

Power Quality

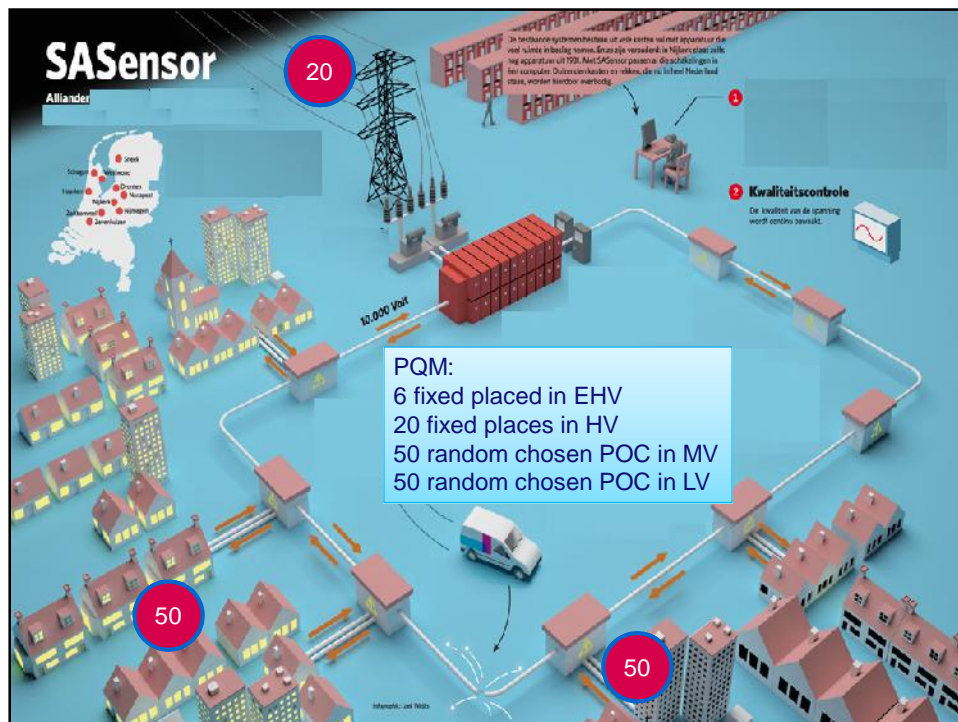
“Voltage Quality Monitoring”

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TU/e Technische Universiteit
Eindhoven
University of Technology

Where innovation starts



Spanningskwaliteit in Nederland, resultaten 2011

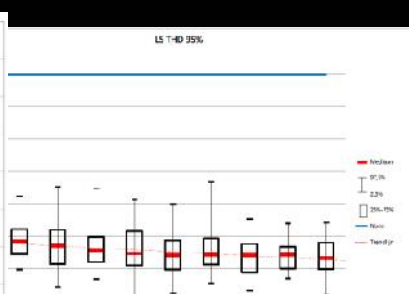
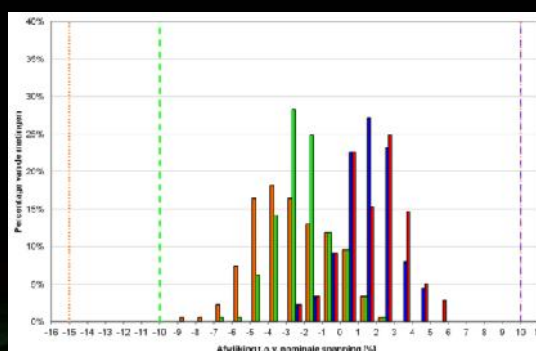
Results

Dips from HV-
network

Trend (LV,MV,HV)

PQ-phenomena
(LV,MV,HV,EHV)

Restspanning u (%)	Duur t (ms)							
	10 ≤ t ≤ 200		200 ≤ t ≤ 500		500 ≤ t ≤ 1 000		1 000 ≤ t ≤ 5 000	
90 > u ≥ 80	1,55	8	0	0	0,05	1	0,05	1
	31	11	0	0	1	1	1	1
80 > u ≥ 70	1,05	9	0,1	1	0,15	2	0	0
	21	7	2	2	3	2	0	0
70 > u ≥ 40	0,3	3	0,15	1	0,1	1	0	0
	6	4	3	3	2	2	0	0
40 > u ≥ 5	0,25	3	0,05	1	0	0	0	0
	5	3	1	1	0	0	0	0
5 > u	0,8	7	0,05	1	0	0	0,2	2
	16	4	1	1	0	0	4	8







Geen energieonderbreking
Graafschade leidt niet meer tot energie-onderbrekingen omdat het netwerk een ringstructuur heeft en de energie van twee kanten kan komen.

Hoe werkt het?

1 binnen in het onderstation.

2 gaat de stroom
IDR Intelligent

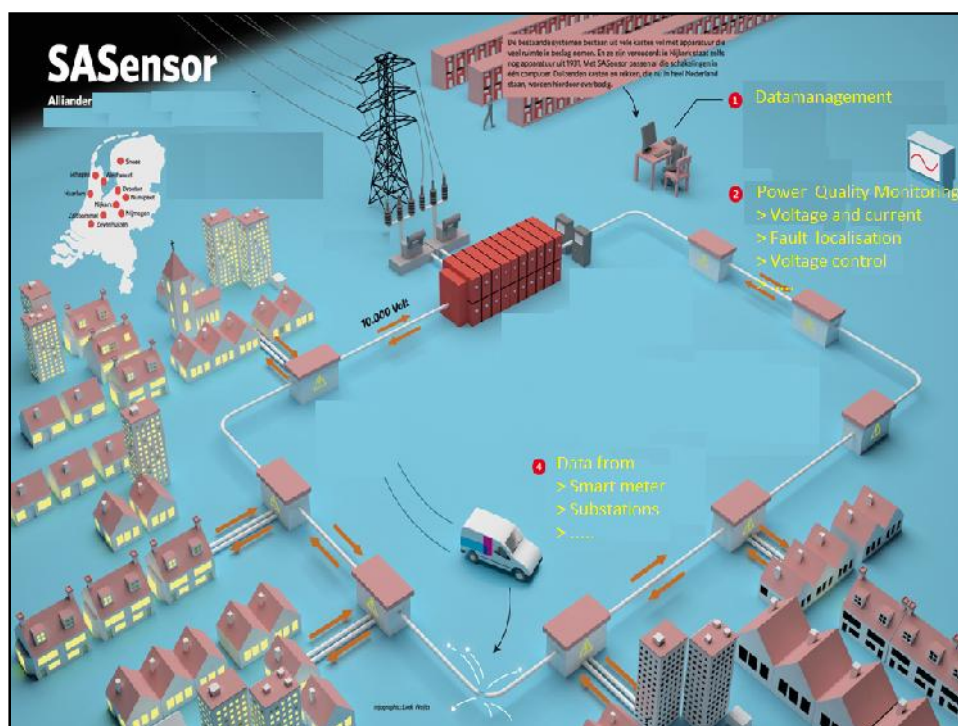
327 een

3

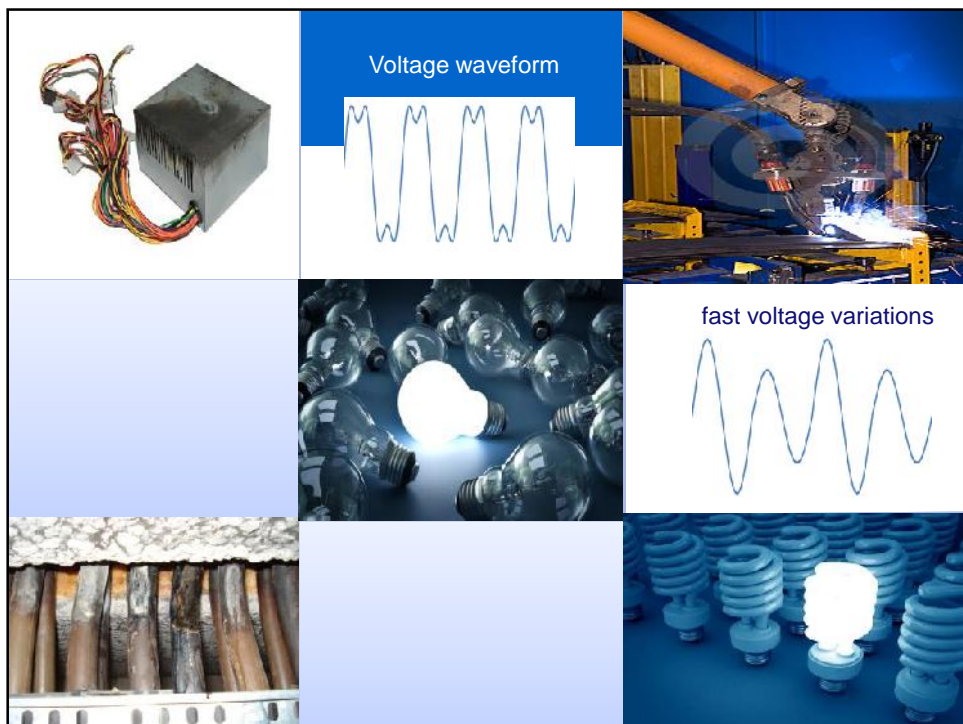
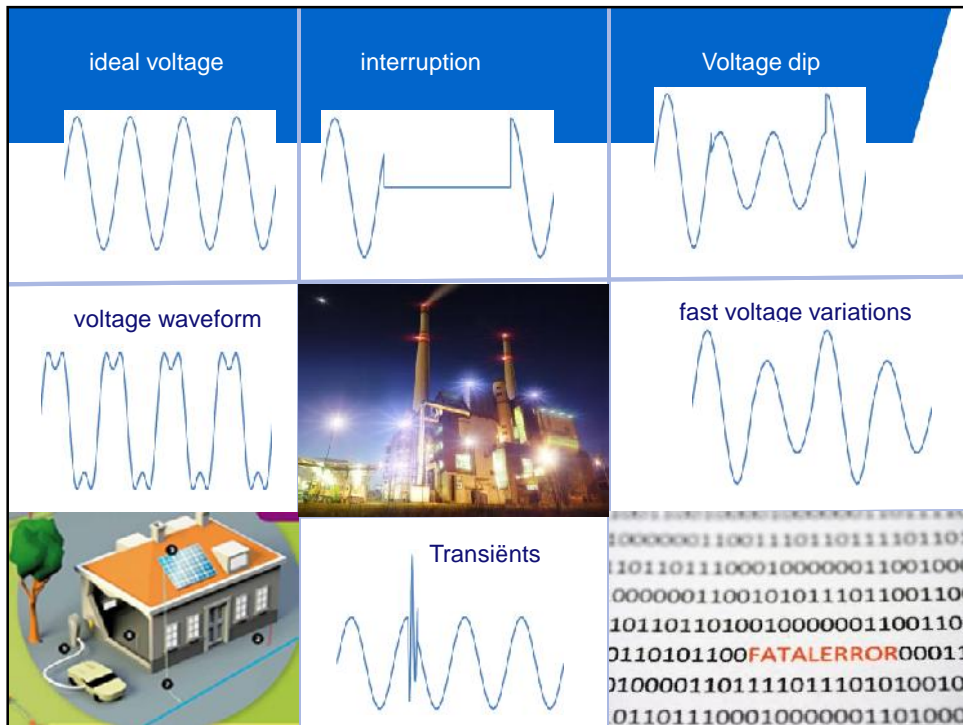
intelligente 10kV MS-
werden beauftrag, gem

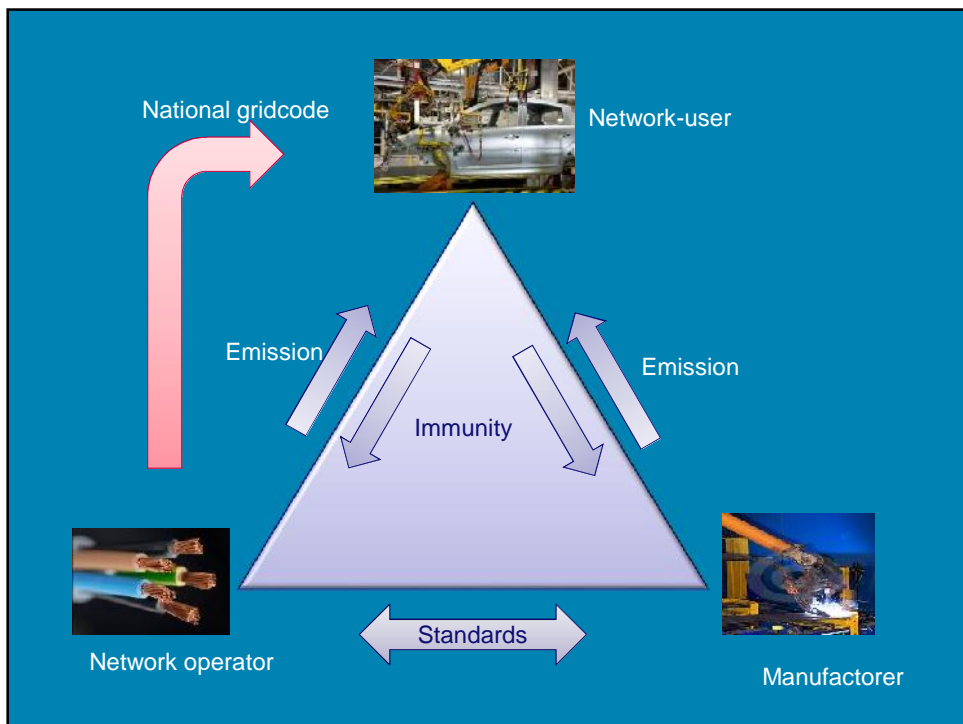
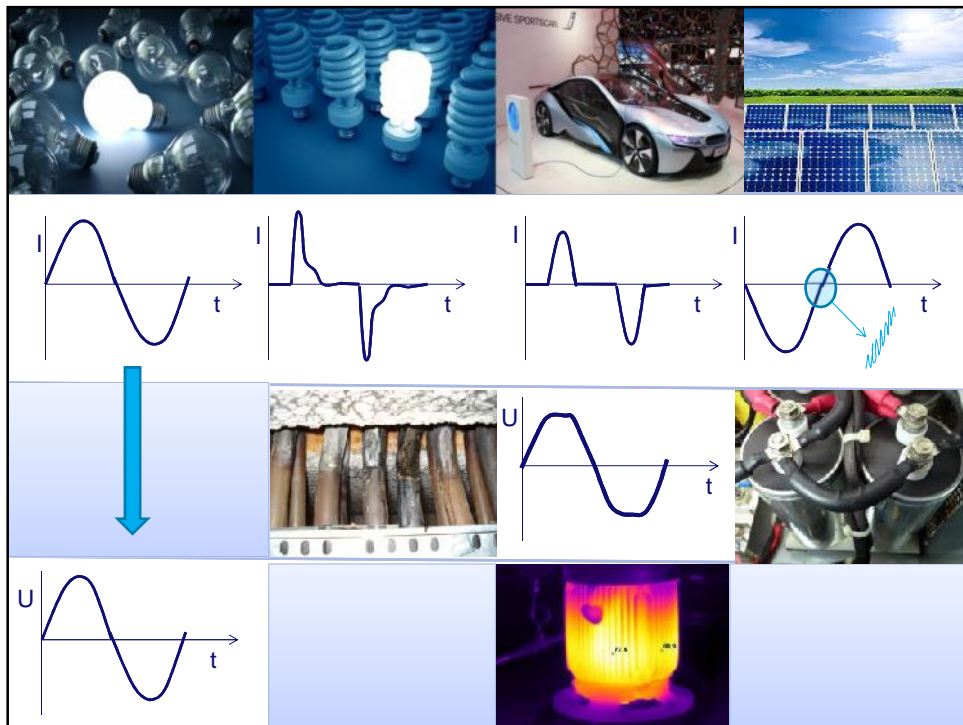
ook deze
en bestuurt

Look

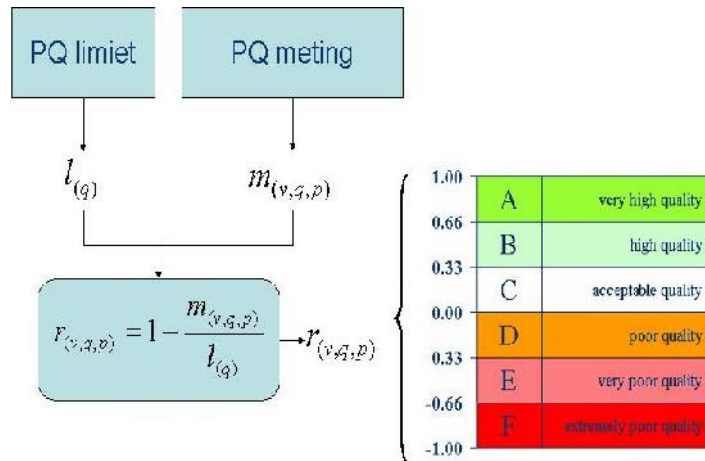




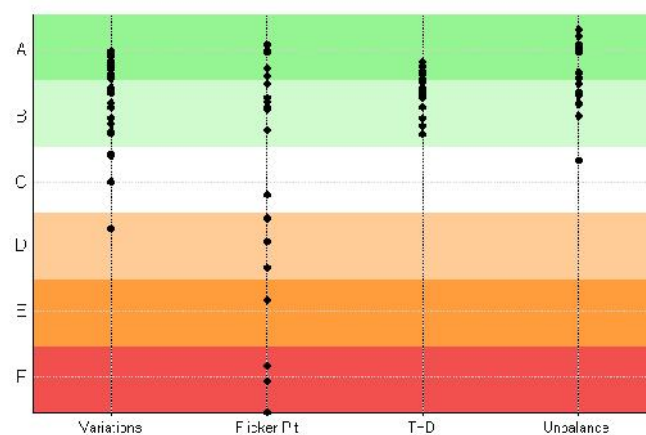




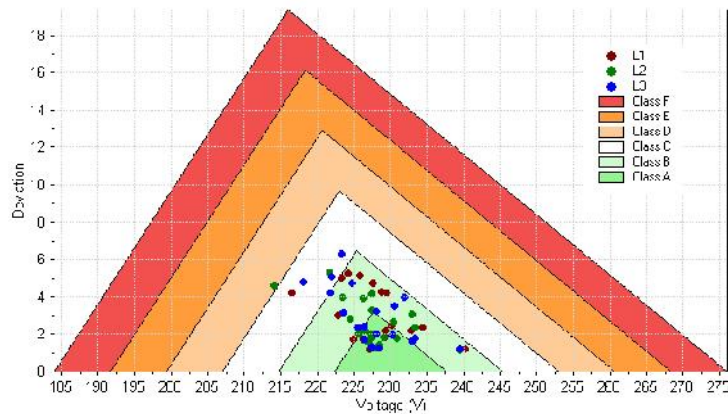
PQ-classification



PQ-classification



Classification Voltage level



Conclusions

- Monitoring needed (combine it with other needs)
- Monitoring will help integrating distributed generation
- For benchmarking/regulators, report on yearly basis
- Classification needed as analyzing/communication tool
- Additional PQM-programs for new developments
- Customers needs (information about dips rather than limits)