


ADVANCED DISTRIBUTION TRANSFORMER LOW-VOLTAGE POWER QUALITY MONITORING

APEX Summit 2019

Presenter :- Kelvin Anto
Electra

1





AGENDA

- Brief overview of Electra
- The key purpose of this project
- The monitor selection & evaluation
- Prospective transformer sites to install the monitors
- Data analysis
- Moving forward


2

KA1 Electra




1



45,060 active customers



1628sqkm



1603

942

3

Electra

2

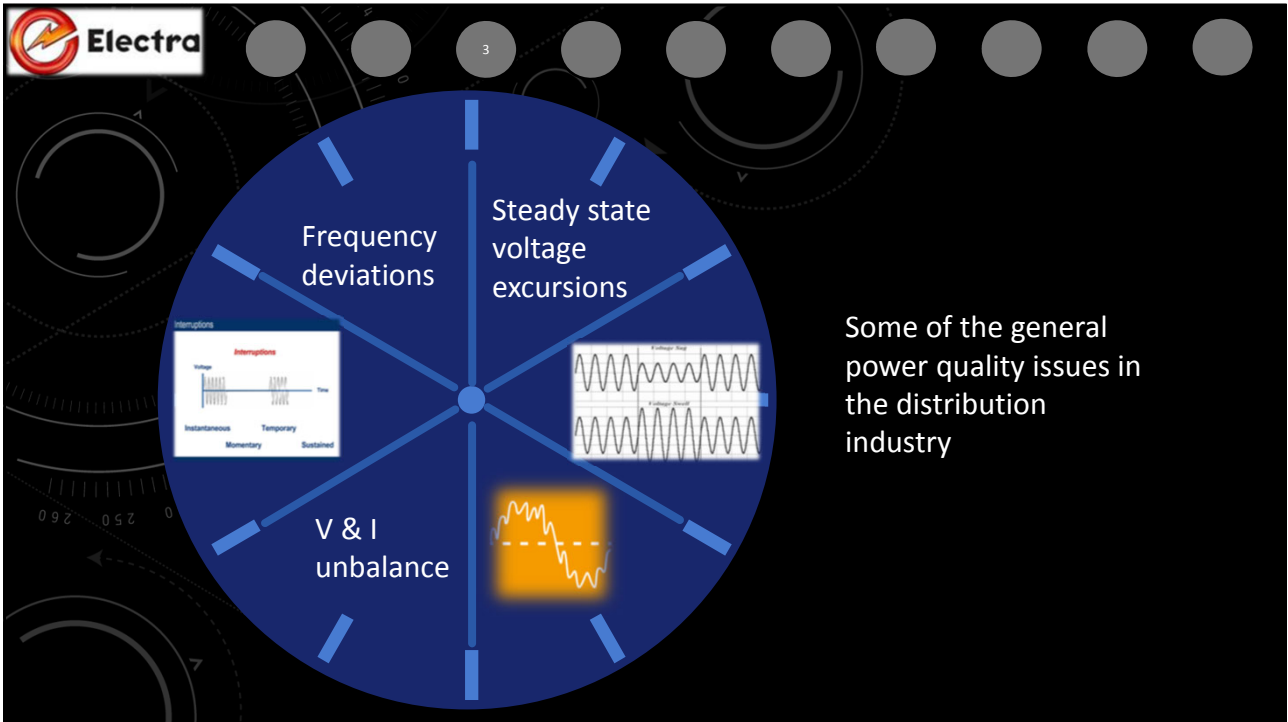


- Improve visibility of low-voltage(LV) network
- Power quality baseline
- Customer expectation management
- Validating After Diversity Maximum Demand (ADMD) assumptions

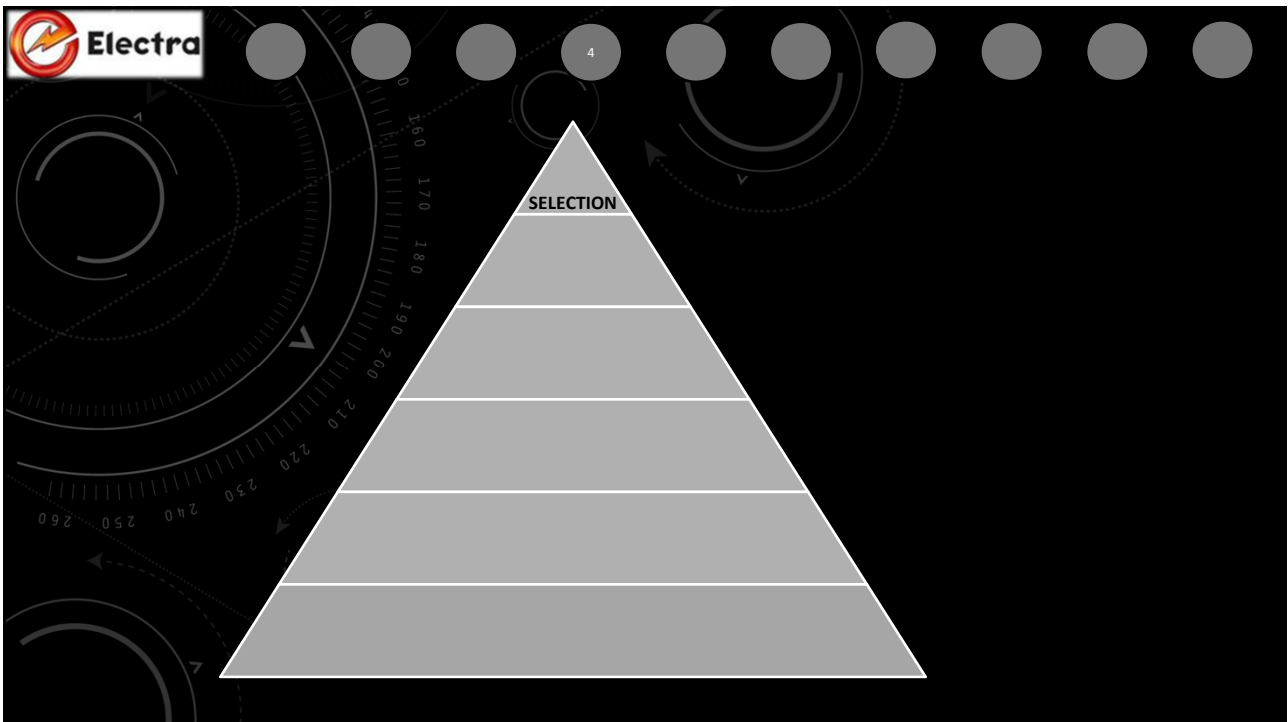
4

Slide 3

KA1 Kelvin Anto, 16/08/2019



5



6

5.1

Criteria for PQ monitor selection


1. No. of monitorable parameters
2. Monitor accuracy
3. CT accuracy
4. Ease of installation
5. IP rating
6. Sampling interval
7. Communications protocol
8. Cost of monitor
9. On-going costs

7



5.2

DESCRIPTION	MANU 1	MANU 2	MANU 3	MANU 4	MANU 5	MANU 6	MANU 7	MANU 8	MANU 9
V & I waveforms	✓	✓	✓	✓	✓	✓	✓	✓	✓
Power	✓	✓	✓	✓	✓	✓	✓	✓	✓
Voltage sags & swells		✓		✓	✓	✓	✓	✓	✓
Harmonics – V& I		✓		✓		✓	✓	✓	✓
THDs – V& I		✓		✓		✓	✓	✓	✓
Phase angle, power factor	✓	✓	✓	✓	✓	✓	✓	✓	✓
V & I unbalance		✓		✓	✓	✓	✓	✓	✓
Monitor accuracy	0.50%	0.20%	0.50%	0.50%	<2%	0.20%	0.10%	0.50%	0.10%
CT accuracy	0.50%	0.50%	0.50%	0.50%	1%	1%	1%	1%	1%

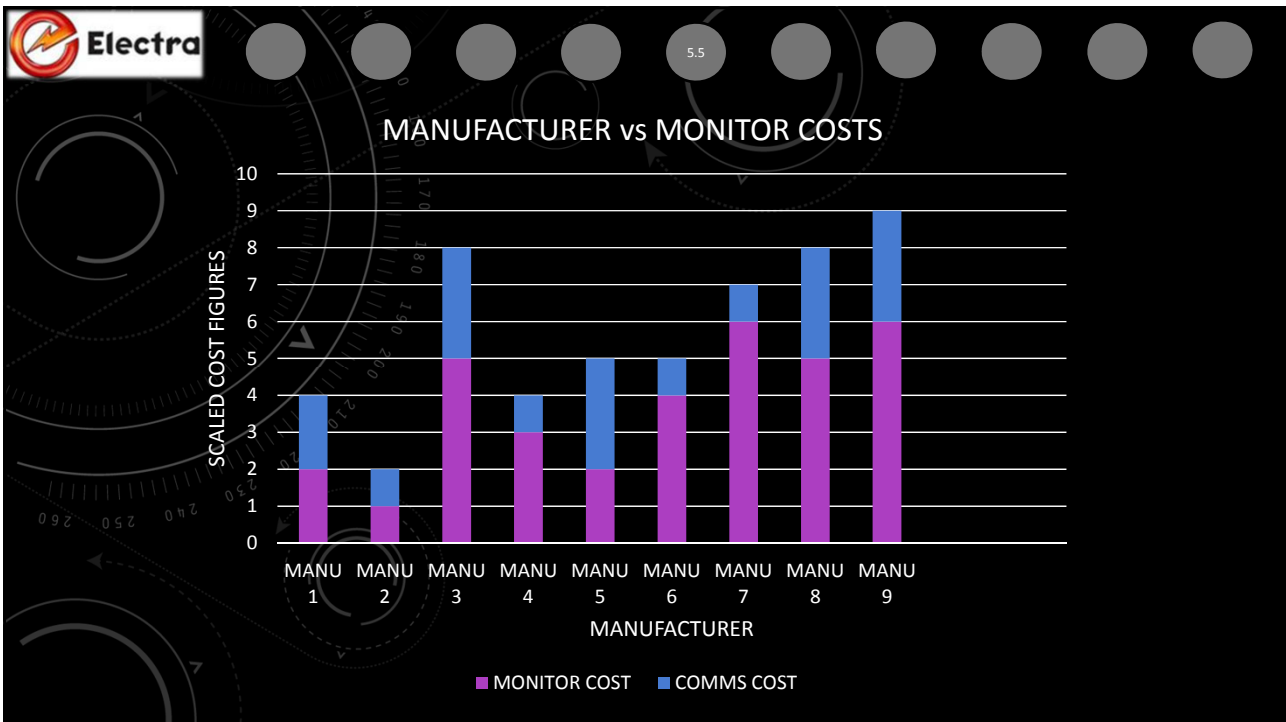
8



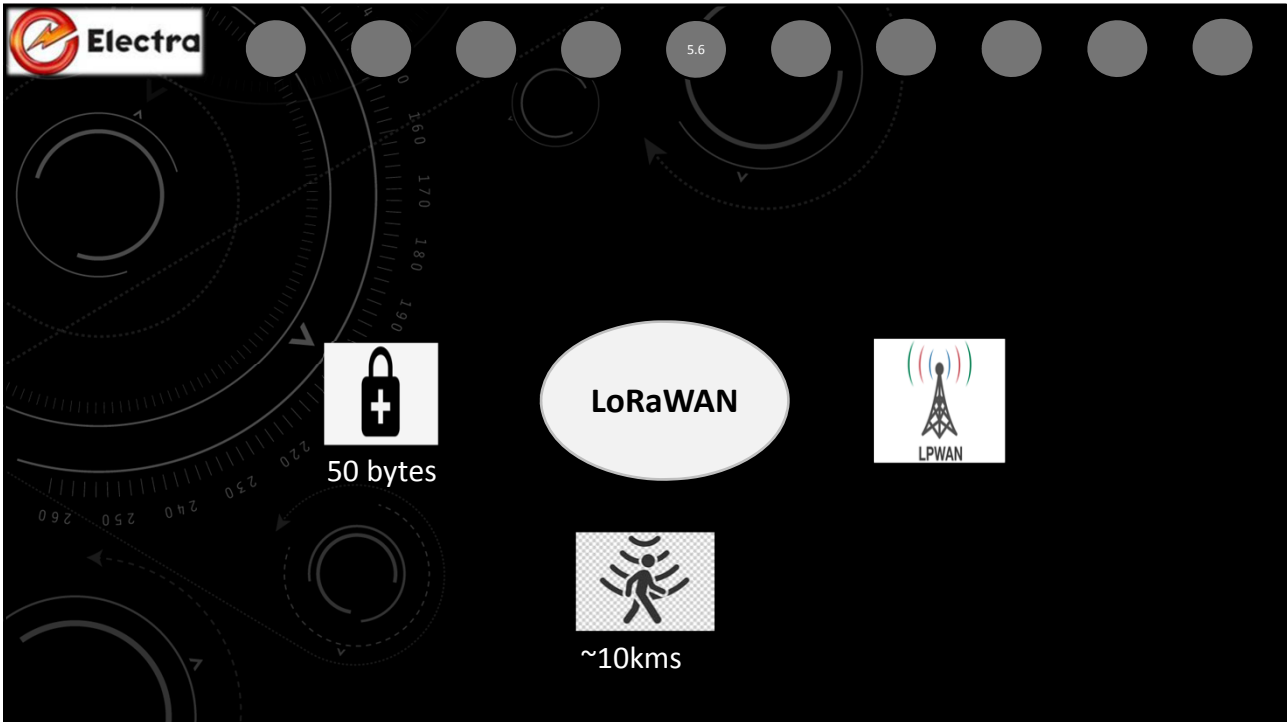
5.3

DESCRIPTION	MANU 1	MANU 2	MANU 3	MANU 4	MANU 5	MANU 6	MANU 7	MANU 8	MANU 9
	MEDIUM	MEDIUM	EASY	EASY	MEDIUM	HARD	HARD	EASY	EASY
	GPRS/GS M/3G	GPRS/GS M/3G/ IoT	GPRS/G SM/3G	GPRS/G SM/3G/ IoT	GPRS/GS M/3G	GPRS/GS M/3G/ IoT	GPRS/GS M/3G/ IoT	GPRS/GS M/3G	GPRS/G SM/3G
IP rating	IP 66	IP 66	IP 65	IP 20	IP 40	IP 30	IP 30	IP 66	IP 66
No of LV ways/feeder per monitor	1	1	1	1	6	1	1	1	1

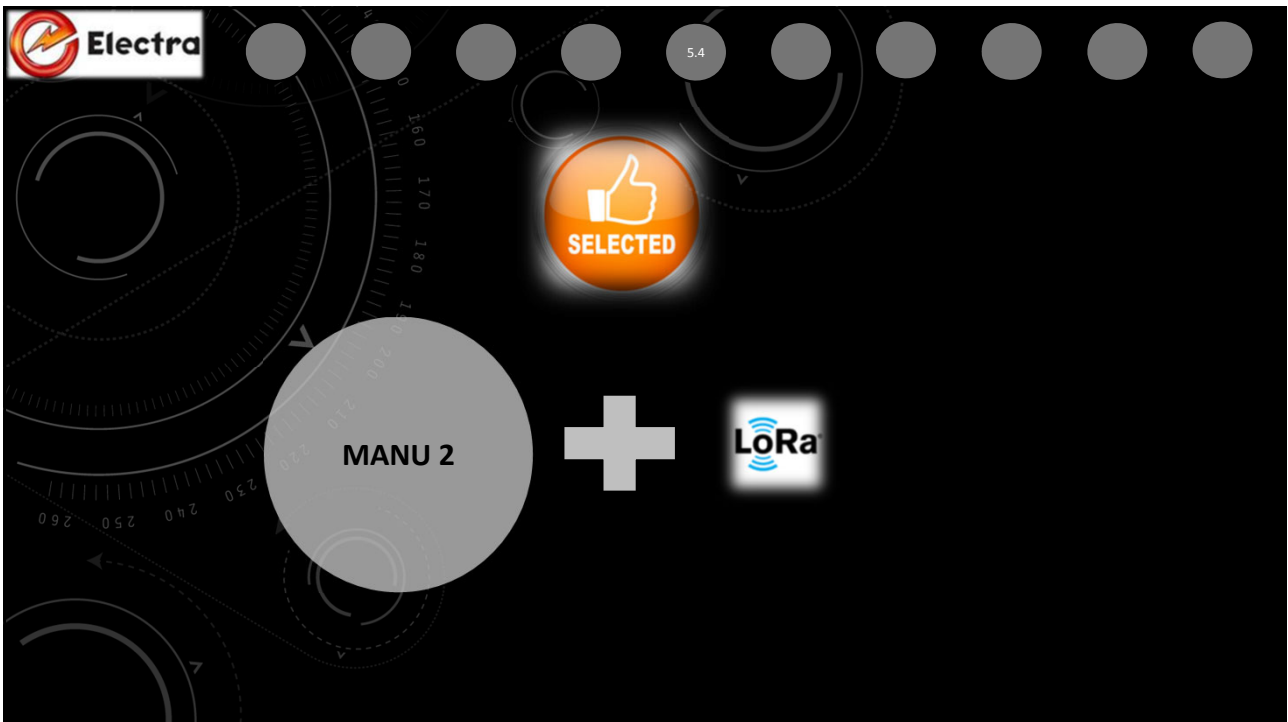
9



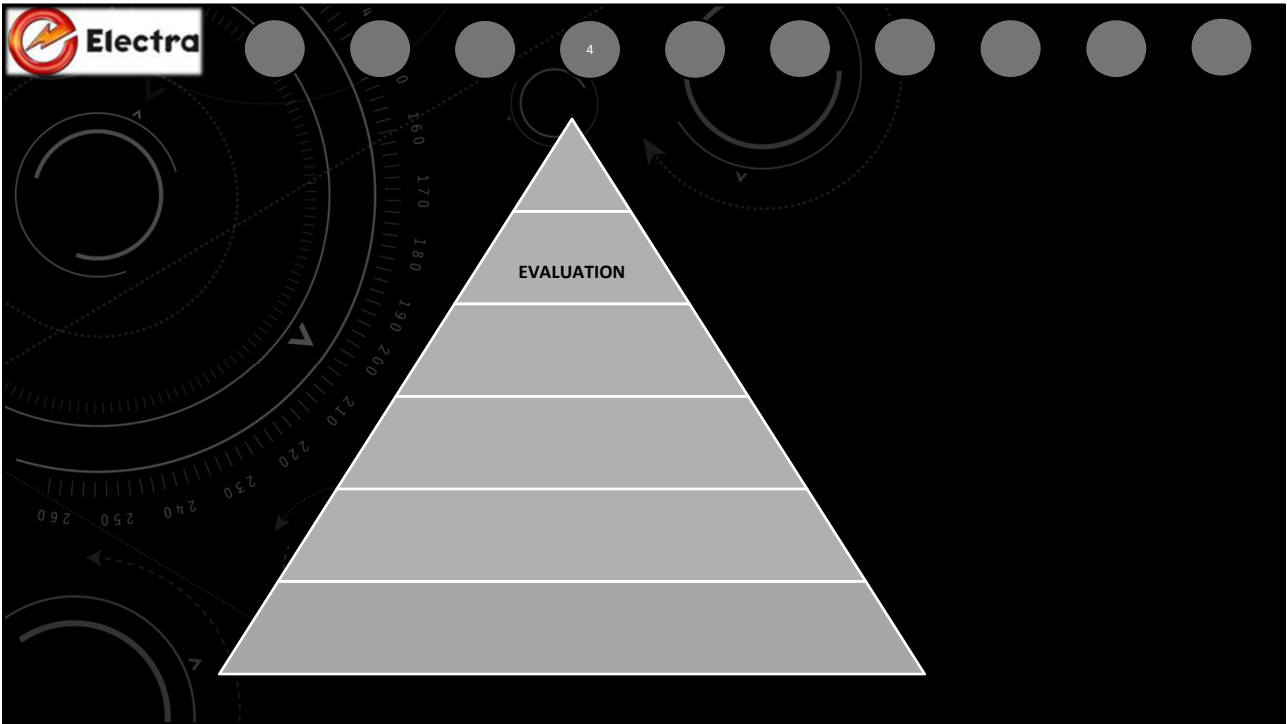
10



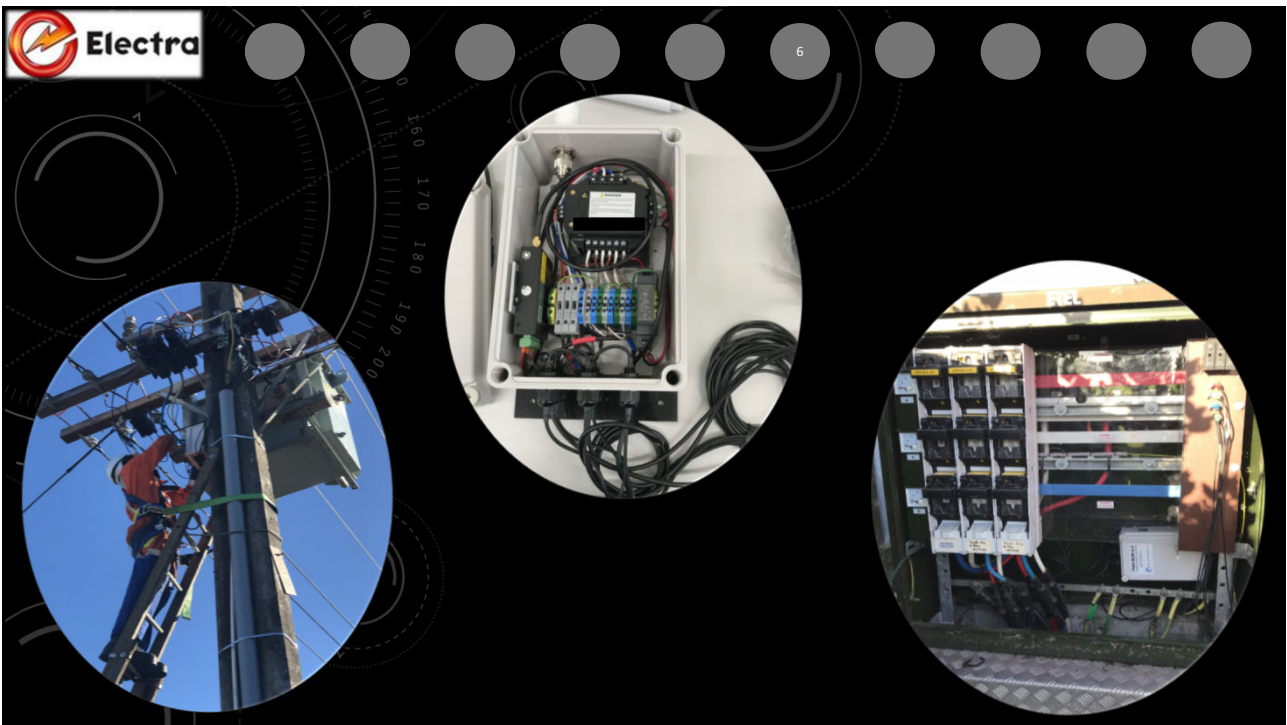
11



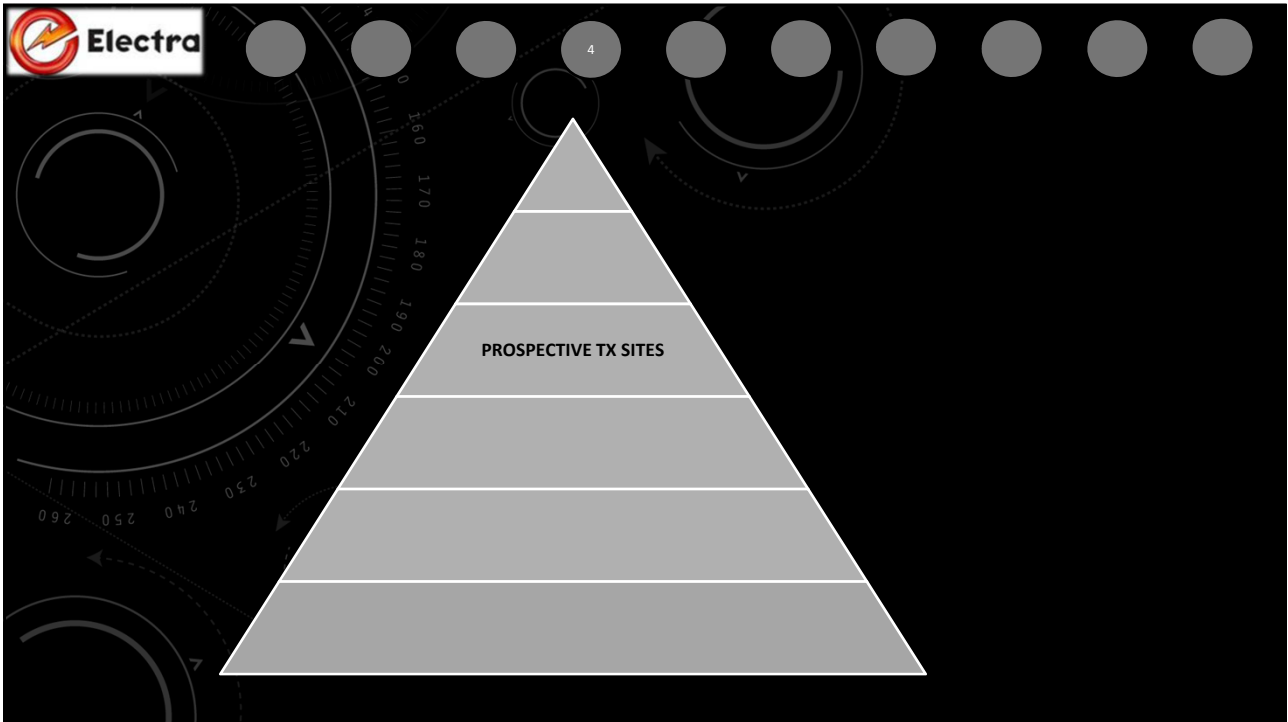
12



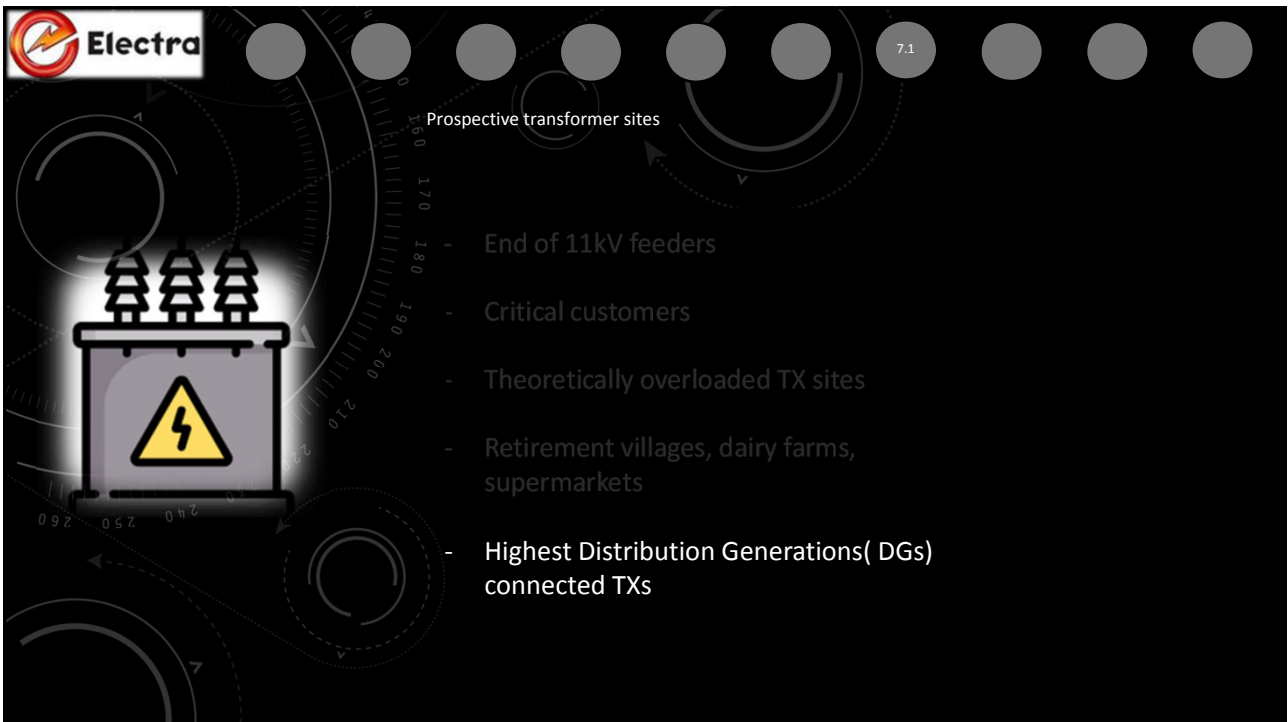
13



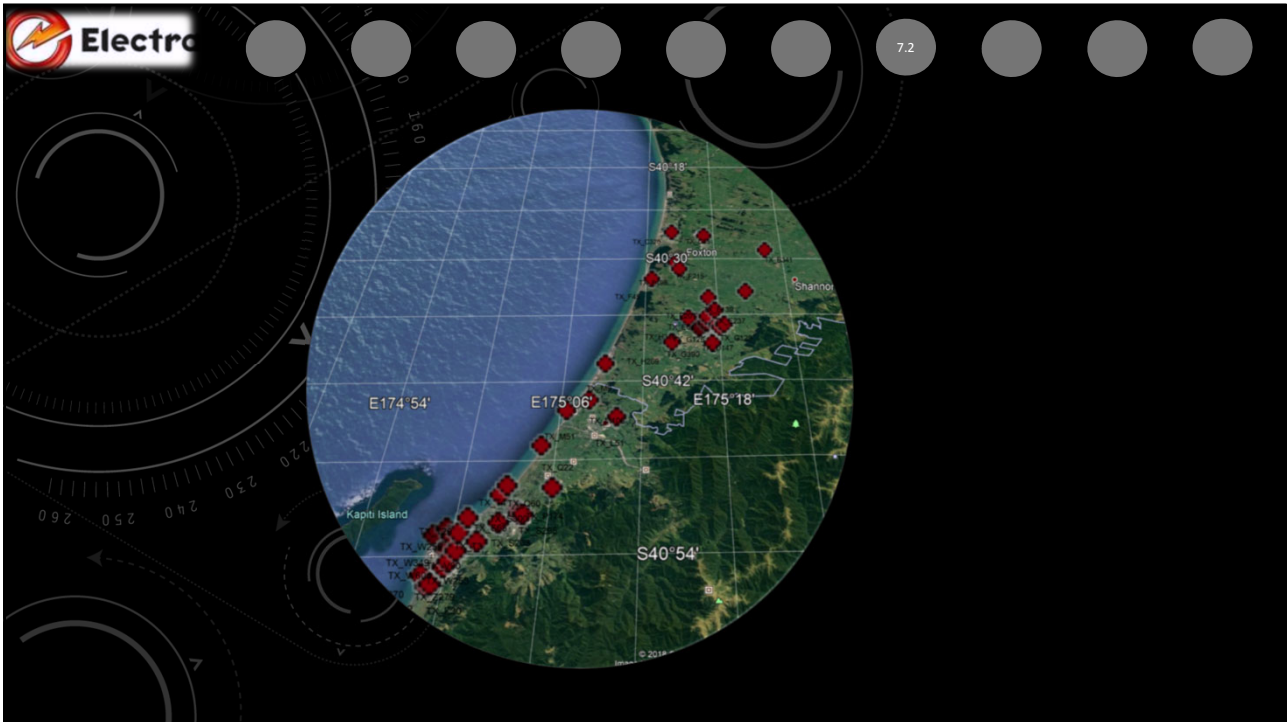
14



15



16



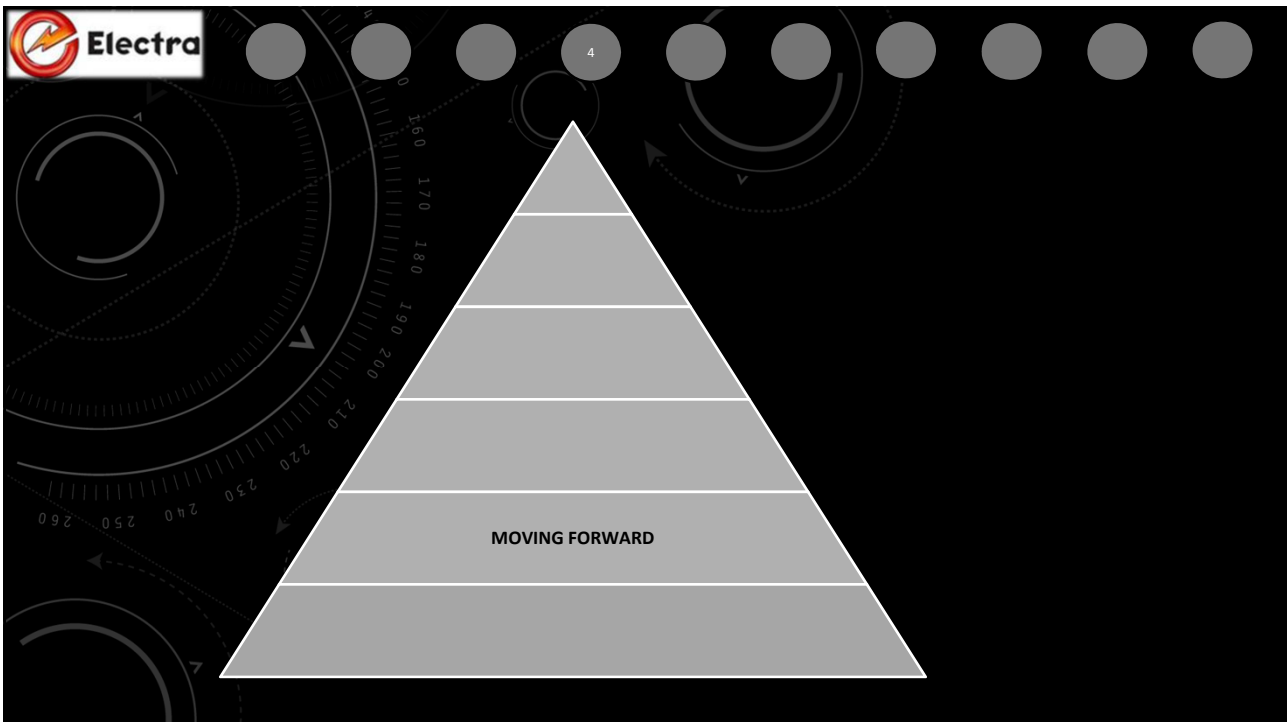
17




18




19





20




9



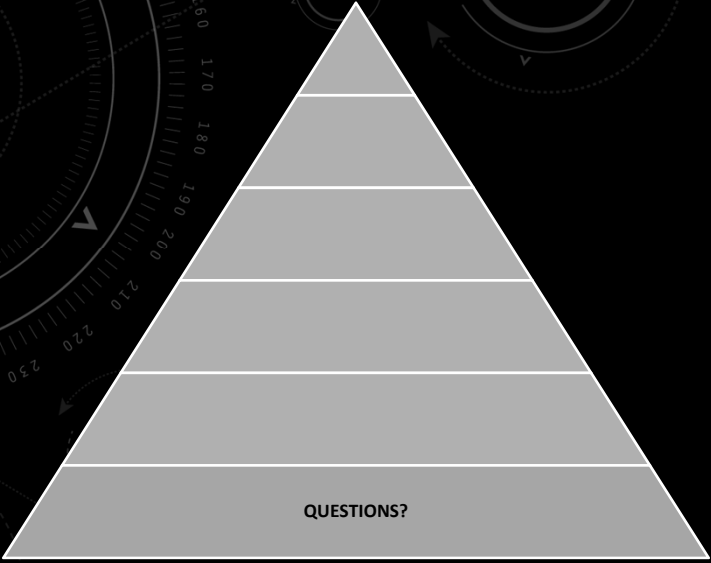
- Power quality baseline
- Use transformer low-voltage data -> 11kV side issues.
- Future impact of Distributed Energy Resources (DERs)



21

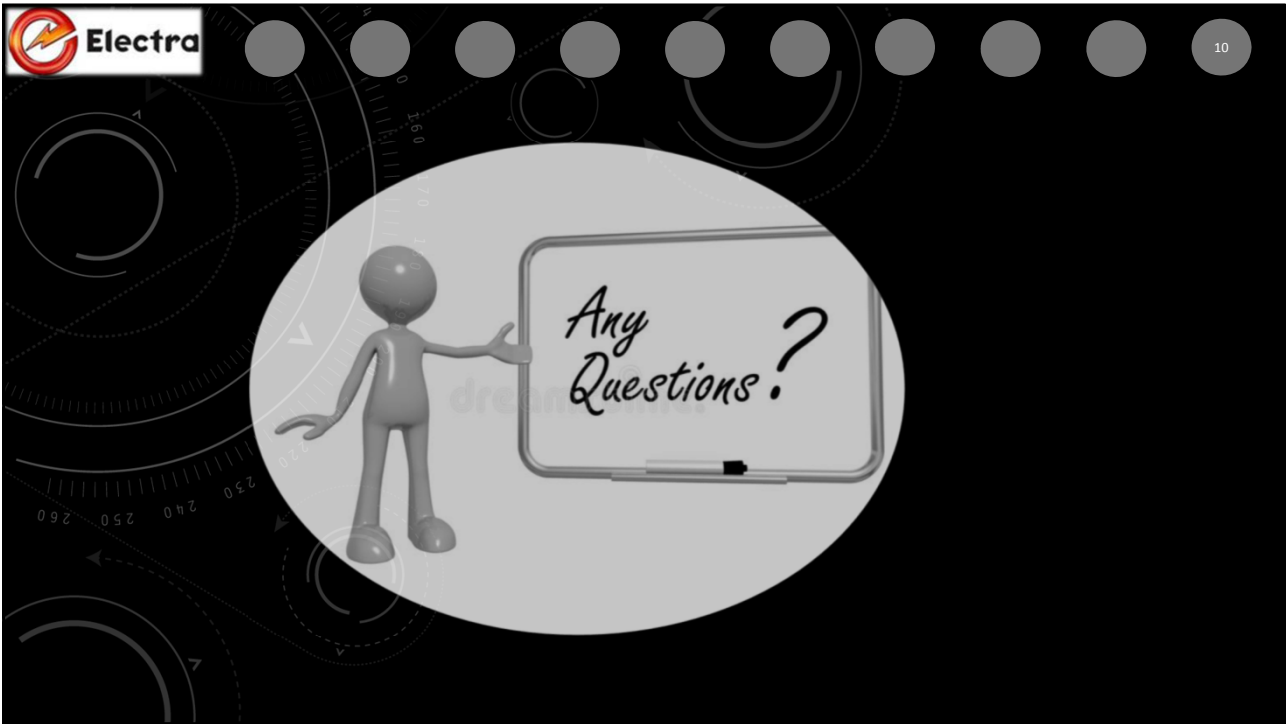


4

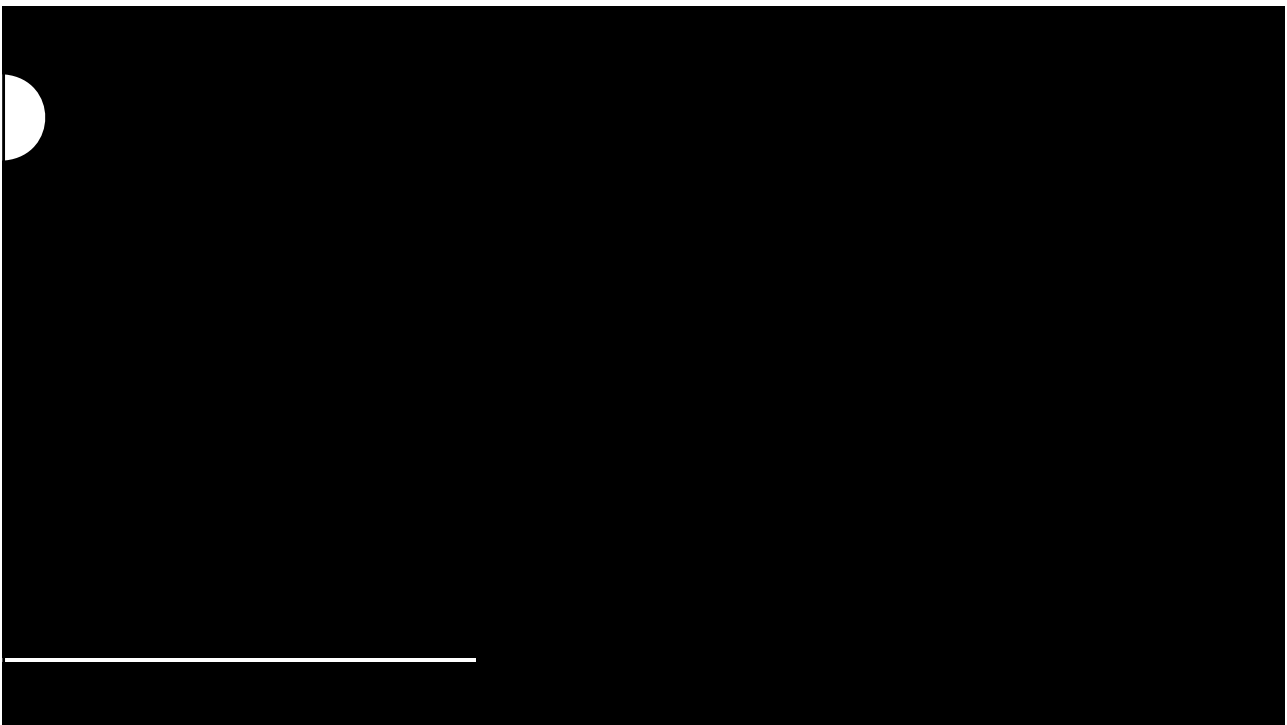


QUESTIONS?

22



23



24