

# **Powerline Bushfire Steering Committee**

**June 2018** 

Tom Hallam, GM Regulation and Network Strategy

Hannah Williams, REFCL Program Director





# Agenda



## **▶ REFCL**

- 1. Tranche 1A commissioning
- 2. GFN technical issues
- 3. Program status
- 4. Tranche 1 roadmap
- 5. Tranche 1 delivery steps to achieve compliance
- 6. Line balancing units
- 7. Tranche 1 exemption applications
- 8. REFCL operating regime
- 9. ESC review of voltage standards
- **▶** Other bushfire mitigation programs
  - 10. ACR Program
  - 11. Powerline Replacement

## 1. Tranche 1A commissioning

## Woori Yallock, Barnawartha and Rubicon A



### Woori Yallock (WYK)

- The REFCLs were taken out of service at the end April 2018
- During May and early June 2018, minor hardware additions and a software update has been underway, primarily to address split bus mode issues
  - Ground Fault Neutraliser (GFN) technical issues have been encountered refer to the following slide
- Line balancing works now complete on 2 of the 4 feeders. All feeders will be balanced by mid June 2018
- Final preparations are being made for compliance testing during the last week of June 2018 and first week of July 2018 pending satisfactory resolution of key GFN technical issues

## Barnawartha (BWA)

- · Line balancing works and capacitive balancing complete
- REFCL software update to be completed post WYK compliance testing, pending performance of the WYK REFCLs
- Plans to demonstrate compliance during July 2018 by using mobile generation to supply the two HV customers have been cancelled due to the excessive mobile generation costs (~\$0.5m)
- Replanning currently underway to confirm the revised compliance testing dates. This is most likely to be post the installation of the isolating substations for each HV customer.

### Rubicon A (RUBA)

- Minor line balancing works will be completed by end July 2018
- REFCL software updates to be completed late July 2018, subject to satisfactory resolution of key GFN technical issues
- Compliance testing is planned for early August 2018 with the AGL generation assets to be taken out of service

<u>Key Point:</u> Completion of demonstration of compliance at the WYK and RUBA ZSS's by early August 2018 is at risk due to GFN technical issues encountered

## 2. GFN technical issues



- During the upgrade of hardware and software on the two GFNs at Woori Yallock (WYK) to resolve the split bus mode issues, a number of technical issues have been identified
  - Refer to the table opposite
- The magnitude and nature of the issues encountered has reduced our confidence in the GFN product
  - Until the issues are satisfactorily addressed, the GFN is not considered fit for service and all online testing has currently been suspended
- The delays encountered in performing the hardware and software upgrade at WYK and the suspension of online testing, is impacting the WYK commissioning schedule
  - Unless these issues are resolved quickly, the entire Tranche 1 delivery schedule for 1 May 2019 is at risk

## › Key technical issues identified to date

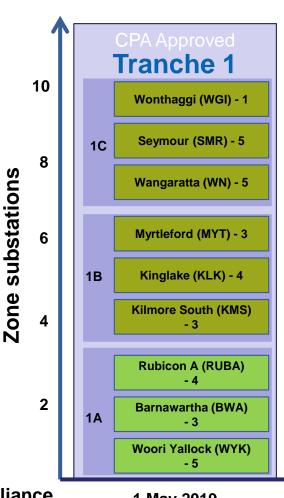
- Hardware failures
  - Board/Card failures in GFN control panel
  - Various inverter components
  - Arc Suppression Coil tuning contactor
- Software bugs
  - GFN failure to operate/respond to clear faults
  - Inadvertent control of inverter
  - Fault confirmation sequence unreliable
  - Inverter tuning algorithm not working as expected
  - Uploading of settings and configuration unreliable
  - Slow engagement of inverter
- GFN Human Machine Interface (NMTerm) bugs
  - Not displaying actual values
  - Randomly crashes and locks up

### **Key Points:**

- The accumulation of technical issues and severity of some of the bugs has resulted in reduced confidence in the GFN product
- These Issues have been escalated with Swedish Neutral
- A detailed assessment and plan to resolve issues is underway

# 3. Program status





**Tranche 2 Ringwood North (RWN)** Eltham (ELM) - 2 Ferntree Gully (FGY) - 2 Wodonga 22 kV (WOTS) - 3 Moe (MOE) - 3 Belgrave (BGE) - 3 Lilydale (LDL) - 3 Bairnsdale (BSD) - 4

## Notes:

- Tranche 1 has been split into Tranches 1A, B and C to improve focus for delivery teams
- WYK REFCLs taken out of service to enable upgrade to resolve split bus issue

## **Tranche 3**

Lang Lang (LLG) - 1

Sale (SLE) - 1

Mansfield (MSD) - 2

Benalla (BN) - 2

Kalkallo (KLO) - 3

**Scope Definition** 

Design

**Site Construction** 

Site **Commissioning** 

**REFCL in Service** 

Station in **Compliance** 

**Compliance** deadline

1 May 2019

33 points (Min to meet regulations: sum to 30 points)

1 May 2021

22 points ( Min to meet regulations: sum to 55 points)

1 May 2023

9 points

# 4. Tranche 1 roadmap

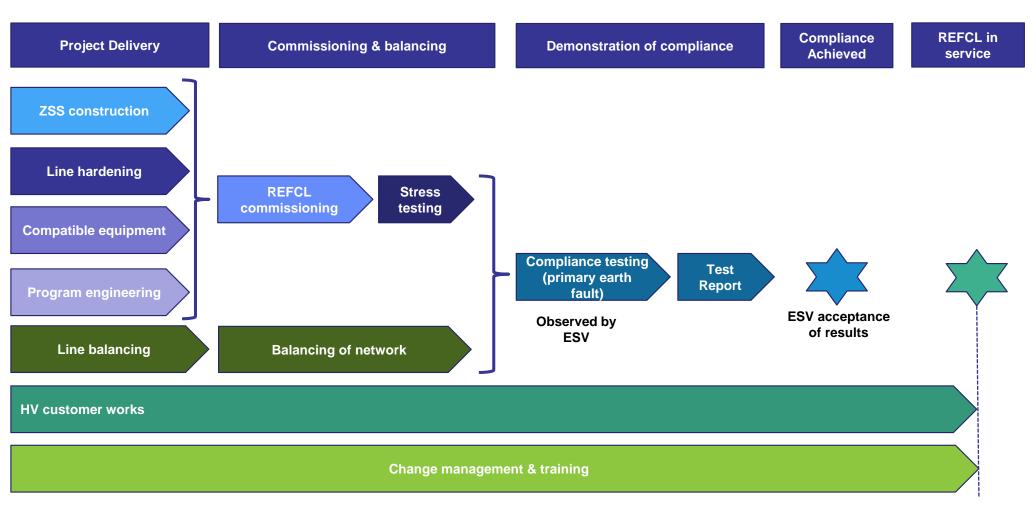


					Status Date 31. May 2018				Compliance Date 1 May 2019													
HV			2018									2019										
Zone Substation	Points	GFN <sub>2</sub>	Connection Points	Work Streams	Jan	Feb	Mar	Арг	May	Jun	Jul	Aug	Sep	0ct	Nov	Dec	Jan	Feb	Mar	Арг	May	
Tranche 1A																						Legend
Woori Yallock (WYK) 5			1	Zone Substation																		
	5	2		Network																		Zone Substation Construction
				HV Customers																		I – I
				Zone Substation															Compliance Testing			
Barnawartha (BWA)	3	1	2	Network																		II
				HV Customers									•									REFCL In Service
			2	Zone Substation																		Network Activities
Rubicon A (RUBA)	4	1		Network																	(including Hardening and Balancing)	
				HV Customers												•		•	<b>&gt;</b>			I I
Tranche 1B																						Network Balancing
Kilmore South	3	1	0	Zone Substation																	HV Customers Works	
(KMS)				Network																		nv Customers works
Kinglake*	4	1	0	Zone Substation					•						•							GFN Delivered to Site
(KLK)				Network						_												V
Myrtleford* (MYT)	3	1	0	Zone Substation						•									GFN Upgrade			
				Network																		,
Tranche 1C				Zone Substation					_											New Transformer Installed		
Wangaratta	5	2	2	Network					_										1			
(WN)	3	2		HV Customers																		Isolating Substation Installed
Seymour* (SMR)				Zone Substation																	1	
		2	,							_										Conversion to LV Supply		
	,		2	Network HV Customers																		
				Zone Substation																		Hardening Completed
Wonthaggi*		1	1											_								
(WGI)				Network																		Bushfire Period
		- 13		HV Customers																		
Total	33	12	10																			

<sup>\*</sup> Associated rebuild activities not included

# **5. Tranche 1 delivery Steps to achieve compliance**





# 6. Line balancing units





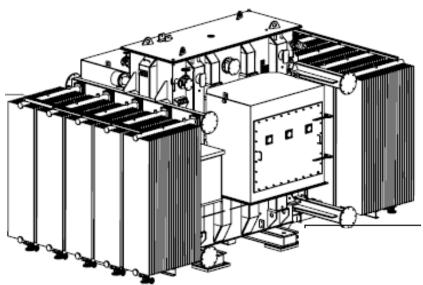
- 3 phase capacitor balancing units being installed on each section of each feeder
- Purpose is to provide fine tuning of capacitive balance once other balancing works are complete
- > Can be adjusted remotely
- AusNet Services working on active balancing system so that small dynamic changes in capacitance can be compensated for



# 7. Tranche 1 exemption applications



- ▶ Six exemptions re-submitted following comments from ESV
- ▶ Puckapunyal being modified to reflect wider reasons for exemption
  - > Capacitive load from Defence network ~70A
  - > Hardening would be challenging due to extensive Defence network
  - Capacitive balancing difficult to achieve and maintain as no obligation on Defence to manage



<b>ABB Isolating Transformer</b>	

zss	HV Customer	Date submitted / re-submitted to ESV	Approval status
BWA	Woolworths	29 May 2018	Application with ESV
BWA	Uncle Tobys	29 May 2018	Application with ESV
RUBA	Pacific Hydro, Eildon Pondage	29 May 2018	Application with ESV
WN	Pacific Hydro, Williams Hovell	29 May 2018	Application with ESV
WN	Australian Textiles Mills	29 May 2018	Application with ESV
SMR	Department of Defence, Puckapunyal	23 March 2018	On hold
WGI	Wonthaggi Wind Farm	29 May 2018	Application with ESV

# 8. REFCL operating regime Three REFCL operating modes



▶ When the GFN is in service, the control room can select one of three operating modes

**Operating Mode 1** Total Fire Ban / Code Red Day (Declared by CFA)

**Operating Mode 2** Non TFB Day – Summer (Fire Danger Period defined by CFA)

**Operating Mode 3** Winter, Spring, Autumn (Outside Fire Danger Period) – hands back to NER/existing mode

<2.5 Amps



>2.5 Amps

Earth Fault Sensitivity Level



<0.5 Amps

- Minimal planned work.
- Less momentary faults but permanent faults may take longer to restore to customers downstream of safety devices (ACRs)
- (outages excluded from STPIS)

- Decreased sensitivity level to allow for planned work and network activities such as network switching
- Less momentary faults but permanent faults take longer to restore
- Decreased sensitivity level to allow for planned work and network activities such as network switching
- Less transient faults and very little change to pre-REFCL reliability for permanent faults

Sensitivity Level

The REFCL operating modes define the different earth fault current sensitivity levels that the REFCL is monitoring for

# 9. ESC Review of Voltage Standards

# AusNet

## **Draft decision**

- ▶ The draft Electricity Distribution Code (EDC) decision was released by the Essential Services Commission (ESC) on 22 May 2018 with final decision to be released in August 2018
  - The draft changes to the EDC remove the conflict between the Bushfire Mitigation Regulation obligations and the EDC obligations regarding the operation of REFCL's
  - In addition, the draft decision clarifies the responsibility for being compliant with REFCL voltage levels with the HV customers

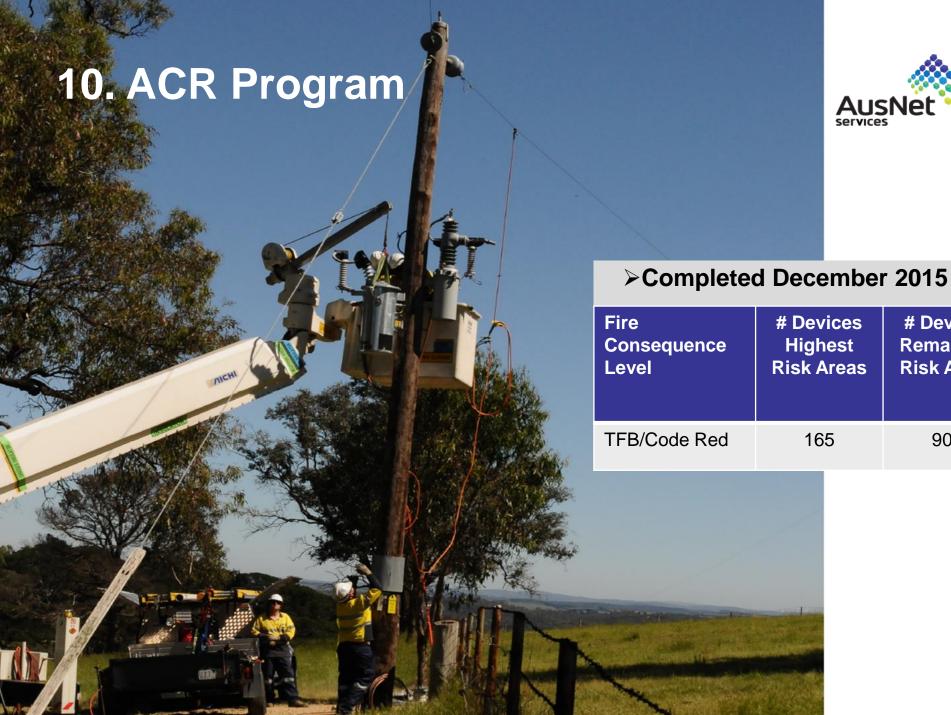
### ▶ AusNet Services supports the ESC's draft decision because it:

- Provides the appropriate flexibility to meet our obligations;
- > Sets clear accountabilities for compatibility with resonant earthed network operation, for equipment at and beyond the point of connection;
- Provides clarification for the AER's revenue setting process; and
- > Provides a customer information process in the event of future plans to implement resonant earthing.

#### ▶ Key issues:

- The obligation to use best endeavours to minimise the period where we operate REFCLs appears to conflict with our bushfire mitigation obligations
- > The definition of REFCLs is restrictive and should use resonant earthing instead
- What constitutes a reasonable period for HV Customers to comply is not clear or what steps would be taken if they don't comply in the reasonable period

<u>Key Point:</u> There is a risk of potential delays to operating REFCLs should Tranche 2 & 3 HV customers not carry out their obligations on a timely basis





**# Devices** 

Remaining

**Risk Areas** 

900

