Brussels, September 2015

NGVA Europe response to DG ENER Consultation on an EU strategy for liquefied natural gas and gas storage

LNG

LNG in the EU today

Question 1: Do you agree with the assessment for the above regions in terms of infrastructure development challenges and needs to allow potential access for all Member States, in particular the most vulnerable ones, to LNG supplies either directly or through neighbouring countries? Do you have any analysis or view on what an optimal level/share of LNG in a region or Member State would be from a diversification / security of supply perspective? Please answer by Member state / region

NGVA Europe's answer:
NGVA Europe basically agrees with the assessment. NGVA Europe believes that all available options for ensuring energy supply security and diversification, and the recourse to environment friendly powertrains must be stimulated all over Europe, so that all countries have access to an efficient energy supply system, and a range of options as wide as possible. Europe has a wide and developed Natural Gas pipeline system, which must be taken profit of to the maximum extent. Having also in place a sound and efficient LNG system in operation across the whole Europe will offer an additional tool to improve energy supply security.
All the best options must be available to the market, which then will determine, case by case, region by region, the best combination of the different options available, based on cost/benefit assessment, or on other strategic conditions. For example, a second line of LNG supply, i.e. intermediate LNG storages closer to the application areas, would be highly beneficial to the development of the LNG pathway. It should be complementary to pipeline NG pathway, and should not be in conflict with pipeline NG, where it is already well settled. Also the interest of all the operators who have invested in the sector of pipeline NG and LNG must be taken in due consideration.

NGVA Europe in answering the consultation, is addressing in particular the scope of the Association, i.e. the use of LNG for the Transport sector. In the transport sector, LNG is applied both directly as fuel for: HD road vehicles, ships, special commercial vehicles; and is also applied indirectly as a strategic gas supply system to CNG refuelling stations, as an alternative to the pipeline system, when and where this last is not available, or inadequate, or too distant.

The gas trend projections shown in the Annex reflect the present situation of Natural Gas in the energy market. They are anyway not necessarily going to be confirmed by facts in the future. This should be also considered when setting energy strategies.

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LNG is the only viable way to deliver Natural gas on a continental basis. The number of LNG importing countries in 2014 was in excess of 30; this number has hence tripled over the last 15 years.

Question 2: Do you have any analysis (cost/benefit) that helps identify the most cost-efficient options for demand reduction or infrastructure development and use, either through better interconnections to existing LNG terminals and/or new LNG infrastructure for the most vulnerable Member States? What, in your view, are reasons, circumstances to (dis)favour new LNG investments in new locations as opposed to pipeline investments to connect existing LNG terminals to those new markets?

NGVA Europe's answer:
NGVA Europe has no cost/benefit analysis on this respect. This kind of studies are anyway useful mostly at the level of single countries, depending on the local conditions, development level of pipeline infrastructure, distance from existing LNG terminals, suitable conditions to build additional LNG infrastructures, such as LNG terminals or intermediate small scale LNG storage installations. The option of local NG liquefaction to produce and distribute LNG using domestic NG resources could also be explored, even if probably this is advisable only for very peculiar situations. LNG infrastructures are extremely cost demanding, often leading to long pay-back time, which may discourage private investors; so additional investments in this respect, and possible Government incentives, must be accurately evaluated.

Asian spot prices of Natural gas continued to slide in 2015 and reached parity with European prices for the first time in four years.

Question 3: Do you think, in addition to the already existing TEN-E Regulation, any further EU action is needed in this regard? Do you think the use of LNG gas and existing LNG infrastructure could be improved e.g. by better storage possibilities, better network cooperation of TSOs or other measures? Please give examples

NGVA Europe's answer:
In the past, LNG was traded under rather rigid and binding long-term contracts; nowadays the trades of it are more diversified and flexible. NGVA Europe believes that in principle the use of LNG and existing infrastructure could be improved anyway, by better storage possibilities, better network cooperation, longer supply lines, e.g. with intermediate storages and small scale infrastructures in the inland areas. But this must not compromise the profitability and the market conditions of the NG pipeline infrastructure where it is developed. Considering the present shrinking of the NG market, the need for additional coast LNG terminals must be accurately evaluated.

Question 4: What in your view explains the low use rates in some regions? Given uncertainties over future gas demand, how would you assess the risk of stranded assets and lock-in effects (and the risk of diverting investments from low carbon technologies such as renewables and delaying a true change in energy systems) and weigh those

against risks to gas security and resilience? What options exist in your view to reduce and/or address the risk of stranded assets?

NGVA Europe's answer:
The low use rate of LNG in some regions is due to many reasons; among them:

- Scarce information about the availability of LNG, and its offered benefit, in public opinion, but also in the industrial sector;
- Lack of research and studies to provide suitable tools to decision makers;
- Reluctance to invest of operators, because of lack of confidence in favourable fiscal policies in the future;
- Reluctance to invest of operators, because of the decreasing trend of NG demand;
- Reluctance to invest of operators, because of not complete nor harmonised standard framework for LNG infrastructure;
- Reaction to the increasing tendency of DG ENERGY policies to consider NG (pipeline and LNG) as just another fossil fuel, overlooking its potential as decarbonisation tool;

All these issues must be properly dealt with, to reduce/address the problem of stranded assets.
NGVA Europe does not fear the *"risk of diverting investments from low carbon technologies such as renewables and delaying a true change in energy systems"*. Environmental targets cannot be met with a single shot. All available low carbon technologies must be exploited, but with a ranking which reflects the actual potential and scale, further to the proper cost/benefit evaluation. At present NG (pipeline and LNG) has got the better combination between:

- Technology maturity;
- Availability of resources, and distribution in the world;
- Industrial scale effect;
- Cost/benefit ratio.

And this will be true also in future. So in the view of NGVA Europe, there is opposite the risk diverting the needed investments from NG technologies to other low carbon technologies, or other solutions which are not offering a similarly good combination of advantages.

Question 5: The Energy Union commits the EU to meeting ambitious targets on greenhouse gas emissions, renewable energy and energy efficiency, and also to reducing its dependency on imported fossil fuels and hence exposure to price spikes. Moderating energy demand and fuel-switching to low carbon sources such as renewables, particularly in the heating and cooling sector, can be highly cost-effective solutions to such challenges, and ones that Member States will wish to consider carefully alongside decisions on LNG infrastructure. In this context, do you have any evidence on the most cost-efficient balance between these different options in different areas, including over the long term (i.e. up to 2050)?

NGVA Europe's answer:
If imported fossil fuels means NG, the inherent lower carbon footprint of NG should be taken in due consideration, along with the proper evaluation of cost and prices of alternative solutions such as RES. RES often have a weak point in specific costs, and scale effect. Also their environment impact on the side of architectural and landscape affect should be taken into account, especially in the case of wind and solar power. The cost-efficient balance must be

evaluated case by case, country by country, on a market base condition, i.e. in absence of subsidies which might be altering the assessment.

Potential entry barriers for LNG

Question 6: What in your view are the most critical regulatory barriers by Member State to the optimal use of and access to LNG, and what policy options do you see to overcome those barriers? Have you encountered or are you aware of any problems in accessing existing LNG terminal infrastructure, either because of regulatory provisions or as a result of company behaviour? Please describe in detail.

NGVA Europe's answer:
From the point of view of NGVA Europe, and in respect to the LNG application sector of HD vehicles, special vehicles and marine vessels, the main barrier is the lack of harmonised standards, to which CEN, the European organisation for norms, is going to provide some partial solution, by preparing European harmonised standards for CNG and LNG refuelling stations. Also the initiatives like the Directive 2014/94 EU o the deployment of Alternative Fuels Infrastructure is heading to provide a solution to this lack of standards.
Another barrier may reside in the national regulation in some countries, prohibiting or restricting the transport of LNG on HD road vehicles on their territory, or in tunnels.
About problems of accessing LNG terminal infrastructures, there is one issue, which comes from the mere location of the terminals off shore, which imposes the recourse to additional means, such as small shuttle LNG vessels, to take LNG on the ground, as insulated submarine LNG pipes are a technical and economical challenge.

Question 7: What do you think are the most critical commercial, including territorial restrictions and financial barriers at national and regional level to the optimal use and access to LNG?

NGVA Europe's answer:
In the opinion of NGVA Europe, one of the critical commercial barriers to LNG is the distance between coastal LNG terminals and the main LNG application areas. In many cases the transport must be done on trucks, which payload is limited. This has a negative effect on the viability of this kind of market; or requires special delivery prices at the terminal delivery point. This creates the need for the availability of different transport systems, i.e. inland navigation, and railroads, as well as the relevant normative framework, and a policy to foster and promote them.
Another financial barrier is the high Capex of the LNG appliances and installations, especially on the small scale side, which is the most important for the NGV sector.

Question 8: More specifically, do you consider that ongoing EU policy initiatives and/or existing legislation can adequately tackle the outstanding issues, or there is more the EU should do?

NGVA Europe's answer:
From the point of view of NGVA Europe, some of the EU policies and initiatives in place, such as the Directive 2014/94 EU (AFID); and the offer of financial support to initiatives like the LNG Blue Corridors Project, are good steps forward. For the NGV sector, it is urgent to settle a suitable LNG refuelling stations network at European level for:

- HD vehicles;
- Special vehicles e.g. airport and port vehicles;
- Off road vehicles in general;
- Marine and inland navigation vessels.

To this aim, AFID is quite well focused, even it containing

International LNG markets

Question 9: How do you see worldwide LNG markets evolving over the next decade and what effects do you expect this to have on EU gas markets? Do you expect a shift away from oil-indexed LNG contracts, and if so under what conditions?

NGVA Europe's answer:
About 30% of the present worldwide trade of NG is via LNG. Global effecting factors will probably make this share to further increase in the future some of them are:

- New NG field discoveries,
- New LNG suppliers,
- Changes in progress on the social and political situation in Europe and other geographic areas of the world, e.g. abolition of embargo on some countries, new problems in the relations with some other,
- Higher flexibility in respect of source and destination of the commodity,
- Need for new destinations,
- Increasing urgency to take profit of "flare gas" instead of burning it,
- Increasing need for LNG application to the automotive and marine sector.

The global gas demand of Natural gas is forecast to increase at an average annual rate of 2% by 2020, with transport sector being the fastest growing end-user segment.

The development of innovative technologies and infrastructure also contributes to expanding the market; some examples:

- Unconventional gas
- Joint tender
- Panama Canal enlargement
- LNG use as fuel
- Small scale LNG plants
- Short term contracts
- Virtually free destination
- Henry Hub indexed
- Spot contracts

After three years with few new projects, a second wave of large LNG additional capacities are coming from this year (2015).

With ample supplies coming from Australia and the United States, along with weaker Asian demand, LNG will be more accessible in next five years.

NGV Europe is not in a position to appraise the trend of contract indexes.

Question 10: What problems if any do you see with the functioning of the international LNG market, particularly at times of stress? Are there specific actions the EU should take, in dialogue with our international partners, including in trade negotiations, to improve its functioning and/or to make the EU market more attractive as a destination for LNG? Could voluntary demand aggregation be helpful in some way?

NGVA Europe's answer:
In theory, a voluntary aggregation of demand would probably help, but it does not seem easy to arrange and control it in Europe. This can be in some way in conflict with the level of freedom that private companies do not want to renounce in their trade activity and relations with potential suppliers of NG and energy in general around the world. All European energy companies probably have election supply markets with which they would rather prefer to establish or keep connections, notwithstanding possible commercial strategies at European aggregated level.
So far, Europe has shown that it must still make some improvement in the general policies, which are often jeopardised by egoism of individual countries. This might play a relenting effect also on the side of energy security.
Before to start with such kind of strategy, Europe must first go back to the positive attitude it used to have towards NG in the past. A favourable strategy would put the European energy market stronger as customer on the international arena also on the side of NG and LNG.

<u>LNG technology issues including LNG use in transport</u>

Question 11: What technological developments do you anticipate over the medium term in the field of LNG and how do you see the market for LNG in transport developing? Is there a need for additional EU action in this area to reduce barriers to uptake, for example on technology or standards, including for quality and safety?

NGVA Europe's answer:
Some of the technologies in application on the transport sector which involve LNG:

- HD long haul vehicles fuelled with LNG in liquid state; they allow to take profit of the environmental and economic advantages of NG also in a kind of application for which normally CNG is not suitable, because of the large amount of energy which must be stored on the vehicle;
- HD dual fuel vehicles to operate both in short and long haul, with high flexibility on the energy supply side;

- Marine engines, in particular in ECA (emission control area); this solution provides a cost effective and environmental friendly way to ensure energy supply to an energy intensive sector;
- L-CNG; it allows to install CNG refuelling stations even in areas which are too distant from the NG pipeline, or where the pipeline is present, but does not have the suitable features in terms of service pressure and flow rate. It also allows production of CNG with a substantial saving of mechanical compression energy compared to the traditional compressor option used by the CNG stations connected to the NG pipeline.

NGVA Europe is confident in a future development of LNG and CNG in the automotive sector, due to the good combination between environmental advantages, technological maturity, abundance of resources, scale effect, and development cost, which are high, but not as the development costs of some other solutions.

Some EU actions are already in progress on the side of technology and standards for LNG applications; some of the main actions are:

- Adoption of international standards ISO FDIS 16923 CNG refuelling stations, and ISO 16924 LNG refuelling stations, as reference documents to edit equivalent European standards, in CEN/PC408/WG1 and WG 4;
- Activity going on in CEN to edit standards on the quality of NG, both fossil and renewable, i.e.:
    - CEN prEN 16726 Quality of gas – Group H,
    - CEN prEN 16723-1 Biomethane for injection in Natural Gas grids,
    - CEN prEN 16723-2 Biomethane and CNG as fuels for vehicles.

Technologies which, even if available already, might need to be further inspected/analysed and developed:

- Small scale LNG intermediate terminals;
- Small scale LNG production plants;
- LNG refuelling systems for ships and marine vessels;

The NGV sector is steadily growing worldwide. European operators of the sector of CNG and LNG vehicles anyway can still boast a technological leadership in the world. This primacy position must be kept over time, and European strategies should help this sector to still improve globally, and offer an increasingly strong support in the development of a environment friendly transport system also in the future.
This may include:

- Settle a European wide CNG and LNG refuelling station network, offering operators good reasons, e.g. financial or fiscal support to endure time, to invest in this sector.
- Good harmonised standards.
- In its predictions based on the present promising conditions and trend, NGVA Europe expects that by 2030 LNG might see a market development to cover more than 30% of the fuel requirements for HD long haul application. This can potentially increase up to 50% by 2050.

In this respect, the high commitment to the LNG technologies of the main manufacturers of HD vehicles, trucks and buses, is also to be taken in consideration. This will make LNG a true/valid competitor to diesel.

NGVA Europe considers within reach a portion of 5% of the new truck sales to consist of CNG/LNG trucks by 2020 and coming from the basis of approx. 300.000 MD/HD truck sales per year, this would mean that in total the new NG truck sales (>3.5 t) will be as follows:
1% in 2016 (3,000 units sales),
2% in 2017 (6,000 units sales),
3% in 2018 (9,000 units sales),
4% in 2019 (12,000 units sales),
5% in 2020 (15,000 units sales).

NGVA Europe believes that the sales will carry on to gradually increase and reach min. 10% by 2030. NGVA Europe hence expects a 0.5% increase per year according to the following model:
5.5% in 2021 (16,500 units sales),
6% in 2022 (18,000 units sales),
6.5 in 2023 (19,500 units sales),
7% in 2024 (21,000 units sales),
7.5% in 2025 (22,500 units sales),
8% in 2026 (24,000 units sales),
8.5% in 2027 (25,500 units sales),
9% in 2028 (27,000 units sales),
9.5% in 2029 (28,500 units sales),
10 % in 2030 (30,000 units sales).

In summary, the total sales potential of gas trucks will minimum double in 2030 versus 2020. In overall numbers, the existing Natural Gas truck market as of today is around 10,000 units (whereof approx. 1,500 are fuelled with LNG). If then summing up and adding new sales as shown above, the result would be:
Running fleet NG trucks by 2020: 55,000 units
Running fleet NG trucks by 2030: 287,500 units
These numbers combine CNG and LNG, however LNG will dominate in the time frame 2020-2030, as the vast majority of annual truck sales is long haul NG trucks (that can only be fuelled with LNG), only few distribution or NG garbage trucks (that can also be fuelled with CNG), which is the main market for Natural Gas so far. NGVA Europe estimates that the total number of LNG trucks could make up 70% of the existing truck fleet by 2030 (around 200,000 units) with a growing tendency. One truck consumes 30-40 ton of LNG per year, which means the total fuel demand is around 6-8 Mio ton of LNG.

LNG sustainability issues

Question 12: Do you think there are any sustainability issues specific to LNG that should be explored as part of this strategy? What would be the environmental costs and benefits of alternative solutions to LNG? Please provide evidence in support your views.

NGVA Europe's answer:

Some studies are already in progress or have been done on this issue, e.g. the Well To Wheels emission and energy efficiency comparison between fuels and energy sources, done by JEC and CONCAWE. Sometimes the available studies appear to us as too oriented towards specific options, or do not take a uniform approach to the different solutions and pathways under examination.
A more technology neutral approach could show different results in respect of some fuels like e.g. LNG and blends of NG.
Also the beneficial impact of renewable NG (biomethane) both as bio CNG and bio LNG should be taken in consideration more seriously. Biomethane offers lower carbon footprint. When it is produced from wastes, its carbon footprint may even be negative, i.e. this solution, besides not adding carbon to the environment, might be even seen as a means of carbon sequestration. Bio CNG and bio LNG share exactly the same infrastructure of fossil CNG and LNG. These last can be considered as part of a bridge technology to them.

STORAGE

Internal market constraints and challenges for storage

Question 13: What opportunities or challenges do the supply projections for different sources, in particular LNG and pipeline gas and low carbon indigenous sources, present for the use of gas storage / for gas storage operators?

NGVA Europe's answer:
The usual transport vehicles mission is substantially the same over the year, with little variation from winter to summer.
The applications of CNG and LNG as automotive fuels hence provide a consumption trend of NG over the year, which is stable and more constant than most of the industrial, residential, and commercial applications of NG, including power generation.
This means that the NGV sector is less dependent on the national NG storage system. The Natural gas sector can more easily predict and plan the supply of NG to this kind of application.

Question 14: Are, in your view, current market and regulatory conditions adequate to ensure that storages can fully play their role in addressing supply disruptions or other unforeseen events (e.g. extreme cold spells)?

NGVA Europe's answer:
NGVA Europe has no points to rise on this issue.

Question 15: As an alternative to mandatory reserves, how could market based instruments ensure adequate minimum reserves?

NGVA Europe's answer:
In the opinion of NGVA Europe, the underground storage of NG is energy demanding and expensive in terms of operational costs. Normally for the process anyway underground depleted gas fields are used, which are already existing, and do not have to be built on purpose. The issue of NG storage should of course be taken in due consideration for strategic reasons and for the sake of energy security, but a more flexible commercial approach on the side of the international trade of NG could offer some benefits at national level, and lessen the requirement for large storage volumes.
Unfortunately, LNG cannot offer any additional support to this aim, as the residence time of LNG in the tank is limited, even in the case of the larger tanks. It must be measured in terms of some weeks or few months; not seasons at all.

Storage Infrastructure

Question 16: Do you have any analysis or view on what an optimal level/share of storage in a Member State or region would be? What kind of initiatives, if any, do you consider necessary in terms of infrastructure development in relation to storage?

NGVA Europe's answer:
NGVA Europe cannot offer any cost/benefit analysis of this kind, as this is wide out of the scope of the Association.
As a principle, storing for months an already paid amount of energy means capital immobilisation, which is not exactly an efficient use of money. Of course it becomes viable, as well as necessary, as consequence of the long term NG purchase contracts, which are normally based on a "take or pay" criteria.

Question 17: Do you think, in addition to the existing TEN-E Regulation, any further EU action is needed in this regard?

NGVA Europe's answer:
No further action on the respect of storage is needed at European level.

Question 18: Given uncertainties over future gas demand, how would you assess the risk of stranded assets (and hence unnecessary costs), lock-in effects, the risk of diverting investments from low carbon technologies such as renewables, delaying a transition in energy systems and how would you ~~and~~ weigh those against risks to gas security and resilience? What options exist in your view to reduce the risk of stranded assets?

NGVA Europe's answer:
The value and usefulness of the NG storage system goes beyond the present situation. In the future it could be used to store also possible amounts of renewable NG coming from variable intensity production processes. Some examples are:

- Biomethane produced from desultory supply kind of biomass, e.g. waste biomass from sugar/alcohol production or other similarly seasonal agro industrial processes
- E-gas from hydrogen produced by renewable electricity, combined with CO2 from biogas upgrading or similar processes.

All these processes are not constant, and are made in variable size plants spread around over a country; so they might benefit from the use of the pipeline and storage system as a way to level the production trend.
So the present NG storage system can be seen as an investment, rather than stranded asset. The point can be different in the case of possible additional storage volumes in the present days.

Regulatory framework and potential barriers for storage

Question 19: What do you think are the most critical regulatory barriers to the optimal use of storage in a regional setting?

NGVA Europe's answer:
NGVA Europe has no points to rise in this respect.

Question 20: Do you think ongoing initiatives and existing legislation can tackle the remaining outstanding issues or is there more the EU could do? Do initiatives need to include additional issues further to the ones described here?

NGVA Europe's answer:
As far as NGVA Europe can judge, there is no need for further EU level legislation.

Question 21: Do you consider EU-level rules necessary to define specific tariff regimes for storage only or should such assessment be made rather on a national level in view of available measures able to meet the objective of secure gas supply?

NGVA Europe's answer:
NGVA Europe has no points to rise in this respect.

Question 22: Have you ever encountered, or are you aware of, difficulties in accessing storage facilities? Has this concerned off-site or on-site storage facilities? Please describe the nature of the difficulties in detail.

NGVA Europe's answer:
Nothing to point out on this issue.

Question 23: Have you ever encountered, or are you aware of, difficulties related to feeding LNG gas from the storage site back into the gas network? If so please describe the nature of these difficulties (regulatory provisions, company behaviour, technical problems) in detail.

NGVA Europe's answer:
Nothing to point out on this issue.

NGVA Europe… for sustainable mobility

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