Global property research
Solutions for customized property indices

WHITE PAPER

OCTOBER 2017

EUROPEAN LISTED INFRASTRUCTURE

Understanding the pure infrastructure industry

TOPICS

Historical overview

Infrastructure assets in Europe

- Electricity & Gas: unbundling
- Telecommunication: tower companies

Expected developments

- Electricity Transmission: building a network
- Pipelines & Storage: growing demand
- Communication towers: independent companies
- Satellite: the sky is not the limit

To fully understand the European infrastructure market it is crucial to understand the influence the European Union (EU) had in the past and will have in the future. All pure infrastructure* sectors are either directly or indirectly impacted by the rules and regulations as imposed by the European Commission (EC).

Through unbundling — to prevent vertical integration — there was a push towards pure infrastructure. That, combined with the desire of the EU to create a fully integrated market, makes vast investments in the European infrastructure market imminent. A large part of the funding for these projects must come from private investments, of which listed vehicles will see a growing demand.

While it is still a long way to the envisioned fully integrated European market, the European infrastructure market has seen dramatic changes. In this paper these changes will be further explained and put into context. Furthermore, future goals and expected developments — as set forward by the EU member states — will be stipulated.

** The definition of pure infrastructure as used by GPR is further explained in the White Paper published October 2016 titled Global Listed Infrastructure—understanding the pure infrastructure industry*

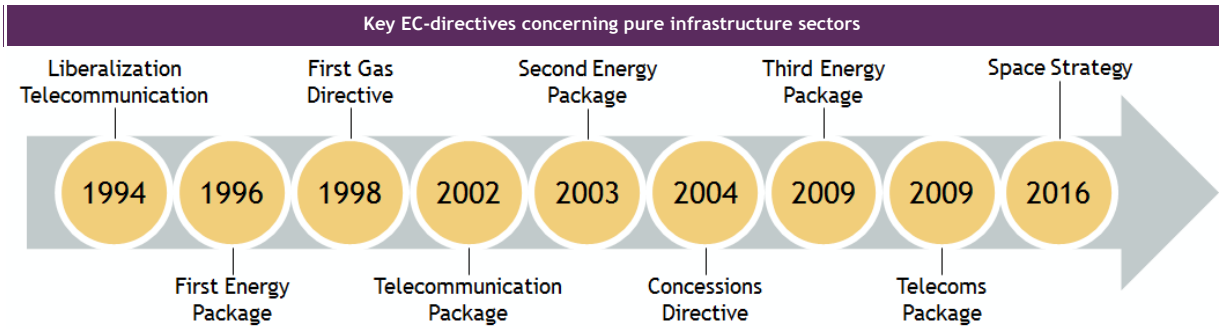
Infrastructure assets in Europe

The European Commission (EC) - as the executive body of the European Union (EU) - supports the creation of integrated European markets. One of the EC's focal objectives is the promotion of efficiency and competition within the EU market via active regulation of companies' anti-competitive conduct. This is achieved by preventing the emergence of monopolies or cartels that have the capacity to damage societal interest. In particular, this aspect of the EC's function bears most importance during the emergence of newly competitive markets that materialize through liberalization. During the early 1990s, the EU decided to engage transformative policies stimulating conversion from a monopolistic to a competitive market framework, thus supporting the functioning of the European market through continuous and efficient networks. Through the process of liberalization, European countries opened up their national industries to all member states. The process of heightening the efficiency of the, formerly state-owned, natural monopolies in the infrastructure markets was facilitated by :

- Opening up markets for competition;
- Unbundling non-competitive transmission assets;
- Introducing non-discrimination access;
- Stimulating cooperation of member states and operators;
- Foundation of European bodies focusing on a coordinated development.

The intention of unbundling non-competitive network operations from the generation and supply business was intended to ensure that the European markets do not fall victim to vertical integration, whilst guaranteeing efficient access to the essential infrastructures[1]. As identified by the EC, vertically integrated incumbents could abuse their monopolies over the transmission networks in order to stifle the emergence of competition in the supply business.

This White Paper reviews the impact of EC policies on the 'pure' infrastructure sectors as defined by GPR. The timeline below highlights several of the EC's directives that were introduced in order to increase efficiency and non-discriminatory competition.



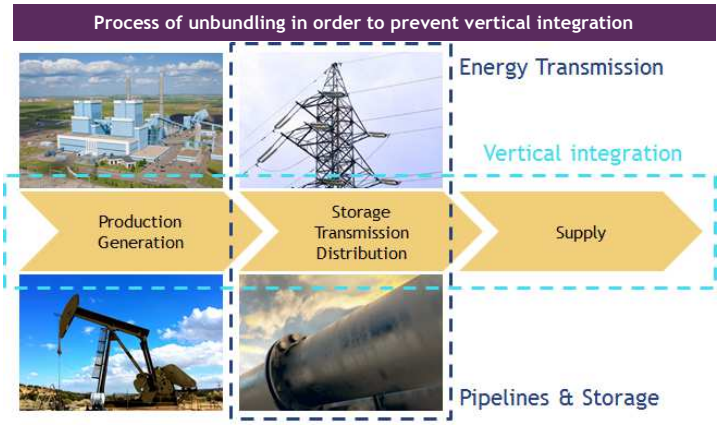
Although the transport sector (i.e. Airports, Ports and Toll Roads) has seen no significant reformations, the sector's assets - like other infrastructure assets - are operated through concessions with national governments. Each member state has its' own independent national regulatory authority, obligated by the EU, responsible for regulating and supervising public infrastructure concessions.

The EC secures competition and efficiency by requiring transparency, fairness and legal certainty guaranteed by the award of concessions[2]. National Regulatory Authorities (NRAs) must comply with notice of concession, deadline for bids, announce awarded concession and other specific preconditions. The EC stimulates the cooperation of member states, NRAs and both regional and European level operators in order to integrate different national markets into an internal EU market. This paper refrains from discussing details of concession. Rather, the focus is on the main reformations made by the EC as a mechanism to promote competition and efficiency, and the resulting impact on the 'pure' infrastructure sectors.

Electricity & Gas: unbundling

Preceding the 1990s, electricity and gas markets were dominated by national state-owned monopolies. However, the 1990s political agenda encompassed liberalization initiatives stimulating a restructuring of the gas and electricity sector. The EC complimented these initiatives with energy packages in 1998, 2003 and 2009 - further reforming electricity and gas markets. The reformations were characterized by a change of monopolistic infrastructure utilities and the introduction of regulatory frameworks with the establishment of independent regulators to enable competition and efficiency.

As aforementioned, the EC focused on the change of monopolistic parts in order to prevent vertical integration. A clear distinction was made between competitive and non-competitive parts of the industry, subsequently permitting the operators of non-competitive parts to allow third parties access to the infrastructure[3]. 2009 saw the Third Energy package proclaim ownership unbundling[4], stipulating the separation of companies' generation and sale operations from their transmission networks. Consequently, independent transmission operators were formed as companies with three key aims: (i) owning and, in most cases, operating the grid; (ii) balancing the system; and (iii) facilitating the market. Independent transmission operators offer the same service to different users under identical contractual conditions. They are considered as pure infrastructure assets, resulting in two subsectors; electricity transmission sector and the pipeline and storage sector.



In 2009, the EC founded the Agency for the Cooperation of Energy Regulators (ACER), which provided both a framework at EU level for national regulators to cooperate and offered regulatory certainty[5]. In turn, the European Network of Transmission System Operators for Gas (ENTSO-G) and the European Network of Transmission System Operators for Electricity (ENTSO-E) were founded in order to help achieve the objectives of ACER, alongside coordinating cooperation of independent transmission operators and the development of a single internal European energy network.

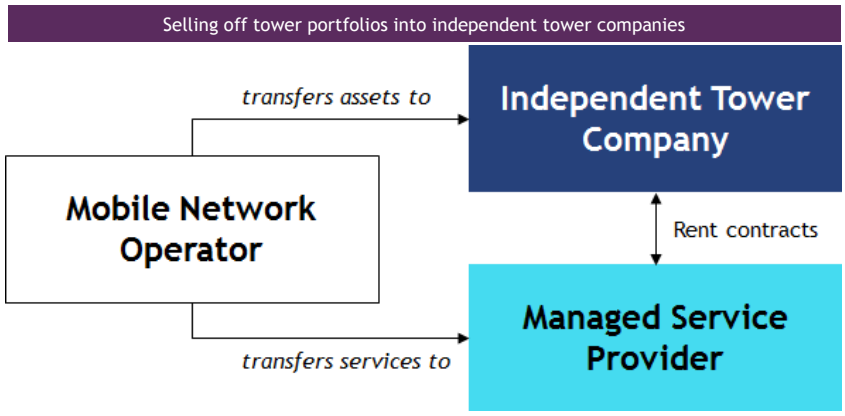
Telecommunication: tower companies

The early 1990s EC market liberalization saw further initiatives directed into the telecommunications market. The EC's desire to open up and restructure the telecommunications market materialized through the promotion of market structures enabling the exploitation of substantial demand and innovation potentials in the industry. It was in 1994 that the EC pushed for full liberalization of telecommunications infrastructure and services[6]. Consequently, came the emergence of the independent Mobile Network Operators (MNO).

Both the 2002 and 2009 Telecom Package's focused solely on providers of telecommunication services[7]. The package details required these providers to offer conditional access on fair, reasonable and non-discriminatory terms, in order to ensure the availability of a wide variety of programming and services. The 2002 Telecoms Package became embroiled in political controversy that included disputes over the provision of access to infrastructure by dominant broadband providers. The EC set out a number of principles and objectives for access to telecommunication infrastructure. NRAs are required to guarantee efficient allocation of resources, technical efficiency, innovative efficiency and competition within the telecommunications market. As some of these goals potentially conflict with each other, the regulator must balance the objectives.

It was anticipated that competition increases innovative activity. However, technical inefficiencies can arise if the infrastructure investment is not sustainable. More specifically, inefficiencies occur when the investment becomes unprofitable once factors favoring the investment - price distortions or cost advantages - have been phased out. NRAs promote market structures that ensure services are available in the geographical markets in which they are demanded. In particular, the availability of cross-border services should be promoted in the EU, which is historically characterized by fragmentation into national markets.

Today, not all MNOs see the ownership of towers as a source of competitive advantage. Largely this is due to the increasing demand for faster data connectivity and the requirement for more efficient and higher quality networks. As a result, MNOs are forced to create joint ventures or sell off their portfolios to independent tower companies. These independent tower companies are considered to be pure infrastructure assets.



Whilst companies in the telecommunication sector were originally state-owned monopolies, satellite operators have always been private initiatives. These initiatives have molded the European satellite market into the global leader and attracted the interest of the EC in the process. In 2016, the EC presented a 'Space Strategy' for satellite communication for Europe as one of its key initiatives[8]. The Space Strategy's purpose is to clarify the overall strategic vision for the EU's activities while ensuring effective coordination and complementarity with the pursuits of member states and the European Space Agency (ESA). Space policy contributes to the growth and investment agenda of the EC and space is recognized as a strategic sector in which Europe should maintain its global leadership.

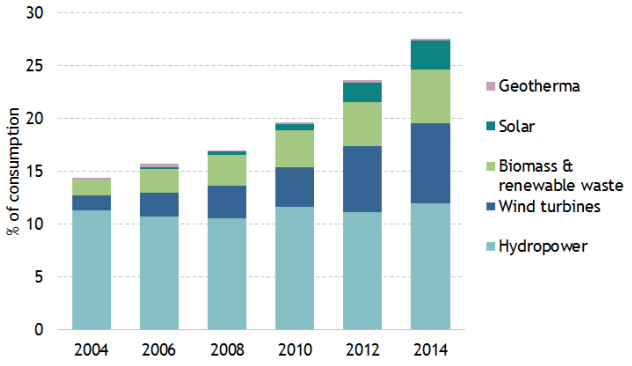
Electricity Transmission: building a network

A key long-term goal of the EC is to reduce greenhouse gas emissions, comparable to 1990 levels, by 80-95% by 2050[9]. The Energy Roadmap 2050 explores the energy system transition that accommodates for the reduced emissions target and also seeking to increase competitiveness and security of supply. The EC aims to fully eliminate energy islands in Europe whilst an overall increased interconnection capacity of 40% up to 2020 will be needed to ensure effective competition - further integration will follow.

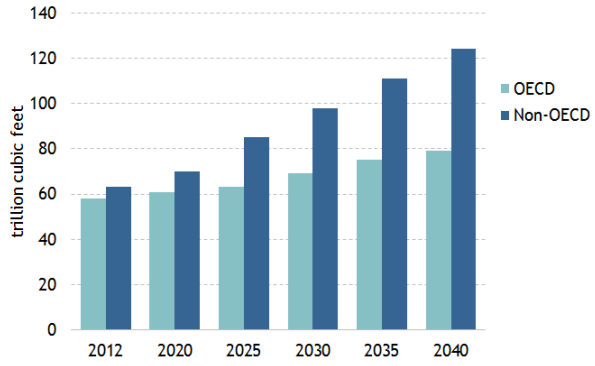
To achieve the set goals, EU-leaders set up the '2020 Strategy' in 2007[10]. The original goal of this initiative was to see renewable sources reach a 20% share in energy supply by 2020. In 2014, renewable energy in the EU had a 25.4% share of total primary energy production from all sources[11]. EU countries have revised a new 2030+ target on renewables, emissions and energy efficiency demanding that 30% of energy is sourced from renewable sources alongside a 40% improvement in energy efficiency. The 2030 Strategy[12] sends a strong signal to the market: encouraging private investment in new pipelines and electricity networks.

The ENTSO-E is the organization that supports Europe's policy objectives by promoting closer cooperation across Europe's transmission companies. Every two years, it is responsible for preparing and updating a non-binding Ten-Year Network Development Plan (TYNDP) for European-scale infrastructure. The emphasis on the TYNDP resides in increasing the exchange between networks to create a single internal market. In addition, it builds necessary interconnection infrastructures between the individual national markets, existing grid and the new renewable projects. As a result, electricity transmission companies are forced to invest in their existing networks. The EC's expectations were for EUR 38bn annual investment to achieve its objectives over the period 2011-2030[13].

Europe's growing share of energy from renewable sources (source: Eurostat)



Worldwide growing gas demand (source: EIA)



Pipelines & Storage: growing demand

The ENTSO-G facilitates and enhances cooperation between European gas transmission system operators with the aim of developing the European transmission system in line with the principal European energy goals. ENTSO-G adopted the TYNDP to remain committed to building a healthy European gas market. Although the frequency of renewable projects is increasing, this will not negatively affect absolute demand for gas in the short term. The growth requires increased pipeline and storage capacity and high-grade European infrastructure to transport the resources safely and efficiently.

Europe expects to see several billions of US dollars pumped into new pipeline infrastructure to accommodate the rising demand for natural gas. The International Energy Agency reports that Europe needs to invest USD 40bn in natural gas supply every year[14]. Europe's gas transmission system operators are responsible for ensuring that the infrastructure (pipelines, LNG terminals, storage facilities) is in place for an efficient and competitive European gas market. To build the necessary interconnection between existing grids, operators rely on new sources of capital to meet new investments. Investors will become a significant source of capital for the growth of the pipeline sector.

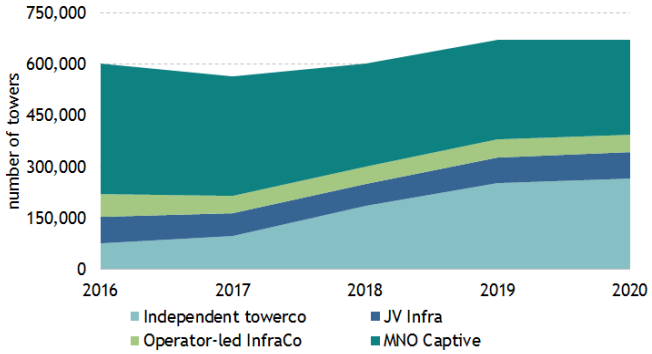
Communication Towers: independent companies

Past ownership of communication towers was claimed by MNOs. These identify as independent communication service providers that own the complete telecom infrastructure for hosting and managing mobile communications between the subscribed mobile users with users in the same and external wireless and wired telecom networks.

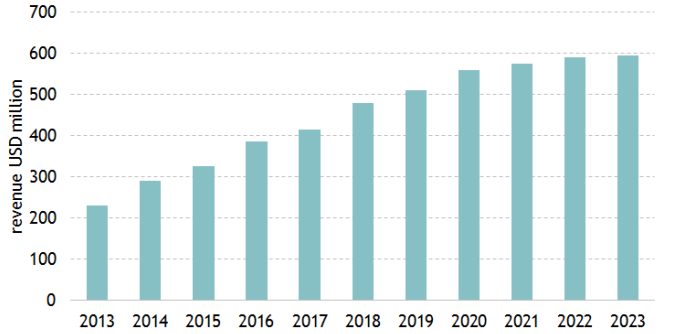
A mobile tower sector is formed when portfolios are sold by MNOs seeking to raise capital to fund investments in improving the network. Shared networks help reduce costs for large mobile operators, and therefore has led to a growing number of independent companies owning tower infrastructure. The process of shared infrastructure bears similarities to the process of unbundling by electricity assets. These companies are paid rent by operators using the towers, generating almost real-estate-like returns for investors due to the long-term contracts with anchor tenants. Independent infrastructure unlocks huge investment and enables much better coverage, hence leading to more independent tower companies. Additionally, NRAs encourage competition through shared infrastructure and joint ventures, as they are responsible for an efficient communication market.

2016 was a transformational year for the European independent tower industry. Following recent tower divestment announcements by several mobile network operators, this year 23% of European mobile towers have come under ownership of independent tower companies. It is predicted that 48% of European mobile towers will be owned by, and 65% managed by, independent tower companies by 2020 as mobile network operators continue to divest their infrastructure[15].

Europe's growing independent tower companies (source: TowerXchange)



Worldwide growing revenue from satellite M2M (source: NSR)



Satellites: the sky is not the limit

Since 2002, the EMEA Satellite Operators Association (ESOA) has served as the voice of Europe's satellite operators. ESOA supports the EC's "Space Strategy for Europe". This strategy aims to guarantee the integration of space into society and the economy whilst fostering a globally competitive and innovative space sector. EU policy objectives will stimulate growth for both European space industry and operators.

Europe represents the second-largest public space budget in the world with programs and facilities spanning various European countries. During 2014-2020, the EU alone will invest over EUR 12bn in space activities[16]. It currently owns world class space systems - Copernicus2 for Earth observation, and EGNOS3 and Galileo4 for satellite navigation and geo-positioning. With 18 satellites currently in orbit and over 30 planned in the next 10-15 years, the EU is the largest institutional customer for launch services in Europe.

About the GPR Pure Infrastructure Europe Index

The GPR Pure Infrastructure Europe Index consists of 38 European listed infrastructure companies, representing a free float market capitalization of over USD 180bn. Apart from the index's strong performance, the broad exposure to regions and sectors provides investors the opportunity to further diversify an investment portfolio and thereby improving the risk-return trade-off. For instance, the sectors within infrastructure offer a wide variety in correlation to Equities and Bonds. This variety has resulted in a risk/return profile that has provided strong outperformance over both Equities and Bonds during economic upcycle and limited underperformance during economic down cycle. Historically, the strong returns and lower volatility compared to other equity investments have resulted in infrastructure being able to provide attractive risk-adjusted returns, potentially enhancing the efficient frontier of a multi-asset portfolio.

Companies included in the GPR Pure Infrastructure Europe Index are required to obtain at least 50% of operational turnover from pure infrastructure activities, i.e. facilitating the movement of people, goods, natural resources and information, by owning or operating the real asset. Besides this, companies must have a minimum free-float market capitalization of USD 100m.

<table>
<tr><td colspan="6">GPR Pure Infrastructure Index</td></tr>
<tr><td rowspan="3">Geographic</td><td colspan="2">GPR Pure Infra
Americas Index</td><td colspan="2">GPR Pure Infra Europe, Middle East & Africa
Index</td><td>GPR Pure Infra
Asia-Pacific Index</td></tr>
<tr><td>GPR Pure Infra
Americas
Index</td><td>GPR Pure Infra Europe
Index</td><td>GPR Pure Infra Africa
Index</td><td>GPR Pure Infra
Asia
Index</td><td>GPR Pure Infra
Oceania
Index</td></tr>
<tr><td colspan="5">GPR Pure Infra COUNTRY Index</td></tr>
<tr><td rowspan="3">Diversification</td><td colspan="3">GPR Pure Infra
Developed Index</td><td colspan="2">GPR Pure Infra
Emerging Index</td></tr>
<tr><td colspan="3">GPR Pure Infra MLP Index</td><td colspan="2">GPR Pure Infra ex MLP Index</td></tr>
<tr><td>GPR Pure Infra
Pipelines & Storage
Index</td><td>GPR Pure Infra
Electricity Transport
Index</td><td>GPR Pure Infra
Transportation
Index</td><td>GPR Pure Infra
Communication
Index</td></tr>
</table>

Constructing bespoke benchmarks: Customization possibilities

Over more than 20 years, GPR has been able to gain know-how on the construction and maintenance of (bespoke) property benchmarks. By extending this know-how with the GPR Pure Infrastructure Index Series, GPR again demonstrates its dedication and specialization in the provision of standard and customized benchmarks.

Apart from the standard indices, GPR is fully capable to tailor indices to specific client's and needs. Examples of these needs are the in- or exclusion of specific stocks, sectors or countries, imposing weight capping's or the hedging currency risks. By working together with clients, GPR is able to ensure that the benchmark will perfectly reflect the investment strategies of clients.

All indices are available in price and total return versions and are calculated in AUD, EUR, LOC and USD. The GPR Pure Infrastructure Index Series is distributed via our website www.globalpropertyresearch.com,Bloomberg (GPRI <GO>) and Reuters (0#.GPRINFRA).

Contact us:

Please contact Global Property Research (GPR) to get more information on the GPR Pure Infrastructure Index and other benchmarking possibilities.

Analysts:
Jeroen Vreeker j.vreeker@gpr.nl
Floris van Dorp f.van.dorp@gpr.nl

Global Property Research
Beethovenstraat 300 | P.O. Box 75666
1070 AR Amsterdam | The Netherlands

Phone: +31 20 3488 451/452
Fax: +31 20 3488 962
Email: info@gpr.nl | www.globalpropertyresearch.com

IMPORTANT DISCLOSURES

[1] Lowe, Philip, et al (2007). Effective unbundling of energy transmission networks: lessons from the Energy Sector Inquiry. *Competition policy newsletter 1,* 23-34.

[2] Directive 2014/23/EU of the European Parliament and the Council of 26 February 2014 on the award of concession contracts.

[3] Directive 2003/55/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in natural gas and repealing Directive 98/30/EC.

[4] Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC.

[5] 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.

[6] Council Resolution of 22 December 1994 on the principles and timetable for the liberalization of telecommunications infrastructures.

[7] Directive 2009/140/EC of the European Parliament and of the Council of 25 November 2009 amending Directives 2002/21/EC on a common regulatory framework for electronic communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities, and 2002/20/EC on the authorisation of electronic communications networks and services.

[8] Communication form the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a *Space Strategy for Europe*, 2016 COM(2016) 705 final.

[9] Communication form the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on *Energy Roadmap 2050*, 2011 COM(2011) 885 final.

[10] Communication form the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on *Energy 2020 A strategy for competitive, sustainable and secure energy*, 2010 COM(2010) 639 final.

[11] Renewable energy statistics. (n.d.). Retrieved from http://ec.europa.eu/eurostat/statistics-explained/index.php/Renewable_energy_statistics.

[12] Communication form the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on *A policy framework for climate and energy in the period from 2020 to 2030,* 2014 COM(2014) 15 final.

[13] Commission Memo, *Questions and answers on 2030 framework on climate and energy*, (Jan. 22, 2014).

[14] The International Energy Agency (2014), *World Energy Investment Outlook,* 166.

[15] TowerXchange (2017), *Journal of the telecpm tower industry in EMEA, CALA and Asia,* Issue 18, p.7.

[16] Communication form the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a *Space Strategy for Europe*, 2016 COM(2016) 705 final.