ENERGY SUMMIT 2022

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Ministry of Foreign Trade and Economic Relations of BiH

State Electricity Regulatory Commission

Regulatory Commission for Energy of RS

Regulatory Commission for Energy in FBiH

ENERGY SUMMIT 2022

Technical workshop
Recommendations for amendments of distribution network codes

Neum, 24 March 2022

Recommendations - content

No.	Topic	TSO	DSO
1	Categorization of generators	✓	✓
2	Simplified connection procedure		✓
3	Requirements for grid connection of generators	✓	✓
4	Requirements for demand connection	✓	✓
5	Requirements of the remaining EU network codes (not transposed yet)		✓
6	Integration of new distribution network users		✓
7	Distribution network development planning		✓
8	Requirements for energy efficient power transformers		✓
9	Requirements for demand side management providers		✓
10	Requirements for power quality monitoring in distribution network		✓

Categorization of generators

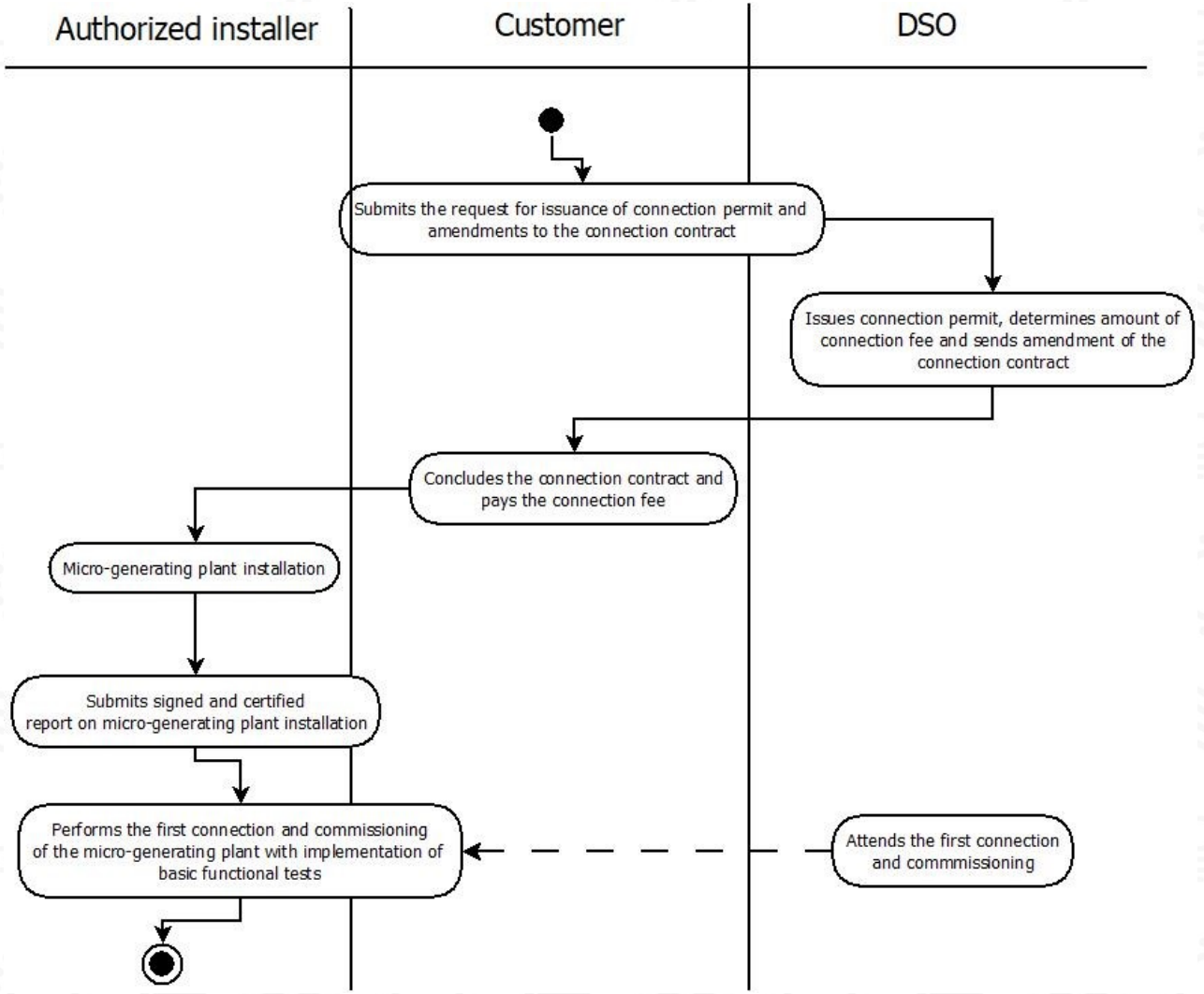
	Type A/B	Type B/C
1	Stability of generating module operation during short circuits in power system	Frequency regulation capability
2	Reactive power capability and voltage regulation	Remote control of active power generation
3	Remote real-time monitoring and data exchange with generating modules of relatively low capacity	Availability of generating module simulation models for the simulation of power system operation
4		Reactive power capability and voltage regulation

Threshold value	A/B threshold	B/C threshold	C/D threshold
Pinst	500 kW	10 MW	20 MW

Simplified connection procedure of microgenerators

Application (proposal):

- Pinst up to 10.8 kW 3-phase or up to 3.6 kW per phase
- Generation for self-consumption purposes within the existing objects of end customers
- All technologies of renewable energy sources
- Certificate of compliance with BAS EN 50549-I



Requirements for grid connection of generators

Documents for harmonization:

- EU Network code for grid connection of generators - NC RfG
- EN 50549-1 Requirements for generating plants to be connected in parallel with distribution networks - Part 1: Connection to a LV distribution network - Generating plants up to and including Type B
- EN 50549-2 Requirements for generating plants to be connected in parallel with distribution networks - Part 2: Connection to a MV distribution network - Generating plants up to and including Type B

Requirements for grid connection of generators

Key functional requirements

- Frequency and voltage operating range
- Immunity to rapid frequency changes (ROCOF)
- Limited frequency sensitive mode - overfrequency (LFSM-O)
- Limited frequency sensitive mode - underfrequency (LFSM-U)
- Frequency sensitive mode (FSM)

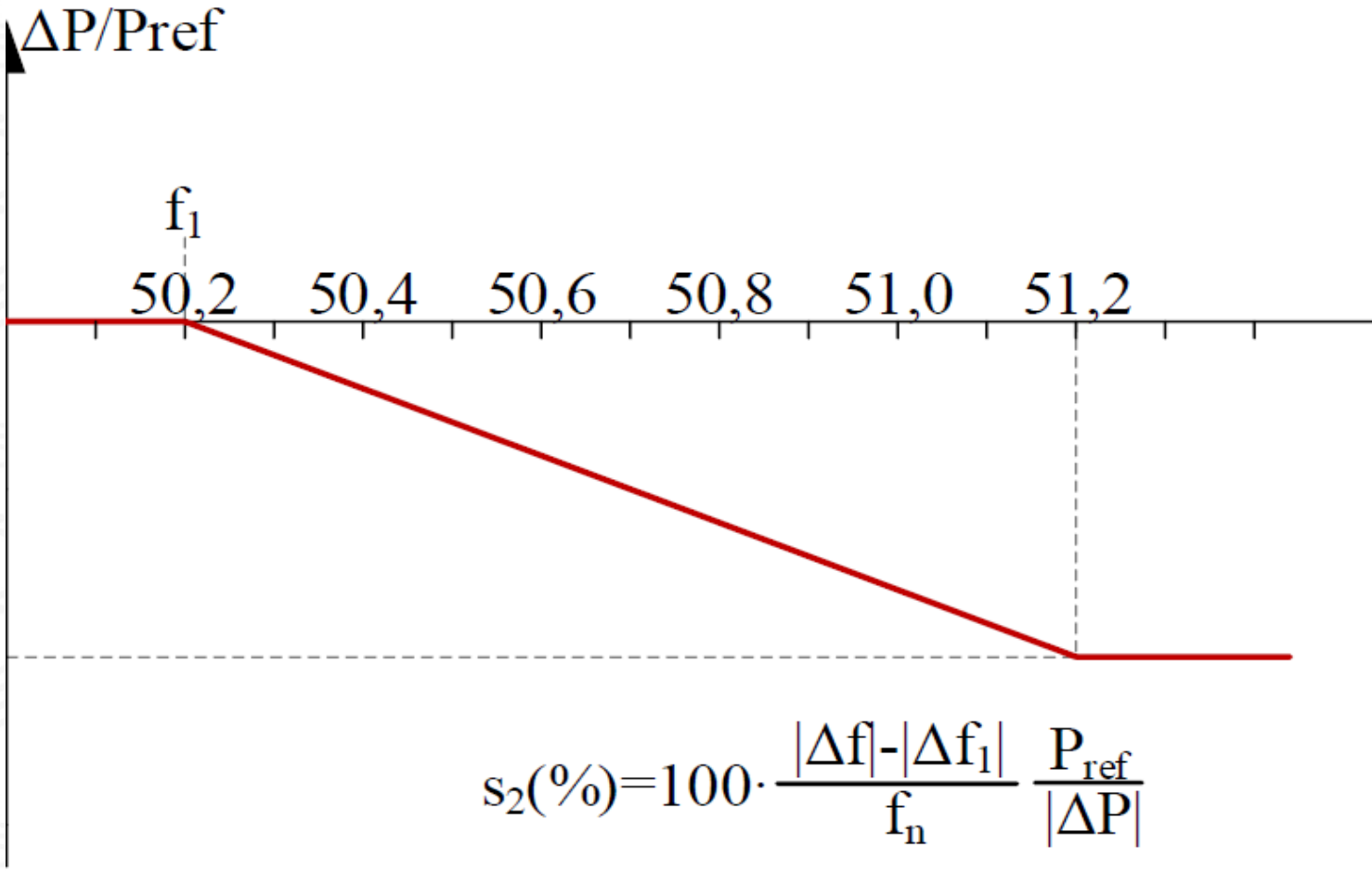


Figure 6.2 Frequency response of active power in LSFM-O

Requirements for grid connection of generators

Key functional requirements:

- Stability at voltage rise at the connection point (OVRT)
- Stability during short-circuits in power system (UVRT - FRT)

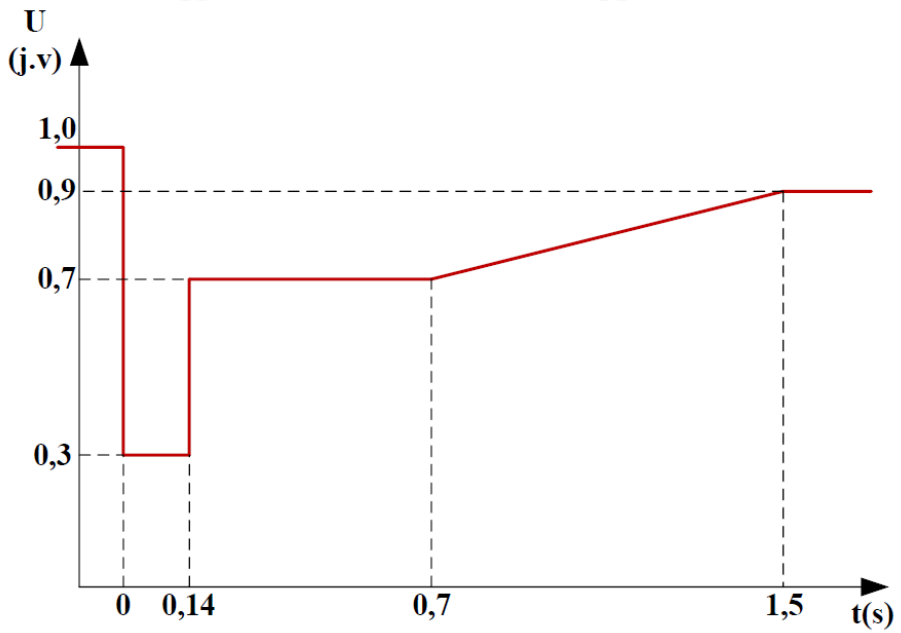


Figure 6.4 FRT curve for synchronous generation modules

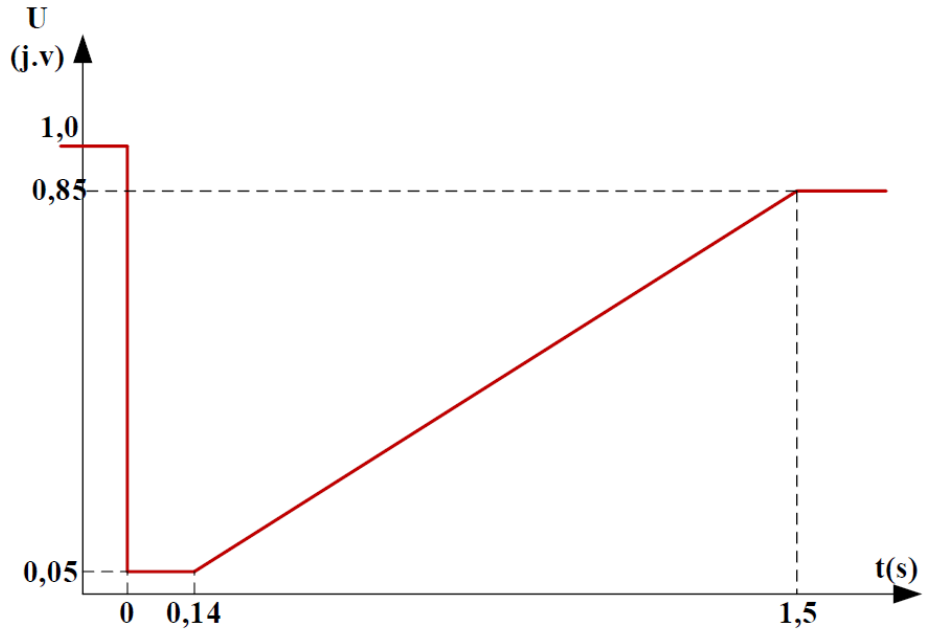
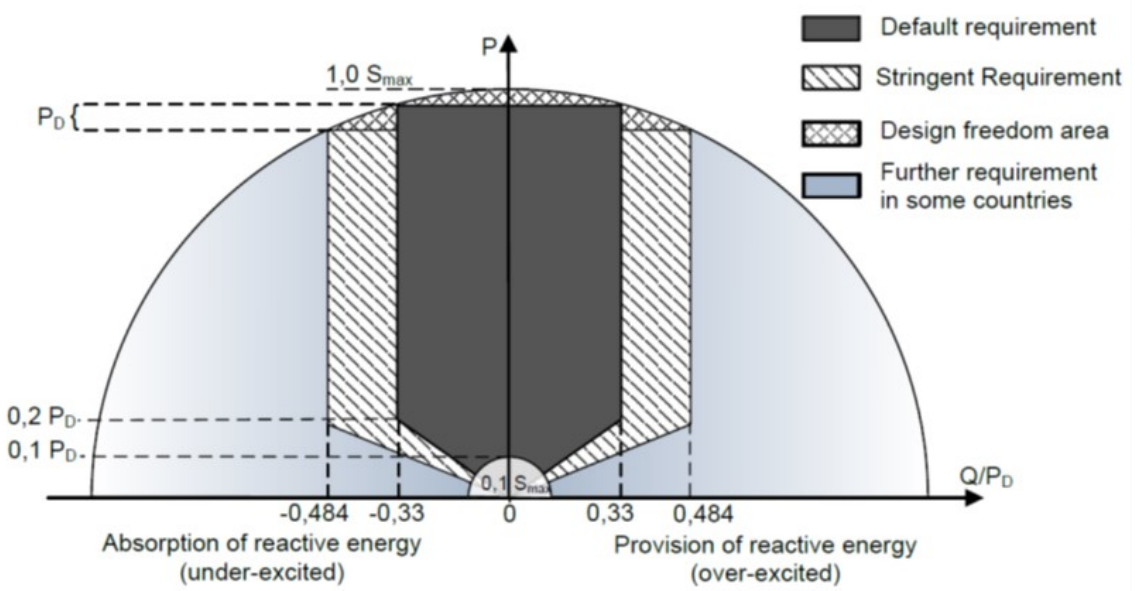


Figure 6.5 FRT curve for power parks modules

Requirements for grid connection of generators

Key functional requirements:

- Reactive power capability
- Requirements for protection devices
- Remote data exchange and control of active power generation



Source: BAS EN 50549-2

Requirements for demand connection

Documents for harmonization : EU Network Code on Demand Connection – NC DCC

Key functional requirements:

- Frequency and voltage operating range
- Reactive power consumption
- Requirements for protection devices
- Low frequency demand disconnection
- Low voltage demand disconnection
- Requirements for demand side response service providers
- Data exchange

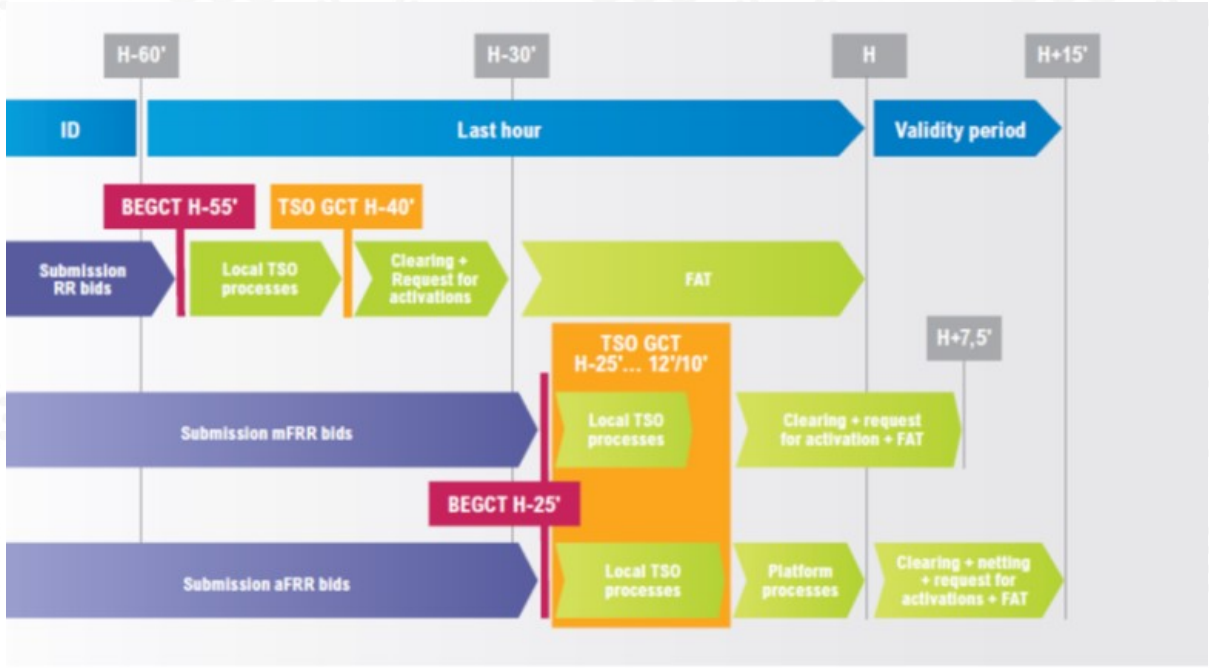
Requirements of the remaining EU network codes (not transposed yet)

Documents for harmonization:

- Guideline on electricity transmission system operation (EU 2017/1485)
- Network code on electricity emergency and restoration (EU 2017/2196)
- Guideline on electricity balancing (EU 2017/2195)

Key functional requirements for DSO:

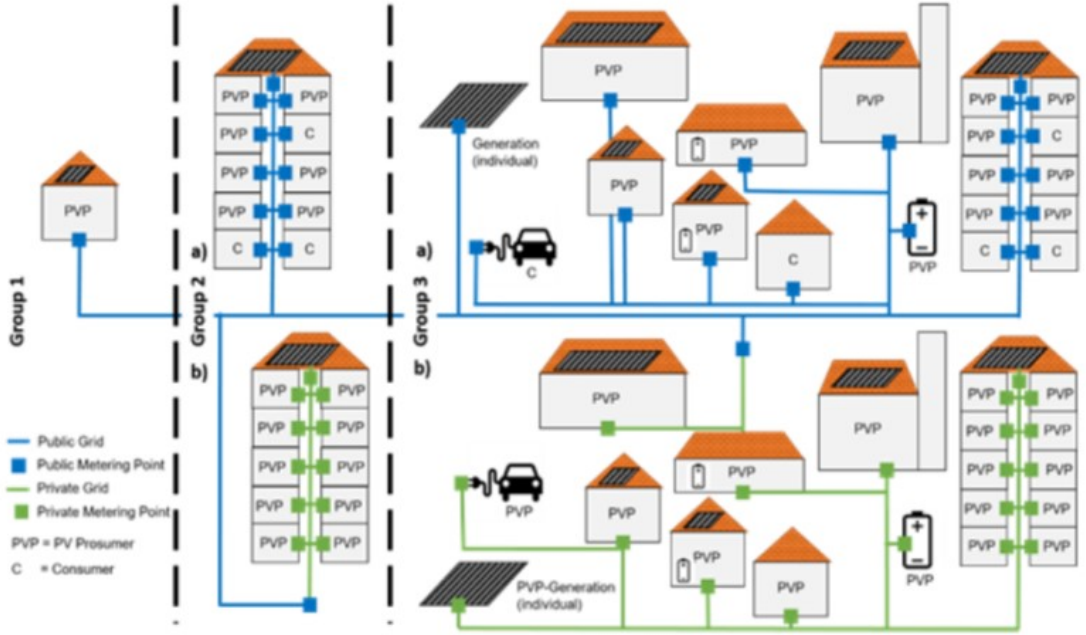
- Data exchange with TSO
- Outage coordination
- Participation in the active power and frequency regulation process
- Development and implementation of the power system defence plan and the power system restoration plan



Integration of new distribution network users

New network users' categories:

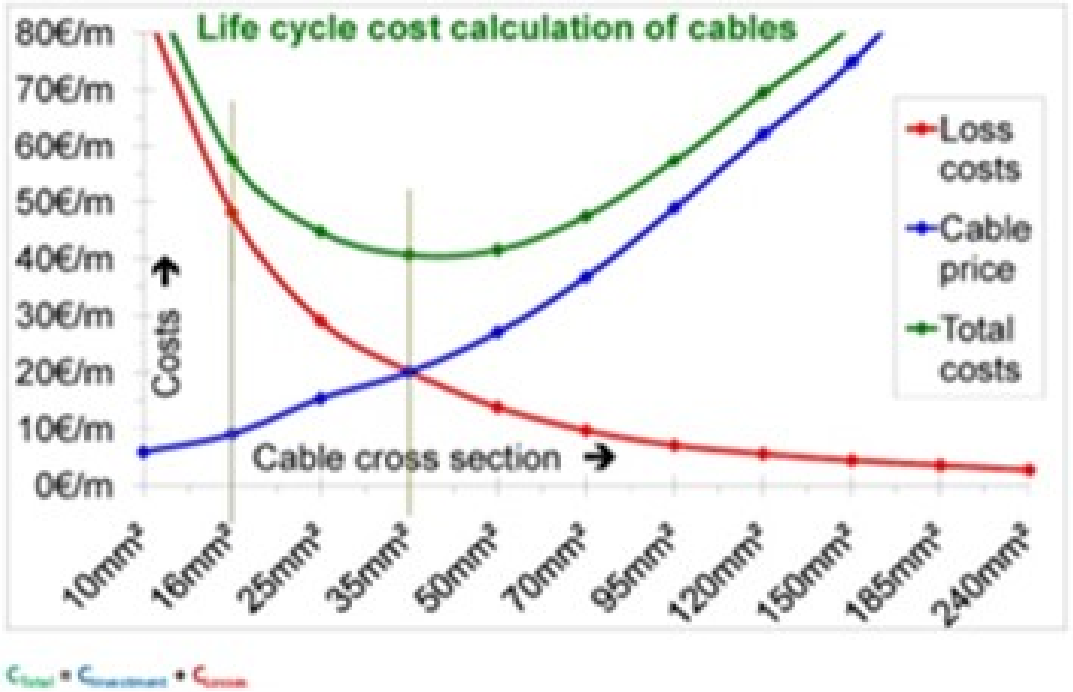
- Individual and collective prosumers
- Energy communities
- Charging stations for electric vehicles
- Electricity storage devices



Distribution network development planning

Key requirements:

- Criteria for the preparation of network development plans
- Determination of planning scenarios
- Impact of distributed resources on the security of supply
- Cost analysis in the planning process (CAPEX and OPEX)



Source: ttps://www.slideshare.net/sustenergy/cu0105-wp-cable-sizing-v1

Requirements for energy efficient power transformers

Documents for harmonization:

- EU Regulation 548/2014

Key requirements:

- Categorization of power transformers
- ECO-DESIGN requirements
- Exemptions from application

	Tier 1 (from 1 July 2015)		Tier 2 (from 1 July 2021)	
Rated Power (kVA)	Maximum load losses P_k (W) (*)	Maximum no-load losses P_o (W) (*)	Maximum load losses P_k (W) (*)	Maximum no-load losses P_o (W) (*)
≤ 25	C_k (900)	A_o (70)	A_k (600)	A_o – 10 % (63)
50	C_k (1 100)	A_o (90)	A_k (750)	A_o – 10 % (81)
100	C_k (1 750)	A_o (145)	A_k (1 250)	A_o – 10 % (130)
160	C_k (2 350)	A_o (210)	A_k (1 750)	A_o – 10 % (189)
250	C_k (3 250)	A_o (300)	A_k (2 350)	A_o – 10 % (270)
315	C_k (3 900)	A_o (360)	A_k (2 800)	A_o – 10 % (324)
400	C_k (4 600)	A_o (430)	A_k (3 250)	A_o – 10 % (387)
500	C_k (5 500)	A_o (510)	A_k (3 900)	A_o – 10 % (459)
630	C_k (6 500)	A_o (600)	A_k (4 600)	A_o – 10 % (540)
800	C_k (8 400)	A_o (650)	A_k (6 000)	A_o – 10 % (585)
1 000	C_k (10 500)	A_o (770)	A_k (7 600)	A_o – 10 % (693)
1 250	B_k (11 000)	A_o (950)	A_k (9 500)	A_o – 10 % (855)
1 600	B_k (14 000)	A_o (1 200)	A_k (12 000)	A_o – 10 % (1 080)
2 000	B_k (18 000)	A_o (1 450)	A_k (15 000)	A_o – 10 % (1 305)
2 500	B_k (22 000)	A_o (1 750)	A_k (18 500)	A_o – 10 % (1 575)
3 150	B_k (27 500)	A_o (2 200)	A_k (23 000)	A_o – 10 % (1 980)

(*) Maximum losses for kVA ratings that fall in between the ratings given in Table 1.1 shall be obtained by linear interpolation.

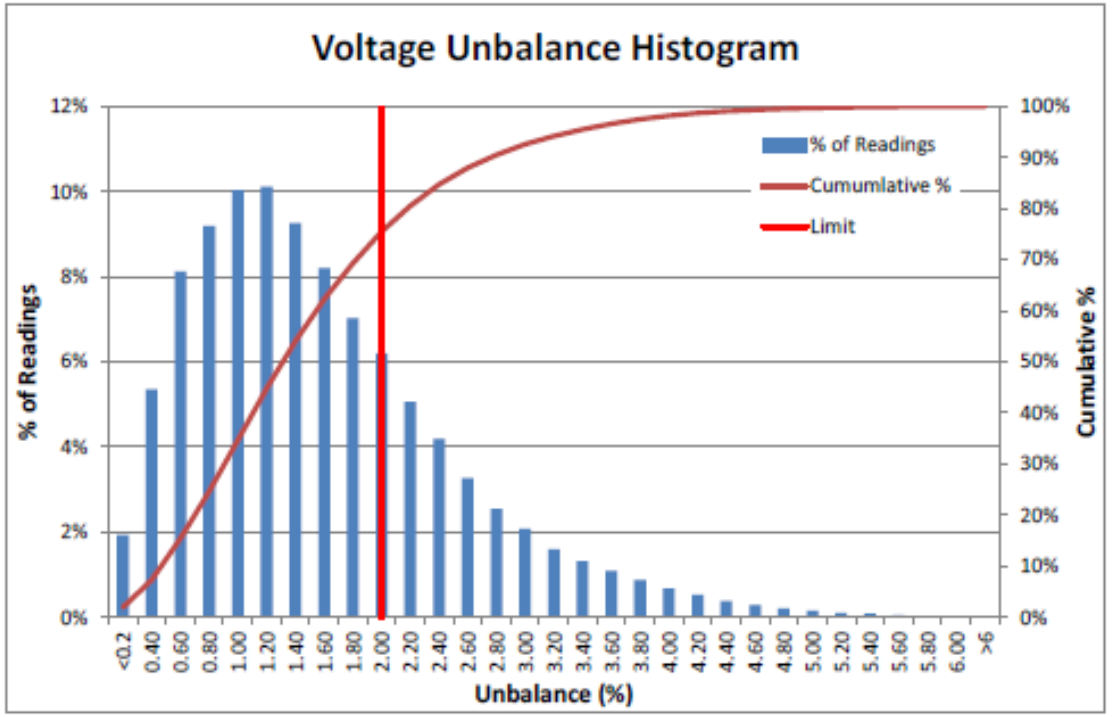
Power quality monitoring in distribution network

Documents for harmonization:

- Technical standard BAS EN 61000-4-30
- CIGRE TB 596 Guidelines for Power Quality Monitoring

Key requirements:

- Conditions and method of power quality measurement
- Requirements for metering instruments
- Selection of measuring locations
- Metering data format
- Voltage quality reporting



Source: CIGRE TB 596

DSO – Key operational changes

- Coordination with TSO:
  - ✓ Transposition of functional requirements for generating modules, as prescribed by TSO
  - ✓ Improvement of existing and setting new operational processes
  - ✓ Changes of data exchange process
  - ✓ Active role in ancillary services provision
- Methodology of distribution network planning
- Facilitating integration of new categories of network users
- Systematic approach in ensuring power quality

Thank you for your attention

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