

Engineering Tomorrow's Energy Future (Lessons from a Graduate Engineer)

How collaboration makes us stronger

Helen He - ElectroNet



Why I am here

- For graduate Engineers
- Share real experiences
- Student→ Engineer
- Teamwork & Collaboration



Kaiwera Downs Wind Farm Stage 2 (KD2)



155MW → 36 Turbines

Enough power for 93,000 homes

Stakeholders:

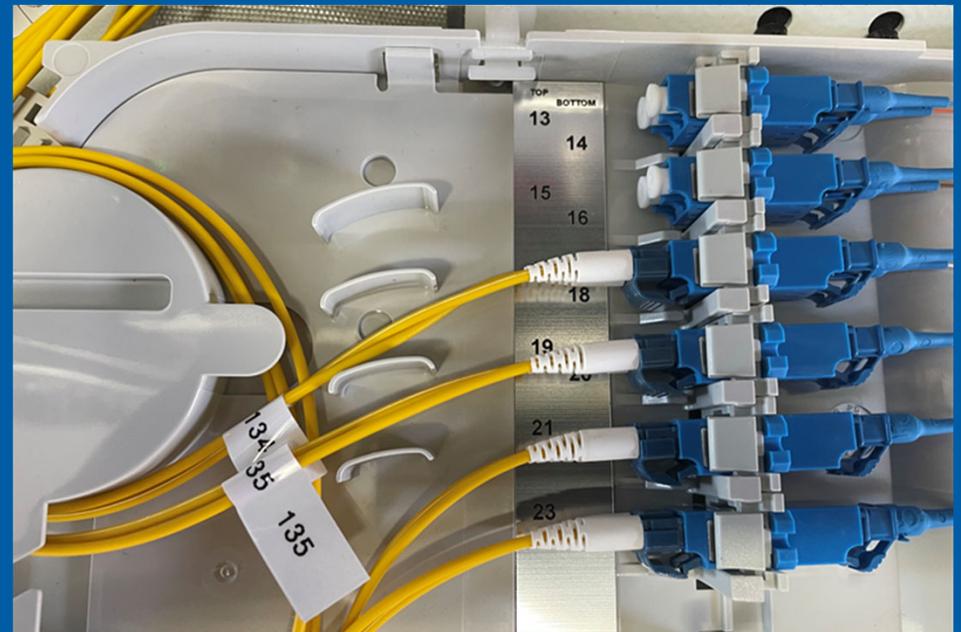
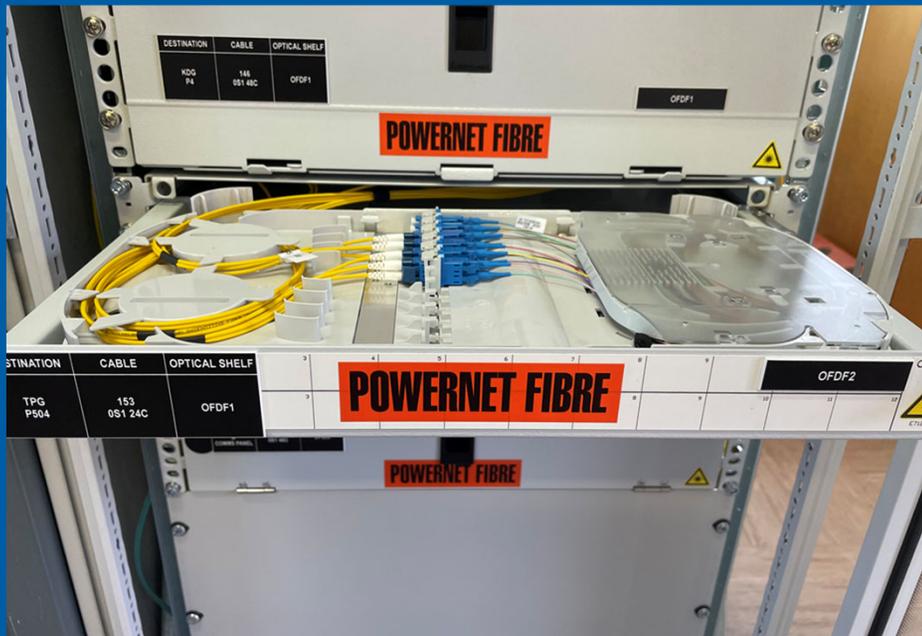
- Mercury
- Transpower
- Vestas
- Higgins
- ElectroNet

My role:

Secondary design + SCADA integration

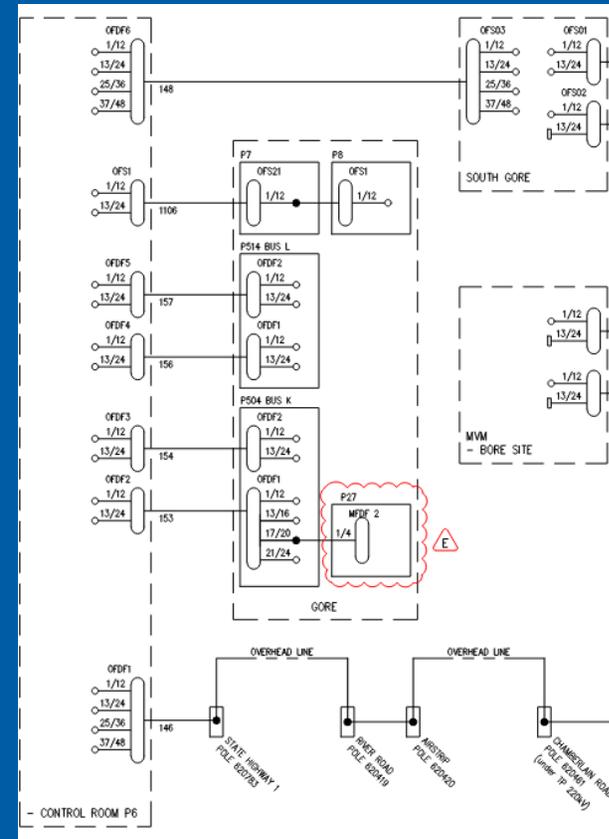
Example 1 - Fibre Connections

Interface between Transpower, Mercury, PowerNet

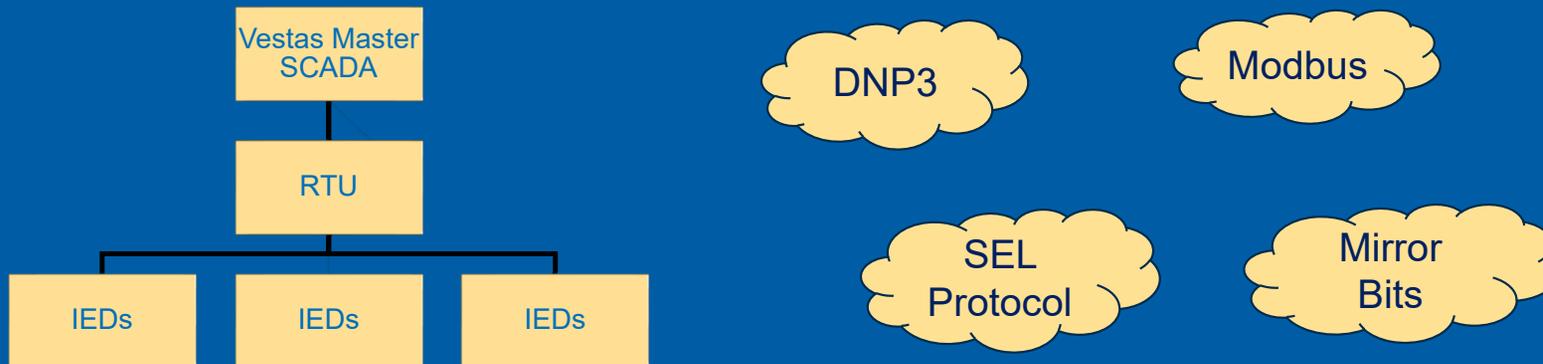


Lessons from Fibre Work

- Communication > Assumptions
- Right time and right way
- A clear drawing = good communication
- Collaboration starts in design



Example 2 – SCADA Signal Mapping

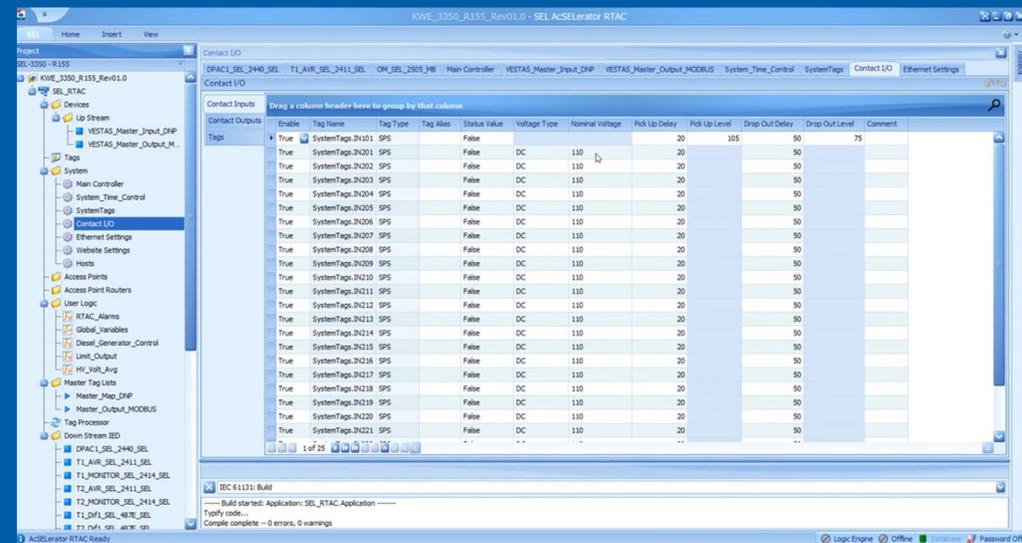


0		Equipment			RTAC			RTAC Tag
Number	Monitored by Mercury	Equip. ID.1	Equip. ID.2	Data Point Description	TYPE	Relay Word Bits	Source Expression	RTAC Tag
83		T1_AVR_SEL2411.	DI.	T1_AVR_SEL2411.Loss of Volts	SPS	T00_LED	T1_AVR_SEL_2411_SEL.FM_INST_T00_LED	Master_Map_DNP.BI_00083
84	Y	T1_AVR_SEL2411.	DI.	T1_AVR_SEL2411.Transformer Over Flux	SPS	T02_LED	T1_AVR_SEL_2411_SEL.FM_INST_T02_LED	Master_Map_DNP.BI_00084
85		T1_AVR_SEL2411.	DI.	T1_AVR_SEL2411.Tap Change In Progress	SPS	T03_LED	T1_AVR_SEL_2411_SEL.FM_INST_T03_LED	Master_Map_DNP.BI_00085
86		T1_AVR_SEL2411.	DI.	T1_AVR_SEL2411.Tap Changer In Local	SPS	T04_LED	T1_AVR_SEL_2411_SEL.FM_INST_T04_LED	Master_Map_DNP.BI_00086
87		T1_AVR_SEL2411.	DI.	T1_AVR_SEL2411.End of Tap Range	SPS	T05_LED	T1_AVR_SEL_2411_SEL.FM_INST_T05_LED	Master_Map_DNP.BI_00087
88	Y	T1_AVR_SEL2411.	DI.	T1_AVR_SEL2411.Tap Change Blocked	SPS	T06_LED	T1_AVR_SEL_2411_SEL.FM_INST_T06_LED	Master_Map_DNP.BI_00088
89	Y	T1_AVR_SEL2411.	DI.	T1_AVR_SEL2411.GOOSE Messaging Fail	SPS	SV12T	T1_AVR_SEL_2411_SEL.FM_INST_SV12T	Master_Map_DNP.BI_00089
90	Y	T1_AVR_SEL2411.	DI.	T1_AVR_SEL2411.Tap Change Fail	SPS	SV13T	T1_AVR_SEL_2411_SEL.FM_INST_SV13T	Master_Map_DNP.BI_00090

		Equipment		Data Point		RTAC		Modbus
Number	Monitored by Mercury	Equip. ID.1	Equip. ID.2	Description	Data Point Description	SEL / MODBUS Name	Relay Word Bit	Modbus
8			DO.					Master_Output_MODBUS.COIL_00008.operSet.ctlVal
9			DO.					Master_Output_MODBUS.COIL_00009.operSet.ctlVal
10	Y	T1_AVR_SEL_2411.	DO.	Raise Command	T1_AVR_SEL_2411.Raise Command	T1_AVR_SEL_2411_SEL.FO_RB_RB01.operPulse	RB01	Master_Output_MODBUS.COIL_00010.operSet.ctlVal
11	Y	T1_AVR_SEL_2411.	DO.	Lower Command	T1_AVR_SEL_2411.Lower Command	T1_AVR_SEL_2411_SEL.FO_RB_RB02.operPulse	RB02	Master_Output_MODBUS.COIL_00011.operSet.ctlVal
12	Y	T1_AVR_SEL_2411.	DO.	AVR in Auto Command	T1_AVR_SEL_2411.AVR in Auto Command	T1_AVR_SEL_2411_SEL.FO_RB_RB03.operPulse	RB03	Master_Output_MODBUS.COIL_00012.operSet.ctlVal
13	Y	T1_AVR_SEL_2411.	DO.	AVR in Manual Command	T1_AVR_SEL_2411.AVR in Manual Command	T1_AVR_SEL_2411_SEL.FO_RB_RB04.operPulse	RB04	Master_Output_MODBUS.COIL_00013.operSet.ctlVal
14	Y	T1_AVR_SEL_2411.	DO.	Alarm Reset	T1_AVR_SEL_2411.Alarm Reset	T1_AVR_SEL_2411_SEL.FO_RB_RB05.operPulse	RB05	Master_Output_MODBUS.COIL_00014.operSet.ctlVal

Lessons from SCADA Mapping

- Check, test, then test again
- Collaboration = many small alignments
- Clarity beats complexity
- Think “system”, not “signal”



The screenshot shows the SEL RTAC software interface. The main window displays a table of 'Contact I/O' settings. The table has the following columns: Enable, Tag Name, Tag Type, Tag Alias, Status Value, Voltage Type, Nominal Voltage, Pick-Up Delay, Pick-Up Level, Drop Out Delay, Drop Out Level, and Comment. The data rows show various tags like SystemTags.IN201 through SystemTags.IN221, all with a status value of 'False' and a voltage type of 'DC'. The pick-up level is consistently 105, and the drop-out level is 75. The status value for all tags is 'False'.

Enable	Tag Name	Tag Type	Tag Alias	Status Value	Voltage Type	Nominal Voltage	Pick-Up Delay	Pick-Up Level	Drop Out Delay	Drop Out Level	Comment
True	SystemTags.IN201	SPS		False	DC	110	20	105	50	75	
True	SystemTags.IN202	SPS		False	DC	110	20		50		
True	SystemTags.IN203	SPS		False	DC	110	20		50		
True	SystemTags.IN204	SPS		False	DC	110	20		50		
True	SystemTags.IN205	SPS		False	DC	110	20		50		
True	SystemTags.IN206	SPS		False	DC	110	20		50		
True	SystemTags.IN207	SPS		False	DC	110	20		50		
True	SystemTags.IN208	SPS		False	DC	110	20		50		
True	SystemTags.IN209	SPS		False	DC	110	20		50		
True	SystemTags.IN210	SPS		False	DC	110	20		50		
True	SystemTags.IN211	SPS		False	DC	110	20		50		
True	SystemTags.IN212	SPS		False	DC	110	20		50		
True	SystemTags.IN213	SPS		False	DC	110	20		50		
True	SystemTags.IN214	SPS		False	DC	110	20		50		
True	SystemTags.IN215	SPS		False	DC	110	20		50		
True	SystemTags.IN216	SPS		False	DC	110	20		50		
True	SystemTags.IN217	SPS		False	DC	110	20		50		
True	SystemTags.IN218	SPS		False	DC	110	20		50		
True	SystemTags.IN219	SPS		False	DC	110	20		50		
True	SystemTags.IN220	SPS		False	DC	110	20		50		
True	SystemTags.IN221	SPS		False	DC	110	20		50		

My Collaboration Toolkit



- 🗨️ Communicate early
- 👁️ See from others' perspective
- 🧩 Understand interfaces
- 🧠 Share knowledge openly
- 🤝 Trust the team

My Small Work → Big Impact

- Small details = big system reliability
- Collaboration connects every discipline
- Renewable energy projects = teamwork at scale
- “Many hands, one purpose”



What the Chopsticks Taught Me



- One engineer = one chopstick
- Together = strength, stability, resilience
- Collaboration builds trust and learning

What I've Gained

- Confidence in communication
- Understanding big-picture systems
- Respect for other disciplines
- Passion





Any questions?