Powerline Bushfire Safety Program

Legislation – Ashley Hunt

Powerline Bushfire Safety Program

Purpose and Rationale:

Background to Regulatory Enhanced Network Standards

- Victoria is one of the most bushfire-prone areas of the world due to its geography and seasonal periods of intense, dry heat.
  - Sixty-seven percent of all network fires are started on 22kV powerlines.
  - In the 7 February 2009 Black Saturday Bushfires, powerline ignitions caused the loss of 159 of the 173 lives lost and contributed to the $4.4 billion in property loss suffered by Victorians.
- Victorian Bushfires Royal Commission Recommendation 27 called for the progressive replacement of all SWER (single-wire earth return) and all 22kV powerlines in Victoria with aerial bundled cable, underground cabling or other technology that delivers greatly reduced bushfire risk.

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Purpose and Rationale of Powerline Bushfire Safety Committee: *Electricity Safety (Bushfire Mitigation) Amendment Regulations 2016*

- On 1 May 2016, the Victorian Government introduced targeted enhanced network safety protection standards into law through the *Electricity Safety (Bushfire Mitigation) Amendment Regulations 2016*, mandating:
  - enhanced fault suppression standards for 22 kV powerlines emanating from 45 targeted rural and regional zone substations
  - new standards of powerline undergrounding or replacement with covered conductor in 33 high risk codified areas of the state
  - the roll out of the anticipated 1000 new generation automatic circuit reclosers (ACRs) on all single wire earth return (SWER) lines

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Purpose and Rationale of Powerline Bushfire Safety Committee: *Electricity Safety (Bushfire Mitigation) Amendment Regulations 2016*

- The *Bushfire Mitigation Regulations* also mandate new reporting requirements for the distribution businesses which must:
  - before the specified bushfire risk period each year, report to Energy Safe Victoria the results of testing undertaken in that year in accordance with regulation 7 (1)(hb) (*i.e. testing to ensure its supply network can operate to meet the* ***required capacity*** *to satisfy the relevant delivery tranche milestone requirements*.)

These regulatory standards to reduce powerline bushfire safety risk deliver on Recommendation 27 of the Victorian Bushfires Royal Commission

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Content of the *Electricity Safety (Bushfire Mitigation) Amendment Regulations 2016*

- The Regulations do **not require the installation of a specific asset class** but instead prescribe a ***required capacity*** for fault detection and suppression at the 45 targeted zone substations as follows:

> ***required capacity*** means, in the event of a phase-to-ground fault on a polyphase electric line, the ability—
>
> (a) to reduce the voltage on the faulted conductor in relation to the station earth when measured at the corresponding zone substation for high impedance faults to 250 volts within 2 seconds; and
>
> (b) to reduce the voltage on the faulted conductor in relation to the station earth when measured at the corresponding zone substation for low impedance faults to—
>
> (i) 1900 volts within 85 milliseconds; and
>
> (ii) 750 volts within 500 milliseconds; and
>
> (iii) 250 volts within 2 seconds; and
>
> (c) during diagnostic tests for high impedance faults, to limit—
>
> (i) fault current to 0·5 amps or less; and
>
> (ii) the thermal energy on the electric line to a maximum I^2t value of 0·10;

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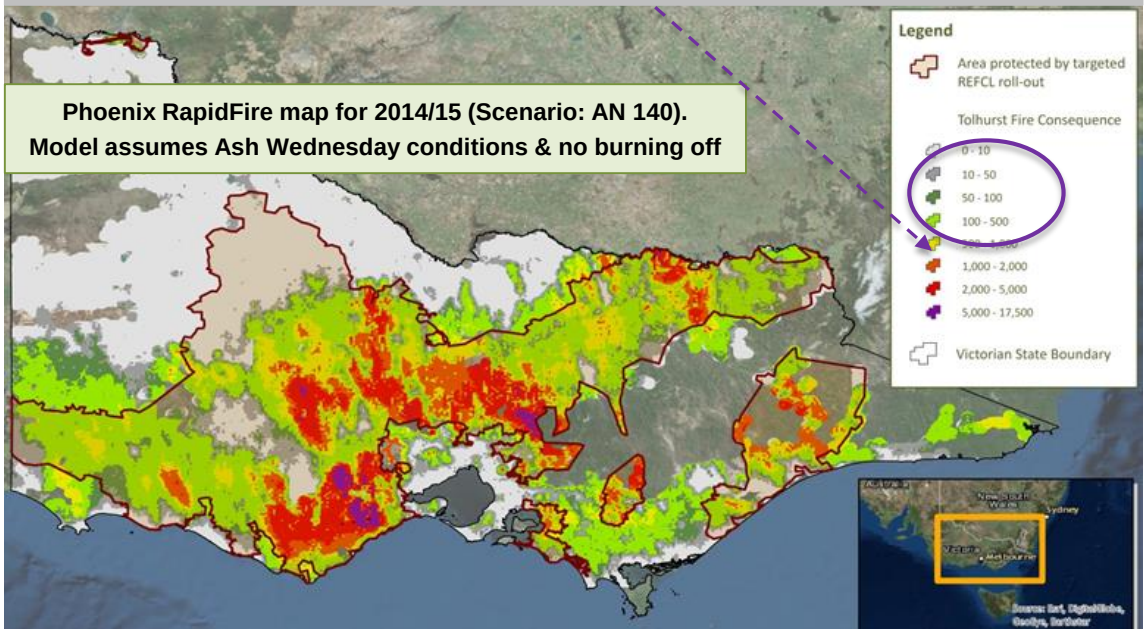
Content of the *Bushfire Mitigation Regulations* : Schedule 2

- Schedule 2 of the Regulations list 45 zone substations where the new required capacity must be met. These zone substations have been selected to maximise bushfire risk reduction.

Deployment targets LOCATIONS of highest bushfire risk

Areas to be protected by deployment of 45 REFCLs at targeted ZSSs



The *Bushfire Mitigation Regulations* stipulate the required capacity must be met at 45 zone substations over a seven year schedule in three tranches according to a points system.

These milestone tranches are:

- 1 May 2019 – 30 points
- 1 May 2021 – 55 points
- 1 May 2023 – All remaining points

Deployment of Rapid Earth Fault Current Limiters (REFCLs) at these locations will significantly reduce the statewide bushfire threat.

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VICTORIA State Government

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Rapid Earth Fault Current Limiters

- Regulation 7 requires the Distribution Businesses' Bushfire Mitigation Plans to provide:

  - details of the preventative strategies and programs … (including details in relation to timing and location) by which the major electricity company will ensure that—

    (i) in its supply network, each polyphase electric line originating from a selected zone substation has the required capacity; and

    (ii) on and from 1 May 2023, in its supply network, each polyphase electric line originating from every zone substation specified in Schedule 2 has the required capacity;

  - details of testing that will be undertaken before the specified bushfire risk period each year by which the major electricity company will ensure that its supply network can operate to meet the required capacity in relation to each polyphase electric line

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Rapid Earth Fault Current Limiters

- The Regulations require the distribution businesses manage milestone point shortfalls by:

  - ensuring that sufficient zone substations meet the new standards at the 1 May 2019 , 1 May 2021 and 1 May 2023 milestone dates;
  - ensure the standards are delivered in zone substations in the remaining tranches in Schedule 2 if insufficient zone substations are deliverable to make up the required points in a given tranche.

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Powerline Replacement

- Regulation 7 requires the Distribution Businesses' Bushfire Mitigation Plans to provide:

  - details of the preventative strategies and programs … (including details in relation to timing and location) by which the major electricity company will ensure that, on and from 1 May 2016, within an electric line construction area, each electric line with a nominal voltage of between 1 kV and 22 kV that is constructed, or is wholly or substantially replaced, in its supply network is a covered or underground electric line;

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Powerline Replacement

- ***wholly or substantially replaced*** means the planned replacement or relocation of an electric line that involves—

  (a) the relocation of at least 4 consecutive spans of the electric line; or

  (b) the replacement of conductors on at least 4 consecutive spans of the electric line.

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SWER ACRs

- Regulation 7 requires the Distribution Businesses' Bushfire Mitigation Plans to provide:

  - details of the processes and procedures by which the major electricity company will ensure that, before 1 May 2023, the major electricity company has installed an Automatic Circuit Recloser in relation to each SWER line in its supply network

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Bushfire Mitigation Plans

- The Regulations also require Distribution Businesses' Bushfire Mitigation Plans to:

  - detail the businesses' plan for testing to ensure its network can achieve the required capacity in relation to each polyphase electric line originating from a zone substation specified in Schedule 2; and
  - detail the processes and procedures for installing an Automatic Circuit Recloser in relation to each SWER line in its supply network.

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Statement of Reasons

- The 1 May 2016 Statement of Reasons for the *Bushfire Mitigation Regulations* states that the Director of Energy Safe Victoria may under Section 8 of the *Energy Safe Victoria Act 1998* call a committee to provide advice on variations and exemptions on a case-by-case basis.
- These exemptions may be required in circumstances where full compliance with the Regulations is not possible and where a business:
  - ❑ Can evidence that matters beyond their reasonable control materially impacts on full compliance
  - ❑ Scopes the extent of exemption required (deviation from technical specifications, volume, and/or timeframes); and
  - ❑ Provides a written undertaking as to how they will ultimately achieve full compliance with the proposed Regulations within a defined period.

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Companion Legislation - f-factor

- Under the proposed f-factor scheme, each network ignition will be recalculated into an Ignition Risk Unit (IRU) by being weighted against the two following metrics:
  - the bushfire risk of the geography in which the ignition occurred (G); and
  - the declared fire danger rating (FDR) on the day on which the ignition occurred (T).
- The G and T metrics will be multiplied against a base value (M) to arrive at a final value.
  - This is demonstrated by the formula: **G x T x M = IRU**

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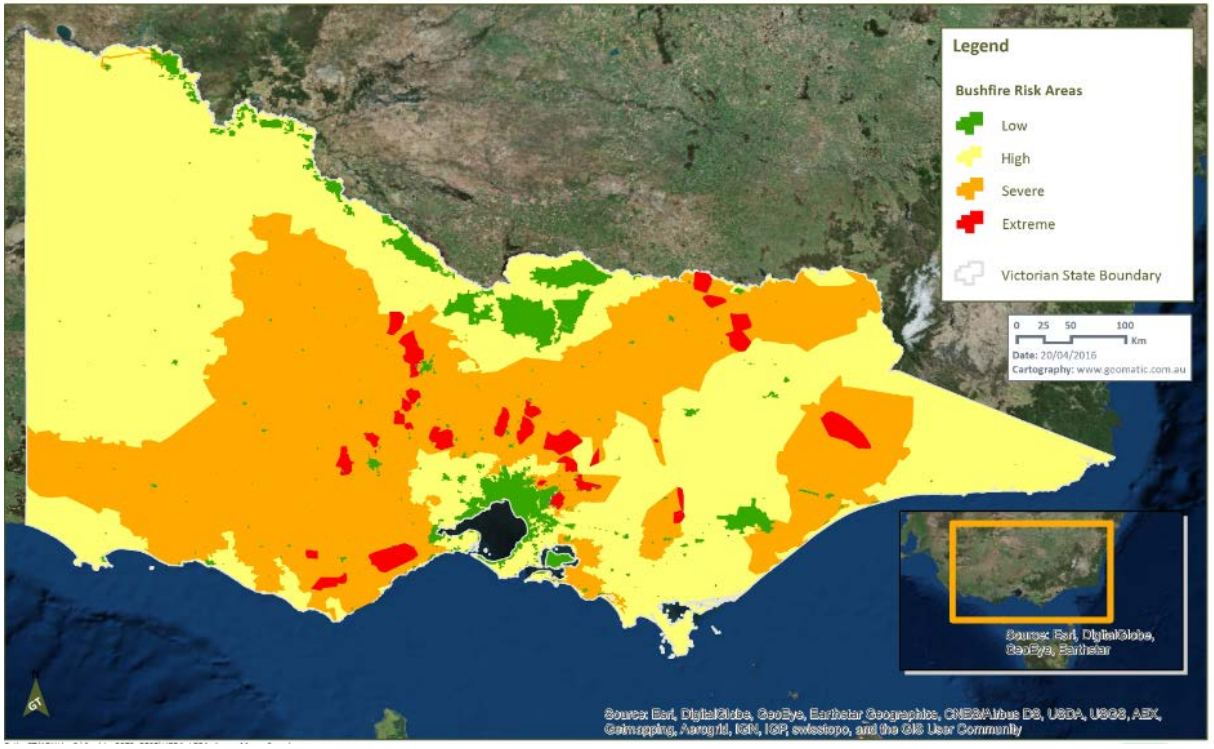
Companion Legislation - f-factor

- The Geographical metric is comprised of four categories which in ascending in value are: Low Bushfire Risk Area (LBRA); High Bushfire Risk Area (HBRA); Severe Area (REFCL) and Extreme (electric line codified areas). This typography is represented below.



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Companion Legislation - f-factor

- The redesign of the scheme will lower the distribution businesses' benchmarks to reflect the ignitions reduction impact of REFCLs.
  - The benchmarks will be decremented in three tranches to ensure the ignitions reduction benefit of REFCLs at the mandated 45 zone substations is passed on to consumers.
  - The first decrement will occur at the start of the 2019/20 financial year.