



EREGG evaluation of the European Ten Year  
Network Development Plan 2010-2019  
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## INFORMATION PAGE

### Abstract

This document E10-GIF-01-04 is an ERGEG document on evaluation of the European Ten Year Network Development Plan 2010-2019 published by ENTSOG in December 2009.

The purpose of this ERGEG document is to elaborate an analysis of the first TYNDP in order to assess whether it effectively contributes to non-discrimination, effective competition, and the efficient functioning of the market and a sufficient level of cross-border interconnection open to third-party access.

### Target Audience

Energy suppliers, traders, gas/electricity customers, gas/electricity industry, consumer representative groups, network operators, Member States, academics and other interested parties.

If you have any queries relating to this paper please contact:

Mrs. Fay Geitona

Tel. +32 (0)2 788 73 32

Email: [fay.geitona@ceer.eu](mailto:fay.geitona@ceer.eu)

### Related Documents

#### CEER/ERGEG documents

- Final ERGEG Recommendations on 10-year network development plan, 13 July 2010. Ref. E10-GIF-01-03, 13 July 2010
- ERGEG recommendations on the 10-year network development plan - Evaluation of responses, 11 November 2009, E09-GNM-10-08
- ERGEG recommendations on the 10-year gas network development plan, 11 March 2009, E08-GNM-04-03

#### External documents

- ENTSOG European Ten Year Network Development Plan 2010-2019, 23 December 2009, Ref. 09ENTSOG-02

- European Capacity Development Report, November 2008, Ref: 08GTE+298
- GTE+ Demand Scenarios vs Capacity Report, 31 July 2009, Ref: 09GTE+14
- Model-based Analysis of Infrastructure Projects and Market Integration in Europe with Special Focus on Security of Supply Scenarios, EWI, Final Report, 9 August 2010  
[http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/EER\\_PUBLICATIONS/CEER\\_ERGEG\\_PAPERS/Gas/2010/EWI\\_Study\\_17062010.pdf](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_ERGEG_PAPERS/Gas/2010/EWI_Study_17062010.pdf)
- Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators
- Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005
- Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC

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## 1. Introduction

The Directive 2009/73/EC concerning common rules for the internal market in natural gas, the Regulation (EC) No 715/2009 on conditions for access to the natural gas transmission networks and the Regulation (EC) No 713/2009 establishing an Agency for the Cooperation of Energy Regulators (ACER) provide for the elaboration of a Community wide ten-year network development plan (TYNDP) by the European Network of Transmission System Operators for Gas (ENTSOG). Article 8 of Regulation (EC) No 715/2009 states that this plan shall be non binding and published every two years.

According to the Regulation (EC) No 715/2009, ACER has to verify that the Community-wide TYNDP is consistent with national network development plans (Article 8) and shall recommend amending national ten-year network development plans or the ENTSOG TYNDP as appropriate. ACER also has to provide a “duly reasoned opinion as well as recommendations to ENTSOG and to the Commission where it considers that the (...) draft TYNDP submitted by ENTSOG does not contribute to non-discrimination, effective competition, the efficient functioning of the market or a sufficient level of cross-border interconnection open to third party access” (Article 9).

The purpose of the present ERGEG document is to elaborate an analysis of the first TYNDP published by ENTSOG in December 2009 in order to assess whether it effectively contributes to non-discrimination, effective competition, and the efficient functioning of the market and a sufficient level of cross-border interconnection open to third-party access. It is largely based on prior ERGEG work, namely the final ERGEG recommendations on the TYNDP<sup>1</sup> published in July 2010 and the study “Model-based Analysis of Infrastructure Projects and Market Integration in Europe with Special Focus on Security of Supply”<sup>2</sup> elaborated by EWI.

This document represents a first evaluation aimed at preparing the future task of ACER. ERGEG acknowledges in particular that its final recommendations were published after the publication of the first TYNDP; (compliance) analysis therefore only aims at proposing improvements for the future. In 2010, ENTSOG is working on an update of the TYNDP, focussing especially on the improvement of the modelling and scenarios part of the plan.

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<sup>1</sup> Ref: E10-GIF-01-03

<sup>2</sup> [http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/EER\\_PUBLICATIONS/CEER\\_ERGEG\\_PAPERS/Gas](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_ERGEG_PAPERS/Gas)

## 2. Structure and content of ENTSOG's 1st TYNDP

The TYNDP should deliver a European TSOs' perspective on the potential development of demand, supply and transport capacity. Each TSO had been individually polled by GTE+. The TYNDP was based on the responses of 58 TSOs (or ministries in some cases) from 33 European countries.

GTE+ followed a three step process when elaborating the TYNDP. In the first phase, it European Capacity Development Report<sup>3</sup>, describing the existing and foreseen capacity at relevant interconnection points from 2008 to 2017. In the second phase, ENTSOG<sup>4</sup> developed demand scenarios based on a stakeholder survey, and published an analysis of demand compared with the capacity report. This was the GTE+ Demand Scenarios vs Capacity Report<sup>5</sup>. The final step consisted in completing the process by adding information on supply; ENTSOG published the First European Ten-Year Network Development Plan 2010-2019 on 23 December 2009.

### 2.1 Main findings of the TYNDP

The conclusions from ENTSOG's first TYNDP are rather general in terms of specific network investment needs (which can be interpreted as the essential nature of a TYNDP). This is because the results are only available at an aggregated and broad regional level<sup>6</sup> and the identification of specific physical bottlenecks (e.g. location / certain interconnections) is not possible. Instead, ENTSOG provides a "communication tool" or status report, underlining ENTSOG's intention not to interfere in any investment decision making process.

### EREGG comment

EREGG considers that the approach taken by ENTSOG results in insufficient information to the market on existing physical bottlenecks and on infrastructure investments that may be necessary (on a project or pipeline basis or at least at concrete cross border level). In addition - even though ENTSOG's comparison of its prognoses (based on aggregated capacities by TSOs) with the (gas volume) forecasts of other recognised institutions validated the results - EREGG finds it potentially problematic to equalise these two categories. Capacities are infrastructure based, but the equivalent gas volumes are not necessarily available to the market.

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<sup>3</sup> Published in November 2008 Ref: 08GTE+298

<sup>4</sup> ENTSOG was created on December 1, 2009; it succeeded GTE+ which hosted most of the elaboration process of the first TYNDP.

<sup>5</sup> Published on 31 July 2009, Ref: 09GTE+14

<sup>6</sup> Furthermore, the derivation and clear division of the identified regions are not reproducible.

In general, the first TYNDP is rather a report than a plan for the development of the European gas transmission network. The main result of the report – that the calculated peak-day and annual demand are being met - was derived from the capacity analysis at European / regional level only. It should be the goal to identify possible physical congestion at cross-border level.

## 2.2 Supply, demand and capacity analysis

ENTSOG's analysis of supply, demand and capacity developments from 2010 to 2019 includes peak day and annual scenarios; it also includes a comparison with alternative scenarios published by other organisations (IEA, European Commission, etc.).

According to ENTSOG's peak-day demand analysis, in terms of capacity the TYNDP concludes that during the next decade there will always be sufficient supply to satisfy peak-day demand. This is possible under the assumption that, in total, not only the sum of all indigenous production, LNG, and storage capacity is sufficient to satisfy the aggregated peak-day demand, but that there are also equivalent gas volumes readily available.

Looking at the annual demand scenarios (ENTSOG demand), the TYNDP concludes that with respect to infrastructure, capacity will be sufficient until 2019, if all FID projects are realised. The annual potential supply scenario was split by potential supplies from existing and FID infrastructure and potential supplies from mature projects. This was compared with the annual demand scenario with the addition of 5 pipeline import projects (Galsi, ITGI, Nabucco, South Stream and White Stream). Further "mature projects" or prominent ones such as Nabucco would increase the "safety margin" in terms of capacity.

ENTSOG compared also its forecasts on EU indigenous production, the Russian pipeline import capacity, the Norwegian production and the North African production with the forecasts of the International Energy Agency (IEA), the Russian Energy Ministry and the Norwegian Petroleum Directorate. Concerning demand, the yearly aggregated demand scenarios for the EU27 was compared to EU demand scenarios of the EU Commission (PRIMES), Cedigaz, Eurogas and the IEA. The ENTSOG annual demand scenario is amongst the higher scenarios, with Cedigaz and Eurogas.

Regarding congestion in the network, the report identifies several regions (aggregated capacities) of different sizes where demand potentially exceeds transport capacity:

- region Denmark/Sweden (from 2014 onwards)
- region AT, GER, B, CZ, F, IRL, IT, LUX; NL; SUI, UK (2018-2019)
- region HU<sup>7</sup>, MAC, SERB, SLO.

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<sup>7</sup> Comment of the Hungarian Energy Office (HEO): Considering the significantly reduced (by 30%) demand scenario figures submitted by the Hungarian TSO to the HEO in May 2010, existing pipeline entry capacities seem sufficient in Hungary for the whole time period.

At the same time, there are some excess capacities in other countries that could increase security of supply in the above mentioned countries as soon as investments in interconnection capacities (e.g. “reverse flows”) are realised.

## **EREG comments and proposals**

The first TYNDP focuses on the existing and expected infrastructure enhancements from 2010-2019 and creates a profound database for all interested market parties on existing infrastructure and projects, where the Final Investment Decision (FID) has already been taken.

The first TYNDP represents a detailed database on the European gas infrastructure, even if it still lacks homogeneity in terms of details per country. It combines peak day and annual analyses, which enables to estimate two important dimensions of the European gas system in a reference situation elaborated by ENTSG.

EREG welcomes the first TYNDP, and acknowledges the complexity and difficulties arising when preparing such a plan for the first time. EREG agrees that this is a learning-by-doing process. However, EREG expects improvements regarding the analysis provided and the content of the TYNDP. First, the TYNDP shall investigate market integration, namely identify where the European system lacks capacity - identify physical bottlenecks - in order to achieve the internal gas market. Second, the security of supply dimension should be studied further by testing the resilience of the system over longer periods of exceptionally high demand as stated in the security of supply regulation, for instance. Third, scenario comparisons should include simulations of the behaviour of the EU gas infrastructure.

Concerning the presentation of the results, next versions should include clear descriptions of where the identified physical bottlenecks are located (e.g. depicted on maps) under different scenarios, and consistent national descriptions. In particular, potential capacity gaps shall be easily identifiable in the report. In addition, an analysis including the assumptions used should be included in order to provide a clear diagnosis on the future gas balances in Europe.

### **2.3 Role of stakeholders and market consultation**

As required by the 3rd Package, ENTSG conducted an extensive consultation process from the early stages of the development of its first TYNDP. This involved all relevant market participants. Starting in 2008, several bilateral meetings and workshops, including some coordinated with EREG, took place. Stakeholders had the opportunity to express their views. Discussions highlighted that expectations were high from stakeholders, the Commission as well as Member States and regulators. They showed that developing contributions from stakeholders on data collection could provide an important added value, notably about data which is not directly accessible to TSOs.

For its first TYNDP, ENTSG collected the data on pipeline import capacity, LNG entry and send-out capacity, production and storage deliverability from TSOs or national



ministries. However, sponsors of relevant infrastructure projects were not involved. Furthermore, the data on domestic European production was not provided by producers<sup>8</sup>. ENTSSOG also lacked data on the development of gas production and adjacent infrastructures outside the EU.

### **ERGEG recommendations**

ERGEG appreciates the approach ENTSSOG used to involve stakeholders through several workshops and bilateral meetings.

Even though ENTSSOG is responsible for the elaboration of the TYNDP, the inputs of several actors are necessary to provide a reliable picture of the European infrastructure development needs. Harmonising data collected and completing the missing elements is an important improvement to be expected in next TYNDPs. These elements concern European countries as well as non-EU producers and up-stream infrastructure operators.

In addition to TSOs' contributions, ERGEG recommends that LNG system operators, storage system operators, distribution system operators, supply undertakings, traders and producers contribute to ENTSSOG's work (upon written request).

A continuous and structured framework should be elaborated to ensure a proper consultation procedure. This approach would enable completing the TYNDP with all the necessary data and would help in homogenising the assumptions. This will also be particularly important for common work on network modelling.

### **3. Methodology analysis**

In this section, ERGEG analyses the compliance of the first TYNDP with the recommendations published in March 2009<sup>9</sup>. The elaboration of the first TYNDP represented an important challenge for ENTSSOG and was particularly instructive for all actors involved. It was based on a regular dialogue with stakeholders, through the organisation of workshops and bilateral meetings.

Nevertheless, ERGEG's expectations are more ambitious than the first TYNDP, especially regarding the quality of data, the harmonisation of assumptions and the analysis of the EU gas system's behaviour.

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<sup>8</sup> Sponsors will probably be more involved in the second 10 YNDP as ENTSSOG has published a questionnaire addressed to all non-ENTSSOG members that are sponsors of a gas infrastructure project and "believe their project should be included in the TYNDP 2011-2020" in July 2010. ENTSSOG requested some general information on the project, with technical details and time schedule.

<sup>9</sup> ERGEG submitted a first version of the "Recommendations on the 10-year network development plan" in March 2009 for a public consultation. The final recommendations were published in July 2010.

### **3.1 Data collection and assumptions: the need for top-down supervision**

This first TYNDP was mainly built on a so-called “bottom-up approach”, using an aggregation of national data collected from TSOs or ministries. This resulted in the description of the system being excessively heterogeneous and in a lack of transparency regarding the assumptions taken, which makes comparisons and analyses cumbersome.

ENTSOG compiled data from TSOs using publications provided at a national level. Significant differences were highlighted in the ENTSOG TYNDP in terms of type of publication (mandatory or voluntary), period coverage (3, 5, 7, 8 or 10 years), contents (capacity, demand and supply), frequency of publication and the organisation responsible for producing the report.

#### **EREGG proposals**

A top-down approach appears to be a necessary complement to the current approach in order to ensure an appropriate level of homogeneity and harmonisation of assumptions and definitions. ERGEG recommends ENTSOG provide guidance to TSOs in order to elaborate a coherent and consistent structure in their national TYNDP. ENTSOG should also provide recommendations to adjacent TSOs to ensure that they consistently address common cross-border infrastructure projects. ERGEG thus recommends a transparent top down process making it possible for ACER to monitor the plan and check its consistency with national and regional investment plans, as required by the 3rd Package.

#### **Harmonisation of assumptions**

ENTSOG considered several assumptions when elaborating the TYNDP notably based on questionnaires to national TSOs for demand and supply. Theoretically, each TSO can have its own assumptions on economic growth or other parameters directly affecting development of gas consumption. National data were simply aggregated, which thus questions the consistency of this approach with a “truly” European-wide perspective. In the same manner, ENTSOG did not elaborate a top-down harmonisation of peak day assumptions when preparing the scenarios.

Concerning the evaluation of physical congestion, the TYNDP is based on average annual load factors for pipelines and LNG terminals (conversion from daily to annual load factor). However, ENTSOG did not justify these assumptions. In addition, ENTSOG distinguished FID and “mature” projects without providing a clear definition of “maturity”. TSOs were not required to justify why projects were classified in this category.

#### **Security of supply**

Security of supply is an important dimension of the TYNDP. It covers different aspects, including simulations of disruptions, infrastructure developments in relation with security of supply legal provisions and priority infrastructures. The Regulation (EC) n°715/2009 states that the TYNDP shall “take into account (...), if appropriate, aspects of network planning,

including the guidelines for trans-European energy networks in accordance with Decision No 1364/2006/EC of the European Parliament and of the Council”.

### **EREGG comments**

ENTSOG mentioned the TEN-E projects, the EEP and the GTE+ reverse flow study which provide valuable inputs to the TYNDP. However, ENTSOG did not explain how these projects were taken into account. ERGEG considers that the TYNDP lacks a top down approach applied to infrastructure developments for security of supply purposes, notably when assessing the maturity and feasibility of the investment projects.

### **3.2 Scenario development and network simulation**

ENTSOG's supply projections are lower than the ones from the IEA or the European Commission. On the demand side, ENTSOG's demand projections are higher than the ones developed in the Commission's PRIMES baseline scenario. These relatively low supplies combined with high demand can be considered as a careful analysis with respect to infrastructure sufficiency. Nevertheless, this approach does not allow for a more sensitive scenario analysis with variable demand/supply assumptions and the analysis of the impact on the European gas infrastructure and security of supply in general.

In addition, the comparison of ENTSOG scenarios with scenarios of other organisations should be explored more deeply, notably by analysing their stakes in terms of congestions and security of supply. Analysing different infrastructure scenarios would be worthwhile to compare and evaluate different - potentially competing - infrastructure projects (such as the different projects of the Southern Corridor) and their impact on the existing system. ENTSOG did not elaborate such an analysis.

### **EREGG proposals**

EREGG would like to refer to its recommendations on the TYNDP and invites ENTSOG to take the given recommendations on board for the development of the 2<sup>nd</sup> TYNDP.

A more sophisticated EU infrastructure modelling would be welcomed to enhance the top-down perspective on necessary European infrastructure development. It would also enable the analysis of the interdependencies of gas flows within Europe and facilitate the identification of potential physical bottlenecks. The applied ENTSOG model does not sufficiently address such requirements and does not deliver concrete structural bottlenecks that can be geographically located or isolated. Furthermore, the current model does not include security of supply scenarios and does not evaluate the potential impact in terms of customer cut offs.

### **3.3 Monitoring chapter**

In Chapter 7, ENTSOG has mentioned the contributions of Member States missing in the Capacity Development Report and in the Demand Scenarios vs. Capacity Report as well

as some amendments or revisions of capacity developments. ERGEG welcomes this initiative to include a chapter on changes in relation to the previous reports leading to the TYNDP, which constitutes a first step towards a monitoring chapter, as recommended by ERGEG.

#### **4. Modelling and analysis of the functioning of the EU system Comparison of main results: ENTSOGs TYNDP vs. EWI - study<sup>10</sup>**

With regard to the modelling of the EU network, the aim is to develop a European perspective (top-down approach) on infrastructure needs in the coming decade, taking the need for integration of national markets and the European strategy into account (i.e. Priority Interconnection Plan/TEN-E). Furthermore, the scenario-based modelling task should help to identify possible bottlenecks within the EU-27 and at its borders and to help analyse the potential effects of possible supply disruptions of major sources (various security of supply “crisis” scenarios).

ERGEG commissioned the consultant EWI<sup>11</sup> to elaborate a study on a “Model-based Analysis of Infrastructure Projects and Market Integration in Europe with Special Focus on Security of Supply”<sup>12</sup>. As the TYNDP shall include the modelling of the integrated network in different scenarios (in addition to a European supply adequacy outlook and an assessment of the resilience of the system), ERGEG initiated this modelling analysis in order to gain a better understanding of the European infrastructure and to provide a basis for the discussion of the impact of selected major infrastructure projects on (cross-border) gas flows, physical market integration (i.e. bottlenecks) and the potential security of supply stress scenarios. This study has to be seen as a complementary approach to GTE+/ENTSOG’s early work on modelling that should help ACER in evaluating ENTSOG’s TYNDP.

The EWI-study broadly confirms ENTSOG’s findings of its 1st TYNDP, supporting the interpretation, that the EU gas grid (in terms of technical security of supply) is and will be sufficiently well developed assuming that all new included projects (“final investment decision already taken”) will indeed come online and that there is an optimal/efficient functioning of the market and use of existing network (i.e. efficient CAM & CMP are implemented and all efficient swaps are realised).

In terms of concrete results, both EWI as well as ENTSOG found sufficient capacities to cover demand (incl. peak day demand) in all European countries, except for Denmark and Sweden, Slovenia, Hungary<sup>6</sup>, Bosnia-Herzegovina, Macedonia and Serbia. In addition, the

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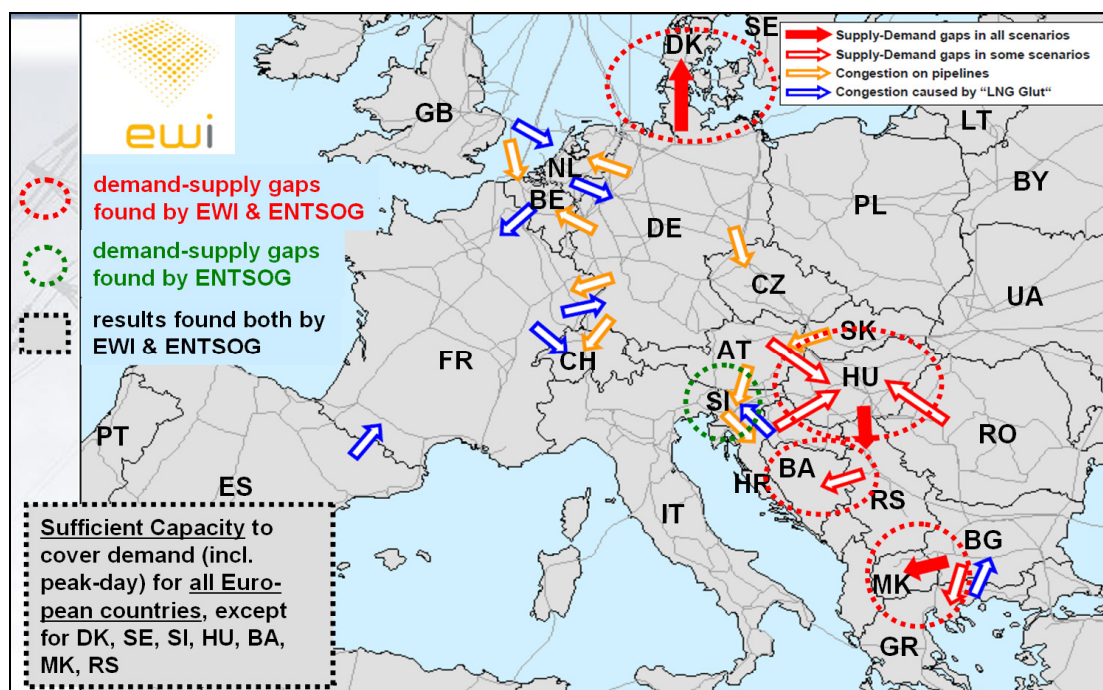
<sup>10</sup> Model-based Analysis of Infrastructure Projects and Market Integration in Europe with Special Focus on Security of supply Scenarios. EWI, Final Report 2010-08-09  
[http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/EER\\_PUBLICATIONS/CEER\\_ERGEG\\_PAPERS/Gas/2010/EWI\\_Study\\_17062010.pdf](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_ERGEG_PAPERS/Gas/2010/EWI_Study_17062010.pdf)

<sup>11</sup> Energiewirtschaftliches Institut an der Universität zu Köln

<sup>12</sup> [http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/EER\\_PUBLICATIONS/CEER\\_ERGEG\\_PAPERS/Gas](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_ERGEG_PAPERS/Gas)

model-based scenario analysed by EWI also allows for the conclusion that the necessary gas volumes in all considered scenarios (with different demand projections and on the peak demand day) are there to fill the capacities with natural gas.<sup>13</sup> As illustrated in the figure below (red circles vs. red arrows), five of six demand-capacity gaps identified by ENTSG are also replicated by the EWI study. The demand-supply gap in Slovenia which was found by ENTSG was not detected by the EWI study. This is probably due to differing assumptions on LNG supplies from neighbouring Croatia.<sup>14</sup>



When applying the TIGER model and following the volume based approach (in addition to the capacity analysis), the study allows for identification (and differentiation from supply-demand gaps leading to severe security of supply issues) of congestion on pipeline routes (congestion which is not so severe as to cause demand disruption, but limit market integration - “economic bottlenecks”), as depicted in the following figure<sup>15</sup>.



<sup>13</sup> One exception was found for Greece, when taking into account availability of gas volumes next to capacities: “Even though sufficient import capacity exists, high demand in Turkey might in some scenarios lead to a reduction in Turkey-to-Greece gas flows causing a supply-demand gap in Greece when demand in Greece is also very high (peak demand day). While this may be only relevant in the extreme case of very high demand in both countries, it illustrates the importance of considering both capacities and volumes.”<sup>6</sup>

<sup>14</sup> The EWI study includes the Krk LNG terminal which allows supplies from Croatia to Slovenia, whereas Croatia is not explicitly considered in ENTSGs 10YNDP.

<sup>15</sup> This figure represents a simplification and aggregation of the bottlenecks for illustrative purposes. The scenario specific results are to be found in Table 4 (page 66) in Section 8.2. of the EWI report.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Existent or expected physical bottlenecks                                                                                                                                                                                                                                                                                                                                                                                                                                                             | “weak” market integration links, “economic bottlenecks”                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <ul style="list-style-type: none"> <li>- <b>decreasing domestic production</b> (e.g. in DK / S) → strong need for new cross-border capacity DE → DK</li> <li>- <b>missing links in SE-EU</b> for sufficient supplies during <b>winter months</b> (mainly HU &amp; Balkans, somewhat eased with Nabucco or South Stream online)</li> <li>- <b>resultant investments</b> induced by new major infrastructures (NordStream/NEL)</li> <li>- <b>preventive measure against crises</b> reverse flow projects mainly for Eastern EU countries in case of Russian supply disruption</li> </ul> | <p>For Western-EU, a <b>potential need</b> for capacity increases to improve <b>market integration</b> has been identified at several borders:</p> <ul style="list-style-type: none"> <li>- UK→BE, DE→FR, DE→NL, DE→BE <b>on peak demand days</b> only</li> <li>- AT→SI, SI→HR depending on LNG prices and time of the year</li> <li>- DE→CH, DE→CZ, SK→AT</li> </ul> <p>Such congestions are to be analysed on a <b>case-by-case basis</b> and might be solved w/o physical capacity increases.</p> <p>There are some general <b>West-to-East</b> bottlenecks in the <b>LNG “glut” scenario</b>.</p> |

Apart from two additional stress scenarios (4 weeks of transit disruptions via Ukraine and 4 weeks of import disruptions from Algeria), the EWI study differs from ENTSOG’s work in another respect: The variation of infrastructure assumptions between scenarios leads to different potential demand-supply gaps, since they depend on which (major) infrastructure projects are realised. It has been found by EWI that in south-eastern Europe, demand-supply gaps are either reduced or eliminated if one of the major new import pipelines in the region is being built. This is valid for Greece, Hungary, Bosnia and Herzegovina and Serbia.

Further value is added to the EWI analyses by actually presenting the results (e.g. flows) on maps, compared to (national balanced) capacity considerations and (highly aggregated) diagrams by ENTSOG’s 1<sup>st</sup> TYNDP.

The TIGER model’s economic approach, its resolution and satisfactory resemblance of real flows (2008 validation) turned out to be eligible and sufficient for a first-time analysis of infrastructure and gas flow development in the EU and of ENTSOG’s 1<sup>st</sup> TYNDP, although some contract-induced gas flows (or even further pipeline-operational issues necessary for a technical simulation) cannot always be replicated.

## 5. Conclusions & Way Forward

ERGEG welcomes ENTSOG's previous and ongoing efforts towards an EU-wide TYNDP during the interim period, before the 3rd Package becomes applicable. ERGEG acknowledges the difficulties arising and the inherent complexity of developing a TYNDP for the first time. This is clearly a learning-by-doing process. However, ERGEG invites ENTSOG to consider ERGEG's recommendations for TYNDP when further developing the TYNDP.

ENTSOG's first TYNDP can be regarded as a wide-ranging documentation ("communication tool") on existing infrastructure (pipelines, LNG terminals, gas storages), "firm" infrastructure projects, production deliverability and import capacities. Confronting those with an annual and a peak day demand scenario allows for some broad conclusions on the adequacy level of capacities.

The methodology followed by ENTSOG essentially corresponded to a bottom-up approach. ERGEG recommends combining this approach with a "top-down" model-based scenario analysis in order to increase validity and to meet stakeholders' expectations and to fulfil the legal obligations. Addressing European security of supply issues (resilience of the system) and their potential consequences on EU gas infrastructure in different scenarios would add value to the TYNDP as well. Furthermore, ENTSOG should recognize the importance of what is happening at the European borders, e.g. up-stream investments might have significant impact on the European gas transmission network.

The implementation and application of an infrastructure-based model for the development of the next TYNDP seems essential for the identification or indication of concrete existing and potential infrastructure bottlenecks that can be illustrated and pinpointed on e.g. a map and translated into specific projects.

Even though both ENTSOG and EWI generally report that the EU gas grid (in terms of technical security of supply) is and will be sufficiently well developed under the assumptions taken, some capacity increases have to be realised (e.g. resulting from decreasing domestic production, missing links or measures against supply disruptions). This is true under the assumption that gas flows are not hampered by inefficient capacity allocation / congestion management.

ENTSOG is already working to improve their European analysis model in 2010. The constructive dialogue with stakeholders – which took place in the past - should be continued. Not only the Madrid Forum qualified as a good platform, but also the established links of working groups of European regulators and ENTSOG. Regulators are looking forward to further fruitful cooperation with ENTSOG on that matter.