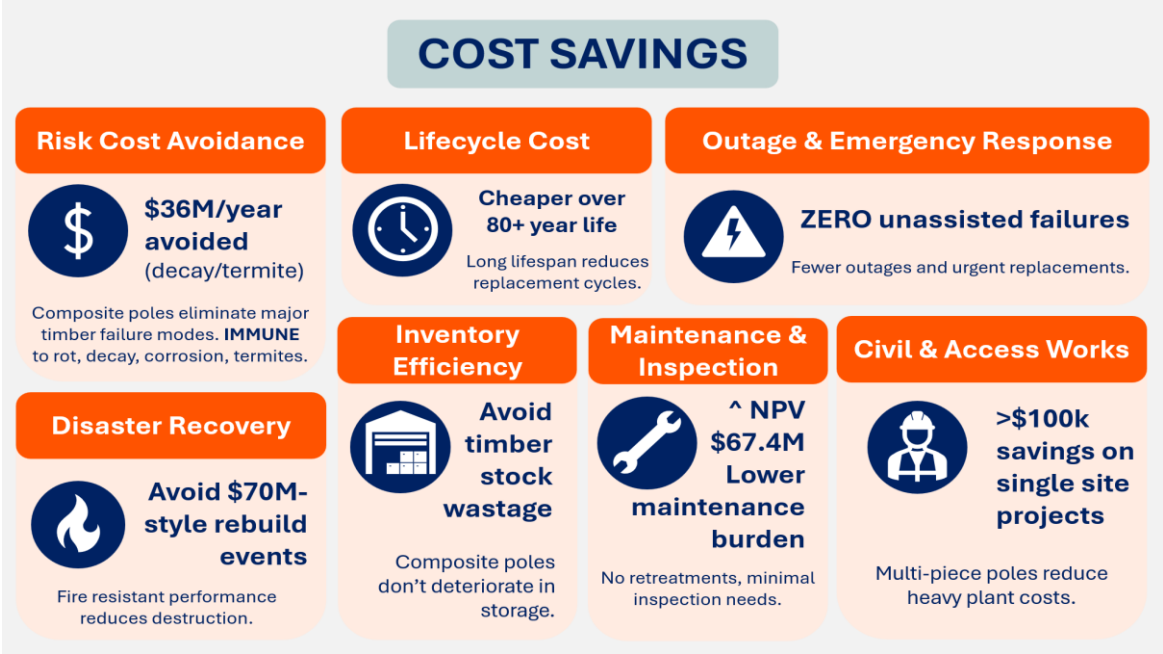
Reduced risk of unassisted pole failures.

End-of-life

Re-useable, evolving technology for recycling.

Composite Poles:
Delivering Long-Term Value





Composite poles provide significant operational, safety and environmental advantages over timber and alternate pole materials while also reducing whole-of-life costs.

Together, these benefits support a more resilient, sustainable and cost-effective network.

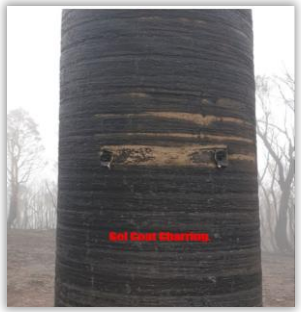
Black Summer Bushfires

The unprecedented damage caused by the 2019-20 Black Summer bushfires demanded a significant network recovery effort.

The lessons learned from this event accelerated the need for stronger, more resilient asset solutions.

2019-20 CONSOLIDATED BUSHFIRE STATISTICS

- **3,400m ha** affected by fire
- **104,000+** customers affected by power outages
- **4,700** customers affected by power outages
- **540+** peak employees involved in response
- **470+** peak crew on the ground
- **3,200+** power poles damaged
- **4,500** crossarms damaged
- **90+** peak EWP fleet
- **425+** peak light fleet
- **150+** peak heavy fleet



Composite Pole Inspection & Repair

Designed for simple inspection, rapid assessment and repair.

01 Inspect
Requires visual inspection only

02 Assess
Vehicle/plant impact damage assessed in-house for loss of strength

03 Prepare
Prepare the damaged area.
Grind out the impact area to remove any delaminated material.

04 Rebuild
Rebuild pole thickness using resin and glass filler
(Minor repairs completed in-house; major repairs utilise repair kits)

05 Finish
Apply finishing wrap
Apply UV protective coating following cure

Onsite Drilling & Dust Mitigation

KEY POINTS

- All standard and equipment poles are supplied pre-drilled.
- Additional drilling can be completed onsite where required.
- Fibre Extraction Clamp designed in-house and captures dust at the source.
- Standard PPE used, including a P2 dust mask during activities.
- Occupational hygienist review completed.

Even without the extraction clamp, inhalable dust levels remained < 2.0mg/m^3.

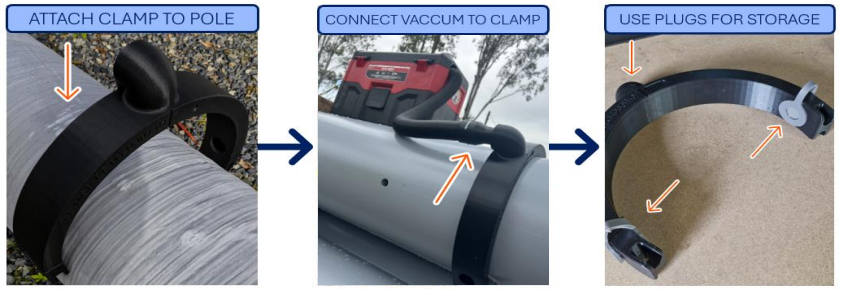
Summary of Personal Inhalable Dust Exposure Results

Date	Job Title	Sample ID	Contaminant	Inhalable Dust Concentration (mg/m^3) [5]
17/01/25	Linesman 1	240813-91	ID	0.16
17/01/25	Linesman 2	240813-99	ID	0.04

TOOLS & EQUIPMENT

Drilling Equipment

Fibre Extraction Clamp



Effective dust control protects our people, our community and the environment.

Make safety your own

OTHER INSTALLATION ASPECTS

The transition to composite poles has been supported by the development of new installation equipment, accessories and work practices.

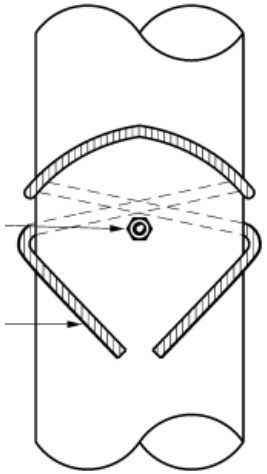
01 WEB SLINGS

Composite pole web slings introduced to provide better grip.

02 POLE STEP

Pole steps can be used through pole step or single sided version.

03 WRAP-LOCK STAYS



Based on tests, wrap-lock stays provide a robust arrangement compared to the eyebolt connection.

04 INSTALLATION OPTIONS

Poles can be stood with excavator jaws or crane with the composite pole web slings in difficult access sites.

Construction drawings, design modelling, estimating and field user guides developed to cover most of our pole usage situations.

COMPOSITE POLES

BUILT BETTER FOR TRANSPORT

Composite poles are significantly lighter than timber or concrete poles, allowing more poles to be transported in a single load.

LIGHTWEIGHT DESIGN

Reduced weight.
More poles per load.

LESS TRIPS LOWER COSTS

Fewer deliveries.
Lower emissions.

SAFER & MORE EFFICIENT

Easier handling.
Improved safety.

4X

MORE POLES PER LOAD

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