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**AIR LIQUIDE's answer to European Commission consultation on generation adequacy, capacity mechanisms and the internal market in electricity**

Air Liquide is the world leader in gases for industry, health and the environment, and is present in over 80 countries (25 in Europe) with 43,600 employees worldwide. Oxygen, nitrogen, hydrogen and rare gases have been at the core of Air Liquide's activities since its creation in 1902. Using these molecules, Air Liquide continuously reinvents its business, anticipating the needs of current and future markets. The Group innovates to enable progress, to achieve dynamic growth and a consistent performance.

Air Liquide presence in most European countries provides a very good perspective on the functioning of electricity markets.

Furthermore Air Liquide is an electro-intensive industrial company with electricity consumption over 25 TWh per year worldwide. One of the specific features of gas production is indeed its energy intensity. Energy costs represent the main share of AL's production costs (up to 78% of its production cost).

In this regards ensuring competitive and stable energy price is a key issue for Air Liquide, as well as for its customers whose competitiveness is also dependent on energy prices.

In parallel, Air Liquide is fully committed to reducing its energy footprint: in 40 years we have achieved to reduce by nearly 50% the specific energy consumption of the air gases separation units. Besides, we contribute, through our products, to the improvement of the energy efficiency of our clients through our continuous technological innovations, our operational expertise, the optimization and integration with our customers' processes, synergies in industrial areas with efficient co-production of various products, and economies of scale.

In the prospect of a well functioning and fully integrated energy market for electricity and gas, we fully support the guidance and coordination efforts by European authorities to bring energy competitive environment, maintain the security of supply and contribute to a sustainable environment

The present European situation however is in need of reinforced coordination or even harmonization between countries energy policies to overcome distortions that have developed in energy markets. Such distortions are mostly the result of national policies having limited attention to their impacts on neighboring countries while prioritizing on national implementation in the historical context of large European discrepancies in production mix affected in particular by the Renewable supports, technical competitiveness of producers, grids designed for limited national geographies and varying regulations, among which energy-linked taxation to end-users categories.

Market evolution accompanying these varying policies have seen the buildup of significant barriers hindering flexible generation investment decisions, like energy-efficient, sustainable environment friendly cogeneration plants, whereas, on the demand side, consumer categories behaviour have evolved, with little or even lower participation by demand-side response to generation adequacy.

Before the introduction of new elements, like capacity markets, to complete the global energy supply construction, **it is believed that the removal, or at least the minimizing of their impact, of all existing and previous barriers should be a first priority for European and national authorities, with an emphasis of cost-effective optimization of existing assets** and social welfare benefits for consumers, so as to address signals to investors of more stable, sustainable conditions for further investment.

**In particular, demand-response services for volunteering consumers categories should be encouraged more widely**, as it was the case in the past, because they can contribute to less demand inelasticity when given proper economic rewards.

If conditions are met for the introduction of capacity market concepts, a focus of the following aspects would be helpful to limit any significant distortion to the energy-only markets:

- **Increased demand-side participation**

As said in introduction, demand side participation should be encouraged by minimizing barriers and leave place to innovative initiatives (demand aggregation, energy storage) In the case of rare but extreme scenarii, (demand-supply deficit beyond electricity ultimate margins), an extreme massive real-time demand-side interruptibility service on Regional scale can represent a more cost-effective solution than new capacity generation investment for such rare use

- **Incentivizing principle of generation adequacy: " the causer the payer"**

Capacity market or mechanisms shall be designed in order to minimize the burden on market actors, especially end-user consumers, with such a simple but virtuous criterion to consider as the principle of “the causer the payer”: such actors or category of actors who are the source of similar generation inadequacies should bear most of the cost of the solution to address them.

- **Cost effectiveness of capacity mechanism and reinforcement of customer segmentation involvement through ex-ante cost benefits analysis**

The capacity mechanisms shall obviously be cost-effective, especially in terms of social welfare, and consistent with the other energy and environmental regulations. Harmonized methods for ex-ante cost-benefits analysis shall be provided to justify the need of adequate capacity.

Market capacity shall not provide windfall profits for every available capacities, especially for those already under support schemes

- **A pragmatic startup with innovative national capacity mechanisms taking into account its Regional impacts would be preferable to a global European capacity market**

Generation adequacy need to be assessed with harmonized assessment methodology and criteria between TSO's and NRA's, given the TSO's reinforced responsibility to provide the reference vision of Long-term (10-year) generation adequacy.

Instead of treating generation capacities in a undifferentiated way, the classification of capacity would be helpful with explicit merit order considerations such as flexibility, sustainable environment effectiveness, load factor profitability, etc. .

This would allow capacity markets to address the specific needs to cure only and timely identified generation inadequacies seen on both national and Regional level, and focus in priority on flexible generation, peak generation, congestion management, demand-side response.

- **Necessity of feedback /return on experience for capacity mechanisms**

Any market capacity initiative in Europe will be partly experimental, since no capacity model as experienced in the past in foreign countries proved their universal validity. Prescheduled returns of experience and associated feedback action plan will support market capacity operations in view of further adaptations with transparent predefined cost-benefit analysis criteria including the final cost contributors. .

- **Reinforced European control**

The reinforced scope for ACER, for example, would be welcome as a pragmatic approach to accelerate the elaboration of a more integrated European guidance and understanding of generation adequacies beyond the resolution of single national generation issues.

<b>Detailed answers</b>
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**1. INVESTING IN THE INTERNAL ENERGY MARKET**

(1) Do you consider that the current market prices prevent investments in needed generation capacity?

*Yes and additionally they may encourage the closure of flexible, energy efficient capacities, illustrated by, but not limited to, the two following examples:*

- Current markets prices currently show that some generation technologies, like recent environmental friendly cogeneration plants, are facing hard times with negative variable profitability when considering their own variable production cost (negative Clean Spark spreads values).*
- The fast growing renewable energies highly incentivized to meet the European 20% target of production mix, have more and more significance on the market model of marginal generation cost. Their massive, unavoidable volumes offset the marginal generation point, bringing prices down, while the renewables energy-pricing is fixed out of market.*

(2) Do you consider that support (e.g. direct financial support, priority dispatch or special network fees) for specific energy sources (renewables, coal, nuclear) undermines investments needed to ensure generation adequacy? If yes, how and to what extent?

*Continuous supports for specific energy sources do have impact on the market. They use financial resources that could be optimized differently, having in view the comparative global price of energy in different European countries. Their effect provides large discrepancies to be seen among national countries about energy related taxation*

(3) Do you consider that work on the establishment of cross-border day ahead, intraday and balancing markets will contribute to ensuring security of supply? Within what timeframe do you see this happening?

*All efforts made to foster cross-border exchanges, day-ahead coupled markets as well as intraday markets can only bring improved conditions to ensure security of supply and optimize existing resources not only at national level but also at regional or European levels.*

*In current conditions, we can satisfactorily see more market convergence on commodity prices and more possibilities to stimulate competition across Europe. The existing situation however is showing many local particularities such as congestions, difficulty of grid access, or even development of market complexities such as loopflows that may impact the security of supply and need to be addressed before adding new market capacity concepts.*

*The real existence and effective liquidity of intraday markets across Europe need still to be seen. Having effective European intraday markets could also be a prior condition for improvement of market conditions before adding new capacity market concepts.*

*Balancing markets share some merit order criteria with capacity market, however with fundamentally different timeframe and dynamic response requirements to ensure the security of supply. But balancing is basically used for real-time problem and contingencies solving, out of technical reach of day-ahead or even intraday markets, whereas capacity markets contributes to the security of supply in a medium-term (2- 3 years) or longer-term prospect.*

*To avoid distortion created by double incentivization, the use of generation capacity for balancing purposes should be treated differently and with no overlaps from capacity market use.*

*Balancing mechanisms are currently prevailing with national control area management. However, in the implementation of the Third Energy Package, the evolution towards more coordination on balancing principles (marginal balancing price with TSO-TSO common merit order approach) to promote cross-border balancing exchanges will bring, subject adequate availability interconnection capacity, improvements in Regional security of supply ... before capacity market concept.*

- (4) What additional steps, if any, should be taken at European level to ensure that internal market rules fully contribute to ensuring generation adequacy and security of supply?

*Not only prior reinforced coordination but also harmonization of energy policies for the production mix, grid rules, access, seasonal tariffs and cost principles, RE support, could help to find a better optimization of resources in order to alleviate market distortions and ensuring better generation adequacy and security of supply.*

*Demand-side response mechanisms are to be encouraged, using the flexibility of categories of consumers and should be opened to innovative solutions (consumer aggregation, energy storage, voluntary load-offsets, diffuse load-shedding services allowed by smart metering technologies, etc.).*

*Such demand side-response have existed in the past and their use can also contribute to the security of supply, with greater cost-effectiveness because they can avoid unnecessary large investment in flexible generation to address demand-supply inadequacies.*

*In the case of rare but extreme-stress scenarios,(demand-supply deficit beyond electricity ultimate margins), massive real-time demand-side interruptibility services from predefined large customers on Regional scale can also represent a more cost-effective solution than new capacity generation investment for such rare use*

- (5) What additional steps could Member States take to support the effectiveness of the internal market in delivering generation adequacy?

*A long term target could be the creation of a Pan-European management of unified networks under appropriate guidance and delegated authority by Member States to pave the way for a more effective market and a real European understanding of the use and optimization of energy assets and infrastructure. This role could be entrusted in a pragmatic way to existing entities like the ACER, with the corresponding authority and staff reinforcements.*

- (6) How should public authorities reflect the preferences of consumers in relation to security of supply? How can they reflect preferences for lower standards on the part of some consumers?

*Because of its welfare impact, the security of supply should be considered as uniform and non-discriminative as possible among all consumers, with continuously improving standards of quality and avoidance of any general blackout, even though the presence of local differences such as congestion are recognized to take time to solve.*

*To better take into account consumers' preferences in the security of supply, we first welcome any reinforcement of recognized consumers' representation by public authorities, i.e. industry representatives.*

*Security of supply does not mean continuous supply all through the year at full subscribed power for all consumers. Any demand-side participation means the use of consumption flexibilities of some categories of consumers with prior acceptance of downgraded supply conditions – meaning reduced or even interrupted supply – against proper recognition and efficient financial reward.*

### **3. ASSESSING GENERATION ADEQUACY**

- (7) Do you consider that there is a need for review of how generation adequacy assessments are carried out in the internal market? In particular, is there a need for more in-depth generation adequacy reviews at:

- a. National level
- b. Regional Level
- c. European Level

*Generation adequacy needs to be assessed from even local level before national, Regional or European level. When doing these assessments, it is essential to use a harmonized and comprehensive approach for each of all these levels, not only taking from the different technology existing mix and potential in those areas, but also taking into account the need for flexibilities, all the associated costs of energy (grid /distribution costs, taxation) to the different categories of consumers.*

*Generation adequacy shall also use the same harmonized approach and criteria for cost/benefits analysis of any future solutions to existing generation inadequacies and associated financial schemes*

- (8) Looking forward, is the generation adequacy outlook produced by ENTSO-E sufficiently detailed? In particular,
- a. Is there a need for a regional or European assessment of the availability of flexible capacity?

*As regards the security of supply, and in the prospect of the Internal Energy market, energy markets will rely more and more on import/export exchanges with neighboring areas which are no longer limited to TSO's control area within national boundaries. ENTSOE, previously UCTE, have experienced for long and share among their members, a vision of the grids at Regional and European level.*

*In-depth assessment of regional control area dependences and synergies, cross-border flexible capabilities in combination of interconnection effective availability shall be a compulsory part of the methodology used for the generation adequacy outlook produced by ENTSOE*

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- b. Are there other areas where this generation adequacy assessment should be made more detailed?

*Inclusion of adjacent countries to the European Union like Switzerland, Russia, Norway, Turkey, Serbia etc. is also essential for the generation adequacy outlooks by ENTSO-E and its members, given grid systems obvious interdependence as regards security of supply and key-positions held in energy-storage, flexible generation capacities or essential gas sourcing for flexible generation*

- (g) Do you consider the Electricity Security of Supply Directive to be adequate? If it should be revised, on which points?

*We would like that before further implementation, the Security of Supply Directive provides more in-depth assessment about associated comprehensive energy costs passed to the European consumers. To this effect, a systematic use of ex-ante cost/ benefits analysis methodology harmonized at European scale shall be used.*

- (10) Would you support the introduction of mandatory risk assessments or generation adequacy plans at national and regional level similar to those required under the Gas Security of Supply Regulation?

*Emphasis shall be on harmonization of risk assessments methodology.*

*Transposition from Gas Security of Supply Regulation to electricity is limited by electricity generation specificities: time frame (need for real-time adequacy), unequal distribution of large energy-storage capacities, less dependence on third party countries sourcing, grid design cost and taxation difference for end users; more extensive infrastructure for electricity.*



*For flexible gas-fired plants, the generation adequacy may strongly depend on imported gas sourcing availability, especially in case of extreme cold situation.*

- (11) Should generation adequacy standards be harmonised across the EU? What should be that standard or how could it be developed taking into account potentially diverging preference regarding security of supply?

*Harmonization of generation adequacy standards is a rather long term view when it comes to have binding standards leading to fully aligned implementation in the Internal Energy Market*

*Because of timeframe constraints, strong disparities on flexibility requirements and dedicated TSO's responsibilities, resistance will be strong to change national practices regarding security of supply: a reinforced Regional coordination on security of supply and generation adequacy standards seems a more pragmatic approach*

- more focus is necessary on the link between generation and differentiated demand from consumers profile categories.*
- Such standards should not hinder demand-side service participation*
- Regional approach shall always include consideration of its final cost-effectiveness using predefined set of criteria*

#### **4. MECHANISMS TO ADDRESS GENERATION ADEQUACY CONCERNS**

- (12) Do you consider that capacity mechanisms should be introduced only if and when steps to improve market functioning are clearly insufficient?

*Capacity mechanisms rather address long term vision on specific and local generation inadequacies.*

*The prior removal or minimization of present market distortions is an important task for present correct market functioning.*

*The potential of demand-side participation in its possible forms and innovative initiatives shall be also used beforehand, because of its cost effectiveness.*

- (13) Under what circumstances would you consider market functioning to be insufficient:

- a. to ensure that new flexible resources are delivered?*
  - b. to ensure sufficient capacity is available to meet demand on the system at times of highest system stress?*
- Situation of repeated alerts and pre-alerts from TSO's about loss of security margins corresponding to the specific scenarii of generation inadequacies.*
  - Lead- time necessary to execute large investment in new adequate generation capacities is on the critical path*



(14) In relation to strategic reserves:

- a. Do you consider that the introduction of a strategic reserve can support the transition from a fossil fuel based electricity system or during a nuclear phase out?

*Strategic reserves (reserving mothballed but flexible plants) can provide a relief solution to generation inadequacies, but its cost impact should carefully determined so as not to create unjustified windfall profits , especially if this is related to existing and largely depreciated assets*

*Such strategic reserves, whose cost- effectiveness have to be challenged could be complementary with demand-side extreme interruptibility services (see Question 5) to be activated also in case of extreme- stress situations to avoid complete blackouts*

- b. What risks, if any, to effective competition and the functioning of the internal market do you consider being associated with the introduction of strategic reserves?

*Effective generation capacity of such strategic reserves should be used only to cover the generation inadequacy occurrences, to avoid creating recurrent interference and distortion with conventional markets.*

(15) In relation to capacity markets and/or payments:

- a. Which models of capacity market and /or payments do you consider to be most and least distortionary and most compatible with the effective competition and the functioning of the internal market, and why?

*Capacity model which remunerates indifferently all available generation capacities are not relevant, because of the risk of double incentivization on generators and also because only specific generation inadequacies need to be solved and should therefore not be the source of windfall profits.*

- b. Which models of capacity market and /or payments do you consider to be most compatible with ensuring flexibility in a low carbon electricity system?

*Market has not been able to provide the most efficient ex-ante capacity model, as experienced in other countries. Experimental model with a strong feedback regulation seems the best pragmatic approach. To address buildup of generation adequacy by real investment, duration of capacity model should be compatible at least for the minimum harmonized lifespan of all generation technologies.*

- c. Are there any models of capacity mechanism the introduction of which would be irreversible, or reversible only with great difficulty?

*First capacity models should be presented as experimental models, with predefined announcement of feedback mechanisms based on return of experience allowing flexible adjustment to the real solving of specific generation inadequacies and cost effectiveness for the financing party.*

(16) Which models of capacity mechanisms do you consider to have the least impact on costs for final consumers?

*In generation adequacy assessments, the behavior of consumers categories, according to their profile consumption is one of the key factor, especially on the peak demand issue.*

*The undifferentiated pooling of capacity mechanisms costs for all endusers is therefore not relevant with generation adequacy firstly because consumers behaviors are to be segmented in profile categories.*

*Market actors should be more specifically accountable for generation (in)adequacy, following the simple, virtuous principle of "the causer the payer": whoever energy actor is a significant causer of generation inadequacies shall contribute to most of its costs*

*With this regard to this principle, renewable energy support in a medium-term prospect may be moderated by the generation adequacy counterprovisions they imply.*

(17) To what extent do you consider capacity mechanisms could build on balancing market regimes to encourage flexibility in all its forms?

*Capacity mechanisms address generation adequacy issues which have points in common with balancing markets. Need for flexibility on demand side and generation are fundamental. We could also consider the use of merit order criteria used in balancing common merit order (downward/upward flexibility, peak demand adequacy, activation constraint, response time) as well as energy-efficiency, environment-friendliness criteria for a better definition of generation adequacy.*

*However the vision is clearly a long term prospect for capacity markets, whereas balancing markets are meant to address real-time and very short term demand-supply imbalance issues (see Question 3)*

(18) Should the Commission set out to provide the blueprint for an EU-wide capacity mechanism?

*Any guidance from the EC will be helpful especially if they are provided with a European harmonized vision of how capacity markets initiative could develop.*

*But as experienced from the past development of market directives, essential focus on cost allocation to market actors will also be provided as well as monitoring tools to correct any unexpected significant deviations from ex-ante cost-benefits analysis and market distortions.*

## **5. FRAMEWORK FOR ASSESSING CAPACITY MECHANISMS**

Potential detailed criteria to apply to capacity mechanisms

(1) The necessity for a capacity mechanisms should be clearly established in the context of:

- a. The potential of the identified needs being met in the normal operation of the internal energy market, in particular:

- increased interconnection and in particular the completion of identified projects of Common interest.
    - steps to encourage effective competition by addressing the position of dominant undertakings.
  - b. Alternative, less distortionary measures which could be taken, for example steps to improve energy efficiency or reduce electricity demand.
  - c. Removing barriers to the effective participation of demand in the electricity market.
- (2) The effectiveness of the capacity mechanism addressing the identified market failure should be demonstrated and that it is additional to what would have occurred under normal market rules.
- (3) The duration of the application of the capacity mechanism should be clearly limited and clearly specified,
- a. the impact on the market of the introduction of capacity mechanisms should not make it difficult to reverse that decision in the future.
  - b. the necessity of retaining reinstating a capacity mechanism should be subject to review.
- (4) Any capacity mechanism should be open to electricity undertakings operating in other Member States, to the extent they are able to make the electricity available in markets to which the capacity mechanism is established.
- (5) Any capacity mechanism should not act as a barrier to cross border trade or competition in the internal market by
- a. artificially altering trade flows or the location of production, in particular by:
    - restricting the ability of electricity undertakings in the Member State to sell their electricity to customers elsewhere in the internal market, (i.e. capacity physically located in a Member State should not be reserved for that Member State).
    - distorting the commercial behaviour of generators in the day ahead and intraday markets.
    - distorting investment signals in the internal market leading to inefficient locational choices.
    - distorting investment signals in the internal market leading to the displacement of new investment from one Member State to another.
  - b. distorting dynamic incentives/crowding out;
    - The incentive on consumers or generators to respond to high prices at periods of scarce capacity should not be diminished.
    - The mechanism should not undermine incentives on the electricity market to deploy new techniques for demand reduction or electricity storage and generation.
  - c. Creating market power or exclusionary practices;
    - The mechanism should not strengthen or maintain the market power of incumbent firms.
    - The mechanism should not act to maintain inefficient market structures or undertakings, acting to deter new entry.
- (6) To be non-discriminatory a capacity mechanisms should
- a. be allocated after an open competitive bidding process.
  - b. allow demand response and energy efficiency solutions to bid into capacity markets on an equal basis to generation.
- (7) Not be confined to any particular generation technology, i.e. being tech. neutral (insofar as the mechanism is directed towards security of supply concerns – this may not apply if other objectives are also being pursued).
- (8) Capacity mechanism should be at least cost:
- a. The direct costs imposed on suppliers or others electricity undertakings must be kept to the minimum necessary.
  - b. Persons providing capacity under the obligation must not be overcompensated.

- c. Any selection process in the mechanism should be conducted in a transparent, open and non-discriminatory way which is market based.
  - d. the duration of any compensation to generators under the mechanism should be clearly justified.
- (9) Costs associated with capacity mechanisms should be allocated to the beneficiaries of secure energy supply with different classes of consumers being treated in a non-discriminatory way.

**QUESTIONS:**

- (19) Do you consider that the European Commission should develop detailed criteria to assess the compatibility of capacity mechanisms with the internal energy market?

*At this early stage, and in the absence of completely convincing capacity market model, any guidance is helpful to accompany the first experimental capacity mechanisms in the internal energy market.*

- (20) Do you consider the detailed criteria set out above to be appropriate?
- a. Should any criteria be added to this list?

*Introduction of harmonized merit order criteria would put more emphasis on the ability of generation/demand side services to cope with the more specific generation adequacy issues (downward flexibility adequacy, upward flexibility upward, peak generation adequacy, congestion solving adequacy, volume activation, response time, energy efficiency, sustainable environment friendly..)*

- b. Which, if any, criteria should be given most weight?

*More weight should be given to*

- *flexible generation capacity in the long term, and especially during peak times,*
- *demand-side participation*
- *cost effectiveness of different types of capacities*
- *Cost and benefit analysis shall be conducted so as to leave room for feedback adaptation, based on return of experience, of the capacity markets while avoiding excessive market distortions.*