

Red Eléctrica proposes to review the current ENTSOE proposal that has been accepted by ACER

Article 13 says that type A PPM shall comply with Article Y.2.

Voltage parameters (pu)		Time parameters (seconds)	
Uret	0.15 0.05	tclear	0.15
Uclear	Uret	trec1	tclear
Urec1	Uclear	trec2	trec1
Urec2	0.85	trec3	3.0

Red Eléctrica proposes to request to modify the value from a residual voltage of 0.15pu to 0.05pu as shown in the table above. That means that type A PPM FRT requirements would be the same as the more stringent values for type B PPMFRT requirements (Table 3.2.1).

In Spain, the current RfG2 proposal could create big issues because we are not very interconnected with the European system and [our Iberian system \(Portugal & Spain\)](#) is very sensitive to the disconnection of any generation. We anticipate that we will connect in the future a big contingency of type A in our network, so if they do not have the right FRT requirements we are putting at risk in the event of the system split when having any fault in our transmission network.

Red Eléctrica share some public government values for 2030:

- **Autoconsumption: 19 GW**
- **Storage: 22 GW**
- **Electric vehicles: 5.5 Millones**
- **Electrolisers: 11 GW**
- **Peak demand: 51,5 GW. At the moment it is around 35.5 GW.**
- **Interconection: ES-FR: 8 GW**
- **Total installed capacity: 214 GW**
 - » Renewable: 160 GW
 - » Wind: 62 GW (59 GW onshore and 3 GW offshore)
 - » PV: 76 GW
 - » Hydro: 14.5 GW
 - » Thermosolar: 4.8 GW
 - » Nuclear: 3 GW
 - » CCGT: 26.6 GW
 - » Cogen: 3.8 GW

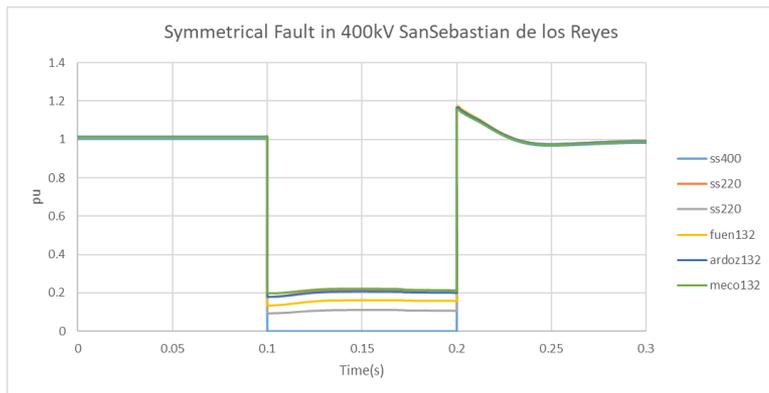
The **government's agenda** is to push to increase the install of autoconsumption installation, storage and to hybridise them as we can see from the last publications.

RfG also proposes to **remove the voltage criteria in the evaluation of Type A and Type B units**. For this reason we may see Type A and Type B connected to the Transmission network.

The **interconnection with France is still relatively low**, which makes as very sensitive to the loss of any generation in our network.

Symmetrical fault in 400kV Madrid:

If Red Eléctrica have a [symmetrical fault in the Madrid 400 kV or 220 kV](#) network, then in the not meshed distribution network in the first instance the GFL inverters do not inject any fast current if there are B type connected and also if there are induction motors in the present we understand that those induction motors are behind converters. Practically, there is no any reactive current sources in order to increase the voltage in the LV and MV networks. Additionally, we only expect the reactive consumption of the loads that would reduce during the fault but the reactive consumption will stay. For that reason, what we foresee is that the voltage values inside the distribution network antenna connected to the 132kV network the voltage will decrease below the voltage value in the 132kV node (in our simulation the value is **0.13pu**).



For this reason, Red Eléctrica needs to require the same FRT capability for type A that we require to type B that is 0.05pu residual voltage, since type A and type B would face the same FRT profiles as both types are usually connected at the same voltage levels (not meshed distribution networks).

Residual Voltage (pu)					
ss400	ss220	ss220	fuen132	ardoz132	meco132
7.3E-06	0.17	0.09	0.13	0.17	0.19

Expert Groups:

In the Expert Group “Baseline for type a power generating modules” EG BFTA published in September 2011, they recommended “*the mass production of type A generating modules, the recommendation for type A PPM FRT capabilities is an exhaustive requirement as a harmonised and predefined voltage-time profile as illustrated in figure 4*”, which goes in line with Spain proposal regarding the residual voltage, although the parameter t_{clear} is more onerous than the RfG 2.0 proposal.

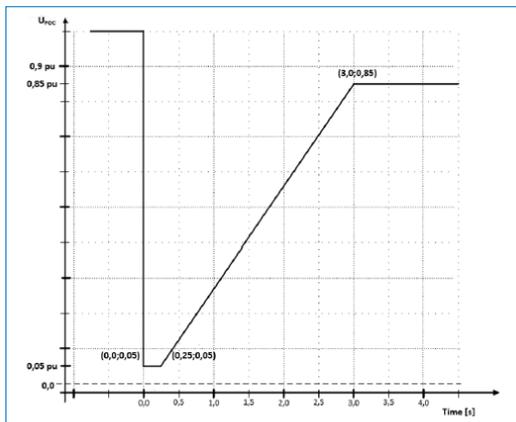


Figure 4. Proposed minimum requirement for the harmonised FRT profile.

Additionally, the [European Standard EN 50549-1 \(ICS 29.160.20\)](#) published by CENELEC in February 2019 where establishes the “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”, also shows the FRT requirements that would be asked for Type A and Type B PPMs, which goes in line with the Spanish proposal.

4.5.3.2 Generating plant with non-synchronous generating technology

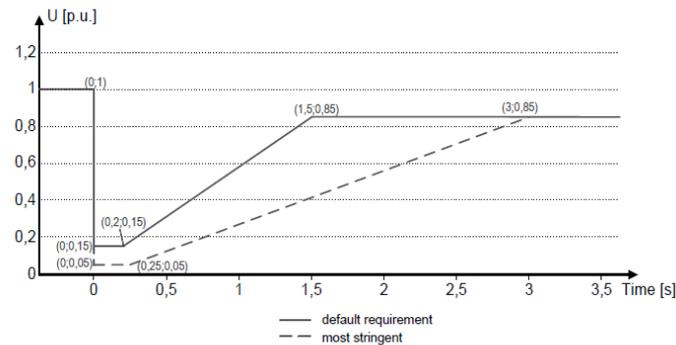


Figure 6 — Under-voltage ride through capability for non-synchronous generating technology