

The French scheme for RES connection. Coordination between stakeholders at regional level.

Yves ZONTA
ERDF - France
yves.zonta@erdf.fr

Jacques MERLEY
ERDF - FRANCE
jacques.merley@erdf.fr

ABSTRACT

According to EU laws, the RES must be given a priority of access to the grid. In France the public authority developed a specific regulatory framework to fulfil these requirements, ease procedural barriers raised by basic legal framework for connection and simplify the structural adaptation of housing capacity.

It resulted in a genuine regulatory framework, making possible a medium term planning of primary substations development without impeding the free access to the grid for independent developers. It is based on two complementary processes managed at regional level and a new mode of invoicing for RES connection.

FRENCH CONTEXT FOR RES CONNECTION

According to European objectives and Kyoto commitments, the share of primary renewable in final energy consumption is to reach in France 23 % by 2020 and 40 % by 2030.

Electric sector is a major contributor through existing hydro and the accommodation of “new” RES. The *Grenelle 1 Bill* has set target capacities to be connected to the network by 2020:

• Photovoltaic	5,4	GW
• Biomass	2,8	GW
• Onshore wind	19	GW
• Offshore wind	6	GW
• Hydraulic (additional capacity)	+3	GW

These values directly influence the feed-in tariffs support scheme, and will probably be adapted upwards when the process of “Projet de Loi relatif à la transition énergétique pour la croissance verte” is completed. But they do not settle the spatial allocation question, critical for grid development. Two hampering factors have been identified.

- The **current financial regulation for connection** does not charge for existing network capacity and puts the burden of incremental costs of the “first mover”.

When a producer triggers an adaptation of the network, he pays a substantial amount of the costs even if he uses but a part of the additional capacity.

This scheme was designed to level the field between rather large market competitors, but for small, numerous, subsidized operators it often results in deterring costs and gives all the value to the “second mover”. It results in unnecessary spending of public money and stand-off loop holes.

- **In some areas the HV network is already close to saturation.**

Creating additional capacities is expensive and a minimum volume of projects must be reasonably secured to limit the risk of stranded assets.



Figure - 1 Available connection capacity

● Null ● Very low

To tackle those issues, the *Grenelle 2 Bill* designed a regional coordination scheme and adapted financial rules:

1. Administrative Regions define an ambition for RES to be connected by 2020 in the *Schéma Régional Climat Air Energie* (SRCAE),
2. TSO together with DSOs, plan HV networks and HV/MV primary substations to connect these RES,
3. Capacity up to the ambition set by SRCAE, is reserved for 10 years at primary substation level in favor of RES projects, on existing and to be developed network. Step 2 and 3 make up the *Schéma Régional de Raccordement au Réseau des Energies Renouvelables* (SRRRER)
4. The financial regulation evolves. Producers above 100 kVA have priority of access to reserved capacity. They pay for the network specifically created or adapted between their connection point and the primary substation and a share of the costs upstream, apportioned to their capacity.

These combined rules give predictability for Network Planners and Producers, and suppress the threshold effect (“trigger one - pay all” becomes “pay as you use”).

SRCAE: RES REGIONAL AMBITION

The *Schéma Régional du Climat, de l’Air et de l’Energie* (SRCAE) ¹, is a comprehensive document elaborated at regional level, on climate, clean air and energy issues.

It includes but is not limited to an “ambition” for RES (electric and non electric) at 10 years horizon.

It’s a non prescriptive document, mainly aiming at a consistent coordination between independent actors (local political and administrative authorities, project developers, utilities...).

In its energy chapter, it describes the type and amount of electricity generating RES to be developed with orientations as to their localization. This gives to the network operators some hints to design network adaptations at HV/MV substations and upstream HV level. The more precise the SRCAE is, as regards volume and location of RES, the more effective SRRRER will be.

SRRRER: A CONNECTION SCHEME TO HOUSE SRCAE’S RES AMBITION.

The *Schéma Régional de Raccordement au Réseau des Energies Renouvelables* (SRRRER) ², is a connection solution to accommodate the RES to come.

It is developed by the TSO together with DSO(s) in each region, and approved by the regional Administration.

It describes the assets: HV networks, TSO substations and DSO HV/MV substations existing and to be build. For the latter, it gives the costs of adaptation.

It sets the reservation of capacity for RES at primary substation level for the next ten years.

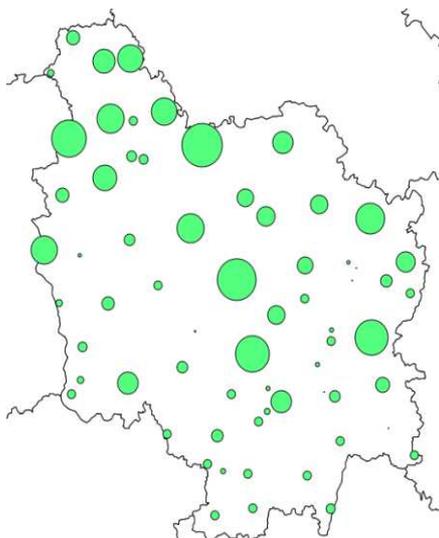


Figure - 2 - Expected RES for Burgundy region

Points on the map represent TSO or DSO substations. Their size reflects the capacity expected.

A specific financial scheme for RES connection.

To get rid of the threshold effect (trigger takes all costs), the law defined an original financial scheme.

The connection bill has two terms: a share of the upstream costs, called “*ouvrages mutualisés*” or “*mutualized network*” and payment of assets specific to the producer: “*ouvrages propres*” or “*own network*”.

The ratio between adaptation costs and reserved capacity is called the “Quote part” or proportional share. It will be charged to projects on a per kW basis, whether the project actually triggers upstream adaptation or not. It represents the contribution of the producer to the development of the “*mutualized network*”

$$Share = Power\ connection * \frac{Creation\ Costs\ for\ HV\ networks\ and\ substation}{Global\ capacity\ of\ SRRRER}$$

The “*ouvrages propres*” or “*own network*” connect generation to the primary substation. They are charged according to common rules: reinforcement in the connection voltage level and creations in the connection voltage level and the next upper one.

This scheme is applicable to eligible RES (over 100 kVA) after enforcement of SRRRER. The non-RES productions do not get the benefit of any reserved capacities and cost sharing. Connection request for non RES producers get in the queue behind the reserved capacities for RES.

Example: MV connection of a 12 MW wind farm with creation of a primary substation

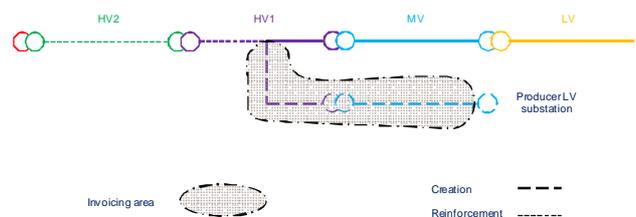


Figure - 3 – Before: Project is charged creations and reinforcements of MV level and creations at next HV level.

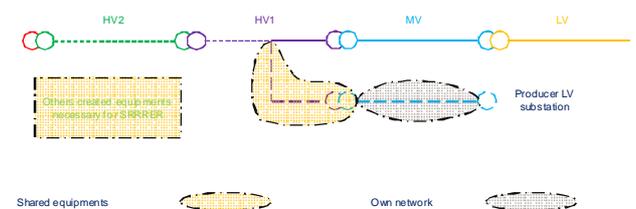


Figure 4 – After: project is charged own network and proportional share of upstream costs.

REALIZATION AND FINANCEMENT

Mutualized network actual development

To avoid stranded assets, creations and reinforcements are triggered if there is “enough” connection requests.

A rule was discussed and adopted, distinguishing important and small adaptation. The triggering conditions of creation or reinforcement of network are:

- **HV networks, HV/MV transformer and MV switchgear creation or reinforcement** as soon as one producer signs and makes the deposit for its connection.
- **DSO/TSO substation creation** as soon as one producer signs and makes the deposit for its connection and the total ongoing connection requests represent 20 % of the housing capacity allowed by the first MV transformer of the substation. Two years after the acceptance by the first producer the second condition is considered as automatically fulfilled.

Furthermore, to minimize delay to actual connection, DSOs and TSO committed themselves to lead the preliminary process as soon as the SRRRER is approved: studies, administrative authorization, land acquisition ... necessary to build the facilities planned in the SRRRER,

Since these studies and administrative delays represent the bulk of the waiting time, this anticipation will result in a shorter time to connection compared to current practices. On the other hand, they represent only a small part of the costs, thus minimizing the risk of stranded assets.

The financing

The basic rationale is: network operators (TSO and DSO) pay for creations of shared networks and they get in return the “quote part”.

All producers above 100 kVA pay their share of costs. Producers below 100 kVA are exempted of payments even though they are taken into account when designing the scheme.

The reinforcements (adaptation of existing assets such as transformers upgrade) are not taken into account for the calculation of the share.

For producers below 100 kVA: reinforcements at LV and MV levels and unfunded mutualized costs are eventually financed by the grid access rate paid by consumers (TURPE).

The share is collected by the network operator, usually a DSO, to whom the producer is connected. An agreement of transfer is established so that every network operator receives the share of the money collected it is entitled to.

The share value is calculated once when the SRRRER is approved and then indexed each year to take into account prices evolution.

The “flexibilities”

The question of mitigation between the initial plan and

the actual development of projects was raised early.

As we all know “things rarely go according to the plan”. Network operators in accordance with project developers and local administration designed a so called “transfer” process. Whenever projects are boosting in one area unforeseen in the SRRRER, but still feasible at same costs, then the reserved capacity from one place is transferred from a location with no demand. Thus the creation of an additional transformer can be switched from one primary substation to another...

These flexibilities have been included in a release of the SRRRER Decree.

Besides actual implementation of codes, discussion are ongoing to design heavier processes, adaption to marginally increase the capacity reserved, revision for SRRRER that prove to be unfit, and closing. For most of these topics discussions can be technical, legal and financial.

ACTUAL IMPLEMENTATION OF SRRRER

2014 progress report

SRRRER elaboration is a fairly new process, the first ones began at the end of 2012.

As at end of 2014, 13 regions have a plan and the RES producers are receiving connection offers according to the SRRRER plan.

For these 13 SRRRER for which 14 GW are reserved for connecting RES producers, a volume of 1,5 GW has made a demand and considering the youth of the plan only 30 MW are connected.

For a 10 % volume of demands, 40 % of the needed networks planned in these SRRRER are decided.

A strong regional disparity

By the end of 2015, this plan will cover all the French territory. It emerges right now that:

- regional ambitions are various
- current networks are more or less able to connect the desired production volumes

The value of “quote part” varies from 0 to 70 € / kW.

Region	SRCAE ambition (GW)	already concretized ambition (GW)	Housing capacities (GW)	Share (€/kW)
Bourgogne	2,2	0,7	1,5	22
Alsace	2,1	1,7	0,5	0
Picardie	3,0	2,0	1,0	59
Champagne Ardennes	3,9	3,1	0,9	49
Midi Pyrenees	7,7	5,9	1,8	70
Auvergne	2,2	1,6	0,6	48
Centre	3,1	1,4	1,7	20
Lorraine	2,1	1,2	0,9	18
Nord Pas de Calais	2,0	1,0	1,0	9
Franche Comté	1,3	0,6	0,7	11
Haute Normandie	1,4	0,4	1,1	11
Provence-Alpes-Côte d'Azur	6,3	4,4	1,9	18
Limousin	2,2	1,5	0,7	26

Tableau 1 Detail of regional ambitions and shares:

Although the housing capacities are determined from the regional ambitions specifying the type of production (wind, photovoltaic), once the SRRRER is enforced, reserved capacity can be used by any RES.

Access to information

Access to information has been identified as a key concern for project developers. Basically they ask to have enough information in early stages of their projects to be able to anticipate roughly the time to connection. The main questions are what kind of connection will I get : to be created or existing substation with/without enough reserved and/or technical capacity, with or without works....

After many consultations the regulator issued a decision describing precisely what kind of information was to be provided to RES and non RES producers.

ERDF and RTE together developed an Internet common site (www.capareseau.fr) presenting the situation down to primary substation.

It gives the connecting possibilities for installations of productions as well as the volumes of installations currently under study or already connected.

Where a SRRRER applies, the volumes reserved for RES and non RES production appears separately.

The update of this information is made every 3 months.

The data structure is open so that local DSO can enter the web service.



Figure 5 - Screen shot of webservice capareseau

QUESTIONS AND PERSPECTIVES

Already a success

The process is still young but has been proved efficient to unlock situations where projects and network could not be programmed jointly. In some areas such as Picardie and Champagne Ardennes, the first results are so promising that their schemes are due to be revised soon, to accommodate further capacities.

MV vs LV generation

The SRRRER is mainly design to boost connection for MV connected facilities by releasing the HV development bottleneck. However its impact on LV development remains unclear.

Although LV units will obviously benefit from the scheme, the question of their correct localization is still pending as well as the question of their competition with MV facilities.

Anywhere but in urban areas, the question of the proximity between generation and consumption is critical. In rural areas a few meters or a few kW more can switch a project from “no impact” to “heavy structural impact” on network. Easing housing capacity at MV/HV level won't help LV/MV constraints, very often triggered by large scale LV project (typically around 100 kVA).

Furthermore in remote areas, LV generation is clearly consuming housing capacity detrimentally for MV generation. Smaller, with less local opposition, faster to develop, it nevertheless uses the same network.

There is currently a work program in France to design an alternative support scheme for self-consumption. It could help attracting LV generation in urban and peri-urban areas where large MV is not in the scope, and free housing capacity.

Overall consistency of energy program

If we extrapolate the present situation to continental France, the SRCAE and SRRRER mechanism should lead to a total ambition and the subsequent adaptation of network for 28 GW of wind power, 16 GW of PV, and 3.5 GW of other RES (hydro and biomass mainly) well beyond the present national targets for RES development given by the *Programmation Pluriannuel des Investissements*³.

It seems sound to have some “slack” between regional and national targets, but significant inconsistency will lead to “ratchet wheel effect”. Project developers have already claimed that support schemes should be adapted to reach the more ambitious consolidated target resulting from the regional plans.

There is presently no mechanism ensuring the overall consistency between regional ambitions, national targets and support schemes.

¹ Content and elaboration process are given in [Code de l'Environnement Livre II Titre II Chapitre II Section 1](#).

² [Décret 2012-533](#) relatif aux schémas régionaux de raccordement au réseau des énergies renouvelables, prévus par l'article [L. 321-7](#) du code de l'énergie

³ [Arrêté du 15/12/2009](#) relatif à la programmation pluriannuelle des investissements de production d'électricité