



THE LONG TERM CENTRAL BUYER MODEL A SOLUTION TO STRENGTHEN LOW CARBON TRANSITION AND TO PROTECT CONSUMERS WHILE KEEPING EFFICIENT SPOT MARKETS

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This paper proposes an alternative to the current market design based on hourly prices aligned with marginal costs and on which retail prices are built. It is based on a public entity which is the counterpart in long term financial contracts (contracts for differences or CfDs) signed up with to share risks in new and existing assets of low carbon technologies (renewables [RES], nuclear), in parallel with the development of private long term contracts (PPA) between private agents. Besides this function of central contractor, the public entity is also a central purchasing agency: it buys their corresponding energy production on the spot market.

So the central buyer is in a position to sell wholesale electricity from low carbon generators to competing suppliers at prices mainly based on long-term costs (represented by CfD's strike prices). CfDs have the virtue to erase the rents of infra-marginal producers (namely RES and nuclear) in periods of fossil price spike. Suppliers will pass long term costs through retail prices they offer to each type of customers along their load profiles. This new organizational model of electricity market not only meets the need to rapidly invest in capital-intensive technologies for low-carbon transition to net-zero, but also consumers' need for protection against price risks and excessive dependence on highly volatile gas market.

A variant is presented in appendix, in which the agency is only a central contractor with low carbon generators and does not directly cover the price risk for the suppliers. It might be more conducive to compromise.

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Disclaimers

The market reform proposal developed in this working paper are the sole responsibility of the authors. The views expressed are theirs and do not necessarily reflect those of CEEM chair and a fortiori of the partners of the CEEM, RTE, EDF EpexSpot and TotalEnergies.

Introduction

The present long lasting crisis in electricity prices calls for a debate on the real effects of competition in the European Union's electricity market whose the design is based on an hourly wholesale market. This organization presents a triple drawback first of giving prices aligned with fuel cost of marginal producers, that never reflects the cost-price of any generation technologies; second, of causing price volatility that makes long-term anticipation of the net present value of an investment an impossible challenge; and third of exposing consumers to episodes of very high prices due to the volatility of fossil gas prices. It removes any role for market prices as long-term signals for investment in production, as proven by the experience of the last fifteen years in Europe, where no more investments in non-RES techniques have been made through the market, with very few exceptions.

It follows that this market model is deficient in facing the long-term challenges of security of supply (SoS) as well as of decarbonisation. The price signal sent by this hourly market is ineffective for investing in equipment lasting 30, 60 or 100 years, as is the case for low-carbon equipment (RES, nuclear, CCGT gas with carbon capture, hydraulic and now storages). It is also inefficient for triggering investment in peaking units which could not cover their investment cost by relying on scarcity rent during very uncertain price spikes.

The present market design has already been modified to meet these two objectives, but only partially as this was in conflict with the Commission's market formalism in matter of competition and State aids limitation. Capacity remuneration mechanisms (CRM), which are considered as State aids, have finally been allowed to be put in place, but on the condition that they were temporary. This has been easier for schemes that guarantee long-term revenues (feed-in tariffs, premium, contracts for differences CfD), for variable RES equipment which benefit from political preferences, unlike other dispatchable low-carbon technologies (nuclear, CCS in particular) that do not benefit from the same favour.

That said, the problem remains entirely open for the rest of the power mix: renewal of dispatchable equipment for the SoS, non-RES low-carbon techniques, flexibility sources, storage, network development, all areas whose importance grows with large scale deployment of variable RES (VRE). In other words, the previous arrangements are not sufficient to move towards decarbonized systems with large shares of variable RES, which require rational and consistent planning of the mix development and the generalization of de-risking arrangements to every technique.

The main traits of the new market architecture

We conceive another way of organizing the market with four objectives:

- *maintaining hourly markets to ensure short-term coordination inside the system and with the other systems*
- *sharing the risks of investing in new equipment through revenue guarantee contracts*
- *hedging the market risks for the suppliers in order to insure the consumer protection with quite stable retail prices aligned with long-term costs*
- *and planning consistently the electricity mix.*

The first point is important to preserve the short-term optimization of the European electricity system and to allow the integration of different systems through the hourly markets in order to manage the increasing variability of power generation. Well-functioning short term markets allows to reach efficient economic dispatch including growing flexibility sources developed at large scale to complement VRE productions.

The third point of hedging the suppliers' risks to protect consumers is justified by the traditional failure of the former to hedge their risks, as it can be observed recently. But, in any way this means to suppress price incentives for consumers to adapt their behaviours in period of price spikes on the spot market. Part of the retailers' sourcing should come from the spot market, so that their price offers to their different customers should keep some variability to incite consumers to modulate their demand during scarcity moments and fossil fuel price spikes.

Conceived in a general way in order to be applicable in each member State which would choose it, the alternative model of is built around an entity that is independent of the market players both upstream and downstream, and of the regulatory body. This entity, called the agency below, would have two main missions leading to an effective low carbon transition and protection of the consumers. Moreover a specific planning entity should be created to give economic consistency to the power system evolution and to realize long-term coordination between more and more interdependent techniques in power systems with increasing high share of VRE.

The function of central contractor

To articulate agency's long-term purchases and short-term coordination through the spot market, the type of contracting that should be chosen to formalize the central buyer's commitments with producers should be financial. For both new and existing facilities, it is based

on contracts for differences (CfDs) in which the strike price covers capital costs (in the case of existing assets, those not written off) and operating costs. For flexible sources, it is based on forward capacity contracts.

Financial contracts for market risk coverage

The central buyer committed in a CfD contract with a generator receives or disburses the difference between the hourly market price and the contract’s reference price (strike price), depending on whether the former is below or above the latter. This type of contract leads to a revenue stream stable, which fits quite well with the cost structure of low carbon equipment (with low or zero variable costs).

Long-term contracting by the agency will be made mainly by auctions, which will be opened regularly and would select contractors on the price they request. Auctions will be specialised by type of technology, each variable renewable source, dispatchable low carbon equipment (nuclear, gas with CCS) and flexibility sources (pumped storage, battery systems, hydro lakes, gas turbines, etc.). All this equipment will also be differentiated between existing equipment with short contracts (from 1 to 8 years for those with refurbishment) and new equipment with long maturity contracts of 15 to 30 years. Notice that it can be done by gré à gré negotiation for very capital-intensive technologies with long lead times, nuclear in particular.

Existing equipment is also committed to shorter-term CfDs, also awarded by auction¹. The strike prices of

¹ The existing CfDs with RES plants, the so-called guaranteed contracts or contrats de complément de rémunération (CCR), will be transferred to the agency.

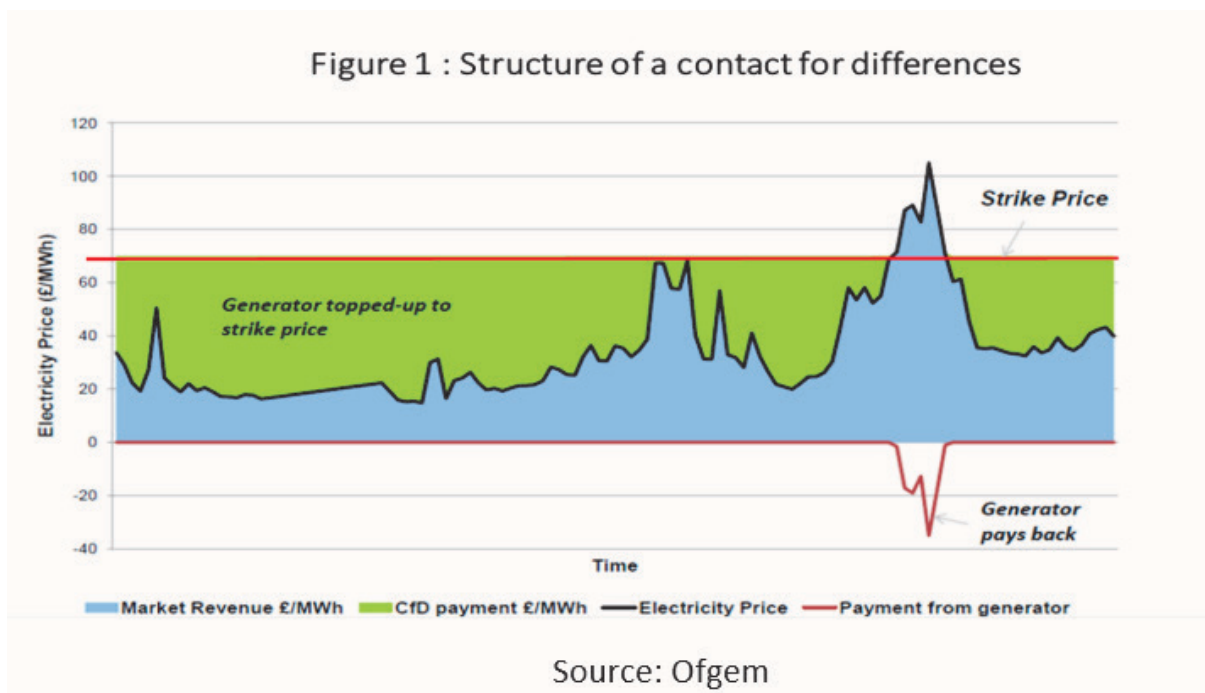
auctioned contracts for existing assets in a technology should be set at a level that covers the depreciation annuity and the operating costs². The extension of CfDs to existing assets has a double objectives: to bring the remuneration of existing assets into line with that of new assets, while to make possible to recover their infra-inframarginal rents in times of price spikes, and to transfer them to consumers.

In order to preserve long-term competition, CfDs should not be mandatory for developers and investors. Investment outside the Central Buyer scheme is possible. In this case market risks coverage is assumed by private counterparts (large consumers, retailers) which sign up power purchase agreements (PPA) at fixed price with a developer.

Capacity contracts with flexibility and back-up sources

For the flexibility sources and fast ramping fossil equipment whose operation is conditioned by the variability of the supply-demand equilibria, coming both from the demand side (winter or summer peaks) and the generation side (with VRE productions), the equipment cannot be made profitable on the basis of its energy production (related to various intertemporal arbitrages) and their revenues on balancing and ancillary services markets. The later ones are so volatile and uncertain over the long recovery period, that it is necessary to secure investment through specific long-term contracts designed with a capacity remuneration and an incentive formula to availability, as it is usual in “tolling” contracts.

² The auction could be a pay-as-bid auction to avoid undue rents.



In countries which have already adopted a capacity remuneration mechanism based on auctioning forward capacity contracts, its coverage will be enlarged to flexibility sources³. In the auction, the selection would be based on the capacity price offered by the candidates. The price in the tolling or capacity contract will cover the producer's fixed costs (annuity covering the capital cost, operating costs), while the latter will recover its fuel costs by selling its MWh's on the spot market (see fig. 2).

The agency will manage both the contracting with low carbon units and the capacity contracting with other equipment, as it is done in the UK by the Low Carbon Contracts Company (LCCC) and the Electricity Settlements Company (ESC).

A central purchasing agency

Organizing centralization in the hands of a public entity will allow the alignment of the agency's transfer prices to suppliers with long-term costs while maintaining short term coordination by spot markets. For that, it should have priority to purchase the bulk of MWh's produced by low carbon units committed in CfDs with her.

The spot and forward markets continue to be organized by private marketplaces such as EpeXSpot, which manage the call of producers from their bid prices

³ Countries which have not such a CRM based on forward capacity contracts would benefit from adopting such a CRM design. It has proven to be the most efficient to ensure capacity adequacy through investments in peaking units, and not only by keeping some conventional units in operation(Indeed it is the sole effect of other CRMs: capacity payment mechanism, strategic reserve and decentralised capacity obligation.

ranged in merit order to determine the hourly price in pay-as-clear. Day ahead markets as well as intraday, balancing, and ancillary services markets are preserved, in particular in their market coupling configuration.

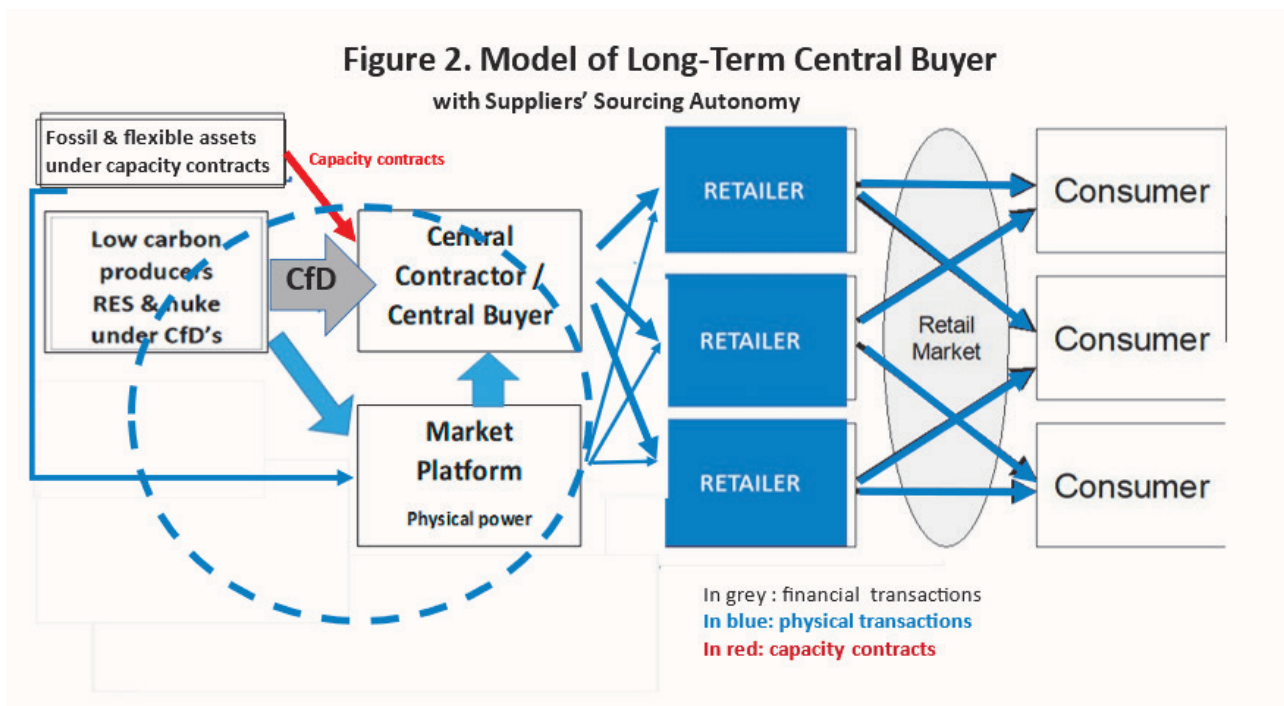
But there are some differences with the present situation. Every low carbon equipment committed in CfDs (even those owned by vertical power companies with retail business) are required to go through the spot market, with two exceptions: first self-production and small decentralised RES generation; second, low carbon equipment which are committed in PPA contracts with private counterparts (see below).⁴

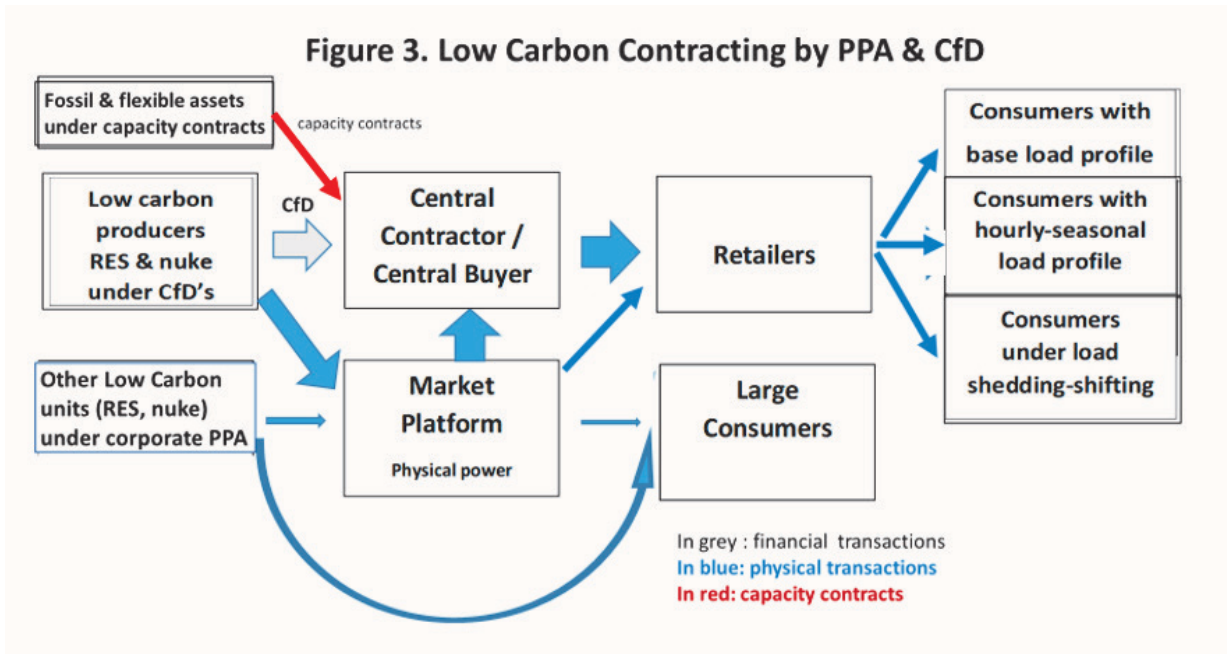
For each plant's production, spot prices are corrected by the payment of the differences with the strike price of the CfD signed with the generator. It is as if the agency purchases the vast majority of the low carbon electricity produced through long-term contracts, by both existing and new low carbon equipment.

Direct contracting between low carbon producers and large consumers

In order to maintain competition in the supply of large customers, they are allowed to choose to not depend upon direct purchases to the agency. Symmetrically new and existing low carbon producers (VRE developers, nuclear) are given the choice of not being risk-covered by long-term financial contracts with the agency. They can choose to reserve some of their new equipment for contracting with

⁴ The consistency of the central buyer model implies also to move from producers' decentralised self-dispatch (the ability to offer the production of several units to a common price) to a central dispatch (price offer for each generation unit).





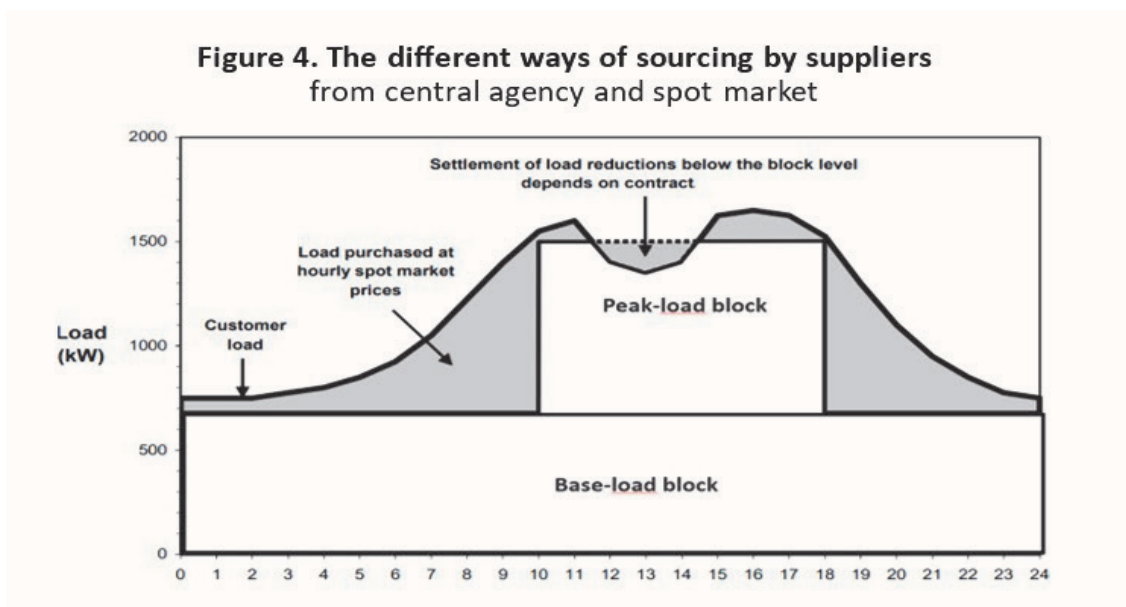
some large consumers. For that, the producer who chooses to not depend from the agency and who therefore takes the hedging risk upon himself, must meet the interest of some large consumers who choose to hedge their sourcing with a long term PPA at fixed prices with a new wind or solar PV unit (the so-called corporate PPAs).

This is particularly relevant for new variable RES equipment. A developer may prefer to look for a large buyer interested in purchasing green electricity at a price stable on the long term. But it is under the challenge for the latter to be exposed to wholesale price risk for the additional sourcing they need for their complementary supply. It could be also the case for contracting by a large consumers' cooperative with a new nuclear plant, as it is observable in Finland with the so-called Mankala set-up.

Towards retail prices aligned with long-term costs

At the exception of RES generation committed in PPAs with private buyers, it has control on long term costs of each low carbon plant with low or zero fuel costs, as well as on fixed cost of flexibility sources and back-up units.

Having the control of long term costs of the whole low carbon power system, the agency is in a position to hedge market risks for the suppliers' sourcing, knowing that the current market design does not encourage suppliers to hedge their risks (although their main function is intermediation between wholesale market and consumers). Indeed the agency is able to sell all the electricity it acquires from new and existing low carbon equipment committed in CfDs to suppliers at transfer prices aligned with long-term costs.



The agency resell low carbon electricity to suppliers at prices that reflect the weighted average long term costs of the low carbon system. Suppliers could procure well-calibrated power blocks (base, mid-base, peak, etc.) from the agency on an hourly basis and in forward contracts. These blocks could be sold by posted prices aligned with the weighted average long term costs of the low carbon mix. A market alternative for their sourcing is auctioning for the acquisition of different blocks from the agency in open descending auctions (with a start price higher the posted price).

The definition of posted prices should have to be transparent along with pricing principles defined by the regulator, in order to avoid any risk of market power exercise by the agency. As a public entity with commercial status and subject to a budgetary balance constraint, the principles for setting these prices must drive to alignment with development costs of the low carbon system, including those of backup units and flexibility sources.

Complementary procurement

If on one hand side, the agency assumes the majority of sourcing of retailers and large consumers for quantities corresponding to low carbon generators committed in CfDs. But the former ones have to complement their sourcing by purchases on the spot market on the other hand side. These purchases correspond to the energy sold on the different markets by flexibility sources (among which fossil units) during periods they are needed to balance the power system..

To expose consumers to some price variability

Prices on the spot markets reflect temporary supply-demand tensions during episodes of VREs' low production, or spikes of fossil fuel prices. The variability of wholesale prices for their complementary sourcing creates an incentive to them to pass on these fluctuations in their retail prices and to develop demand response services on the side of the costumers. Each supplier incite its customers to rationalize their consumption according to their load profile, for instance base load consumption, consumption correlated to a period of the year (winter or other, or else consumption for which call to system may be modulated.

Suppliers compete with each another by their prices and services offers, including the possibility of modulating the power by load shedding. The fundament of their competition is their ability to match their double sourcing from the agency (purchase by blocks) and the spot market, with their specific offers adapted to load profiles of their customers. They are also under the competitive pressure of aggregators' entries.

Planning in view of long term economic efficiency

Overall coherence of the system will be set at the national level by a public planning body endowed with important competences in modelling complex system. It will be responsible for the medium and long term planning of production technologies, flexibility sources and the grid at different levels (local, regional, national). This function could be entrusted to a subsidiary of the transmission system operator which has already competences in matter of grid development programming. Planning and scheduling must be based on an optimisation approach of investment decisions in generation and transmission. The planning function will also cover electrification of energy uses, energy efficiency, demand side management and coupling with gas sector (hydrogen production, common supply). It has also to anticipate the concurrent developments by PPAs between private agents and by CfDs signed up with the public agency.

Long term plan will be defined according to the energy policy objectives set by the government in the light of (supposedly) impartial advice of the planning body legitimate by its modelling capability. It will develop a sliding program for the development (and closure) of production capacities.. This approach is radically different from the present EU political practice of piling up targets (RES share, energy efficiency, etc.) based on political criteria, as they exclude dispatchable low-carbon technologies and ignore marginal costs of carbon emissions reductions by the different measures.

Member-States who adopt this central buyer model, choose in fact to lead their own electricity and energy policy, providing that their decarbonisation commitment to the EU is respected. The choice of the power mix is a matter of national sovereignty according to Article 194-2 of the Lisbon treaty (TFEU). As such, a member-State is legitimate to structure its own governance of long term energy choices based on rational criteria. This does not prevent to search for cooperation between neighbouring countries pursuing different technological trajectories in order to exploit their complementarities, which, incidentally, is already partly ensured by spot exchanges of energy and ancillary services.

The applicability of the Central Buyer model

This new organizational model will be an option open to all Member States, as soon as it is recognized as compatible with European rules. Indeed, this compatibility is almost effective because the model enables upstream competition on the wholesale market and downstream competition on the retail markets, while preserving the market integration of the systems through spot markets in order to ensure solidarity between them through the various market couplings.

There is no real incompatibility between the general development of long-term contracts with public authorities and the European rules in matter of market and competition. The state aid regime for climate, energy, and environment, the so-called Guidelines, already formalises the use of standardised CfDs for RES projects, and this formalisation could be easily extended to other low carbon techniques not considered in the 2021 guidelines, nuclear in particular.

On the other hand, if the CfDs are made mandatory for developers in order to place every low carbon equipment under the central buyer's umbrella of risk coverage, this generalisation of long term contracts with public powers could encounter a legal obstacle. But, as said, if PPAs can develop freely between developers and large consumers, as proposed, there is no reason that the EU market rules restrict the use of long-term financial contracts by member-States.

Two issues of compatibility

That said, two problems of compatibility with European rules remain. The first one concerns the disconnection of retail prices from wholesale spot prices, the former being mainly aligned with long-term production costs and secondarily with spot prices during gas prices spikes. Article 5-2 of the "electricity markets Directive" on retail competition only allows such disconnection for vulnerable consumers and Article 5-6 only temporarily for other consumers. This problem should be easily solved given the interest to protect the consumers

The second problem is the difficulty of exchanging long-term products with other systems. The central buyer model relies on attribution of hedging contracts with new assets which are programmed by the planning entity to satisfy growing electricity needs at the national scale. In the same time the market platform certainly organises physical trade with other systems on a competitive basis in the two directions. But the model is not conducive to cross contracting outside the national system between the agency and large external buyers. It follows that, given the differences in choices to be expected between Member States, these differences will inevitably translate in the long term production costs of the system and therefore in the transfer prices of the agency to suppliers and then in the retail prices, with an advantage for consumers of countries that have made the most economically rational choices⁵.

Conclusion

For Member States which will choose to adopt this targeted market design changes, this new model presents the advantage to ease transition towards carbon neutrality, to protect consumers from extreme price volatility by coupling retail prices with long term costs, while it preserves short-term optimisation of the system through the spot market. The search for institutional and technological coherence justifies extending long-term markets to the overall electricity production system, whereas they have so far only been developed for RES technologies. The interest of this proposal is that it does not require any upheaval of the market architecture that has been progressively put in place for the last twenty years in the European Union. It is a question of adding a « Long-term markets» brick and a planning governance to the current market architecture.

The need for coherence, which is presently undermined by the present EU policy driven by quantity objectives on RES--which is opposite to technological neutrality and far from economic rationality-- justifies strengthening long-term governance through planning and steering policy at national level. This does not prevent to consider some less centralised model to adapt to specific institutional and cultural contexts of Member States that would like to adopt it, in particular by giving more room for manoeuvre to producers' own decisions and to retailers in their sourcing.

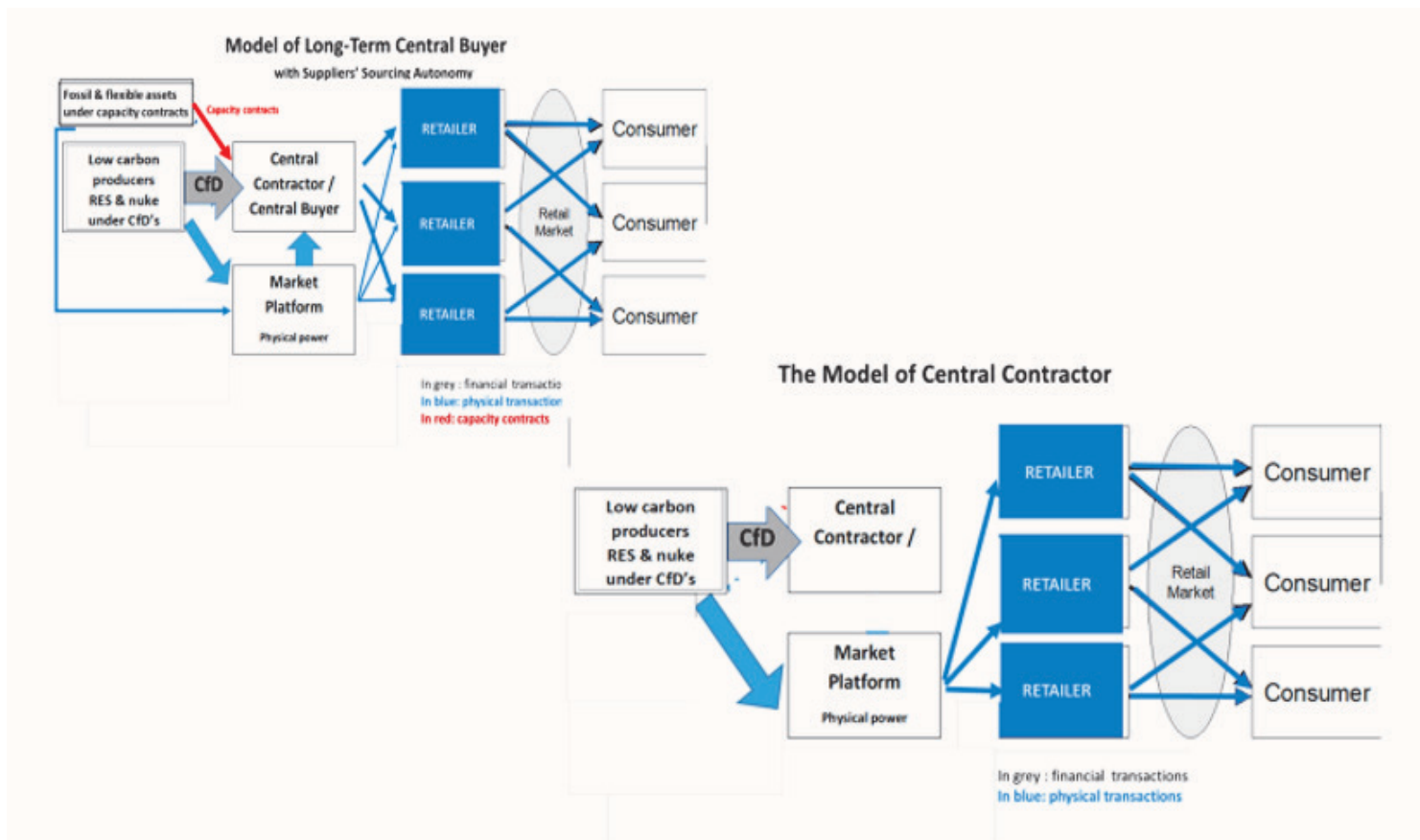
⁵ It is noteworthy that, in a very recent non-paper of the Commission a targeted market design quite similar to the one presented here, would help the acceleration of the net-zero transition (based of course on renewables) and "would bring the benefits of lower cost renewables to consumers in line with their share in the electricity mix" in countries choosing these new model. See EU Commission. Non-Paper – Policy Options to Mitigate the Impact of Natural Gas Prices on Electricity Bills. October 20, 2022

Appendix

The Central Contractor model A less coordinated long term market design

This variant is inspired from the model presented in a Position Paper of July 2022, which emanates from French government¹. In this, the agency is only a central contractor with low carbon generators, new and existing ones, and does not directly cover the price risk for the suppliers. For that It is not a central purchasing agency and has not in hands the long term cost of low carbon generation units. The suppliers buy on the spot market for all their sourcing and have to hedge their risks themselves. But, in the event of a price spike, part of the infra-marginal rent of low-carbon producers is

¹ It is entitled “ POSITION PAPER-REFORMING THE ELECTRICITY MARKET TO FOSTER ENERGY TRANSITION, PROTECT CONSUMERS AND TO KEEP THE BENEFITS OF MARKET INTEGRATION AND MARKET COUPLING”



Upstream characters

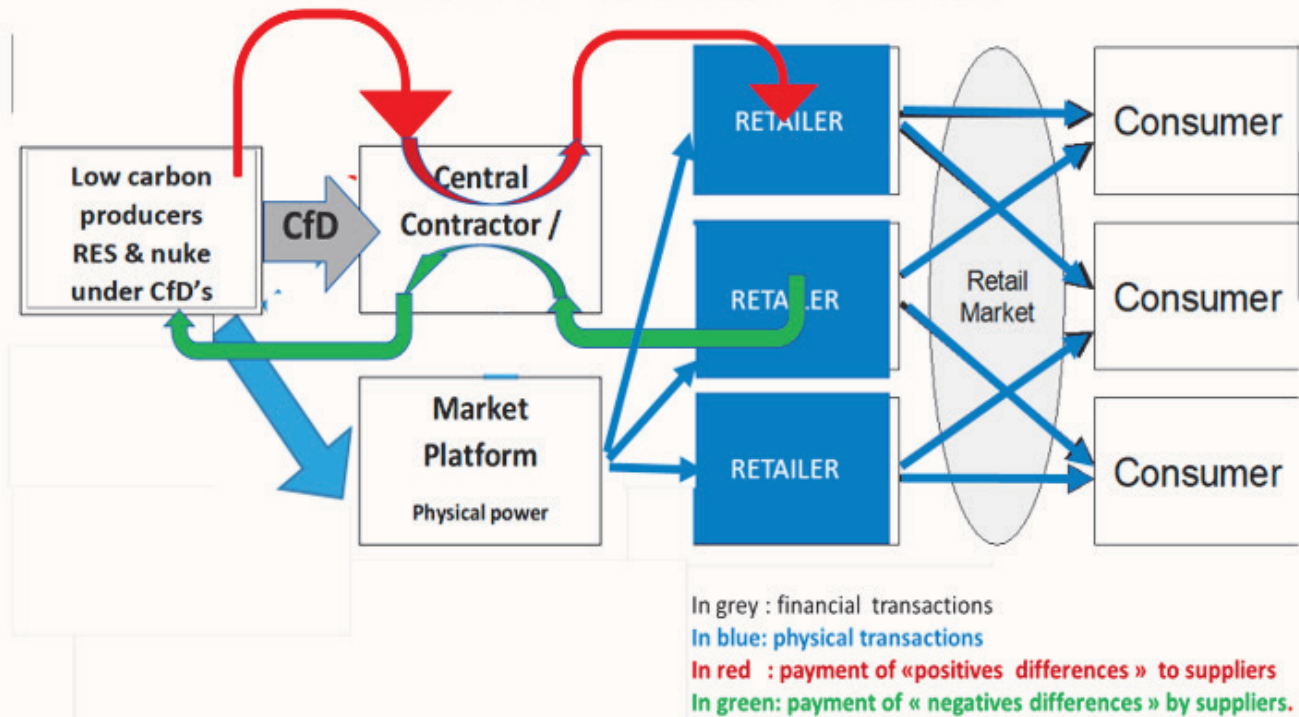
All production assets continue to sell their production on the short-term market, without modifying its design to preserve the proper functioning of the European wholesale market

Member States should be given the possibility to organize long-term contracts with new low carbon assets, and also with existing ones as set out by them in their own power system planning. As in the Central Buyer model, the contract design is “for difference” (CfD): in order to preserve the proper functioning of the spot market. CfDs will be attributed by auctioning.

Producers remain free to develop assets outside this framework, on the basis of market signals alone and by contracting PPAs with large consumers willing to assume price-risk for the developers.

To manage long term contracts and their linkages with spot prices, member-states can set up a public company, the Central Contractor, which is the counterpart of the contract and can manage financial transfers between the consumers (represented by the suppliers) and the low carbon assets. It consists in transfers between upstream (the balance of differences between strike prices and spot prices for each CfD with the assets on a certain time-frame like the week or the month) and downstream (towards the suppliers and beyond, their customers). If the wholesale price is lower than the strike price, compensations to producers are financed by suppliers, and conversely, If the wholesale price is higher than the strike price, payments from producers are transferred to consumers.

Financial flows on « differences » of the CfDs



Downstream traits

For the major part of the suppliers' sourcing, the Central contractor hedges their price risks. These regular transfers leads to an acquisition cost which is close to the weighted average of the long term costs of low carbon plants covered by CfDs, which is in fact the development cost of the low carbon mix. As in the Central Buyer model, the remaining part of the suppliers' sourcing (which de facto corresponds to the fossil generation) will be purchased at market prices. Consequently, as they are not hedged against price risks for this part of their sourcing, they should have to manage to transfer these risks on their respective customers by their retail price offers.

They will be encouraged to diversify their contractual offers away from offers with guaranteed prices over several months, with price offers partly based on the wholesale price in dynamic pricing, or even modulated offers with partial shaving.

Main differences with the Central Buyer model

In the two models the public entity has the same function of long term contractor in financial terms with the low carbon generators, by assuming in particular the role of clearing house

The main differences lie upstream in the way the spot prices are adjusted by top-up payment to generators (or by retrocession) for the "differences", and downstream in the way the acquisition costs of the suppliers' sourcing could be more or less aligned with precision with long-term costs of the low carbon mix.

In the Central Buyer model, the agency purchases on the spot each hour the quantity of MWh's corresponding to total productions of low carbon plants on these hours. Then it is able to resell these MWh's to the suppliers by correcting in "real time" each hourly price by the "differences" spot price/strike price of each CfD that it manages as counterpart. This precision allows to make relevant price offers aligned with the weighted average long term cost of low carbon units (new and existing ones).

In the Central Contractor model, the suppliers buy directly on the spot all the MWh's they have to deliver to their customers, and not from the public entity. Then the central contractor of CfDs could calculate the compensations or the payments to suppliers corresponding to the difference strike prices/spot prices on a certain timeframe.

This greater flexibility may be an argument in favour of this model. On the other hand, it would be appropriate to look closely the reality of the suppliers' hedging by the compensations for "differences" between the two models. The alignment of prices with the long-term costs of low-carbon production in this model is probably less accurate, given the time-frame of the calculation of compensations. Moreover as this refunding could not be in real time, but on a monthly or quarterly basis (like in the UK presently), risks remain important for suppliers on this part of their sourcing which is much more hedged in the Central Buyer model.

