“Tasmanian Electricity Networks to suit the Customer”

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Synopsis

The network business boundary between Transend and Aurora is inappropriate today.

The Distribution Operator has to ask the Transmission Operator:

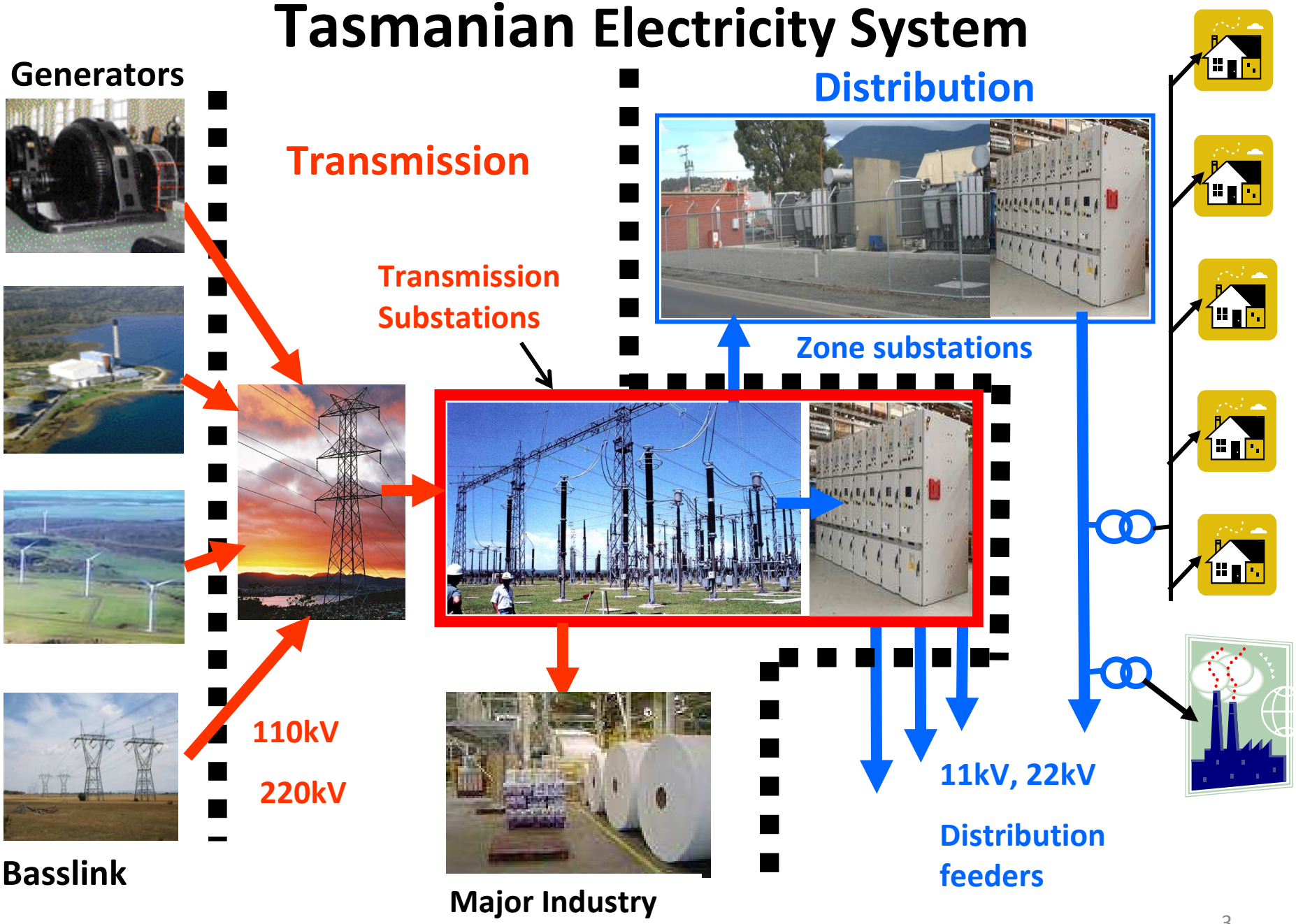
- To pass on alarm and fault data from circuit breakers (CBs) that are the key control devices for the distribution network.
- Many times each day, to adjust control settings on CBs before commencing live-line and related tasks on the distribution network, and restore to normal at completion of the work.

Transmission Operators are distracted from their core work.

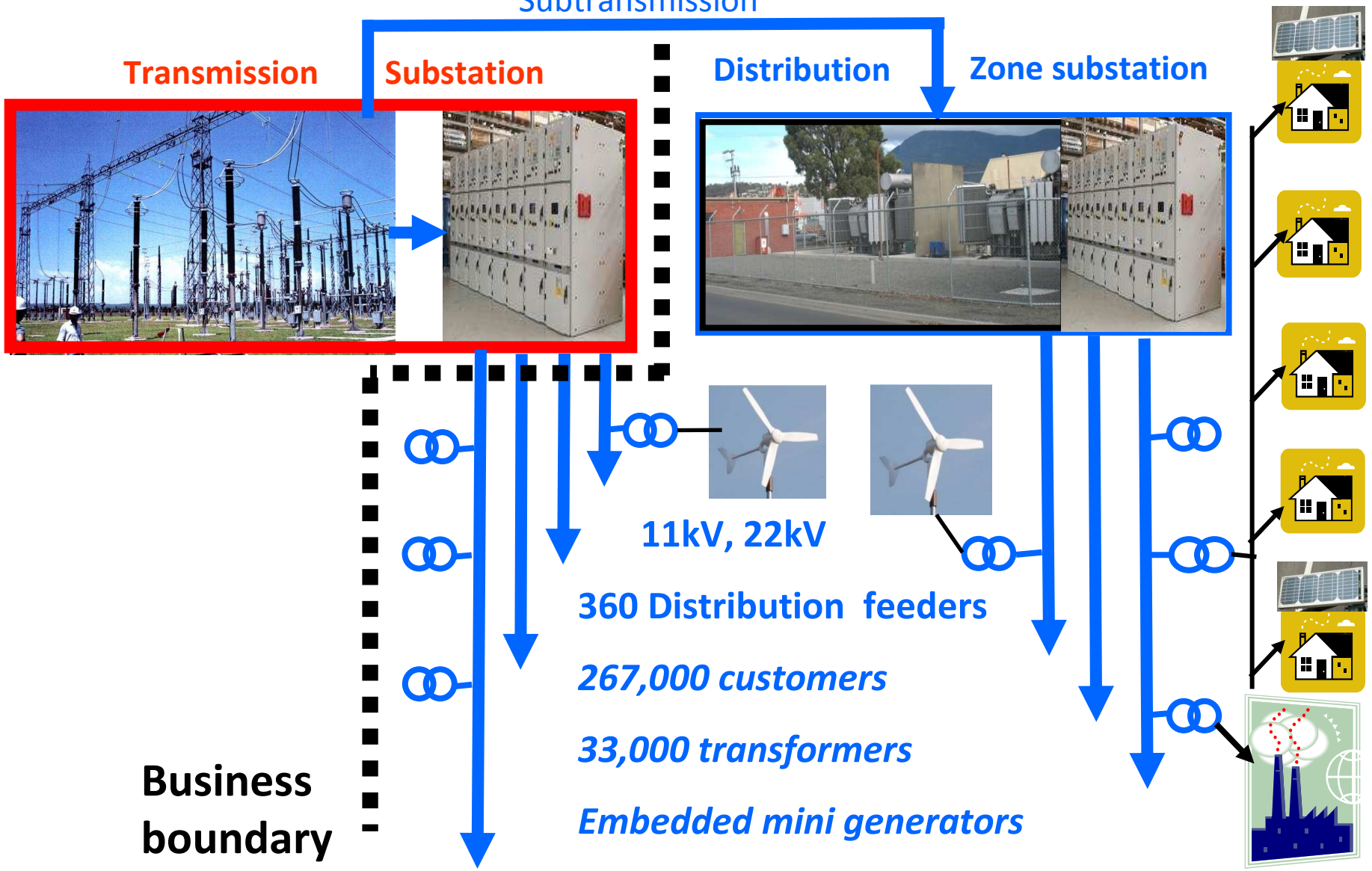
Delays cause higher costs , and customers receive poorer service.

The current business boundary is an impediment to introducing "Smart Network" technologies to Tasmania, as they require on-line data and control of all distribution circuit breakers.

Tasmanian Electricity System



Transmission/Distribution "Today"



Electricity Customer expectations:

- **Electricity interruptions minimised**
- **Interruption durations are minimised**
- **Costs are minimised**
- **Tasmanian ESI will be ready for future technology**

  -- e.g. Smart Networks

Distribution Interruptions

Unplanned Interruptions

- Caused by birds, possums, tree branches.
- Caused by storms, bushfire, vehicle accidents
- Equipment failure

Planned Interruptions

- Maintenance
- Routine work, new connections
- Load transfers.

Distribution Network Solutions:

- "**Auto-reclose**" to cover transient faults
- "**Live-line working**", with no switching off
- **Vegetation clearance**, with no switching off
- **Feeder remote control** and seamless load transfers
- **Smart network features**

  e.g.Loop automation (reduces outages to 60 secs)

Distribution Line work

1990's

- HV conductors switched off.

- Customer Supplies interrupted

2000's

- Live-line

- No customer supply interruption.

Live line working – safety precautions

Preparation requires access to Feeder Circuit Breaker:

1. Switch off “auto-reclose”
2. Adjust protection settings
3. Issue work permits.
4. **Perform work.**
5. Cancel work permits
6. Restore protection settings
7. Switch on “auto-reclose”

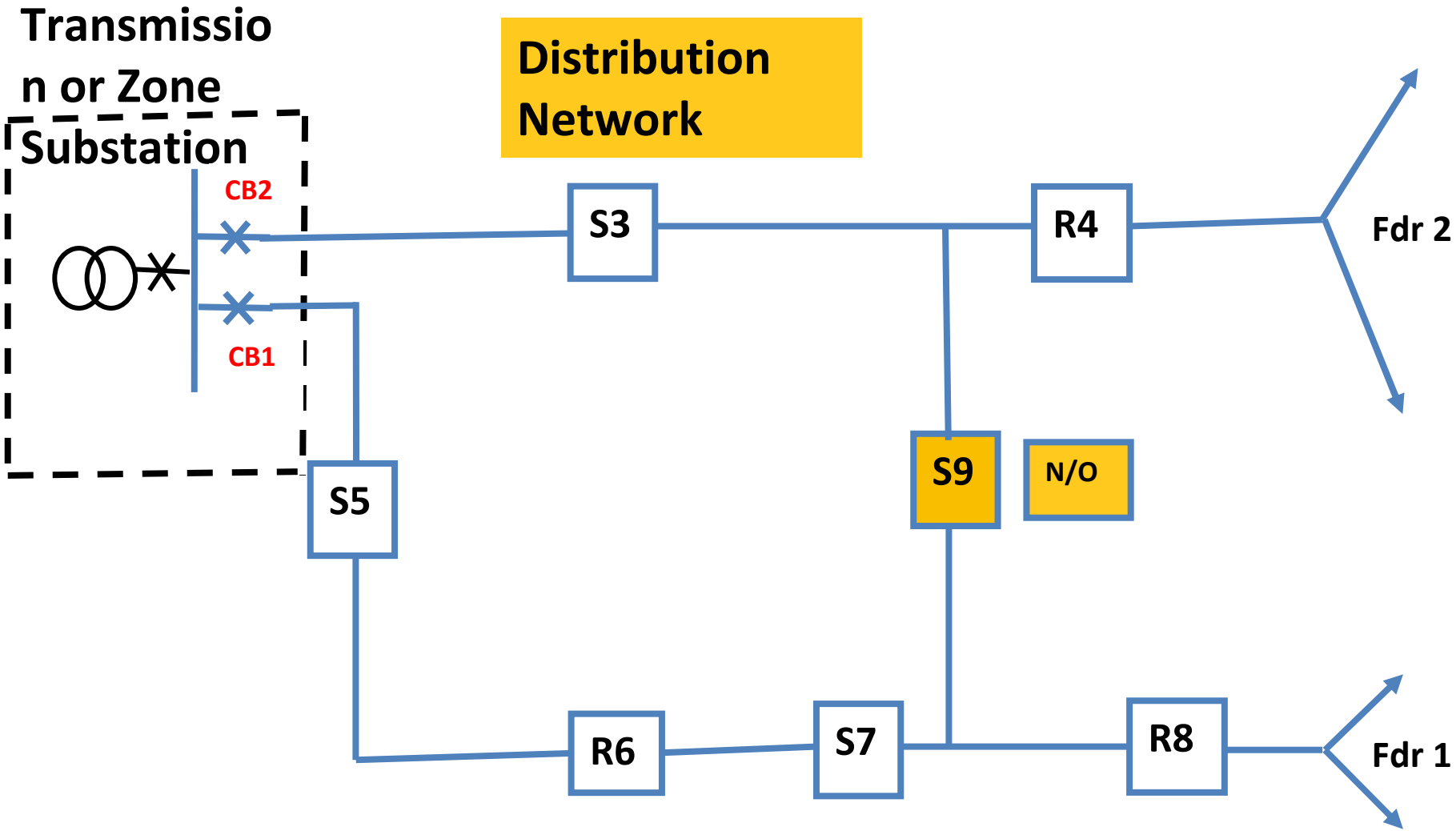
Vegetation Management

Live-line & precautions.

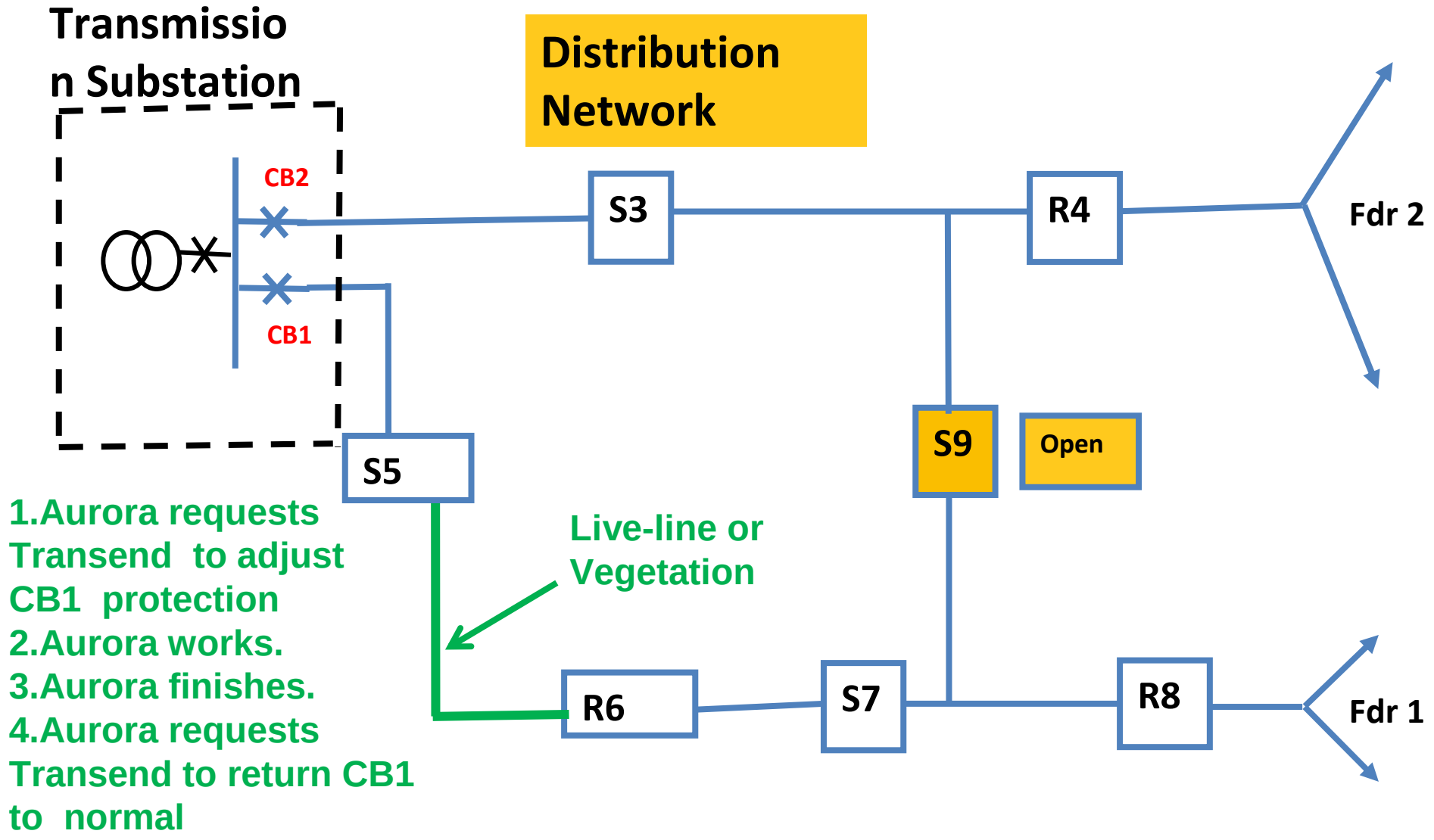
Preparation requires access to Feeder Circuit Breaker.

1. Switch off “auto-reclose”
2. Adjust protection settings
3. Issue work permits.
4. **Perform work.**
5. Cancel work permits
6. Restore protection settings
7. Switch on “auto-reclose”.

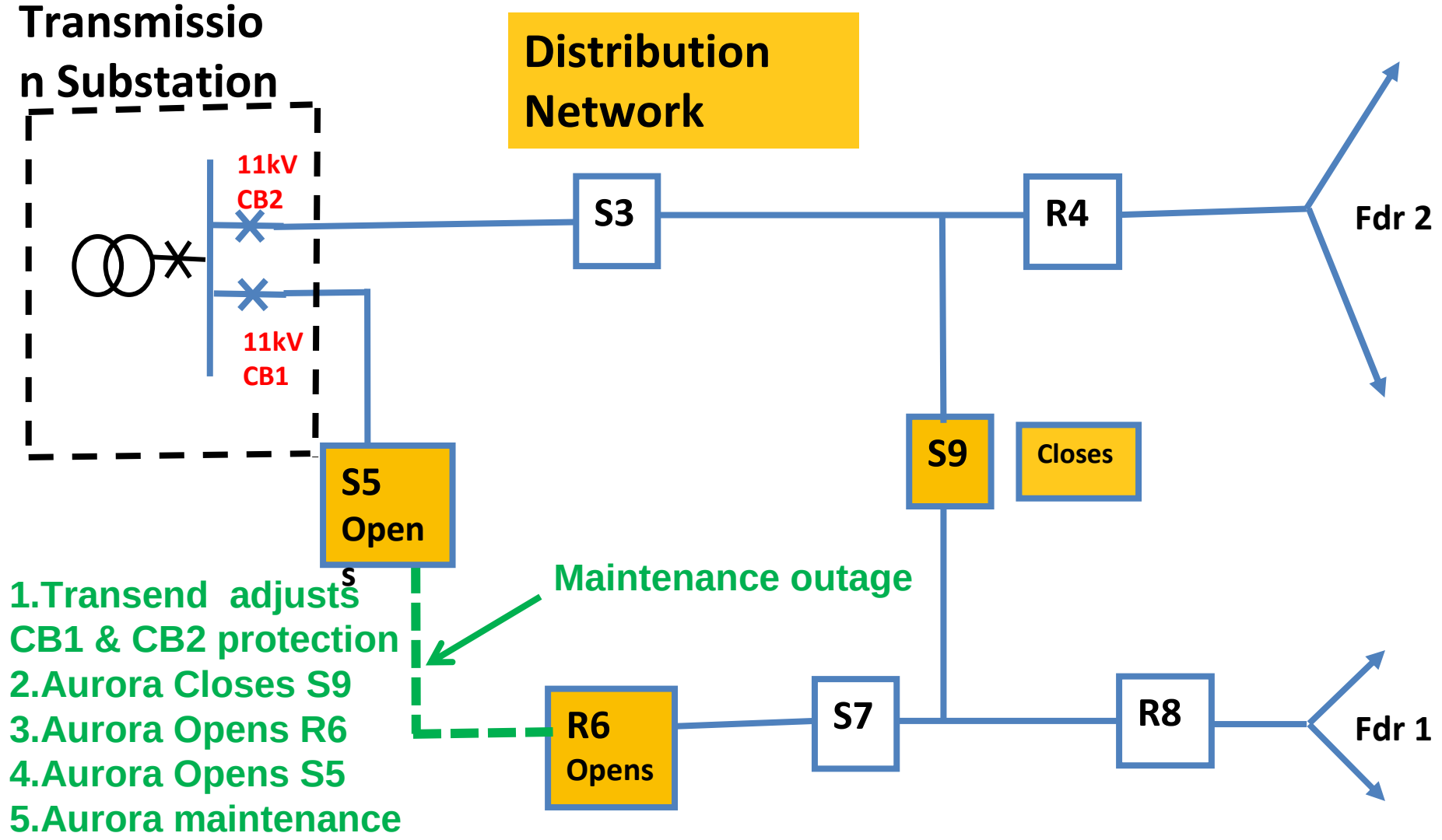
Distribution network – normal state



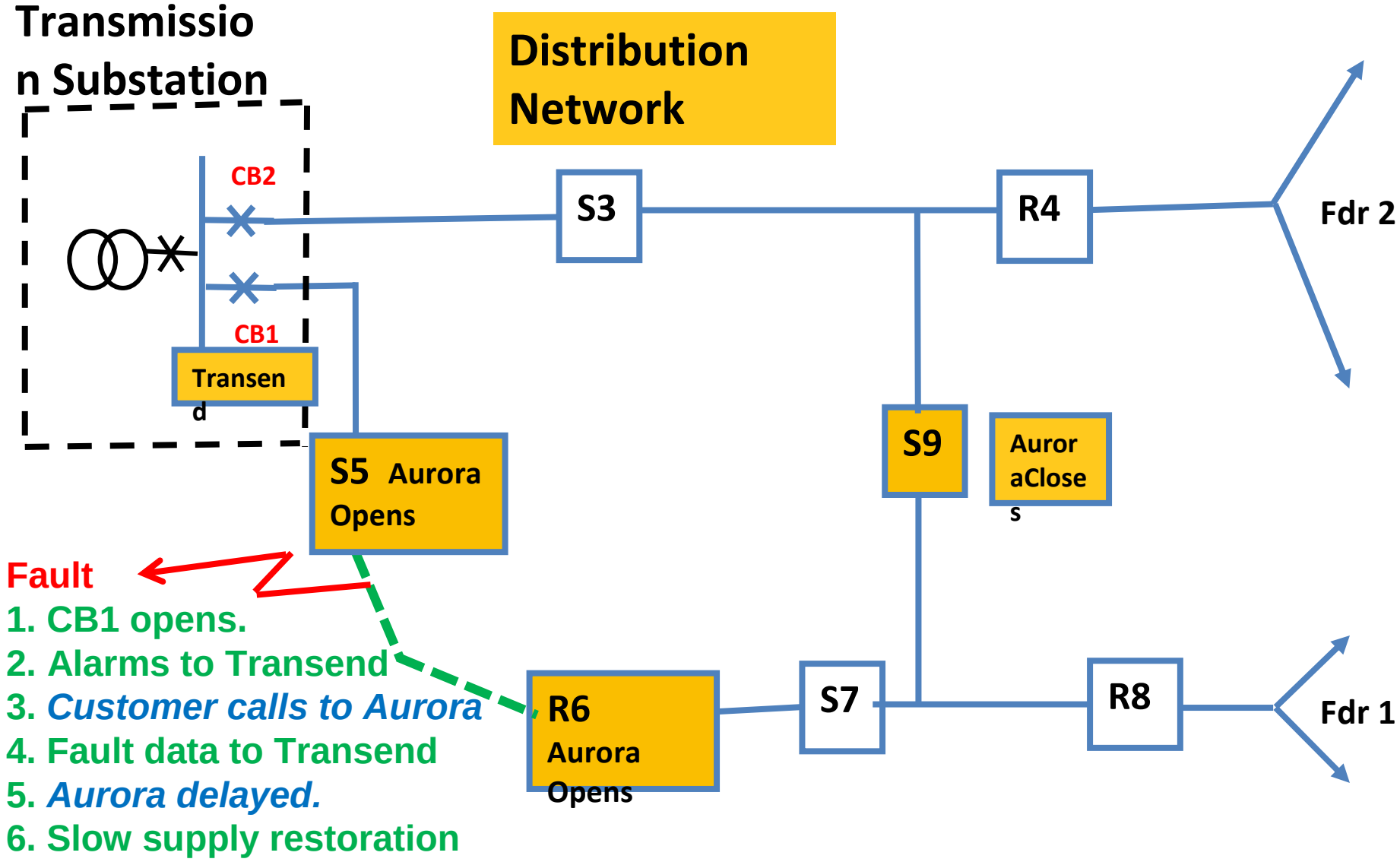
Distribution network – Live-line safety



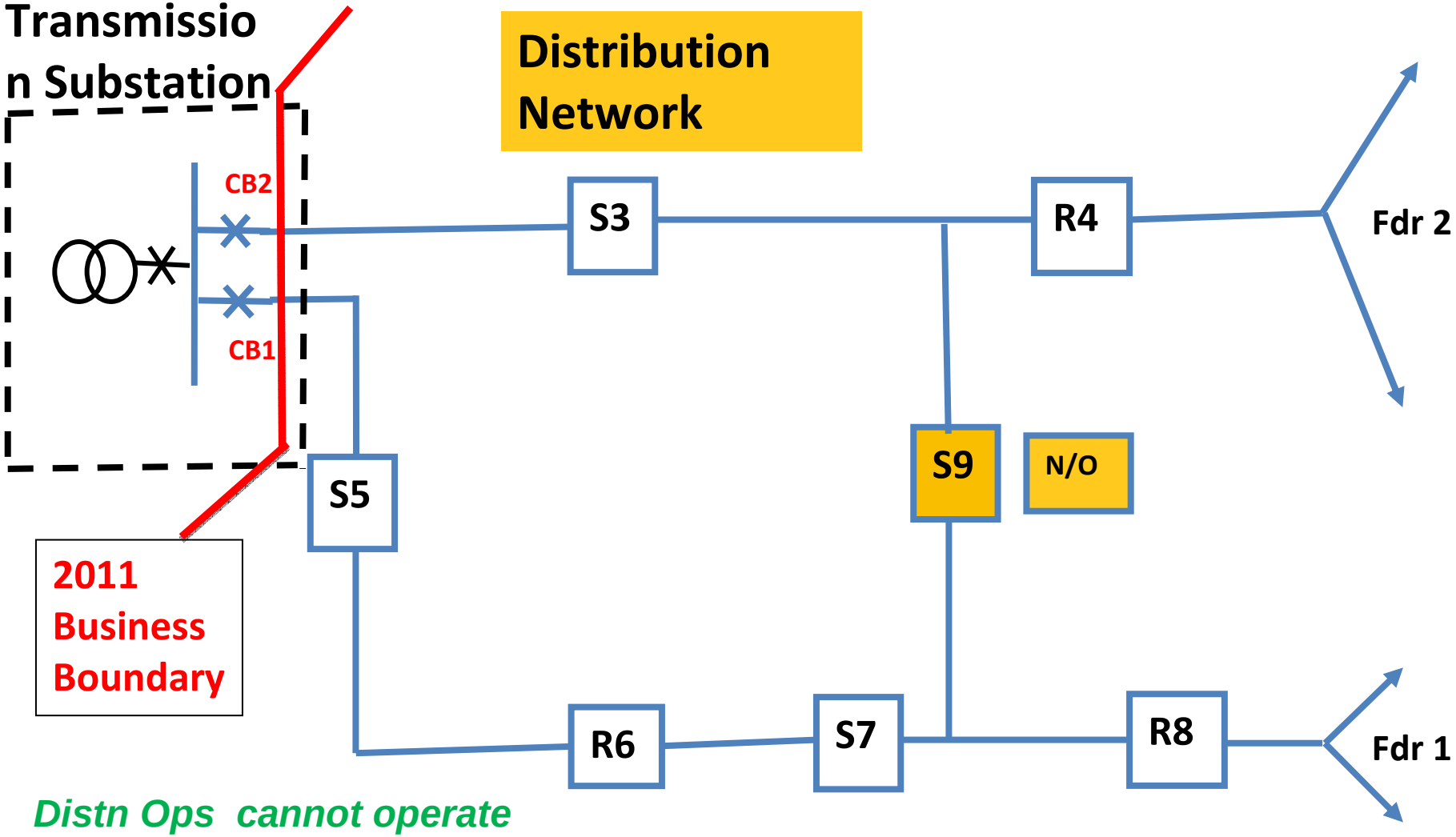
Distribution network – transferred load



Distribution network – fault recovery

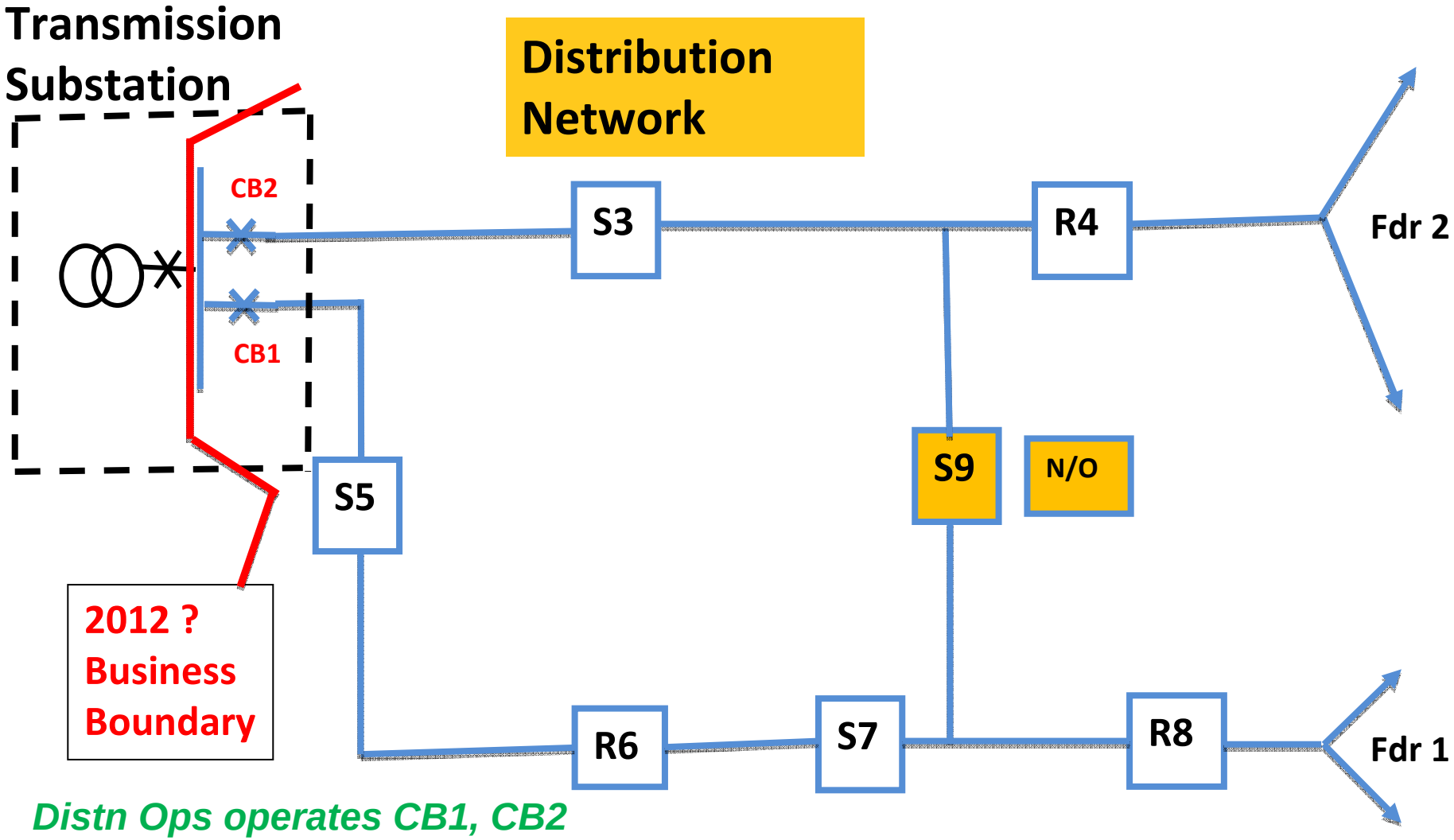


Dysfunctional Business Boundary



Distn Ops cannot operate distribution CB1 or CB2.

New Functional Business Boundary



Distn Ops operates CB1, CB2 and all distribution devices.

Transmission Distractions

- Standard distribution work practises (Live-line, etc) increase involvement of Transmission operators in Tas.
- National Electricity Grid requires Transmission to focus on the bigger picture – 220kV, 110kV, Power Stations, Wind farms, Basslink, major customers.
- Transmission operators rightly treat distribution matters as lower priority, but 11kV & 22kV critical to customers

Solution – remove transmission distractions.

- Transfer control of distribution CBs and relays to Distribution Operator (as already in all other states).

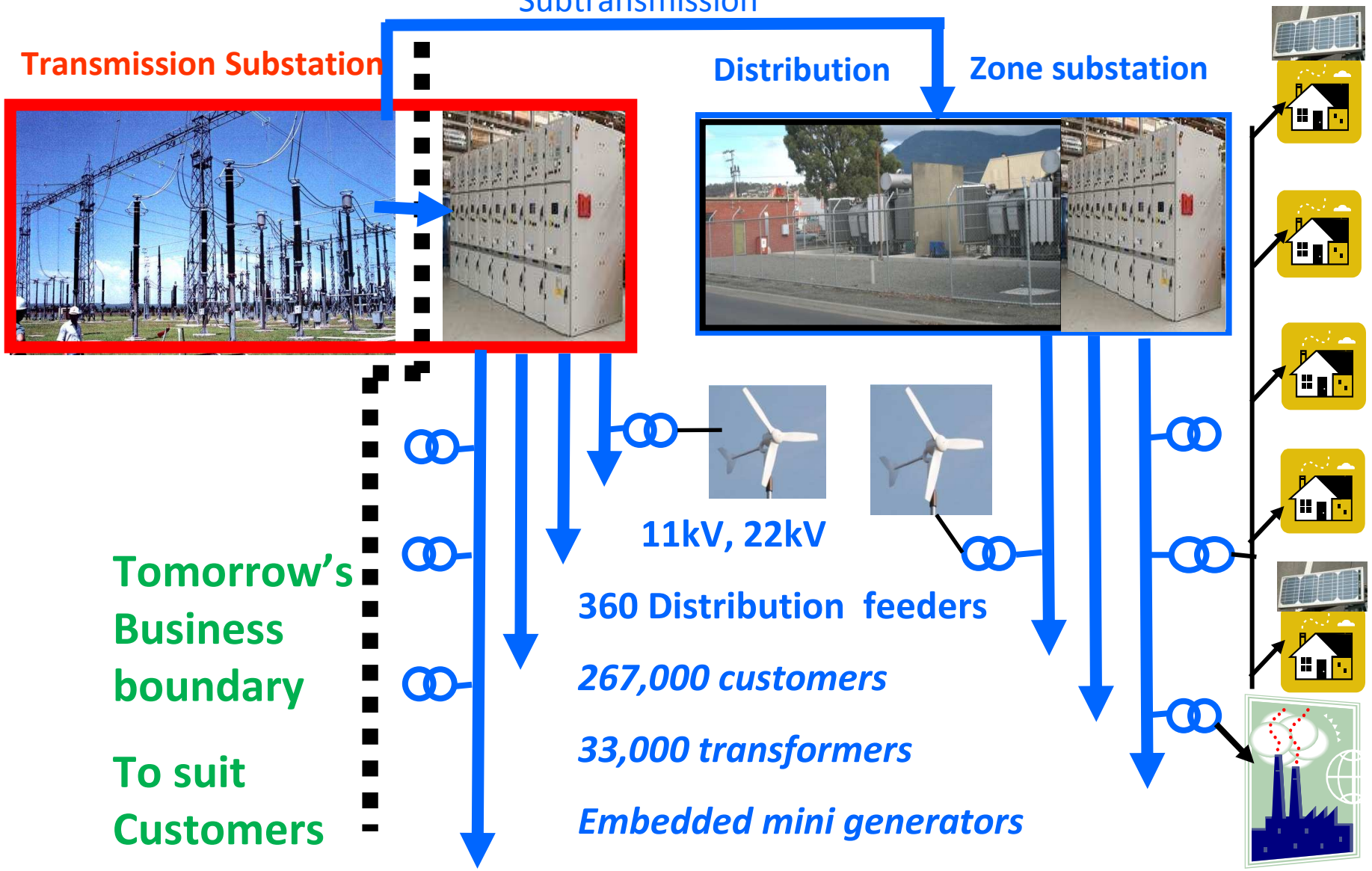
Smart Networks

Dr Perry Sioshansi (USA consultant) in Hobart October 2010.

Engineers Australia "Sustainable electricity" Hobart April 2011.

- **Smart networks will:**
  - Provide Dist. Ops. with immediate fault data
  - Facilitate recovery from faults by automating some distribution network switchings.
  - Provide distribution load data and voltage quality measurements directly to Dist Ops.
  - Facilitate inputs from distributed generation – small wind turbines, solar cells, landfill gas, mini-hydro.
- **Smart networks need control & operation of Dist CBs.**

Transmission/Distribution "Tomorrow"



Summary

The network business boundary between Transend and Aurora is inappropriate today.

There is an opportunity to:

- **Improve Distribution operational efficiency**
- **Improve Transmission operator efficiency**
- **Deliver better service to Tasmanian customers**
- **Position Tasmania to benefit from "Smart Network" technology.**

Change the business boundary to enable Transend and Aurora to perform more efficiently, to meet customer and Regulatory expectations.