Planning Policies and Permitting Procedures to Ensure the Sustainable Supply of Aggregates in Europe

Final Report

Commissioned by UEPG

Department of Mineral Resources and Petroleum Engineering

University of Leoben, Austria

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Foreword

UEPG, the European Aggregates Association, represents aggregates associations and producers from 26 countries across Europe. Some 3 billion tonnes of aggregates (that is, principally crushed stone, sand & gravel) are needed annually in Europe, mainly used as structural sub-base materials and in concrete and asphalt products that are in turn the vital building blocks of domestic, commercial and social infrastructure of European society.

Naturally-occurring aggregates can only be sourced from quarries and pits where suitable deposits geologically occur. Gaining access to these increasingly-critical deposits is becoming ever more difficult because of competing land uses across Europe, particularly in more developed, densely-populated regions. As aggregates are heavy and bulky, it is highly desirable from many perspectives that these be sourced local to the point of use, particularly where transport by rail or ship is not possible, as is usually the case. Therefore access to *local* aggregate resources is a key, fundamental and critical issue for UEPG.

For this reason, UEPG has actively participated in the European Commission's Raw Materials Initiative (RMI) right from its conception. It submitted a position paper in December 2009. UEPG now wishes to ensure that the key concerns of the aggregates industry are more fully understood by the RMI, and that recommendations appropriate to the key needs of the industry are included in the final conclusions of the RMI.

In order to present its case more authoritatively, UEPG sought the assistance of Leoben University, it being an internationally-recognised independent European leader in this field. Leoben University has responded very professionally. Following approval by the UEPG Delegates Assembly, this final report is now submitted as the UEPG position paper to the RMI.

UEPG wishes to extend its sincere thanks to Leoben University, in particular to Professors Peter Moser and Horst Wagner, additionally Dr. Günter Tiess and Student Alexander Kriz for their outstanding dedication in completing this seminal work in a very tight timescale.

Jim O'Brien, President UEPG, June 4, 2010.

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Executive Summary

Aggregates (that is crushed stone, sand and gravel) are an essential ingredient of the key building components that make up the residential, social and commercial infrastructure of modern European society.

Europe currently needs some 3 billion tonnes of aggregates a year, equivalent to over 6 tonnes per capita. Some 90% overall of these aggregates come from naturally-occurring deposits, the remaining 10% coming from recycled materials, marine and manufactured aggregates. The production of recycled and marine aggregates will continue to grow, however longer-term some 85% of demand will still need to come from natural aggregates. As aggregates are heavy and bulky, it is imperative for economic and environmental reasons that these are sourced local to the main markets, particularly where transport by rail or ship is not possible, as is usually the case. Therefore access to *local* aggregate resources is a key, fundamental and critical issue both for the aggregates industry and for European society.

Based on extensive analysis, the Report concludes that the demand for aggregates continues to grow with economic development at national and European levels. Empirical evidence shows that advanced economies can demand up to12 tonnes/capita, though this growth may suffer shorter-term positive or negative influences from economic boom or recession respectively. Therefore it is reasonable to anticipate that European demand for aggregates will soon recover to its 2008 level of 3.5 billion tonnes, and will reach 4 billion tonnes in the medium term, driven mainly by economic growth in Central and South-Eastern Europe. Therefore this growing demand for aggregates needs to be addressed by national Minerals Policies and Planning Systems.

The Report then analyses Minerals Policies across Europe, and more specifically Aggregates Planning Policies in the Member States. It concludes that only very few Member States have a well-structured approach to address the future sustainable supply of aggregates. This may reflect a lack of understanding of the vital role of aggregates in fulfilling society's physical needs. Therefore in the absence of such policies, aggregate supplies may become critical in several regions, leading to local supply deficiencies, with costly consequential inefficiencies in transport, energy usage and CO_2 emissions. Hence the urgent need for establishing Aggregates Planning Policies in all Member States.

The Report then reviews the associated Permitting Systems for extraction of aggregates in the Member States. It concludes that, in most cases, the Permitting Systems are unduly complex and slow, unnecessarily constraining access to resources, and that many permissions eventually granted are too short to justify adequate investments. In some Member States, planning systems are so inconsistent or defective as to foster unpermitted operators, often bringing the industry into disrepute. The responsible aggregates industry has much improved its environmental performance in recent years, and there is increasing focus in achieving biodiversity excellence in Natura 2000 areas. Hence each Member State needs to develop a simplified, more rapid, permitting system, ideally as a "one-stop-shop", or the equivalent thereof, by rationalising links and procedures between national, regional and local agencies involved, while insisting on continued industry excellence in environmental and social performance.

The Report concludes with recommendations to the Raw Materials Initiative urging the EU Institutions to develop a comprehensive European Raw Materials Strategy for aggregates. This should specifically focus on the development of Aggregates Planning Policies and thorough, timely and consistent Permitting Systems in all Member States, to ensure a sustainable and long-term access to local aggregate deposits throughout Europe.

Chapter 1 Background to the Review

1.1 Introduction to the Concerns of the Aggregates Industry

UEPG, the European Aggregates Association, has welcomed the Raw Materials Initiative and has urged the EU Institutions to develop a comprehensive European Raw Materials Strategy to ensure a sustainable and long-term supply of aggregates.

While there is general availability of indigenous aggregates at European and national levels, economically viable regional and local supply of aggregates is often constrained by difficulties in achieving access to aggregate deposits and by the exceptionally long duration of permitting processes. Therefore, unless there is the acceptance Europe-wide of a focused strategy to provide viable local provision, the necessary future supply of aggregates will become even more critical, resulting in increased aggregate transport with the associated energy costs and CO_2 emissions.

The emphasis on local supply stems from the nature of aggregates consumption, which unlike other minerals, is not concentrated in single localities, but is distributed over wide areas. Hence transport of aggregates from the producer to the user is a key issue because of their bulk, weight and low unit costs, and accounts for the bulk of CO_2 emissions from the aggregates sector.

The industry has made significant progress in its environmental and health & safety performance, indeed now being a recognised leader in biodiversity. Despite this, it has been facing increasing difficulty gaining access to vital local aggregate resources. This has affected not only key mineral supplies needed by the EU economy, but also the industry's economic performance, in itself a pre-condition for long term sustainable development. The industry also appreciates the need to preserve resources and actively encourages the use of recycled aggregates in this context. In some member states the amount of recycled aggregates is already near the saturation point of usable demolition materials, though then at best accounts for only some 20% of national aggregates production. Therefore aggregate supplies will predominantly continue to come from natural resources.

The demand for Aggregates in Europe in 2008 was 3.5 billion tonnes per year, produced mainly by SMEs (Small and Medium-sized Enterprises) on 22,000 sites across Europe. The EU average use of Aggregates in 2008 was 6.2 tonnes per capita. The Aggregates Industry is by far the largest in the minerals sector by tonnages produced and accounts for the largest numbers of production sites and numbers of people employed. Taking an EU average price of €7-8/tonne, the aggregates sector represent a turnover of around €20-25 billion, though it has suffered heavily under the current economic crisis, reporting an average decline of about 20% in 2009 compared to 2008. In several countries, there are further volume declines being reported in 2010, indicating the true depth of the current recession, possibly also exacerbated by the severe winter.

Introduction to the Leoben Review

UEPG is closely following the work of the Raw Materials Initiative (RMI), and has made several submissions, including its position paper dated December 8, 2009. UEPG is concerned lest the importance of a viable aggregates industry for the future development of Europe is not fully appreciated by the Commission, and that recommendations specific to the long term supply of aggregates might not form part of the conclusions and recommendations of the RMI.

UEPG therefore approached the University of Leoben, based on its extensive background on minerals policy matters, to assist with the preparation of this submission. The University of Leoben agreed to carry out a highly-focused short review on behalf of UEPG, based on its knowledge of the aggregates industry, plus some knowledge mutually exchanged with the UK-based Land Use Consultants (LUC).

1.2 Structure of the Report

Chapter 2 analyses the current and future aggregates demand in Europe. It concludes that, based on extensive data on national and European consumption and economic development profiles, the demand for aggregates in Europe will continue to rise. As economies continue to grow, this could potentially require aggregate demand to rise from the current 6 tonnes/capita to as much as 9-12 tonnes/capita, indicating steadily growing future demand. Currently recycled aggregates comprise only some 6% of total European output (though this may be an underestimate), already reaching limits in some countries: it is unlikely in the medium term that recycled aggregates will be more than 10% of total European aggregates production. This highlights the need for a policy to ensure sustainable supply of natural aggregates in Europe into the future, and for economic and environmental reasons, this necessitates access to *local* raw material resources.

Chapter 3 analyses Minerals Policies across Europe, and more specifically Aggregates Planning Policies in the Member States. It concludes that only very few Member States have a well-structured approach to address the future sustainable supply of aggregates. This unfortunately appears to reflect a lack of understanding of the vital role of aggregates in fulfilling society's physical needs. Therefore in the absence of such policies, aggregate supplies may become critical in several regions, leading to local supply deficiencies, with costly consequential inefficiencies in transport, energy usage and CO_2 emissions. Hence the urgent need for Aggregates Planning Policies in all Member States.

Chapter 4 reviews the associated Permitting Systems for extraction of aggregates in the Member States. It concludes that, in most Member States, the Permitting Systems are unduly complex and slow, unnecessarily constraining access to resources, and that many permissions eventually granted are too short to justify adequate investments. The aggregates industry has much improved its environmental performance in recent years, and there is increasing focus in achieving the requirements of Natura 2000 areas. Therefore each Member State needs to develop a simplified, more rapid, permitting system, ideally as a "one-stop-shop", or the equivalent thereof, by rationalising links and procedures between national, regional and local agencies often involved, while insisting on continued industry excellence in environmental and social performance.

Chapter 5 summarises the conclusions of the previous chapters, and makes a number of key recommendations for adoption by the RMI in order to ensure the sustainable supply of aggregates in Europe.

The Annex gives back-up information relevant to each Chapter.

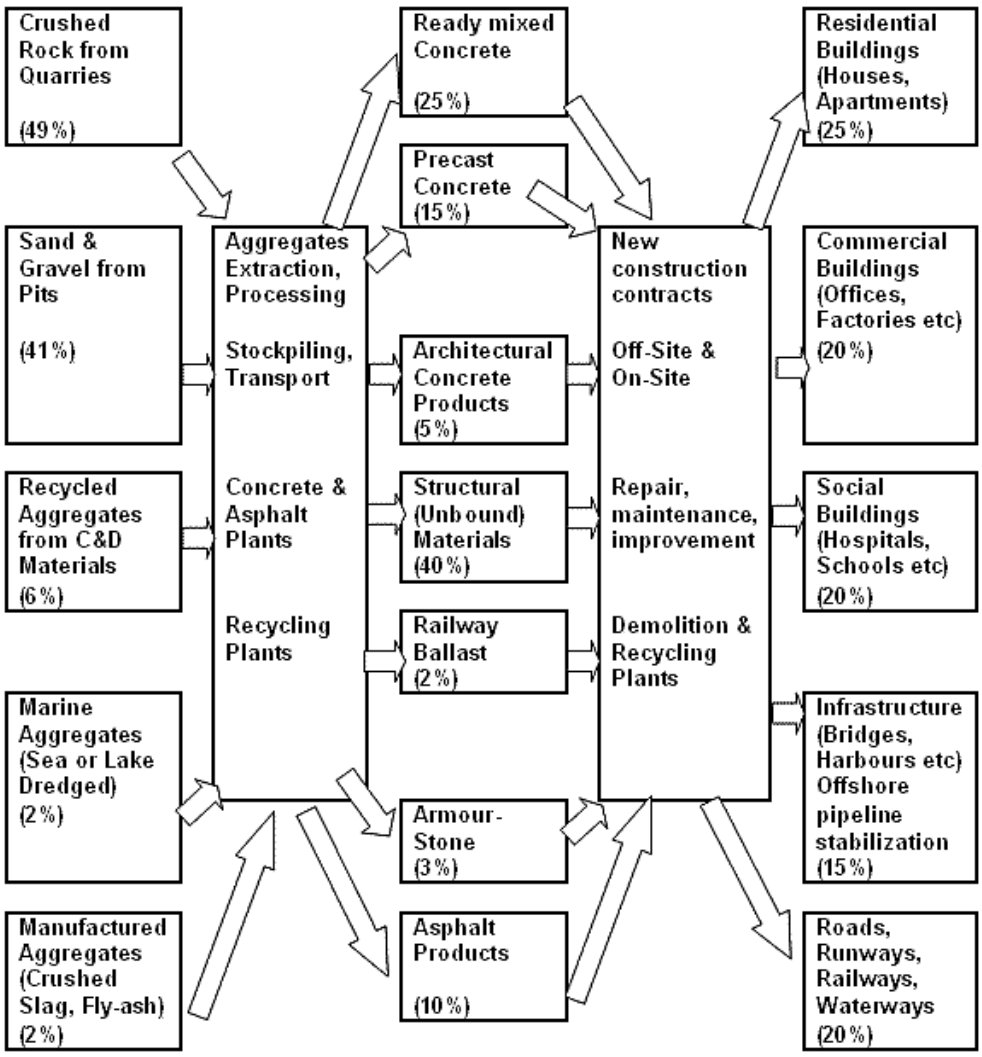
Chapter 2 Current and future Aggregates Demand and Supply in Europe

2.1 The Economic Value of Aggregates and the Value Chain

The economic importance of a sector in a country's economy is usually measured by its contribution to the gross domestic product (GDP) as well as by the job-creating effects of the respective industry. For an appropriate evaluation of the role of the aggregates industry it is important to consider its special position as the first section of a value-added chain. The **multiplication effect in aggregates extraction** concerning the production processes of downstream goods directly or indirectly dependent on the aggregates industry is of utmost significance.[1] Disregard for this fact leads to an incomplete and misleading image of the real overall economic importance of the aggregates sector.

Figure 1: Illustration of the added value chain raw material - end product, (Source: UEPG, 2010)

Schematic Diagram for Aggregates, showing sourcing, intermediate products and final usages, with indicative breakdown of percentages by tonnage of aggregates

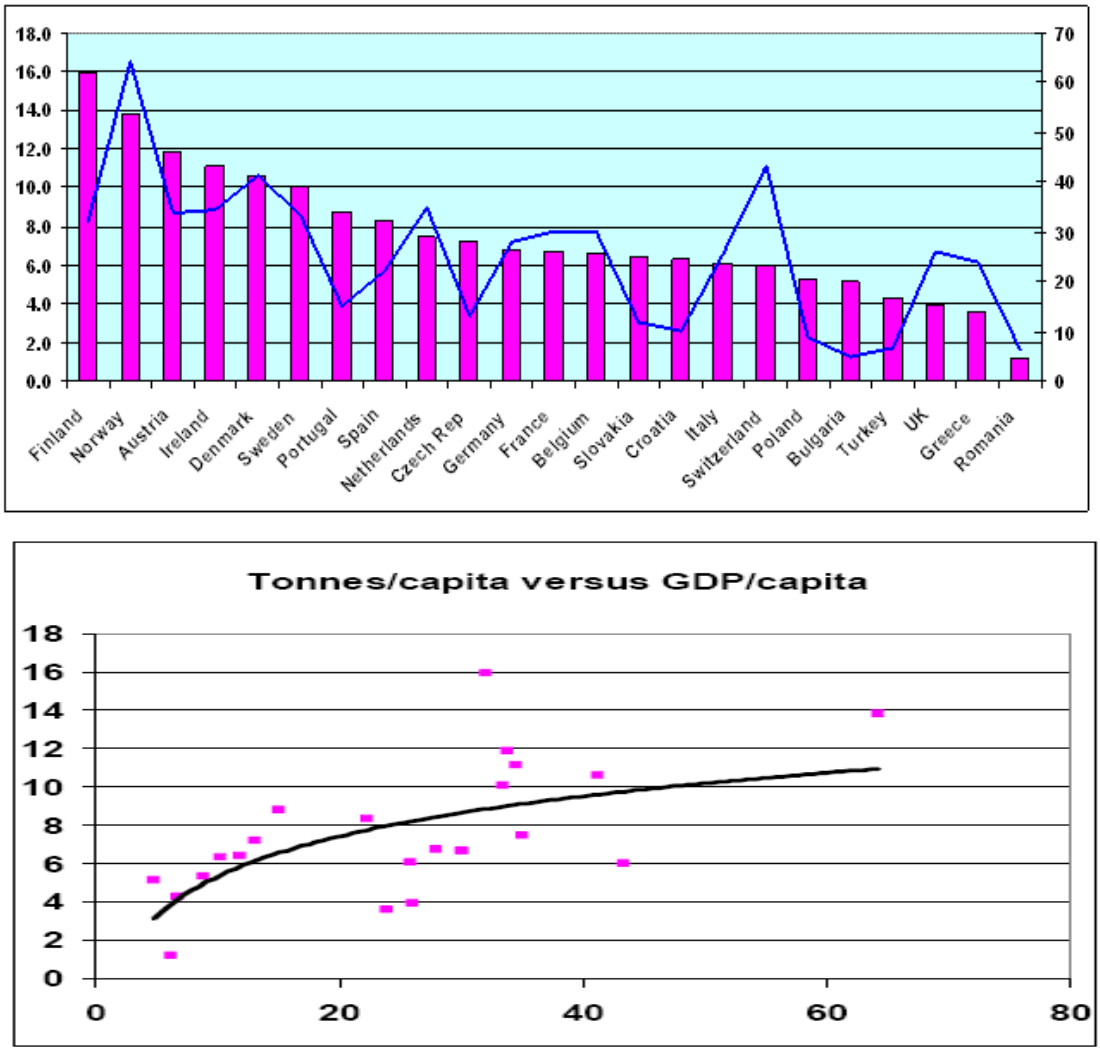


[1] Cp. Wasserbacher, R.. Koller, W., Schneider, H. W. ; M. Luptáčik, M. (2007): The relevance of raw materials extraction to Austria's economy., Journal of Mining, Metallurgical, Material, Geotechnical and Planned Engineering, pp. 391 - 396

2.2 The Demand for Aggregates and linkage with Economic Growth

Usage of aggregates is a function of the state of an economy of a country. As an economy grows, the demand for aggregates increases, as they are essential for infrastructural development and commercial and domestic building activities. In highly developed economies, the demand for aggregates stabilises at a high level.

Figure 2: Aggregates production in 2008 in Europe – Tonnes/capita (left vertical scale) & GDP(€000)/capita (right vertical scale), (source: UEPG, 2010)



(Vertical scale is aggregates production in tonnes/capita, horizontal scale is GDP €000/capita).

In this connection, the degree of industrialization or development of an economy is of fundamental importance.[2] Obviously, the structural changes of a nation's economy are reflected in the development of the intensity of material use. It is a fact that in national economies running through the process from primary to secondary sector, the consumption of raw materials increases in the same or even a higher degree than the economic performance, industrialization being a material-intensive process. In advanced economies, the increasing service sector (tertiary sector) causes a gradual decoupling of economic growth and

[2] Cp.Gocht (1983): Wirtschaftsgeologie und Rohstoffpolitik , p. 83, 199-202.

consumption of some raw materials, which can lead to a decrease of material intensiveness.[3] However, this does not hold true of aggregates: demand stabilises at high levels of economic development. A high demand of aggregates is still to be expected (maintenance of infrastructure etc.).[4]

In the most northern countries, such as Norway, Finland and Iceland, aggregate demand is also driven by the severe winter climatic conditions, which subsequently require significant summer road repair programs. Additionally, in some cases, such as Norway, demand may also be enhanced by exports to other European countries. Furthermore, less populated countries require relatively more infrastructure, and hence of aggregates usage, per capita.

At a European level, the linkage between economic development and aggregate consumption is critically dependent on the large differences in the stage of economic development of the different countries. Since the rate of economic development of the new Member States of EU is considerably higher than that of the old Member States, aggregate consumption in Europe will grow substantially in the former in the medium term. This is illustrated the relationship of economic development and aggregate consumption of three of the newer Member States of EU, namely Czech Republic, Slovakia and Slovenia. All these Member States show a direct linkage between economic growth and aggregate demand. In comparison, the relationship between economic development and aggregate demand is also shown for France. Up to the year 2000 there was a good correlation between economic development and aggregate demand. From 2000 onwards economic development and aggregate demand was largely decoupled. Similar trends have been found for other highly developed countries as well.

As a more general comment, one of the problems with minerals economics is that minerals (including aggregates) are not properly accounted for in national and international statistics. The reasons for this are manifold. One of the main reasons is that minerals often do not fall under the responsibility of one single government department. This is one of the main differences between the minerals industry and agriculture. In the case of the latter every single European country has a department (ministry) of agriculture, while not one European country has a department of minerals. Accurate and complete statistics are however essential for determining the importance of a particular economic sector. In the case of aggregates with the numerous small producers the situation is particularly critical. Frequently official statistics show only a small proportion of real production and consumption. National aggregates associations try to make up for this deficiency by publishing their own figures. These however do not enjoy the same status as official figures. For this reason it is important that national government ministries should in future recognise the importance of having more reliable and complete statistics on aggregates.

[3] Nötstaller, R., Wagner, H. (2007): Reflections on resource consumption and resource policy, Journal of Mining. Metallurgical, Material, Geotechnical and Planned Engineering, p.384.

[4] The tertiary sector consists of market and non-market (services Trade, hotels and restaurants, transport and communication, financial, insurance, public services, etc).

Figure 3: Aggregates consumption/GDP in France (source: Rodriguez Chavez/ Schleifer, 2010)5

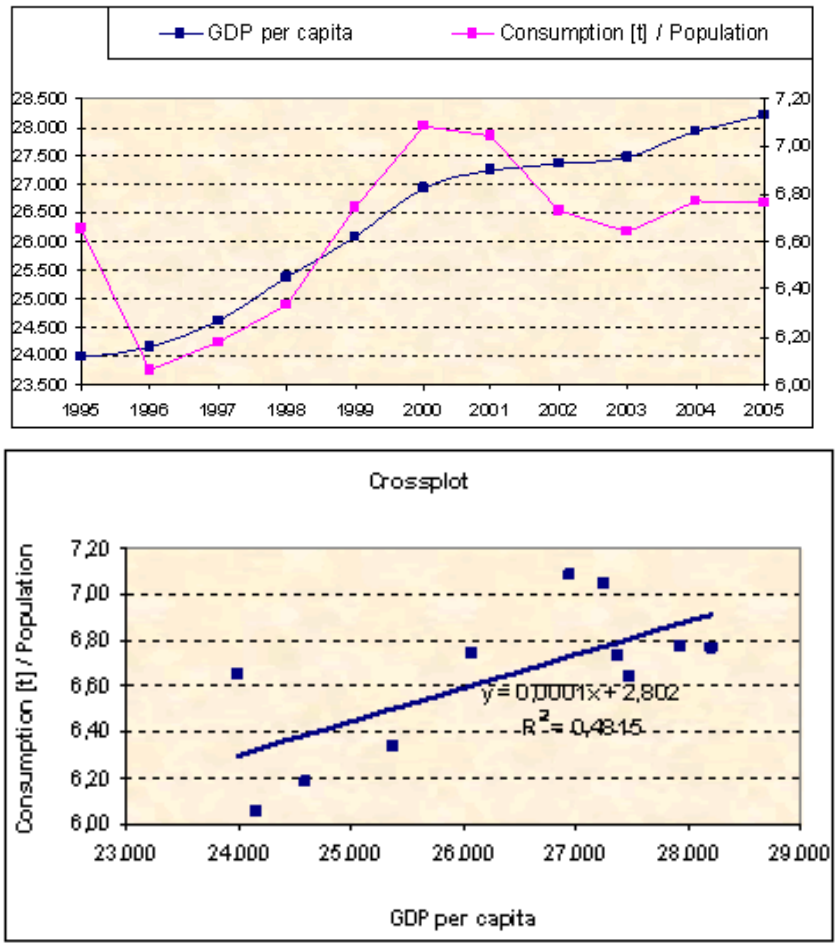
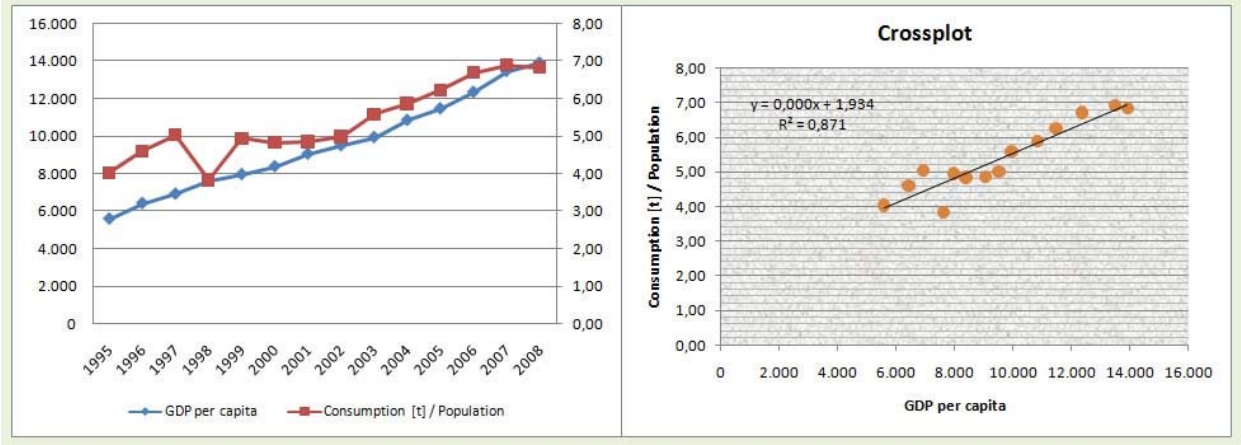


Figure 4:Aggregates consumption/GDP in Czech Republic (source: Sitensky, Czech Geological Survey – Geofond, Czech Republic, 2010)



[5] Remark: Looking for a clear strategy, the so-called ANTAG-project has been developed and successfully applied in France (école des mines de Paris) – Currently, this project is adapted by the University of Leoben for an implementation in Austria. The acronym "ANTAG" connotes "*Anticipation of the access to the aggregate resource by breaking present schemes on the long term*". It has been shown that a project of this type is of high relevance according the prognosis of the aggregates demand in a certain time period.

Figure 5: Aggregates consumption/GDP in Slovakia (source: Sitensky, 2010)

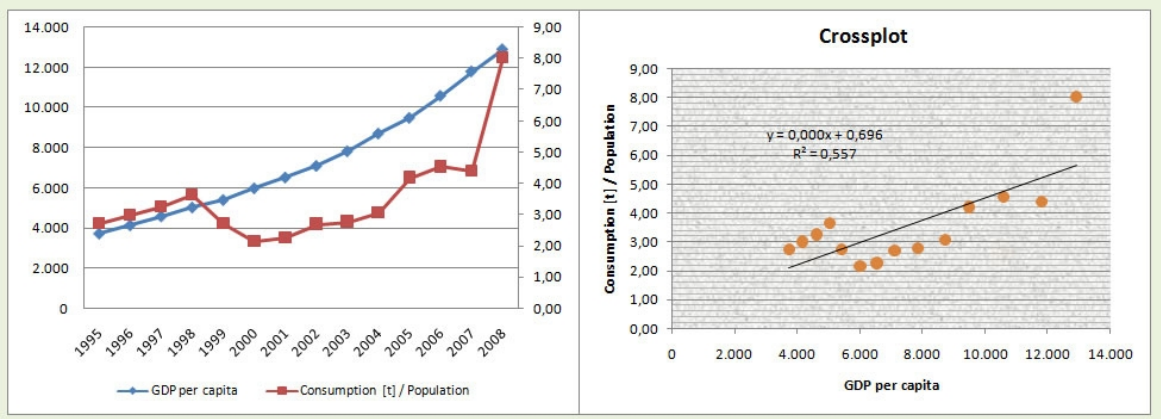
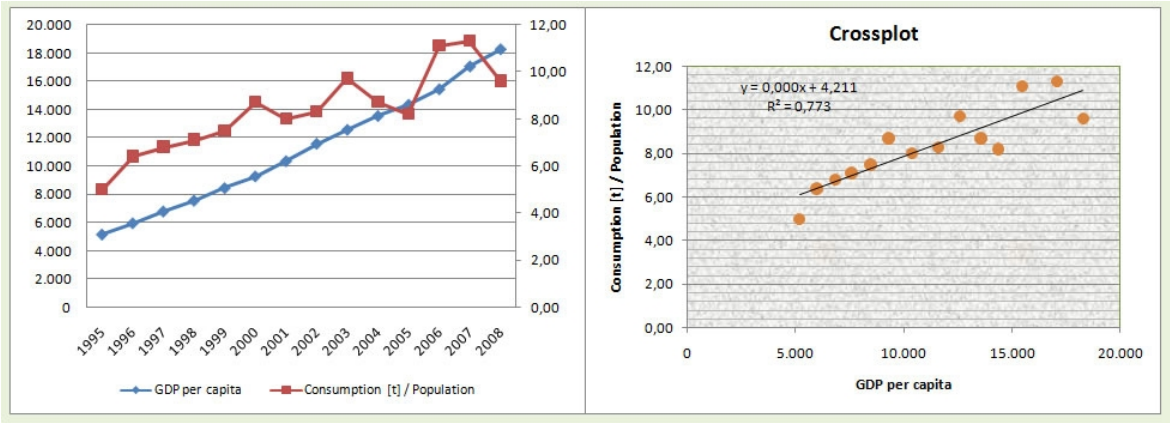


Figure 6: Aggregates consumption/GDP in Slovenia (source: Solar, Slovenian Geological survey, 2010)



Presently about 3.5 billion tonnes of aggregates are being produced annually in about 22,000 production sites.[6] The direct value of this production amounts to €20-25 billion. Recent years have shown a dramatic decline in numbers of producing companies, down from nearly 30.000 in 2006 to about 17.000 in 2008. Similar trends can be observed for other sectors of the minerals industry and are an indication of the growing importance of large multinational companies. Annual aggregates production has peaked in 2006 at about 3.7 billion tonnes. As a consequence of the onset of economic problems, aggregate production declined to about 3.5 billion tonnes in 2008, and is predicted to have declined further to around 2.9 billion tonnes in 2009. Some countries are reporting even further declines in 2010, though this will reverse as economic recovery takes hold.[7]

As pointed out, aggregates consumption per capita is broadly related to the economic performance of a country measured as GDP/Capita. Aggregate consumption per capita is most likely underestimated as national aggregate production and consumption statistics are deficient in many countries. If it is assumed that in some time to come new Member States will reach a GDP/cap of €25,000 and the corresponding mean per capita aggregates consumption reaches 8 tonnes, then an additional 530 million tonnes per year will be required. It can therefore be expected that annual European aggregates consumption will exceed 4 billion tonnes in the not so distant future.[8]

These aggregates constitute an essential component of the materials input into the European construction industry which directly employs 450,000 persons annually (and a lot more

[6] UEPG (2009): Position Paper, Securing access to non-energy mineral resources, and specifically to Aggregates
[7] All information/data from UEPG.
[8] All information/data from UEPG.

indirectly). As indicated above, infrastructure development in Europe will continue to grow at rate faster than the overall economy because of the activities in the new Member States. From this follows that the demand for aggregates will increase substantially in the medium term, that is at least for the next 20-30 years.

2.3 Conclusions

The **multiplication effect in aggregates extraction** concerning the production processes of downstream goods directly or indirectly dependent on the aggregates industry is of utmost significance. Disregard for this fact leads to an incomplete image of the real overall economic importance of the aggregates sector.

Usage of aggregates will continue to increase as an economy grows. With many European economies running through the process from primary to secondary sector, the consumption of raw materials will increase at the same or even a higher degree than the overall economic performance. This is due to the fact that industrialization is a material-intensive process. In advanced European economies, the increasing service sector (tertiary sector) causes a gradual decoupling of economic growth and consumption of some raw materials. However experience has shown that apart from short-term variations due to local economic and infrastructural impacts aggregate demand in highly developed economies generally remains at a high level.

The UEPG data on aggregates tonnes/capita (t/c) versus GDP/capita indicates that aggregates consumption typically rises from about 3-4t/c at very early stages of economic development up to 12t/c at advanced stages of economic development. This would indicate that the demand for aggregates in Europe, as all economies develop further, will increase significantly from the 2008 level of 6.2t/c perhaps to around 9t/c, if not eventually approaching 12t/c.

At this stage it is important to clarify the following: to meet the future aggregates demand it is necessary to have sufficient access to local primary aggregates resources. Recycling of course can make an essential input but cannot meet "alone" future aggregate demands.[9] In 2008, recycled aggregates in Europe reached 216 million tonnes, which although very significant was only 6.1% of total aggregates demand. This already represents very high levels of recycling (about 20%) in some countries (for example UK, Belgium and Netherlands), corresponding to almost full (90%) recycling of all demolition materials available. Other countries still have apparently low levels of recycling (such as France), but this may well be under-reported as in some cases the figures do not include recycling in-situ. In general, in less densely populated countries, the economics of recycling are less attractive compared with densely-populated regions. In the medium term, the average rate of recycling across Europe is therefore unlikely to exceed 8-10%. Likewise marine and manufactured aggregates together in 2008 comprised only 4.3% of European total output: this could grow to 5-6% in the medium term. Therefore some 85% of all aggregates production in the medium term will still need to come from natural aggregate resources.[10]

Therefore Raw Materials Planning for Aggregates must envision longer-term increasing natural aggregate demand across Europe into the future.

[9] Issue recycling is also mentioned in chapter 3 and particularly discussed in the Annex.
[10] All information/data from UEPG.

Chapter 3 Summary of Minerals (Aggregates) Planning Policies

3.1 The Basics

3.1.1 Importance of National Minerals Policy

Section 2 described the importance of and the need for aggregates (that is the demand side). Section 3 discusses the supply side. Even though providing the economy with aggregates is primarily the task of private enterprise, there are essential reasons for the state to be involved.[11] Due to the significance of aggregates in the value-added process of a national economy, it is necessary for the state to establish basic conditions for the realization of measures which are of public economic interest. In that case a minerals policy is necessary to provide the environment for a balance between demand and supply.

Minerals policy is part of the economic policy, [12] which again is assigned to political economy in the scientific sense. In other words: Economic policy is the part of state politics which deals with the shaping of national economy.[13] It seems appropriate to refer to any state activity aiming directly at influencing extent, composition or distribution of the national product as economic policy. The national political interest in raw materials results from their position in the economic chain and the particular characteristics of minerals production.[14]

A national mineral (aggregate) policy can be defined as the **entirety of operations of a state for influencing supply of and demand for mineral resources** on its territory. Minerals planning policies are *part* of a mineral policy framework. [15]

A National Minerals Policy first has to provide a "Mineral Statement" (see figure 9). Regarding aggregates two crucial issues have to be included: A National Minerals Policy first has to create the **awareness** of society's needs for minerals, and specifically for aggregates, and in the case of aggregates of the need for access to local resources. The second really crucial issue is that it sets the supply of minerals, and specifically of aggregates, as a force for the benefit of society, and that it sets a **balanced approach** in the assessment of exploration and development of extractive activities.

The National Minerals Policy should take into account the predicted medium to long-term demand for aggregates, ensuring that there is a sufficient stock of local reserves with access that is an inherent part of local spatial planning. National aggregates planning policies should also take into account traditional waterway exportation routes (such as from Alsace, Baden-Württemberg and North-Rhine Westphalia into the Netherlands and Belgium).

[11] (Austrian) Ministry of Commerce, Trade and Industry (1981): Concept for supply of Austria with mineral raw and base materials.

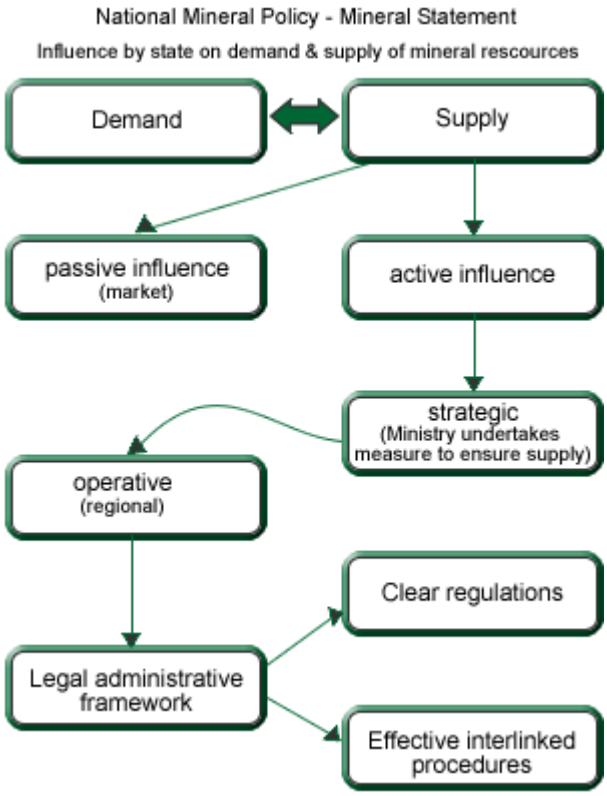
[12] http://www.sowiport.de. Siebert, H. (1983): Economic theory of natural resources, Tübingen. Johansen, Harley E., Matthews, Olen Paul, Rudzitis, Gundars [eds] (1987): Mineral resource development: geopolitics, economics and policy, London. Drnek, T. (2008): Special mineral economy, raw material policy (General objectives), lecture notes, p.1

[13] Tuchfeldt, in: Gabler Verlag (1984), Gablers Wirtschaftslexikon, 10. Auflage Edition, Wiesbaden

[14] Cp. Siebert, Horst (1981): Strategische Ansatzpunkte der Rohstoffpolitik der Industrienationen nach der Theorie des intertemporalen Resourcenangebots, Institut für Volkswirtschaftslehre und Statistik, Mannheim. (Beiträge zur angewandten Wirtschaftsforschung) [Strategic points of the mineral policy of industrialized nations, on the theory of intertemporal resource supply, Department of Economics and Statistics, Mannheim. (Contributions to applied economic research)]

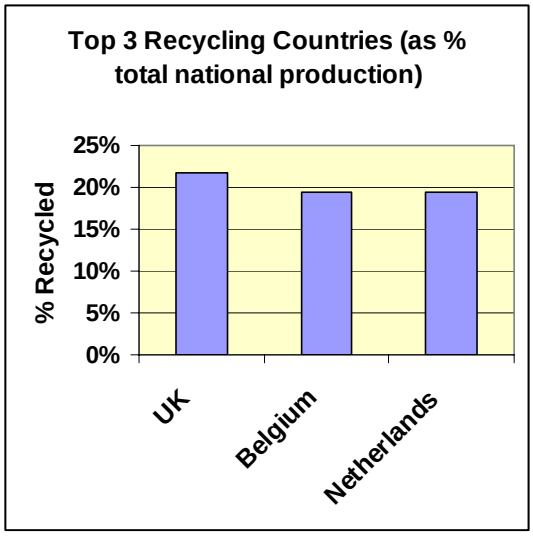
[15] Tiess, G. (2010): General and International Mineral Policy, Springer-Verlag, in press.

Figure 7: National Mineral Policy - Schematic Diagram (Tiess, 2010)



As already indicated in Chapter 2, currently over 90% of aggregate supplies across Europe are sourced from natural raw materials. Recycling at best in densely populated regions presently provides rates of about 20% (see figure 8), the 2008 average across Europe being only 6%. Marine and manufactured aggregates together comprise only 4.3% of total European production. Therefore at least 85% of European aggregates will in the mid-term have to come from natural resources, hence it is important to protect and guarantee access to primary resources for the long-term.

Figure 8: Top Three Recyclers (UEPG, 2010). Overall UEPG average is 6% (216 m tonnes recycled out of total 2008 production, i.e. 3.5 bn tonnes.



3.1.2 Access to local aggregates resources

No country in Europe is able to meet the demand of aggregates without relying predominantly on primary resources.[16] Access to primary aggregates resources has to be secured for the operator in a long-term (30-50), mid-term (10-30 years) and short-time perspective based on land use management. Operators need to have investment security as they have to plan their activities in a long-term. Land use management particularly is a responsibility of land use planning[17] and should be considered/included from the national minerals policy frame work[18] (**minerals planning policy as part,** see also section 3.1.3).

The question may be asked if demand of aggregates can be met from local sources, or through imports (from another region, or even another country)? There are different scenarios:

a) Supply from local, regional resources: In the case of aggregates the economic transport radius by road is a limiting factor and typically is in the range of about 30 km. Given the nature of aggregates use, the supply of aggregates should be done from local resources, that is, at the local/regional level ("regional supply"). This presumes that access to local resources is indeed geologically and operationally possible, and that transport by rail or ship to the point of use is not possible, as is usually the case.

b) Supply from local, regional resources may not be possible because of geological reasons, that is lacking or insufficient number of deposits.

c) Supply from local, regional resources may not be possible because of land use utilization conflicts, caused by conflicting land use interests, environmental or legal constraints.

In the case of b) aggregate supply shortage can be met only through imports (international or interregional), or partially by use of recycled material or changed building technology. In case c) aggregate supply problems can be addressed through imports and/or land use planning measures. The latter often require a formal minerals policy which defines the priority status of minerals relative to that of other land use matters.

Regarding scenarios b) and c), the question of supply security arises, as well as significant transport and environmental costs: therefore scenarios b) and c) are to be avoided. This conclusion is borne out in reality by the relatively little trans-border shipment of aggregates in Europe.

Access to local resources is increasingly limited

The aggregates industry needs to have access primarily to local resources. The *argument* for access to local resources is the distributed nature of the use of aggregates, the cost and environmental impact of transport, CO_2 emissions and overloading of the transport infrastructure[19]. However, it is a fact that access to land is (in all EU-countries) increasingly limited not in terms of geological reason but (mostly) due to lacking land use management

[16] Department of Mining and Tunnelling (2004), Minerals Policies and Supply Practices in Europe, University of Leoben, Final Report, Commissioned by the European Commission Enterprise Directorate General under Contract n° ETD/FIF 2003 0781, Leoben – Brüssel

[17] From the published literature on minerals planning in Europe follows that minerals planning is commonly seen within the context of land use planning. Cp. Department of the Environment (1995): Minerals planning policy and supply practices in Europe: main report, London. Mineral planning in a European Context- Demand and Supply, Environment and .Sustainability. Proceedings of the 1st European Conference on Mineral Planning. Zwolle, Netherlkands, 1997. Geopress 1998. Mineral Planning in Europe. Proceedings of the 2nd European Conference on Minerals Planning, Harrogate, UK, 1999. The Institute of Quarrying 1999. Also the following conferences: European Conference on Mineral Planning in Krefeld/Germany (2002) and in Sarajevo (2006).

[18] Cp. Tiess, G. (2010): General and International Mineral Policy, SPRINGER-Verlag, in press.

[19] UEPG (2009): Position Paper, Securing access to non-energy mineral resources, and specifically to Aggregates. See also Annex.

principles related to aggregates.[20] The ever expanding urban zones and the growing number of Natura 2000 protected areas are increasingly limiting access to key local deposits through sterilisation (UEPG, Dec. 2008). The impact of Natura 2000 has varied by country, depending on the degree of flexibility allowed by permitting authorities towards extraction activities in or near Natura 2000 areas. Some countries have enjoyed a good level of flexibility, while in others there is a virtual ban on any extractive activity, which is now presenting huge challenges to the industry the supply of aggregates.

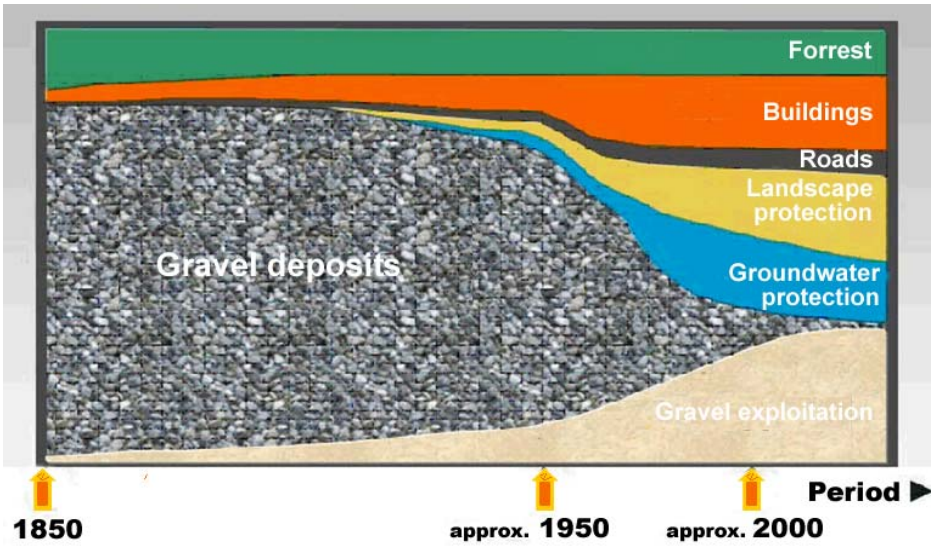
Minerals extraction typically occupies less than 0.1% of the EU Members' land areas, as compared to 40% for agriculture.[21] Land use for aggregate production is in many cases only temporary, and after completion of extraction activities the land can be returned to other uses. For instance in England: the ratio of land restored to land exceeded that prepared for quarrying in 2007 (1:0.9) and 2008 (1:0.7).[22]

In Germany, agriculture and forests occupy 53.0% and 29.8% respectively of the total land area. Of the remaining 17.2% land are, 6.7% is used for building and open spaces, 4.9% as traffic areas, 2.3% as water areas (rivers, canals, ports, seas and dykes), 2.6% in areas related to other utilisation and for recreational purposes, and 0.7% as industry operating areas. Regarding the category "operating areas" of 0.7%, only 0.0027% of the national surface is needed as (temporary) area for the sand and gravel industry.[23]

The figures demonstrate that the surface area required for quarries and pits in any country is less than 0.1% of the total land area, yet access to that minimal area must be ensured by a proper national minerals planning policy.

The time-related impact of various competitive land use categories on the availability of gravel deposits in Germany is illustrated in Figure 9.

Figure 9: A schematic diagram demonstrating that in Germany since 1850 access to gravel deposits has been reduced to almost zero (source: [German] Federal Institute for Geosciences and Natural Resources, 2009)



[20] Kündig et. al. (1997) already stated this issue in the 90er for Switzerland (more information is given in the Annex). Cp. also Department of Mining and Tunnelling (2004), l.c. Also: (German) Federal Institute for Geosciences and Natural Resources (2009). - Location and types of aggregates geologically present are well-known to geological institutes and aggregates companies.

[21] Cp. UEPG (2009), l.c.p.2. Also: Bleischwitz, R., Bahn-Walkowiak (2006): Sustainable Development in the European aggregates industry: a case for sectoral strategies.

[22] Mineral Products Association (2009): Sustainable Development Report, London, page 45: 'natural resources and enhancing the environment', different remarkable indicators.

[23] Kies- und Sand-Kompass (2009): Bundesverband der Deutschen Kies- und Sandindustrie, Duisburg.

3.1.3 Planning policy issues

Minerals planning based on land use management shall be done first at the strategic level (nationally) and then second at the operative level.[24]

At the **strategic level** spatial/temporal priorities for aggregate areas with regard to economic/policy criteria need to be defined. Furthermore, it is necessary that land use be planned according to pre-established priorities preserving future mining areas, also at regional/local level.

Land use planning is an integrative process, in which different claims of utilization (water, forest, nature conservation, minerals etc.) are subjected to an evaluation process on the basis of which the land use planning authority identifies areas. This usually (depending on country area etc.) is done at the regional/local (**operative level**) level but has to be *interrelated* to the strategic level. Permitting procedures *should* be based on such land use plans. Area development plans may in themselves in some situations also create access to mineral deposits.

Regarding aggregates the land use planning authority - if minerals are considered in the planning process - identifies areas where in principle no minerals extraction will be allowed, areas where extraction may be allowed, but is subject to certain conditions and in areas where in principle extraction will be permitted. Such spatial planning should account for "export" of aggregates into adjacent local markets that are lacking their own raw material deposits or have an insufficient number of deposits. Neither should a Natura 2000 or similar conservation designation *a priori* prevent the planning of an extraction area.

From a minerals development point of view it is crucial that information relating to mineral deposits is entered into the land use databases at an early stage to ensure that minerals issues are considered in all land use planning decisions. There is a general need to progressively fill gaps in the geological knowledge of aggregate deposits in Member States.

National, regional and local aggregates planning policies need to take account of:

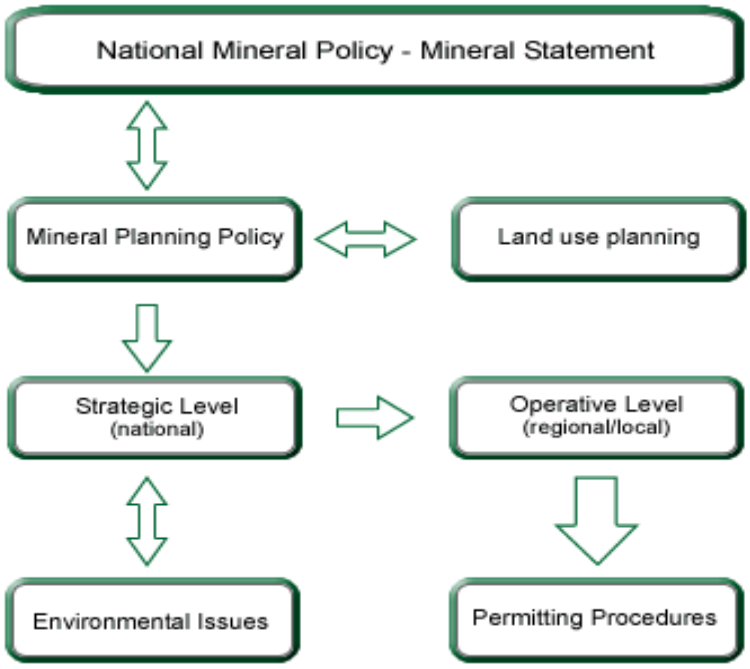
- Local geology, whether or not hard rock or sand & gravel are present geologically (at surface, as underground mining is generally not commercially viable for such materials).
- Whether the deposit is of adequate quality, ideally based on some exploratory boreholes.
- Whether or not there is adequate physical unoccupied land surface area over and near (for access routes) these deposits.
- Whether or not the deposits are in potentially sensitive areas due to being protected areas (Natura 2000) or of high scenic/amenity value, though such designations should not *a priori* prohibit aggregate extraction activities.
- Distance from urban, highly populated or industrial areas where there would be large aggregates demand.
- The road, rail or waterway infrastructure for transporting the aggregates from the point of excavation to the point of usage (which may in a few cases be cross-border, for example from Alsace, Baden-Württemberg and North-Rhine-Westphalia into the Netherlands and Belgium, from Scandinavia to Central Europe, and cross-border between immediately adjacent countries).

The minerals planning policy is part of the national minerals policy framework. In the context of this framework at national level a minerals (aggregates) planning policy must be developed considering strategic issues which then are interrelated to the regional/local (operative) planning level. This is also an important hierarchical planning principle: the planning process starts at (for instance) 1:100.000 and goes to the detailed scale (regional: 1:25.000; local 1: 5.000). The German web portal www.GisInfoService.de is an example of such a system. This is a necessary

[24] Cp. Department of Mining and Tunnelling (2004), l.c. Also: Roberts, P. W., Shaw, T. (1982): Mineral resources in regional and strategic planning, Aldershot: Gower Technical.

step to consider minerals equally. Permitting procedures (aggregates) shall be linked to such plans, to use all existing information (e.g. quarry zones) and - to streamline the permitting process.

Figure 10: National Mineral Planning Policy - Schematic Diagram (Tiess, 2010)



3.2 Analyses of minerals (aggregates) planning policies

Analysis is done according 3.1. In the following a *summary* of planning policies of different EU-Member States is listed according three categories, i.e. “strategic and operative planning”, “planning approaches” and “others”:

Strategic and operative planning

Austria: Austrian Minerals Resource Plan, plan is linked to regional land use planning (responsibility: provinces).

Cyprus: National plan regarding the need for minerals up to 2025. Quarrying zones are identified at the national level.[25]

Czech Republic: The management of mineral resources is at two levels: A State raw material policy, enforced and applied through legislative and economic tools, and A Regional raw material policy, employing land development planning, to be governed by the civil engineering act. [26]

Finland: The Minerals Strategy (also covering aggregates) is currently under preparation (due to be published at the end of 2010).

Greece: Minerals are considered in National Land Plan, designation of quarry zones at the prefectural level.[27]

Germany: Land use planning law at national level (though sometimes not for all minerals), considering minerals and obliging the provinces and districts to carry out land use plans.

[25] National plan was prepared in 2003 (LCU, 2010).

[26] Department of Mining and Tunnelling (2004), l.c. , p16. The Raw Material Policy of the Czech Republic identifies the need for a land development plan covering a large area as a tool for securing the long term needs of the region in terms of mineral resources. However question arises, what has happened, no information in 2010 found.

[27] The question arises: to what extent?

Designation of quarry zones in land use plans at Länder-level (Vorbehalts- und Vorranggebiete).

Denmark: Land use planning law at national level, considering minerals and obliging districts to carry out land use plans.

Sweden; Land use planning law at national level, considering minerals and obliging districts to carry out land use plans.

Planning approaches

Belgium: at regional level, Flanders (comprehensive);

France: Departments are obliged to carry out "Schemas Departementaux des Carrieres".

Italy: Practice varies between regions. Under national law, each region is entirely responsible for preparing their own mineral and planning legislation.

Netherlands: provincial land use plans, considering aggregates and interrelated to local plans.

Portugal: Sector plans at national level were considered based on land use planning law, which should allow guidance for preparing plans at local level.[28]

Slovenia: According the National Mineral Resource Programme a general plan and individual mineral resource management plans shall be developed.[29]

Spain: No national plan exists, since regions are responsible for mineral resources management. Planning practices are very different between regions. In few of them, a specific approach to aggregates quarrying was developed. Some other have a special mining and quarrying plan but not integrated with land planning. Most of the 17 regions do not have integrated extraction planning. Spain also reported that local municipalities, even though not legally part of the planning process, can have a very significant impact in delaying or preventing developments even when approved by all the statutory authorities.[30] On the other hand, a recent legal development of a Natura 2000 area (Southwest Park) near Madrid, where there is a strong collaboration between the aggregates sector, the Regional Government and other stakeholders, has led to a Natura 2000 site management plan which addresses, inter alia, the development of extractive activities, subject to certain specific conditions and prescriptions, such as a zoning that defines the permitted areas for extraction. Now 25 extraction sites are operating in that area.

Others

Albania, Bulgaria, Estonia, Finland (some municipalities), *Hungary, Latvia, Lithuania, Norway* (some municipalities), *Poland* (from a planning perspective seen), *Rumania, Slovakia* are providing little consideration.

Regarding this summary most of the European countries reviewed do not have a clear developed national minerals policy/strategy[31] (one of the crucial issues identified in the EU-study 2004). According to the discussion in section 3.1:[32] if there is no clear national minerals policy frame work, there also will be (at least basically) no strategic planning for minerals at

[28] Department of Mining and Tunnelling (2004), l.c. However question arises, what has happened, no information in 2010 found.

[29] Department of Mining and Tunnelling (2004), l.c. However question arises, what has happened particularly to land use planning; no information in 2010 found.

[30] Furthermore: A recent law in Spain, Law 1/2010, for the Basque Region has prohibited new extraction sites into environmental protected areas. It means that 29 existing sites will be closed in a near future. Most of the regional mining and quarrying suitable geological deposits are now sterilized, and then future aggregates supply for this region will be necessarily from the surrounding regions.

[31] Department of Mining and Tunnelling (2004), l.c. And also Land Use Consultants (LUC) 2010, for instance: No Minerals Policy/Strategy in Belgium, Germany, Italy or Norway but in the UK at a national and regional level, in Austria at national level and in France at regional level.

[32] Minerals planning policy as part of a national minerals policy framework; strategic (national level) and operative (regional/local) planning

national level which then will influence the detailed planning process at the lower (operative) level, i.e. regional and/or local level.

Based on the accessible information[33], there are very few examples of minerals policies at national level. Regarding the regional or local level of the different countries the situation is very heterogeneous. There are some countries considering aggregates planning at regional and/or local level in some regions giving aggregates priority or less priority. Moreover, there are a number of countries which do not at all consider minerals/aggregates in the planning process.

Austria is preparing a National Mineral Resource Plan (which will be finalized in 2010) which is interrelated to the regional land use planning. *Cyprus* has a national minerals plan including quarrying zones (probably also depending on the country area) established. According to information collected in 2004, *Portugal* considered sector plans at national level, which should allow guidance for preparing plans at local level.

Countries like *Germany, Denmark, Netherlands and Sweden* have a national land use planning law, which is balancing the different utilization claims including minerals and detailing the planning process at regional and local process. According to *Danish* land use planning law, the regional land use planning authority has to take into account the national objectives and establishes guidelines for a framework for municipal planning. The Danish EIA procedure is *integrated* in the planning process at the regional level. The regional plan also ensures "extraction of raw materials". The local authority is obliged to designate areas for future exploitation of mineral resources. This approach will obviously streamline and facilitate the permitting process. In the *Netherlands* local government is asked to adjust its Local Land Use Plan if "extraction sites" are designated in the Regional Spatial Plan. If the local government refuses to cooperate, they can actually be forced to do so. Even if the local government cooperates, the estimated time for this procedure is about 45 months. If no "extraction sites" exist, but "extraction zones" are designated in the Regional Spatial Plan, the estimated time for this procedure might take up to 5.5 years.[34]

The County Administration Board in *Sweden* is the authority responsible for issuing extraction permits for non-concession minerals e.g. quarries for crushed aggregates and sand and gravel pits. In addition, the Board compiles inventory maps of sand, gravel and stone resources in co-operation with the Geological Survey. The "Inventory Plans" detail mineral resources and indicate whether extraction would be allowed in principle. The Board is responsible for the supervision of planning and building activities in the county and must co-operate and assist local municipalities in their planning work. The main purpose of an Inventory Plan is to identify sand, gravel and stone resources over a certain area (not necessarily conforming to administrative boundaries), and also to consider issues of nature conservation and to promote the efficient use of resources. The counties make assessments of the future needs of the county in relation to anticipated expansion, which is assessed in consultation with municipalities who plan on a 10-15 basis. They also examine issues of groundwater protection and nature conservation.[35]

Regarding the strengths and weaknesses of land use planning for minerals extraction in specific countries[36]

The Managed Aggregates Supply System (MASS) in *England* is an example of good policy practice at national level. Steady and adequate supply is declared essential in England through policy MPS1. MASS exerts discipline on the planning system/planning authorities to do everything that they can to ensure that supply of aggregates is delivered. This system was established over 30 years ago and has been refined several times. Throughout this time period, minerals supply has been maintained. However, as a result of recent changes and the introduction of an extra level of bureaucratic control (the Regional Assemblies), which allows for an additional level of political interference, the system is no longer performing well. Whilst this

[33] Department of Mining and Tunnelling (2004), l.c. and LUC, 2010.
[34] Information regarding Denmark and Netherlands from: Department of Mining and Tunnelling (2004), l.c.
[35] Department of Mining and Tunnelling (2004), l.c., p141.
[36] Information according LUC (2010) and Department of Mining and Tunnelling (2004), l.c.

has not affected availability of materials so far, replenishment rates are very low and reserves in some parts of England are in *serious decline*.[37]

In *Belgium*, the Decree on Surface Mineral Resources ('Oppervlaktedelfstoffen Decreet') of 4 April 2003, followed by the Order of the *Flemish Government* of 26 March 2004, addresses the specific needs of the extraction industry. Plans of surface mineral resources ('Oppervlaktedelfstoffenplannen') look at the further development over a 25-year period and have to be evaluated every five years. One single plan looks at the entire Flemish Region; other plans look at separate but homogeneous extraction areas. However, according to comments from IMA-Europe, "the existing land planning legislation for mineral extraction is theoretical. Processes that are started cannot be completed because of political discussions. Furthermore, there are lots of restricted areas such as Natura 2000 areas which make the planning permission very difficult. Sectoral planning for nature and agricultural areas is being executed in Flanders, the extractive industry which is also active in these regions is frequently disregarded, and it is now very difficult to have a new area accepted to become a mining area."[38]

The main concerns mainly about land access in the Walloon region of Belgium are:[39] The staffs of the Civil service in charge of land use are by far too small to face all the demands (mainly for area plans modifications). The time limits to treat the demands are nearly always exceeded. The delays for the civil services to provide an answer are not binding. This means that without a decision nothing happens and that there is no incentive to respect the delays. The land use legislation is constantly under modifications (more than 25 modifications since 2000).

The strength of land use planning for minerals in *Austria* is that minerals are included into land use planning due to the close cooperation between federal and provincial authorities. The weakness is that, by law, land use planning is a matter of the provinces, and is handled inconsistently in different provinces.

The potential for aggregates extraction in *France* is taken into account in 'Schémas Départementaux des Carrières' (SDC's) for building, road construction etc. and the information is supposed to be brought to local authorities in charge of elaborating land use plans.[40] These departmental schemes of quarries are realised under the authority of the Prefect ('Préfet') by the departmental commission for and must include information on the supply of, and demand for, quarried minerals, and in particular for sand and gravel. This aids identification of possible new sources of aggregates, in order to meet existing shortages. But the law does not require taking into account the potential for mineral extraction before any decision on land-use. Hence the SDC is not a planning tool to preserve the access to mineral resources on the long-term. However, campaigns are often organized to increase local authorities' awareness of SDC's recommendations.

In principle the spatial planning system in *Germany* could be an adequate instrument to ensure a balance between all the different land uses. But in practice on regional or local community level often the raw material interests are not treated equally to other land uses. Potential for mineral extraction is not taken into account and it is one of the main issues the aggregates industry is working on. Mineral extraction is not an issue that the German authorities consider. Land use management designation reacts merely on requests of aggregates companies for designating land for extraction.

Under national law, each region in *Italy* is entirely responsible for preparing its own mineral and planning legislation. This has led to different systems of land use planning operating in different regions. For example: Emilia-Romagna prepares a Mineral Extraction Regional Plan (PAE) for aggregates, which is then interpreted at a detailed level through Municipal Extraction Activities Plans (PAEC). Other regions have no/less provisions to prepare plans at any level.[41] The main

[37] Information from Mineral Products Association, London, March 2010.
[38] See comments from IMA (RMI- questionnaire, 2010).
[39] Information received from Benoit LUSSIS, Département Ecologie industrielle FORTEA, (March 2010).
[40] The question arises: to what extent?
[41] Department of Mining and Tunnelling (2004), l.c.pp138-139.

weakness of land use planning for minerals in *Italy* is that this planning lasts for aggregates sector for a maximum of only 10 years (20 years applies only for the dimensional stone sector), and there is no protection against other uses of the land impeding the natural termination of the economic activity after 10 years.

Recently, a few regions in *Spain* are developing initiatives in order to integrate minerals into regional land uses strategies. But in those last cases, aggregates have a low level of priority compared to other utilization claims. Regional governments give aggregates very low priority in the few cases where land use planning for minerals extraction are developed. Besides that there is no public awareness of the importance of access to aggregate resources. Due to the NIMBY effect, the lack of a municipal license for many existing sites (that have both mining and environmental regional permits) can be a major source of legal uncertainty for companies.

Besides those mentioned above, there are many countries in Europe where land use planning does not at all include access to minerals.

3.3 Conclusions

As most countries do not have a clear defined National Minerals Policy there is mostly no strategic planning at national level. This is influencing the operative (regional/local) planning process (i.e. securing the access to local aggregates resources), aggregates are often not considered in land use planning.

A National Minerals Policy therefore first has to provide a "Mineral Statement" including two crucial issues: raising the awareness of society's needs for aggregates, and setting a balanced approach in the assessment of exploration and development of extractive activities. Too often nowadays there is unfortunately an assumed pre-disposition against extractive activities for over-riding negative perceptions in environmental or NIMBY (Not In My Back Yard) concerns. It is **essential that the Raw Materials Initiative address both these crucial issues**, and that it makes recommendations setting the right balance on both issues.

The National Minerals Policy should take into account the predicted medium to long-term demand for aggregates, ensuring that there is a sufficient stock of local reserves with access that is an inherent part of local spatial planning. Some will argue that, for prudence, designated areas should be up to three times that required to supply current local market demand. National aggregates planning policies should also take into account traditional waterway exportation routes (such as from North-Rhine Westphalia into the Netherlands).

Again, aggregates are often not considered in land use planning in most countries, and even where they are, there is an unbalanced pre-disposition against aggregates extractive activities, which needs to be clearly addressed in the conclusions of the Raw Materials Initiative.

Aggregates are a strategic resource for any highly developed economy and not available in abundance as is frequently assumed. Consequently the location of aggregate resources should be part of land planning data bases. Only on this basis can it be assured that proper consideration to aggregates is given in national or regional development planning. Of particular importance is thereby that long term access to these resources is assured.

If possible, a country should have both strategic planning (if possible: national or at least regional level) and operative planning based on land use plans. At strategic level it should be cleared which planning strategy will be the best one for a country. At regional and/or local level land use plans shall include aggregates by taking into account the specific issues of the aggregates industry. This is particularly true also at the municipal level, where in some countries (such as Spain) such bodies can delay or even prohibit projects even where they have no such authority to so do.

The planning horizon shall be both mid-term and long-term to make sure that access to local resources is really secured. This is the crucial issue of aggregates planning policy.

Chapter 4 Summary of Permitting Systems

Chapter 2 described the need for future aggregates in Europe, and for access to local resources. Chapter 3 described how this need for aggregates requires to be encapsulated in National Minerals Policies and in Minerals Planning Policies. Chapter 4 now defines the necessity for effective and timely permitting systems such that private enterprise can efficiently fulfil these aggregates needs. The basis for an effective permitting procedure derives from the national minerals policy, based in turn on a balanced and consolidated consultation between all affected stakeholders. Such a permitting procedure must provide an appropriate legislative and administrative framework.

4.1 The Basics

The aggregates industry is a capital intensiveness industry.[42] It needs legal certainty and effective permitting procedures. A national minerals policy has to be strongly linked to the *legislative and administrative framework*.[43] Usually the legal basic premise is a mining law. A good mining law should give aggregates projects the same public importance as other (spatial) interests (like for example nature conservation), and also the possibility for long-term permits (up to 30 years) to safeguard the risks in capital investment and other costs.[44]

Effective permitting procedures are procedures which are not time consuming but offer acceptable results for both operator and competent authority. Such procedures must also ideally operate efficiently, that is without unnecessary bureaucracy or time delays.

Indicators of effectiveness are: permitting procedures that are based on land use planning; using a "one-stop-shop" approach, a multi-authority parallel assessment or a standard application form.[45] The "one-stop-shop" principle does not mean that only one administration is in charge of whole process, but one administration should be in charge of coordinating the work of every involved department, and act as *one regulatory body vis-à-vis the applicant*. Parallel assessment is not as inherently effective as the "one-stop-shop" approach; however it offers considerable possibilities to streamline the permitting process where multiple permitting authorities are involved.

4.2 Analysis of permitting procedures

Analysis is done according the principles described in 4.1. Summary of permitting procedures can be found in table 1.

Table 1: Overview of permitting procedures (source: LCU, 2010; Department of Mining and Tunnelling, 2004)

	Linked to land use planning	Issues of efficiency						Remarks
		One-stop-shop		Parallel assessment		Standard application		
		Yes	No	Yes	No	Yes	No	
Albania:		x						A one-stop-shop process was launched in 2009 through the creation of the National Licensing Centre.
Austria:		x						Only EIA according EIA-directive. Besides that it was not possible to implement the one stop shop approach so far.
Belgium:						x		If the deposit is not covered by the land use plan, the changing of this plan has duration of many years.

[42] Cp. Wagner, H. (1997): Investigation of the supply of mineral raw materials from domestic reserves in Austria, Bd Vol. I – V, Wien, Leoben.

[43] Cp. Otto, J.M. (1999): Mining, Environment and Development, UN Conference on Trade and Development, USA.

[44] Tiess, G. (2010): Legal Basics of Mineral Policy in Europe, Springer-Verlag, in press.

[45] Basically also a standard application form. Department of Mining and Tunnelling (2004), l.c.

	Linked to land use planning	Issues of efficiency						Remarks
		One-stop-shop		Parallel assessment		Standard application		
		Yes	No	Yes	No	Yes	No	
Cyprus:				x				Consultations are undertaken in parallel, but for the town planning permit only
Czech Republic:								Most application processes have to run consecutively
Denmark	x	x						
Estonia:						x		Regarding one-stop-shop, discussions are being held on implementing such a system. A standard application form is used for minerals exploration (also aggregates)?
Finland:						x		A standard application form is used for minerals exploration and extraction (also aggregates)?
France		x				x		A one-stop-shop from an administrative point of view i.e. central administration copies the application to relevant bodies for comment, however in practice the applicant has to liaise with the individual bodies. Standard application form covering all aspects of permitting process
Germany	x							Complicated procedure regarding aggregates.
Greece:				x				Parallel assessment for certain sectors but it is not always guaranteed.
Hungary								Step-by-step licensing is undertaken, although authorities within the same step can act in parallel. Most steps are undertaken by the mining authority (involving 6-10 other authorities), but the environmental licence is issued separately.
Italy								Every public body involved in the authorisation process has to complete its own formal evaluation procedure
Lithuania		x						The Geological Survey of Lithuania is responsible for granting (in most cases) mining and exploration license, enforcement and monitoring of extraction activities and other related issues.
Netherlands	x			x				Parallel assessment: applicant for a permit for extraction can require that the primary authority coordinates any other permits required, undertaken at the regional level. One shop-stop: to be implemented in 2010, using an integrated environmental permit
Northern Ireland				x		x		Standardised application form only for mineral prospecting licence applications. Applicant is required to submit applications in parallel.
Norway	x		x		x		x	Pollution permit from county governor, operation concession from Directorate of Mining, planning permit from municipalities.
Poland				x				The parallel assessment process used in Poland means that the applicant's documents are transferred to different authorities at the same time i.e. concession authorities, environment protection agency, mining authority.
Portugal		x				x		Regarding one-stop-shop, applications are presented to DGEG and to Economy Regional Offices,

	Linked to land use planning	Issues of efficiency						Remarks
		One-stop-shop		Parallel assessment		Standard application		
		Yes	No	Yes	No	Yes	No	
								who coordinate the process and ask for opinions from environmental and land use institutions. However, problems related to decision difficulties of some environmental departments, which cause delays in the process.
Romania								Although numerous applications are submitted to the same authority, they are examined in sequence
Slovenia	x							
Spain		x				x		Few regional authorities have implemented effective one-stop-shop permitting. Commonly, the applicant has to liaise with individual bodies. Regions have standardised application forms but very ineffective administrative procedure in terms of timing. Many municipalities do not participate (voluntarily) in the quarrying permit scheme (EIA procedures) when public and interested party participation is required. Once the regional permit is granted, local authorities can use (illegally) municipal licenses to gain control and regulate the possibility of opening a quarry in their territory, due to the political cost of the NIMBY effect for Mayors. Some municipalities are generically banning extraction.
Sweden								Parallel assessment not normally undertaken as it is impractical for the applicant.
UK				x				This is something that is encouraged but not a legal requirement to do so. Industry is often reluctant to enter into parallel assessment preferring to obtain planning consent first to avoid unnecessary expenditure

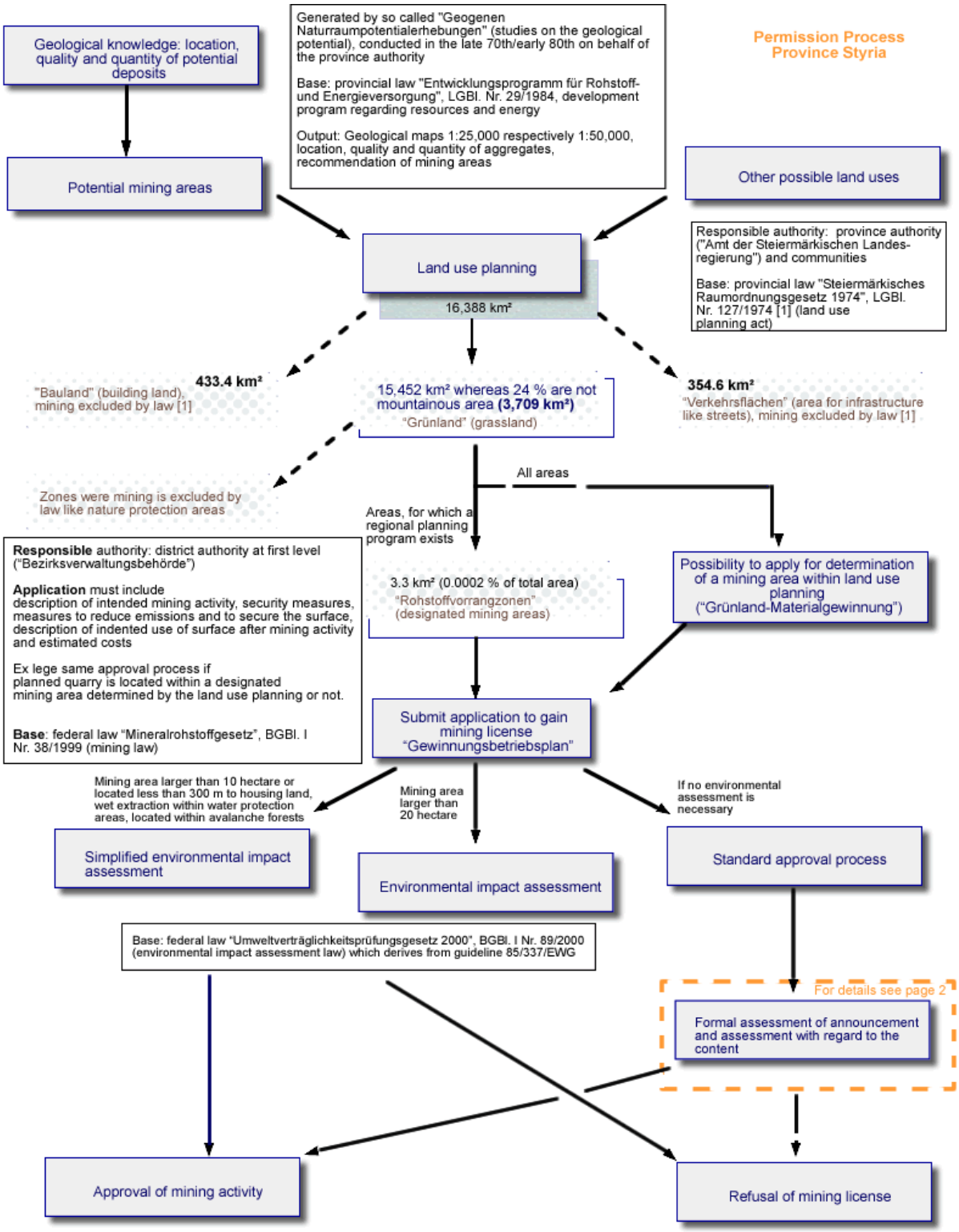
Regarding the summary, first the question arises whether aggregates permitting systems are **based on land use planning**. It may be seen from Tables 1 that only a few countries are actually linking the permitting procedures to land use plans, and then only if the question arises for some or all regions of a country. The latter is probably an exception.

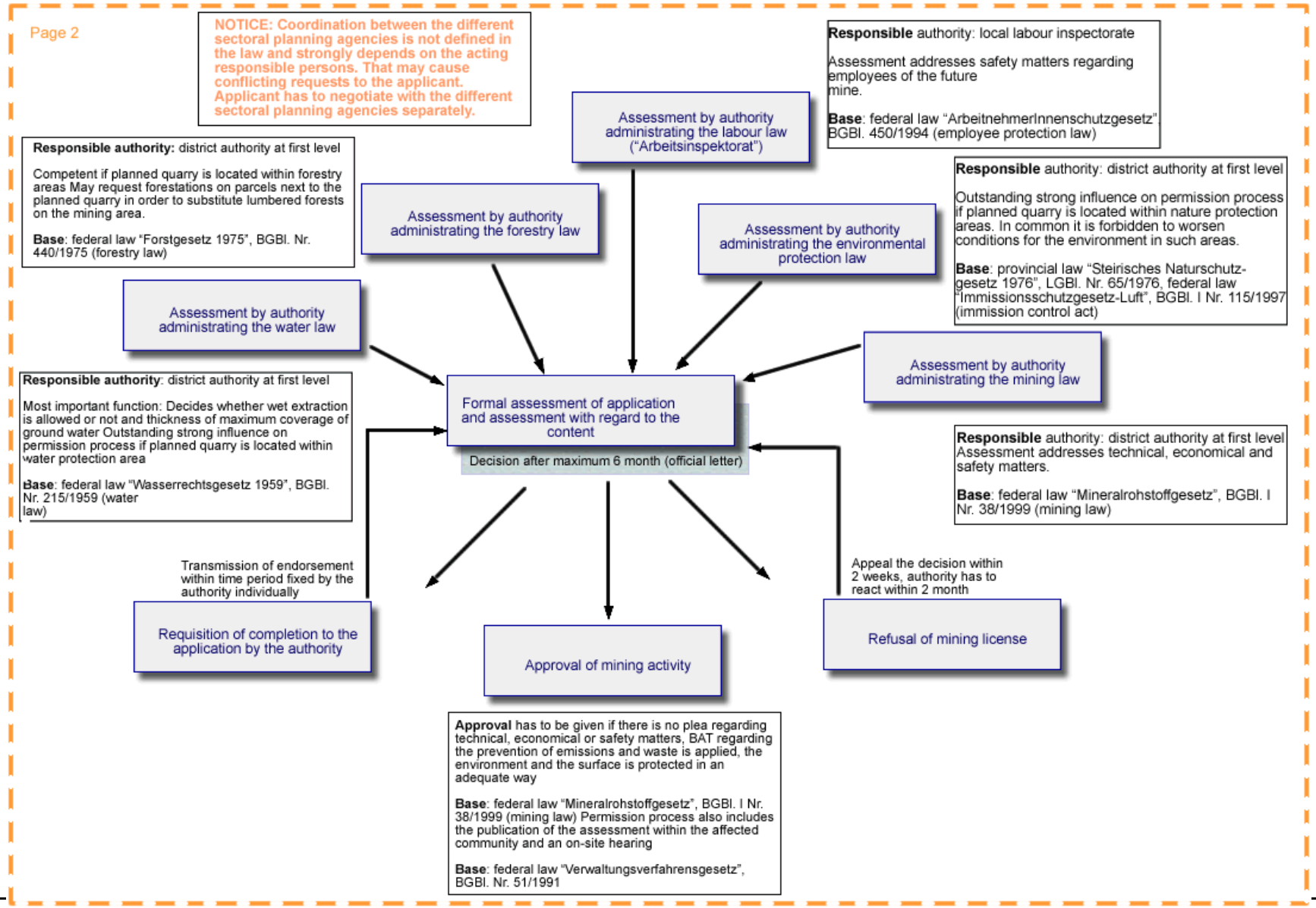
A good example on permitting procedures is *Denmark*, which has six regional authorities which have a regional raw material plans. The Danish *EIA procedure is integrated in the planning process* at the regional level. One very important aspect with regard to the permitting process for extraction is the fact that Article 8 of the Raw Materials Act specifically states that an *application for mineral extraction is also an application for permits* regarding Water Supply Act, Nature Conservation Act etc (a "one-stop-shop" approach). County authorities will assess and handle *all relevant legal issues in co-operation* with other responsible authorities as part of the permitting process. *The majority of these issues may already have been settled in connection with the regional spatial planning process* where the County Council is obliged to designate areas for future exploitation of mineral resources. This approach will obviously streamline and facilitate the application process.[46] Therefore this example is seen as best practice: permitting procedure is based on land use planning and includes the "one-stop-shop" principle. Also in Austria, Germany, Belgium and Netherlands, there are examples from different regions, where the permitting procedure is based on land use planning.

[46] Information from: Department of Mining and Tunnelling (2004), l.c.

For instance, to point out the complexity of a permitting procedure, an example from Austria (Styria) is shown:

Figure 11: Permitting procedure in Styria, Austria – Organigram (Kager / Heimburg, 2010)




Page 2
NOTICE: Coordination between the different sectoral planning agencies is not defined in the law and strongly depends on the acting responsible persons. That may cause conflicting requests to the applicant. Applicant has to negotiate with the different sectoral planning agencies separately.
Responsible authority: local labour inspectorate
Assessment addresses safety matters regarding employees of the future mine.
Base: federal law "ArbeitnehmerInnenschutzgesetz" BGBl. 450/1994 (employee protection law)
Assessment by authority administrating the labour law ("Arbeitsinspektorat")
Responsible authority: district authority at first level
Competent if planned quarry is located within forestry areas May request forestations on parcels next to the planned quarry in order to substitute lumbered forests on the mining area.
Base: federal law "Forstgesetz 1975", BGBl. Nr. 440/1975 (forestry law)
Assessment by authority administrating the forestry law
Assessment by authority administrating the environmental protection law
Responsible authority: district authority at first level
Outstanding strong influence on permission process if planned quarry is located within nature protection areas. In common it is forbidden to worsen conditions for the environment in such areas.
Base: provincial law "Steirisches Naturschutz-gesetz 1976", LGBl. Nr. 65/1976, federal law "Immissionsschutzgesetz-Luft", BGBl. I Nr. 115/1997 (immission control act)
Assessment by authority administrating the water law
Assessment by authority administrating the mining law
Responsible authority: district authority at first level
Most important function: Decides whether wet extraction is allowed or not and thickness of maximum coverage of ground water Outstanding strong influence on permission process if planned quarry is located within water protection area
Base: federal law "Wasserrechtsgesetz 1959", BGBl. Nr. 215/1959 (water law)
Formal assessment of application and assessment with regard to the content
Decision after maximum 6 month (official letter)
Responsible authority: district authority at first level
Assessment addresses technical, economical and safety matters.
Base: federal law "Mineralrohstoffgesetz", BGBl. I Nr. 38/1999 (mining law)
Transmission of endorsement within time period fixed by the authority individually
Appeal the decision within 2 weeks, authority has to react within 2 month
Requisition of completion to the application by the authority
Approval of mining activity
Refusal of mining license
Approval has to be given if there is no plea regarding technical, economical or safety matters, BAT regarding the prevention of emissions and waste is applied, the environment and the surface is protected in an adequate way
Base: federal law "Mineralrohstoffgesetz", BGBl. I Nr. 38/1999 (mining law) Permission process also includes the publication of the assessment within the affected community and an on-site hearing
Base: federal law "Verwaltungsverfahrensgesetz", BGBl. Nr. 51/1991

As the **"one-stop-shop" approach** is one of the key factors for streamlining the permitting process and duration, the question arises whether it could be applied in all countries. This is possible if the legal basis exists (such as in the Danish Raw Materials Act), if not, it is possible to apply the one-stop-shop approach on a voluntary or optional basis. The existing information indicates that there are only a few countries applying this approach for minerals. However experience shows that aggregates are not necessarily considered.[47]

For example in *Germany,* companies which fall under the Federal Mining Act (which usually excludes aggregates) and under the BImSchG (BundesImmissionsSchutzGesetz) have such a 'one stop-shop' system. Extractive activities which are permitted under other legislation (for example water), have no such arrangement if the permission is not granted by "Planfeststellung" or "Plangenehmigung" procedures.

A "one-stop-shop" process was launched in 2009 in *Albania* through the creation of the National Licensing Centre, which has the duties of the promotion and publication of all the permits for the mining rights.

Besides that, there are certain countries applying this approach only for minerals issues or environmental issues. The Geological Survey of *Lithuania* is responsible for granting (in most cases) mining and exploration licence, enforcement and monitoring of extraction activities.[48]

Regarding the "one-stop-shop" approach in *Portugal*, applications are presented to DGEG and to the Economy Regional Offices, which coordinate the process and ask for opinions from environmental and land use institutions. However, there are problems related to decision difficulties of some environmental departments, which then cause delays in the process.

The *Netherlands* are planning to implement an integrated environmental permit in 2010, it is assumed on a legal basis, but this has yet to be proven. Also in *Estonia*, discussions are being held on implementing a "one-stop-shop" system.

Again, it should be emphasised that a "one-stop-shop" system does not necessarily require that there be only one permitting authority. Rather it does require, where there are multiple authorities, that these make their inputs to one central deciding authority which takes into account the conclusions of all the authorities concerned, and then comes to a balanced view on granting (or not granting) a single overall permit. The big advantage of that situation is that the final decision is efficient, balanced and timely.

Regarding **parallel assessment,** such consultations for instance are undertaken in *Cyprus*, but for town planning permits only. In *Hungary* step-by-step licensing is undertaken, although authorities within the same step can act in parallel. Most steps are undertaken by the mining authority (involving 6-10 other authorities), but the environmental licence is issued separately.

The parallel assessment process used in *Poland* means that the applicant's documents are transferred to different authorities at the same time i.e. concession authorities, environment protection agency, mining authority. In our opinion, this method could indeed cut the time of processing by authorities. Parallel assessment is encouraged in the *UK,* but it is not a legal requirement to do so. Industry is often reluctant to enter into parallel assessment, preferring to obtain planning consent first to avoid unnecessary expenditure.

In all other countries reviewed, *permitting procedures* are done in **sequence** and on different levels. This naturally has the highly undesirable effect of adding hugely to the time durations required to get all the permits required.

Decoupling between regional permit scheme and local licensing is a major concern for the industry in some countries. An "illegal" use of the municipal licenses by municipalities is described in Spain in order to have the "final cut decision" at local level even if all the required regional (quarrying, environmental, etc) permits for a quarry are granted, and municipalities have the possibility and the right to participate in the framework of regional permitting.

[47] Department of Mining and Tunnelling (2004), l.c. And also according information from LCU (2010).
[48] Department of Mining and Tunnelling (2004), l.c.

Experience shows that there are often many inappropriate reasons for permit refusals. In many cases, permitting is unjustifiably declined, due to reasons including an overall lack of planning, a single house or building being granted planning permission that sterilises an entire quarry or pit area; excessive or unjustified "NIMBYism"; unreasonable attitude on conservation or biodiversity that shuts out the possibility of quarrying, despite the industry's proven track record.

Finally, some specific national difficulties were cited. In *Ireland*, the Environmental Protection Agency sets environmental conditions for minerals extraction, while the Local Authority sets Planning Conditions, with an associated Planning Board for Appeals: this requires a multi-stage permitting process that can unnecessarily stretch for many years. Such multi-body permitting systems may also require several partially overlapping environmental impact assessments, adding unnecessarily to costs.

A *poor example* of permitting systems is that demonstrated by the new powers being developed by the Environment Agency in *England*.[49] Because minerals can only be worked where they occur and because a steady and adequate supply of minerals is essential, decisions regarding the location of mineral working were hitherto always taken on the basis of a balance of the interests that might be affected by an extraction operation. Clear policy and guidance was available to decision makers to assist in that process. However, the UK is now moving towards the position where many of the issues that were previously taken into account in the planning process are being detached and given to another agency (the EA), which is controlled by a different Government department from that which controls planning. The EA are being given powers to effectively prevent mineral working going ahead even though planning permission may have been granted. The EA has no remit to consider the issue of its permits in relation to "minerals can only be worked where they occur" and "an adequate and steady supply of minerals is essential". Those permits are also of short duration when the minerals industry needs long term certainty to justify investment. The process of introducing the new permitting systems is showing that the EA do not have the appropriate technical skills to deal with it. The production of guidance on many aspects of their new role (essential, particularly for those who do not have the expertise to exercise their new roles) is lagging behind the introduction of the legislation which requires them to do it. The reinstatement of planning permission as the pre-eminent mineral operating consent is regarded as essential together with a statutory role for other regulators as consultees in that process.

The worst scenario is a deficient or inconsistent permitting system that may allow unpermitted operators to operate, in some cases with impunity. High level requirements and controls for quarrying permits and sites collide with little or no requirements and inexistent or very weak control for illegal operators, creating an artificial distortion of the competition. This severely distorts market, as the unpermitted operators can skimp on compliance costs (safety, environment, etc), often bringing the broader aggregates industry into disrepute. This situation is quite common in some Central and South-Eastern European countries (and is indeed a specific focus of the SARMa-project[50]), but also exists to a lesser extent in some Western European countries. That situation has been further exacerbated in some situations by public bodies buying aggregates from unpermitted operators without enforcing compliance. It is essential that permitting authorities are rigorous and consistent in enforcement.

From these analyses, best practice in permitting systems is very apparent, and what action each country needs to take to introduce an effective and timely system.

4.3 Conclusions

Few Member States have efficient and timely "one-stop-shop" permitting systems. In many Member States, multi-body permitting regimes exist for historical, political or administrative reasons, often with differing perspectives and areas of responsibility. The authorisation process is complex and very slow in most countries, taking typically 5-10 years to obtain authorisation for a new quarry, sometimes longer, and permissions then granted may be for only a similar timescale, too short to

[49] Information from: Mineral Products Association, 2010.
[50] http://www.sarmaproject.eu/

justify the capital investment. In some countries, permitting may be so deficient as to allow unpermitted operators to thrive. These aspects also need to be addressed and rectified as part of the Raw Material Initiative.

All permitting considerations have to be linked to the geological presence of aggregates, and the physical ability to get access. In principle, each Member State should have a permitting system that allows efficient and timely granting of permissions for responsible projects, which entails:

- Clear and appropriate legislative structure, with clear designation of authorities and competences.
- Rationalised application process through one authority (as a "one-stop-shop"), or at least well co-ordinated procedures between authorities (regional and local), if there are several. Integration of the permits into a single procedure is a key point.
- Time-limited procedures for clarification by all stakeholders of applications, such that the overall process has to be completed within a 3 year timescale (there are many situations now which take 10-15 years, which few companies can afford).
- A reasonable balanced approach conserving the environment, biodiversity, etc, but equally recognising the essential benefits of aggregates, plus the jobs created and the associated economic support for rural areas.

When granting permissions, for hard rock quarries a 50-year timescale should typically be considered. No permissions should be less than 15 years otherwise the major capital investment cannot be justified. Even in such cases, renewals for similar periods should be anticipated from the outset. For sand & gravel pits, the permission timescale should be 10-50 years depending of the extent of the deposit, with further renewals anticipated proportionate to the scale of the deposit. When granting permissions, the duration of these should always be in line with the lifetime of the deposit, as sustainability requires the extraction of the total deposit.

Permitting authorities should be acutely aware of the potentially sterilising effect of granting permission for even a single dwelling or other building on or close by to a planned or actual quarry or pit area.

Whatever planning system is used, fixed timescales should be set by which planning authorities must come to decisions. In some countries, the system can be stretched almost indefinitely by planning authorities by a last-minute need to seek further data, inappropriately resetting the timescale of steps within the process. There needs to be an appeal process at the highest level, determined by experts in the fields concerned, who can make objective decisions away from politics.

In each country, it is useful to provide *organisational charts* related to land use planning and permitting process. Based on such a schematic diagram, structural issues of efficiency and inefficiency can be discussed and improvements made.

Chapter 5 Report Conclusions and Recommendations

The key conclusions which come from this Review relate to:

Future Demand for Aggregates in Europe

- The demand for aggregates in tonnes/capita increases according to economic development in each country, reaching a plateau at very high levels of GDP/capita. Therefore once the current economic recession is over, demand for aggregates in Europe will increase steadily to a least 4 billion tonnes in the medium term.
- Even with increased recycling in countries where it is so far relatively undeveloped, the total of recycled materials is unlikely to exceed 10% of total aggregate supply in the medium term. Marine and manufactured aggregates together currently comprise only 4% of total aggregate supply. Therefore future supply of aggregates in Europe (up to 85%) will still have to come from natural aggregate resources.
- Due to their bulk and weight, aggregates should be produced close to the point of usage to minimise transport distances, CO_2 emissions, environmental impact, transport congestion and associated costs.
- National governments should be encouraged to improve data collection on the aggregates industry, and thereby to establish short-medium and long-term aggregate demand and supply scenarios for the different development regions taking into account future development plans, also including natural waterway export routes to adjacent markets which lack aggregate deposits. These development plans should not *a priori* exclude areas with Natura 2000 or similar conservation designations.
- There is also a general need to progressively fill gaps in the geological knowledge of aggregate deposits in the Member States.
- There is also a general need for the aggregates sector to further improve the accuracy and timeliness of data collection and reporting.

Minerals (aggregates) policy at EU- and national level

- At EU-level, the importance of the reliable long-term supply of aggregates in the national economic context needs to be clearly recognized, and all Member States should be encouraged to implement measures to ensure this longer term supply from local resources as far as is practicable..
- Only a few Member States have a clear, structured National Minerals Policy. This issue is affecting both minerals planning policies (strategic and operative level, minerals mostly not considered in the planning process) and also the permitting processes (inefficient, ineffective and time-consuming).
- To implement a National Minerals (Aggregates) Policy in Member States is crucial. Each National Minerals Policy must
    - Create an awareness of society's dependence on minerals, and specifically for aggregates, and in the case of aggregates of the need for access to local resources.
    - Point out the importance of the secure supply of minerals, and specifically of aggregates, for society, and promote a balanced approach in the assessment of conflicting interests between minerals development and other land use issues.

National (Regional and Local) minerals (aggregates) planning policy

- Aggregates are not considered in land use planning in most countries, and even where they are, there is an unbalanced pre-disposition against aggregates extractive activities,

which needs to be clearly addressed. Given the geologically-determined locations of aggregate resources, these deserve the same status in land use planning as other issues, such as water or other environmental resources, to ensure long-term access to mineral resources.

- Generally speaking, aggregate resources are not mapped in detail unless the local aggregates association has specifically made inputs to the national or regional development plans, and even when this has been done, access requirements can sometimes be ignored by the planning authorities, a situation which needs be addressed and rectified.
- Minerals planning policy should address strategic (minerals) planning (if possible at national or at least regional level) and operative (minerals) planning based on land use plans. At strategic level it should be decided which planning strategy will be the best one for a country. At regional and/or local level land use plans shall include aggregates by taking into account the specific issues of the aggregates industry. The planning horizon shall be both mid-term and long-term to ensure that access to local resources is really secured. This is the crucial issue of aggregates planning policy.
- National, regional and local coordinated aggregates planning policies need to take account of:
  - Local geology, whether or not hard rock or sand & gravel are present geologically (at surface, as underground mining is generally not commercially viable for such materials).
  - Whether the deposit is of adequate quality, ideally based on some exploratory boreholes.
  - Whether or not there is adequate physical unoccupied land surface area over and near (for access routes) these deposits.
  - Whether or not the deposits are in potentially sensitive areas due to being protected areas (Natura 2000) or of high scenic/amenity value, though such designations do not *a priori* prohibit aggregate extraction activities.
  - Distance from urban, highly populated or industrial areas where there would be large aggregates demand.
  - The road, rail or waterway infrastructure for transporting the aggregates from the point of excavation to the point of usage.

Effective permitting procedure

- Incorporation of aggregate deposit information in land use planning data banks is necessary to facilitate efficient permitting procedures.
- Few Member States have efficient and timely “one-stop-shop” permitting systems. In many Member States, multi-body permitting regimes exist for historical reasons, often with differing perspectives and areas of responsibility.
- The authorisation process is complex and very slow in most countries, taking typically 5-10 years to obtain authorisation for a new production site, and furthermore permissions are often granted for only similar timescales, too short to justify capital investment.
- In some countries, deficient or inconsistent permitting systems can allow unpermitted operators to thrive: any such deficiencies or inconsistencies need to be rectified.
- All permitting considerations have to be linked to the geological presence of aggregates, and the physical ability to get access. In principle, each Member State should have a permitting system that allows efficient and timely granting permissions for projects, which entails:

- Clear and appropriate legislative structure, with clear designation of authorities and competences.
- Rationalised application process through one authority (as a "one-stop-shop"), or at least well co-ordinated procedures between all authorities if there are several. It is important that local authorities, which even if not involved by law, are included in this process as interested parties under EIA procedures.
- Time-limited procedures for clarification by all stakeholders of applications, such that the overall process has to be completed within a 3 year timescale (there are many situations now which take 10-15 years, which few companies can afford).
- A reasonable balanced approach conserving the environment, biodiversity, etc, but equally recognising the need for aggregates, and the regional benefits created. Extraction projects should have at least the same importance as other spatial interests, and in no case should extraction be prohibited *a priori* even in protected areas. Project decisions should generally be taken at a high level, the evaluation balanced in the broader public interest.
- When granting permissions, for hard rock quarries a 50-year timescale should typically be considered. No permissions should be less than 15 years otherwise the major capital investment cannot be justified. Even in such cases, renewals for similar periods should be anticipated from the outset. For sand & gravel pits, the permission timescale should be 15-50 years depending on the scale of the deposit, with further renewals anticipated also proportionate to the scale of the deposit. When granting permissions, the duration of these should always be in line with the lifetime of the deposit: sustainability requires the extraction of the total deposit.
- Permitting authorities should be acutely aware of the potentially sterilising effect of granting permission for even a single dwelling or other building on or close by to a planned or actual quarry or pit area.
- Whatever planning system is used, fixed timescales should be set by which planning authorities must come to decisions. In some countries, the system can be stretched almost indefinitely by planning authorities by a last-minute need to seek further data, inappropriately resetting the timescale of steps within the process. There needs to be an appeal process at the highest level, determined by experts in the fields concerned, who can make objective decisions away from politics.
- In each country, it is useful to provide *organisational charts* related to land use planning and permitting process. Based on such a schematic diagram, structural issues of efficiency and inefficiency can be discussed and improvements made.

Recommendations

- It is recommended that all conclusions of this Review be incorporated into the recommendations of the Raw Materials Initiative and be included in its final report.
- It is recommended that the Raw Materials Initiative should encourage appropriate actions by the European Commission to implement these conclusions in a timely manner as appropriate within all the Member States.
- Progress should be reviewed by a successor to the Raw Materials Initiative on an annual basis over the next 5 years to ensure that effective follow-up actions are put in place and efficiently implemented in all the Member States.

Chapter 6 References

Aggregates Business Europe (2008): Aggregates transportation alternatives, Vol 2 Issue 3.

Bleischwitz, R., Bahn-Walkowiak, B. (2006): Sustainable Development in the European aggregates industry: a case for sectoral strategies. p. 5–7. www.coleurop.be/.../Bleischwitz_Aggregates_Bruges2006.pdf

Department of the Environment (1995): Minerals planning policy and supply practices in Europe: main report, London

Department of Mining and Tunnelling University of Leoben (2004), Minerals Policies and Supply Practices in Europe, Final Report.

European Commission, DG Enterprise, Commission Working Staff Paper (2007): Analysis of the competitiveness of the non-energy extractive industry in the EU

European Commission's Guidance Document "Non-Energy Mineral Extraction and Natura 2000", Final Draft, January 2010.

European Aggregates Association (UEPG): The European Aggregates Industry – Annual Statistics 2006, also 2008.

Federal Institute for Geosciences and Natural Resources (2009): Raw materials demand of an

EU citizen. http://www.bgr.bund.de/cln_092/nn_335074/EN/Home/homepage_node.html?_nnn=true

Gocht (1983), Wirtschaftsgeologie und Rohstoffpolitik

Kager, J. / Heimburg, J., prepared for SARMa-project, 2010 (SARMa-Project (SARMa = Sustainable Aggregates Management Resources), http://www.sarmaproject.eu/

Kies- und Sand-Kompass (2009): Bundesverband der Deutschen Kies- und Sandindustrie, Duisburg

Kündig et. al. (1997): Die mineralischen Rohstoffe der Schweiz (The Raw Materials of Switzerland) Zürich

Hafedh Ben Arab (2006), Aggregates from Construction & Demolition Waste in Europe. http://www.uepg.eu/uploads/documents/pub-12_en-plaquette.pdf

Ministry of Commerce, Trade and Industry (1981): Concept for supply of Austria with mineral raw and base materials

Nötstaller, R., Wagner, H. (2007): Reflections on resource consumption and resource policy, Journal of Mining. Metallurgical, Material, Geotechnical and Planned Engineering

Otto, J.M. (1999): Mining, Environment and Development, United Nations Conference on Trade and Development, USA.

Rodriguez Chavez, M.-L../ Schleifer, J., ANTAG-project ("*Anticipation of the access to the aggregate resource by breaking present schemes on the long term*".), 2010

Siebert, H. (1983): Economic theory of natural resources, Tübingen

Sustainable Development Report, London 2009, page 45: 'natural resources and enhancing the environment', different remarkable indicators

Tiess, G. (2010): General and International Mineral Policy, Springer-Verlag, in press

Tiess, G. (2010): Legal Basics of Mineral Policy in Europe, Springer-Verlag, in press

UEPG Position paper, December 8, 2009, Securing access to non-energy mineral resources, and specifically to Aggregates

Wagner, H. (1997): Investigation of the supply of mineral raw materials from domestic reserves in Austria, Bd Vol. I – V, Wien, Leoben.

Wasserbacher, R.. Koller, W., Schneider, H. W. ; M. Luptáčik, M. (2007): The relevance of raw materials extraction to Austria's economy., Journal of Mining, Metallurgical, Material, Geotechnical and Planned Engineering

World Business Council for Sustainable Development (2009), The Cement Sustainability, Recycling Concrete. http://www.wbcsdcement.org/pdf/CSI-RecyclingConcrete-FullReport.pdf

Chapter 7 Annex

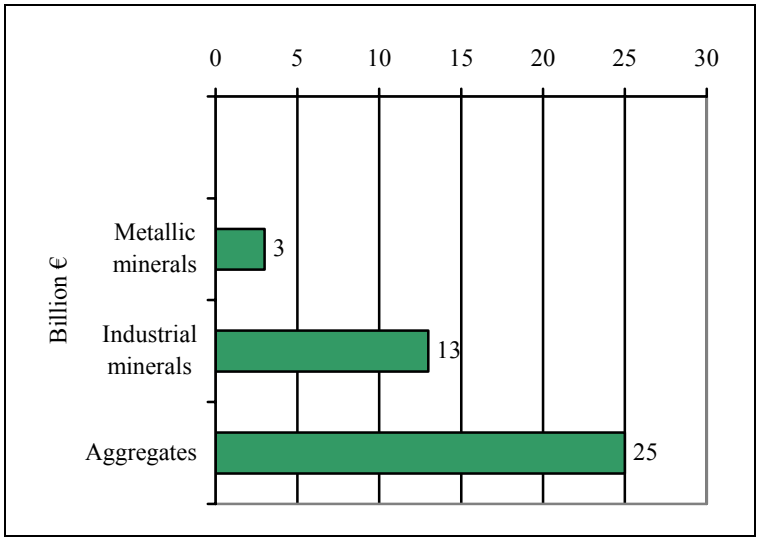
7.1 Additional information to Chapter 2

7.1.1 The Aggregates Industry in context

Figure 12 is showing the turnover of aggregates production & usage in Europe compared to all other minerals, illustrating the importance of the aggregates sector. Aggregates: € 20-25 billion (UEPG, 2010) Industrial minerals: Members of IMA-Europe - operate more than 810 sites throughout Europe. They offer direct employment to some 100.000 people and process an annual volume of some 100 million tonnes of industrial minerals, contributing a value of around Euro 13 billion to Europe's gross domestic product.[51]

Regarding of Metallic minerals: turnover is about €3 billion (European Commission [DG Enterprise], Commission Staff Working Document, 2007).

Figure 12: Turnover of aggregates production & usage in Europe compared to metallic minerals and industrial minerals (in billion €)



[51] http://www.ima-eu.org/industryprofile.html

Figure 13:Aggregate prices in € per tonne in different countries of Europe, averaging around €7-8/tonne (Source: Aggregates Business Europe (ABE), 2010)

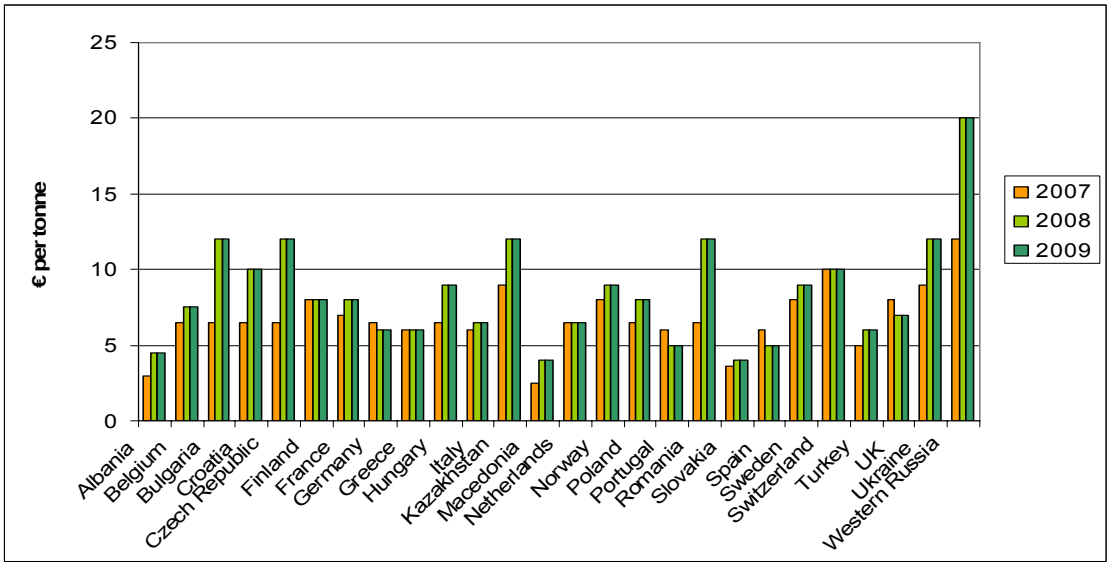


Figure 14: Estimated Tonnages 2009 v 2008, Data & reports at October Economic Committee, show overall 20% decline 2008-2009 to 2.86 billion tonnes Range was +5% for Turkey to -55% for Ireland (source: UEPG, 2010).

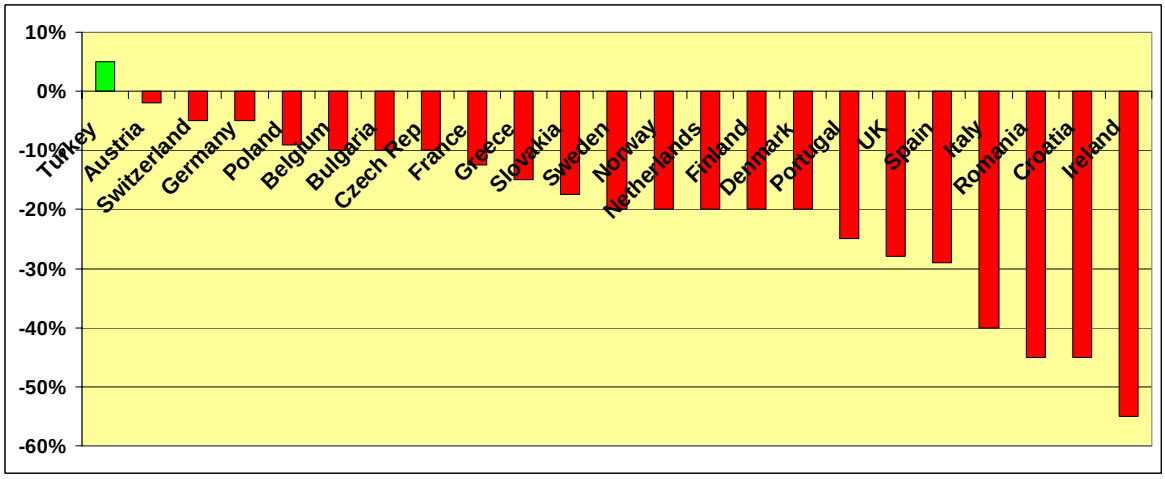


Table 2 is providing data from selected European countries, i.e. companies, sites, employees, production (UEPG, 2010).

Table 2: Aggregates production in Europe (2008), (source: UEPG, 2010) Production (millions tonnes - mt) – Best available country data

Country	Total number of producers (companies)	Total number of extraction sites (active quarries and pits)	Sand & gavel (mt)	Crushed Rock (mt)	Marine aggregates (mt)	Recycled Aggregates (mt)	Manufactured aggregates (mt)	Totals (mt)
Austria	960	1.290	62	32	0	4	2	100
Belgium	180	253	11	42	4	14	2	72
Bulgaria	200	100	18	22	0	0	0	40
Croatia	367	308	7	22	0	0	0	29
Czech Rep	219	489	27	44	0	4	0	76
Denmark	350	300	43	0	5	0	10	58
Finland	400	2.255	25	60	0	1	0	86
France	1.640	3.050	165	237	7	15	8	432
Germany	2.300	1.510	260	218	0	56	18	552
Greece	300	200	20	20	0	0	0	40
Ireland	150	355	25	25	0	0	0	50
Italy	1.796	2.360	225	135	0	5	3	368
Netherlands	65	225	46	0	54	24	0	124
Norway	690	713	15	52	0	0	0	68
Poland	2.044	1.786	131	49	0	22	1	203
Portugal	350	200	61	15	0	0	17	93
Romania	500	730	18	7	0	1	0	26
Slovakia	170	92	13	21	0	1	0	35
Spain	1.600	2.060	134	244	0	5	1	383
Sweden	985	1.802	19	67	0	7	0	93
Switzerland	350	505	37	5	0	5	0	47
Turkey	770	770	25	290	0	0	0	315
UK	450	781	55	114	12	53	9	243
Total	16.836	22.134	1.441	1.720	81	216	72	3.530

Some country data in detail:

Figure 15: Aggregates production in Croatia (t/annum) (Source: Croatian Association, 2010)

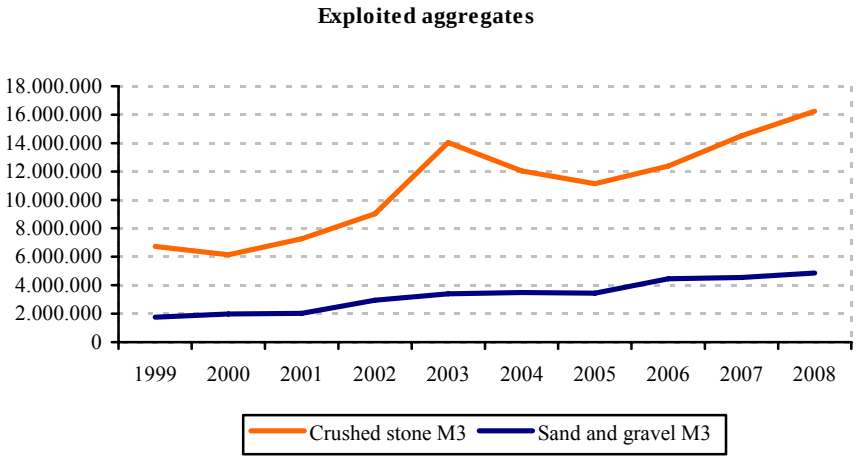
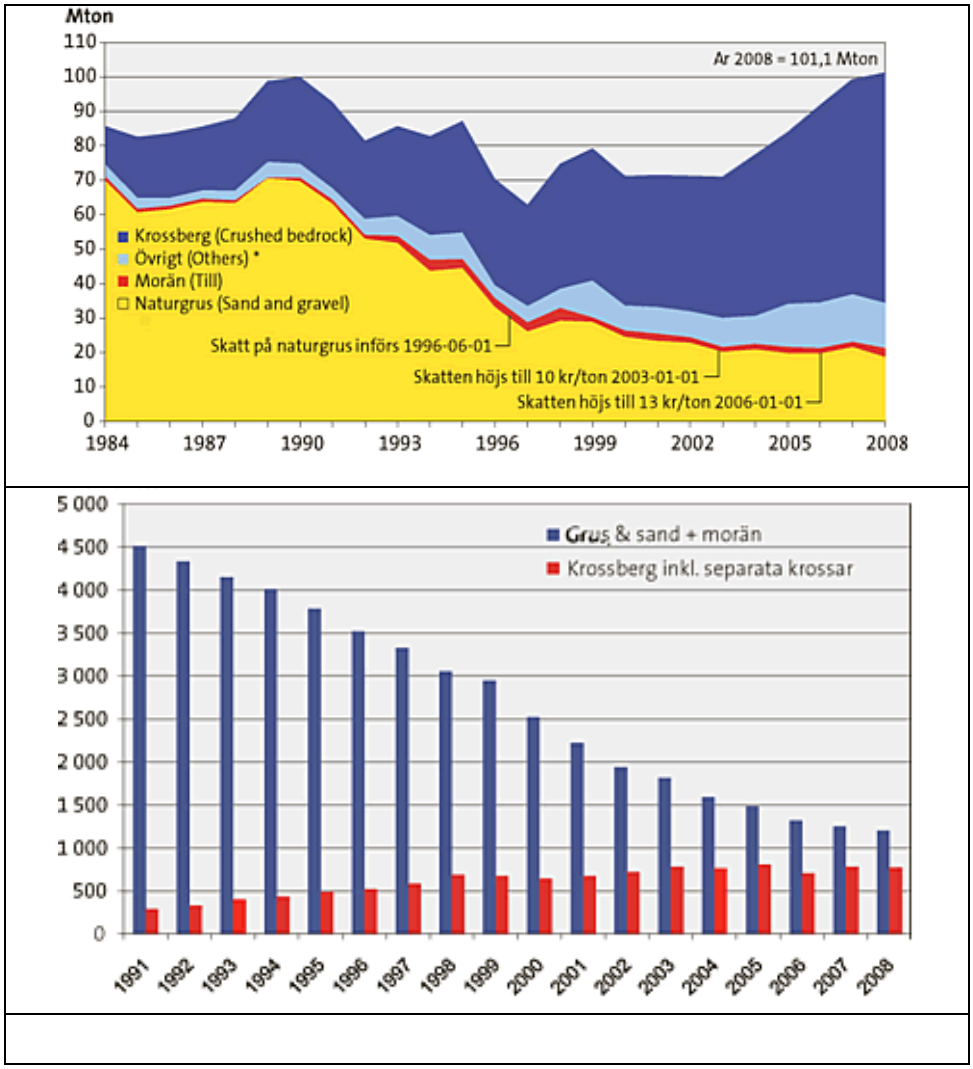
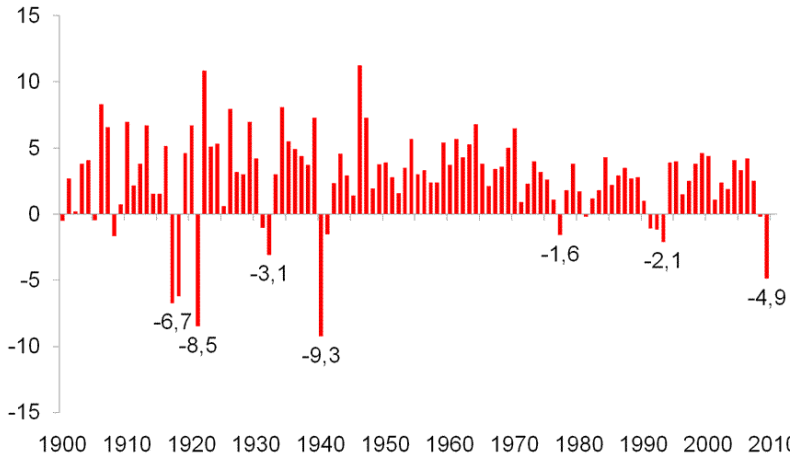


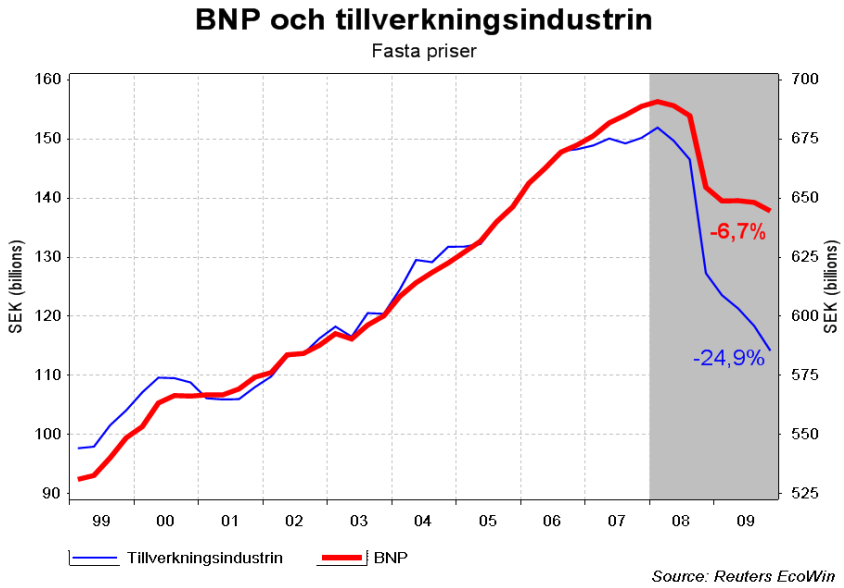
Figure 16: Aggregates production and GNP/GDP in Sweden (Source: Swedish Aggregate Producers Association, 2010)



GNP growth (%) 1900 - 2009



GNP and manufactory industry (blue)



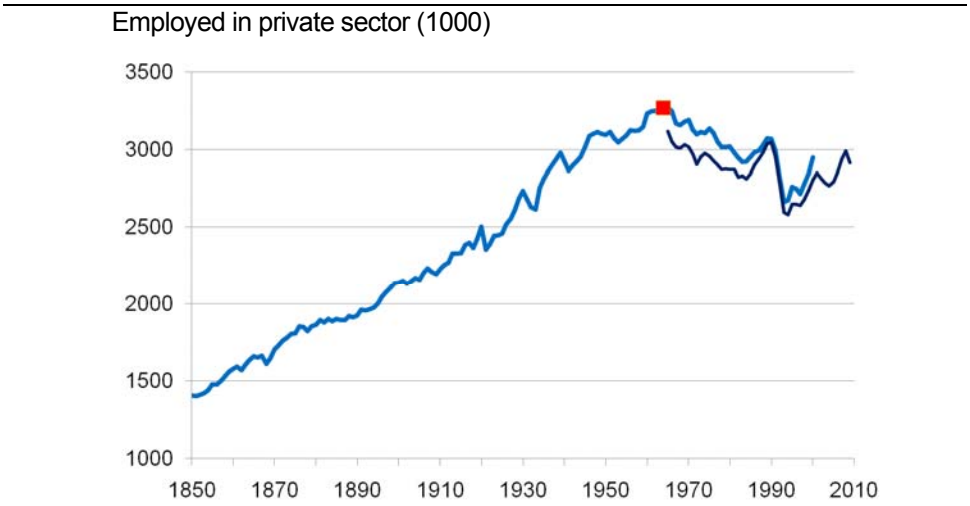


Figure 17: Aggregates consumption and GDP (annual growth %) in Bulgaria; 2009- 2013: estimated (Source: Bulgarian Association, 2010)

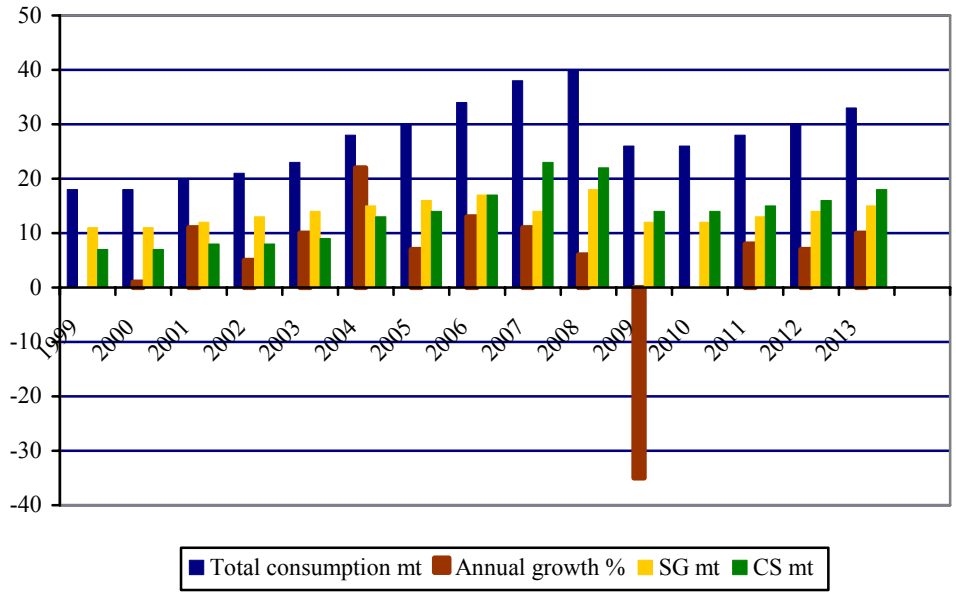


Figure 18: Sand & Gravel production in Germany (Source: German sand & Gravel Association)

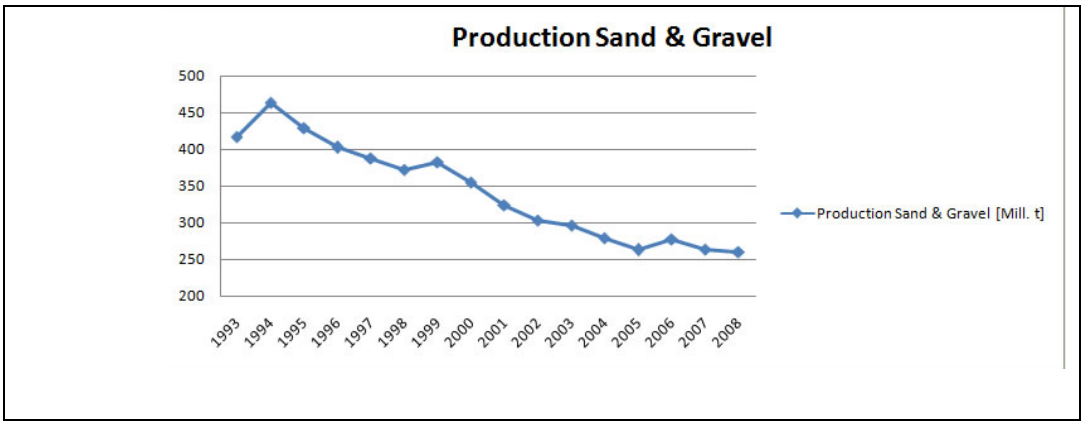
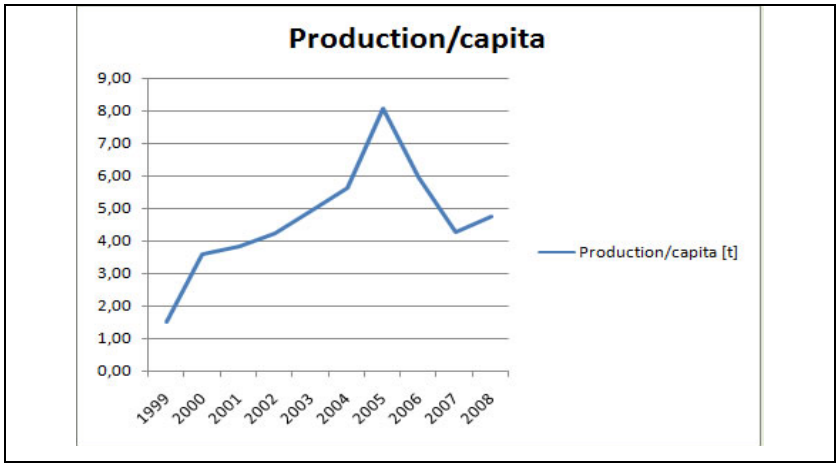


Figure 19: Per capita aggregates production in Hungary (Source: Kovács, Hungarian Office for Mining and Geology, 2010)



7.1.2 Issue of Recycling

Recycling of aggregates is important in different ways. Recycling reduces the need of primary minerals, reduces the construction waste, making it a significant renewable source and decreases also the amount of waste going to landfill.

Main recycled products are for example secondary asphalt, secondary aggregates for new concrete and new road base, and cement bound (asphalts) granulate road base. Thanks to the continuous improvement of the legal framework, incentives from competent authorities and technical innovation, some European countries have achieved a high recovery rate of construction waste.

The quality of aggregate produced depends on the quality of the original material and the degree of processing and sorting. When well cleaned, the quality of recycled coarse aggregate is generally comparable to natural aggregate and the possibilities for use are equally comparable.

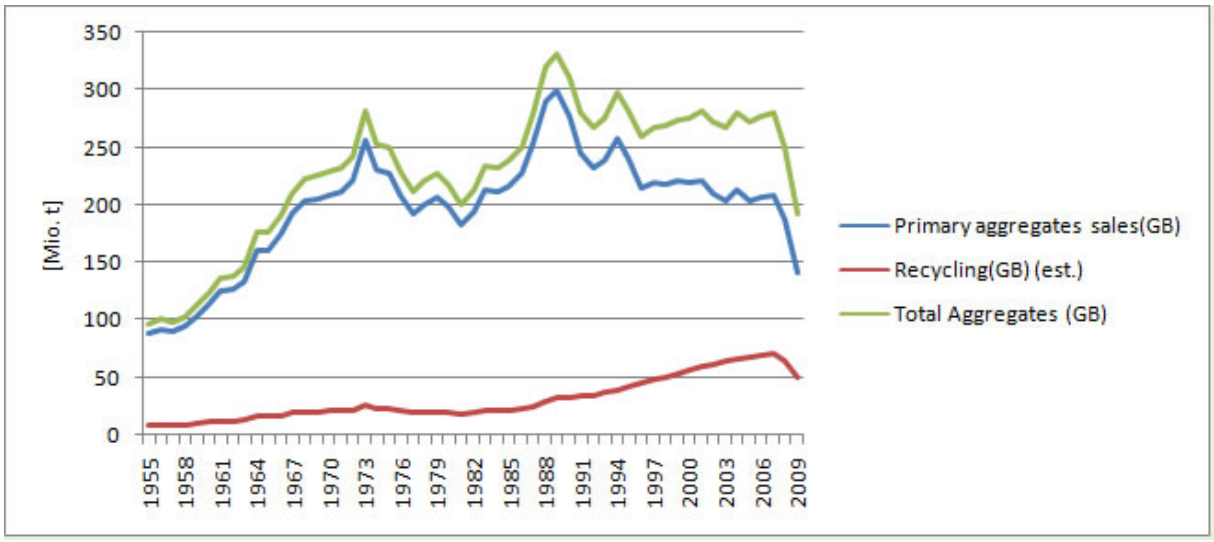
Recycling rate

The percentage of recycled aggregates in the overall market is continuously increasing, generally originating from inert construction and demolition waste, beneficially replacing natural materials and conserving natural resources and stretching deposit lifetimes. This

has the added important advantage of reducing waste going to landfill. However, there are technical qualities and environmental limitations with recycled aggregates that are used in some higher-performance applications and so recycled materials will never be able to completely replace natural resources. In general, the percentage contribution of recycled materials in the total aggregates market will depend to some extent on population density – the higher the density, the higher the likely contribution.

UEPG continues to actively promote higher value applications of recycled aggregates, in cooperation with the International Recycling Federation (FIR) at the European Platform for Recycled Aggregates (EPRA). Serious legislative and regulatory challenges for recycling remain however in REACH (in its application to Recovered Aggregates) and the End-of-Waste criteria. These challenges are inhibiting the Industry in further developing use of recycled materials. Therefore UEPG wish to see the use of Recycled Aggregates being developed to the greatest practicable extent through simplification and removal of inappropriate legislative and regulatory barriers.

Figure 20: Aggregates Production – Great Britain (source: Minerals Products Association, 2009)



Compared to USA: it was estimated in 2000 that ~5% of aggregate in the US was recycled aggregate (World Business Council for Sustainable Development, 2009). According to the same publication, in turn based on Eurostat 2002 data, the total amount of construction and demolition waste (C&DW) available in Europe was 510 million tonnes. Hence the 216 million tonnes recycled in 2008 represented a 42% European recycling rate, even though it amounted to only 6% of total European aggregates produced. It is important to understand the differences between these percentages. Even if 100% of the available C&D materials were recycled, unlikely to be achievable for both technical and economic reasons, that would still represent only 15% of the total aggregates produced.

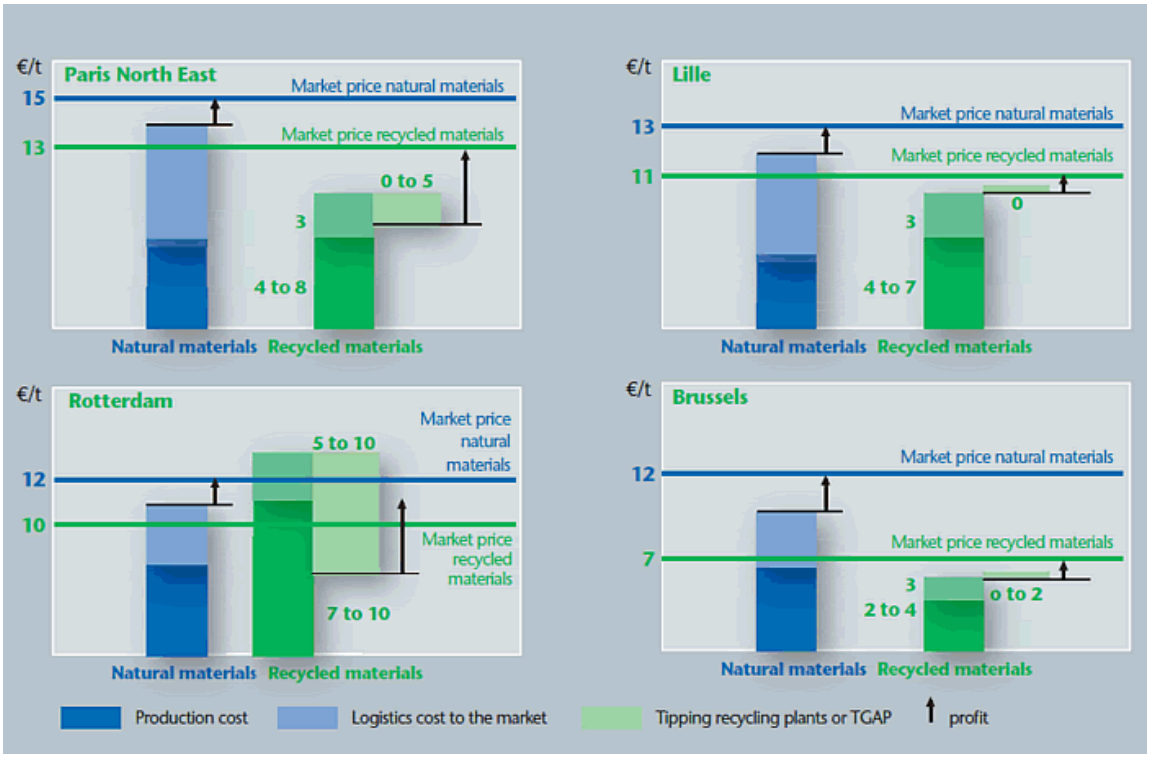
More recent data (2006) indicated that the total C&DW may be higher at 970 million tonnes, though a more recent draft report puts the 2005 figure at 535 million tonnes excluding excavated materials. Clearly there is a need to develop better definitions and data on the availability of C&DW, as well as of the extent of materials actually recycled.

It is viable only in densely-populated areas where there is efficient handling of construction and demolition materials, landfill is scarce or expensive and where natural aggregates are also expensive. Where these conditions do not prevail, as is the case in many EU countries, there is little incentive to recycle. Hence UEPG's view is that, despite the strong commitment to move forward, the overall recycling rate in Europe will increase only slowly from the current overall average of 6%.

Industry studies in Europe have shown a variation in the comparable profit margin as is illustrated in the following example. In Paris, a lack of natural aggregates makes recycled aggregate an attractive alternative, and the recycling market there is driven mainly by civil works companies with vertical integration of recycling outfits. Similarly, in Rotterdam the profit margin for recycled aggregate is high but in this case it is due more to the selling price and despite higher production costs for recycled materials compared to natural materials. In Brussels the lack of dumping possibilities means that construction and demolition companies drop the market price to find solutions for the waste, while in Lille the abundance of quarries make the higher production costs a limiting factor.[52]

Industry studies have shown that in Europe recycled concrete aggregate can sell for €3 to €12 per tonne with a production cost of €2.5 to €10 per tonne. The higher selling price is obtained on sites where all C&DW is reclaimed and maximum sorting is achieved, there is strong consumer demand, lack of natural alternatives and supportive regulatory regimes.

Figure 21: Regional differences in the cost of natural and recycled materials (Source: WBCSD/CSI publication "Recycling Concrete")



[52] World Business Council for Sustainable development: The Cement Sustainability Initiative, Recycling Concrete, p18.

7.2 Additional information to Chapter 3

7.2.1 Access to local aggregates resources

Environmental and Economic Arguments

In principle: Markets for aggregates are supplied within a **limited radius**. Transporting aggregates from the quarry to the customer is a costly business (bulk weight of the material) and many aggregate prices are quoted as ex-works to make the cost per tonne comparable. The portion of short-haul transport costs in the aggregates sector is about 13%. Road transport is often the easy solution for delivering quarried materials (either inside a region or between regions) direct to the customer. For example, the tonnage of aggregates transported in Germany via freight vehicle amounts to 45 % of total goods transported.[53] The same is true for Austria.

Thus, the nature of aggregate products, being of low value and homogeneous, makes them unprofitable to transport over long distances (>30km) if no rail or ship transport options exist, in which cases the distances could be much longer. However, in the last years due to different reasons - not necessarily geological but as mentioned particularly policy reasons - also road transport over longer distances in a country or between countries can be observed, for instance: the significant trade in sand and gravel occurring between Germany (North Rhine-Westphalia) and the Netherlands, and between the Netherlands and Belgium (see figure 5).[54]

For many quarry operators road transport is the only way to get aggregates to their market but for some sites alternative solutions are helping to open new doors - and keep existing ones open - for the industry. Water borne transport, country inside possibilities like it can be found in French (Seine), Poland, Germany, Austria (Donau) plays an increasing role. In Paris for instance, Lafarge is using water-borne transport to reduce road congestion. The company estimates that deliveries from its Bernières-sur-Seine wharf eliminate 120,000 truck journeys into Paris each year. The gravel pit is located on a plateau that overlooks the Seine valley but is not connected by roads suitable for frequent passing of quarry trucks. The unprocessed aggregates from the quarry are carried via a 7km long series of conveyor belts.[55]

CO_2 discussion:

CO_2 generated in the production of Aggregates:[56]

Industry data (most specifically the UK MPA) indicates that the CO_2 generated in the production of a tonne of aggregates varies from 4kg/tonne for sand & gravel to 9kg/tonne for hard rock.

Taking a weighted average of around 6.5kg/tonne indicates a generation of some 20m tonnes of CO_2 per year for the total EU production of 3 billion tonnes of aggregates.

These emissions result from the fuel used in heavy mobile plant in quarries, and in the usage of imported electricity for crushing, screening, washing, filtering and conveying machinery.

CO_2 generated in the transport of Aggregates:

Best data available (such as the UK DEFRA guidelines) indicate that HGV trucks, fully laden as is normal, transporting on average 25-30 tonnes of aggregates per truck, based on typical fuel usage, produce around 1kg of CO_2 per kilometre travelled.

[53] http://www.aggbusiness.com/articles/environment/highway-alternatives-707

[54] The sand imported by the Netherlands from Germany is generally coarser than the sand exported from the Netherlands to Belgium.

[55] http://www.aggbusiness.com/articles/environment/highway-alternatives-707/

[56] UEPG-position paper, 2009

UEPG data indicates that around 84% of all aggregates produced, that is 2.5 billion tonnes a year, are despatched by road (the rest by rail or barge/ship, about 4% and 12% respectively).

Therefore transporting these aggregates even 1km will result in an extra CO_2 generation of 2.5m tonnes of CO_2.

Taking an average transport distance of 30km, this will result in an extra CO_2 generation of 75m tonnes, over 3 times that generated in the production of the aggregates.

Where rail or ship transport is feasible, then CO_2 emissions will of course be much smaller.

Cost of Aggregates:

Data given in "Aggregates Business Europe", Nov/Dec 2007, indicates a range of aggregates selling prices across Europe varying from €3/tonne to €12/tonne, averaging then around €8/tonne. Current average prices have probably dropped to around €6-7/tonne. (See: Figure 13).

Hence the total economic value generated by the industry is about €20-25 billion a year.

Cost of transporting Aggregates:

Industry published data would indicate a cost of around 10 cents per tonne per kilometre (higher in Western countries, lower in Central/Eastern countries) for transport in typical 25 tonne payload trucks.

Therefore transporting 2.5 billion tonnes of aggregates a year an average of 30km costs an extra €7.5 billion, adding some 40% over the cost of production.

By extrapolation, transporting aggregates more than 75km indicates a cost of transport greater than the material value.

Conclusion: Both the environmental and economic costs of transporting aggregates make a very strong argument for access to local aggregate resources.

A comment on international aggregates trading:

Because of the distributed nature of aggregates consumption and the large tonnages involved the increased aggregates demand can be met only to a very limited extent by international aggregates trade.[57] Such trade is usually limited to costal regions and along inland shipping routes and is estimated to be less than 5% of total European production. Where aggregates have to be transported by road transport distances tend to be short, usually less than 30-50 km. Aggregate transport by road apart from high costs, increased CO_2 emissions and atmospheric pollution results in traffic congestions and creates safety hazards.[58] In some European countries aggregates account for nearly 50% of mass transported by road. Because of generally short transport distances, made possible by local aggregates production, transport performance, expressed in t*km tends to be less than 25% of total. This favourable situation could change dramatically should it no longer be possible to produce aggregates from local sources.

7.2.2 Issues limiting the access to aggregates resources

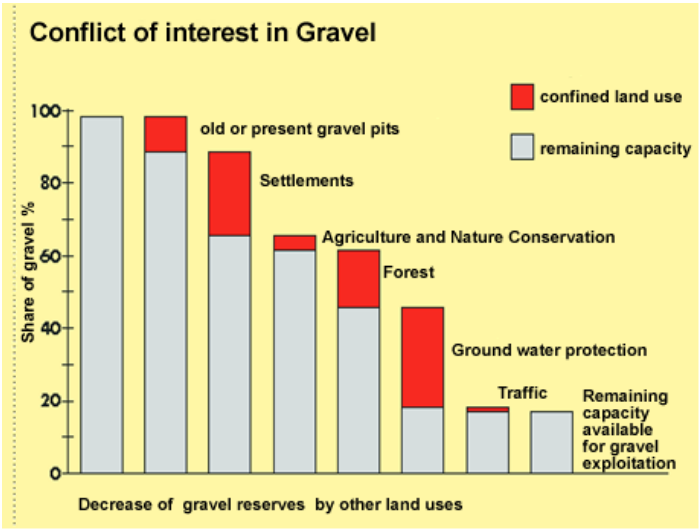
From a global geological perspective, there is no indication of imminent physical shortage of the majority of aggregates in Europe. However, geological availability does not necessarily mean

[57] Cp. (Dutch) Ministry of Transport, Public Works and Water Management (2003): Construction Raw Materials Policy and Supply Practices in Northwestern Europe, Delft

[58] http://www.aggbusiness.com/articles/environment/highway-alternatives-707/

access to these raw materials for the mining companies. Access to land (i.e. deposits) is increasingly influenced by policy issues, for instance, lack of mineral planning policies or polices like taxes and charges. Reduced availability of deposits is a phenomena existing in whole Europe (and is impacting the competitiveness of the aggregates industry). However, the availability of aggregates from regional and local sources is essential for economic development, in view of logistical constraints and transport costs. Kündig et. al. (1997) already stated in the 1990s for Switzerland that from initial 100% of sand and gravel reserves about 10% is deducted in favour of outdated or present gravel pits, 18% in favour of residential areas, 5% for protection of nature and environment, 16% for forests, 30% for groundwater, 1% for traffic and only about 20% remains available for exploitation.

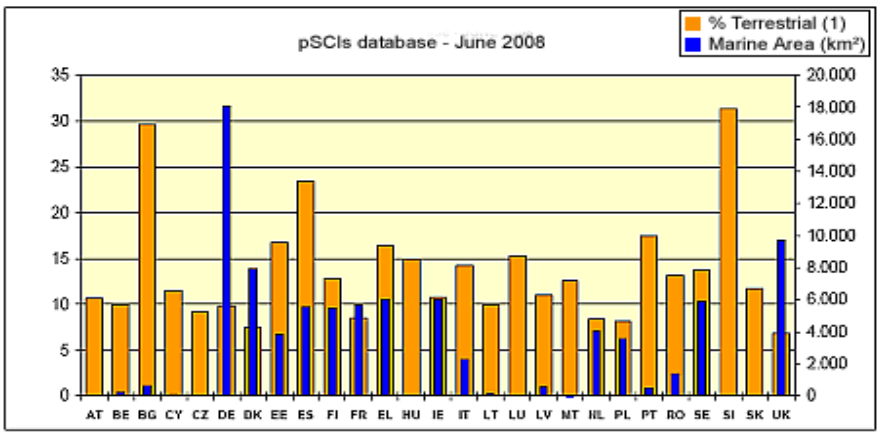
Figure 22: Reduction of gravel reserves due to other land use utilizations (Source: Kündig et. al. 1997, Die mineralischen Rohstoffe der Schweiz)



Access to aggregates resources in France is reduced in 3-4 French regions (e.g. Aquitaine, Ile-de-France, Lorraine). [59]

Figure 23: Proportion of land areas designated to FFH-protection in the EU-27

http://ec.europa.eu/environment/nature/natura2000/barometer/docs/sci_barometer_0608.pdf



[59] Clément RIEU, UNICEM, 2010.

Summary of responses from the non-energetic extractive industry and national geological surveys to the request for information on the current impact of Natura 2000 on permits for minerals extraction:[60]

Austria - A few aggregates companies are affected. *Czech Republic*: A significant number of gravel and rock resources are within or adjacent to Natura 2000 sites and any future applications for a permit are expected to be rejected.

France - A few proposals for extensions to existing sites and one renewal of a permit have been delayed, while in one case the area sought was reduced. The key concerns appear to be the time and costs emerging through this situation. New information received: Clément RIEU, UNICEM : 20 to 40% of the quarries are concerned by Natura 2000 area Ile-de-France region represents 21% of wet land – actually in study.

Germany - In one region 80 cases are said to be affected, although the nature of the difficulties has not been stated, and the outcome has yet to be decided. Another region indicated that eight potential sites had been excluded from the Regional Plan because of Natura 2000 designations.

Greece - While no existing permits were found to have been affected, there is concern that large areas of the Greek mountain chains (e.g. Olympus-Pindos in central/western Greece and Rhodope in north-eastern Greece) contain important mineral deposits but have been designated as Natura 2000 sites. A number of permit applications have been rejected.

Ireland – There is some flexibility in carrying out extraction within Natura 2000 areas.

Lithuania - New permits are not being granted on land notified as a Natura 2000 site. However, extraction can continue where a permit already exists. No permits have been revoked or suspended as a result of an area being notified as a Natura 2000 site.

Portugal - The existence of Natura 2000 areas makes mining activities on such land impossible, because the national institution that manages the network considers that the environmental values are incompatible with mining. Mining activity in these areas is therefore limited because of the investment risks.

Spain - The industry expresses the opinion that site selection was hurried and lacked a consistent approach across the autonomous regions. It has been suggested that the boundaries of some notified sites were set to stop future industrial development, including mineral extraction, but this has not been substantiated.

In the context of these observations, the recent Commission final draft Guidance Document on "Non-Energy Mineral Extraction and Natura 2000" is particularly relevant. It points out that responsible extraction activities can exist in harmony with Natura 2000 areas, and that a Natura 2000 designation does not *a priori* prohibit responsible extraction activities.

7.2.3 Aggregates Planning Policies

Additionally examples are given:

Belgium - Modification of an area plan in the Walloon region

Information received from Benoit LUSSIS, Département Ecologie industrielle FORTEA, (26 March 2010): The Walloon region (South part of Belgium), is covered by 23 "area plans" (plans de secteur) that define the main land use (1/10 000). These "area plans" are legally binding. This means that we can deviate from them only through a legal procedure define by the land use legislation (Code wallon de l'aménagement du territoire, de l'urbanisme et du patrimoine : CWATUP). An "area plans" specifies the land allocation and the layout of the main infrastructure (road, rail, motorways, electricity,…). Land allocation can be or not an urban development area.

[60] European Commission, 2007; and also additionally information (2010).

The urban development areas include: habitat zones, rural habitat zones, zones for public services and facilities, waste landfill zones, leisure zones

- Economic activity zones, with a split for mixed, industrial, agro-economic, department store.
- *Extraction zones*

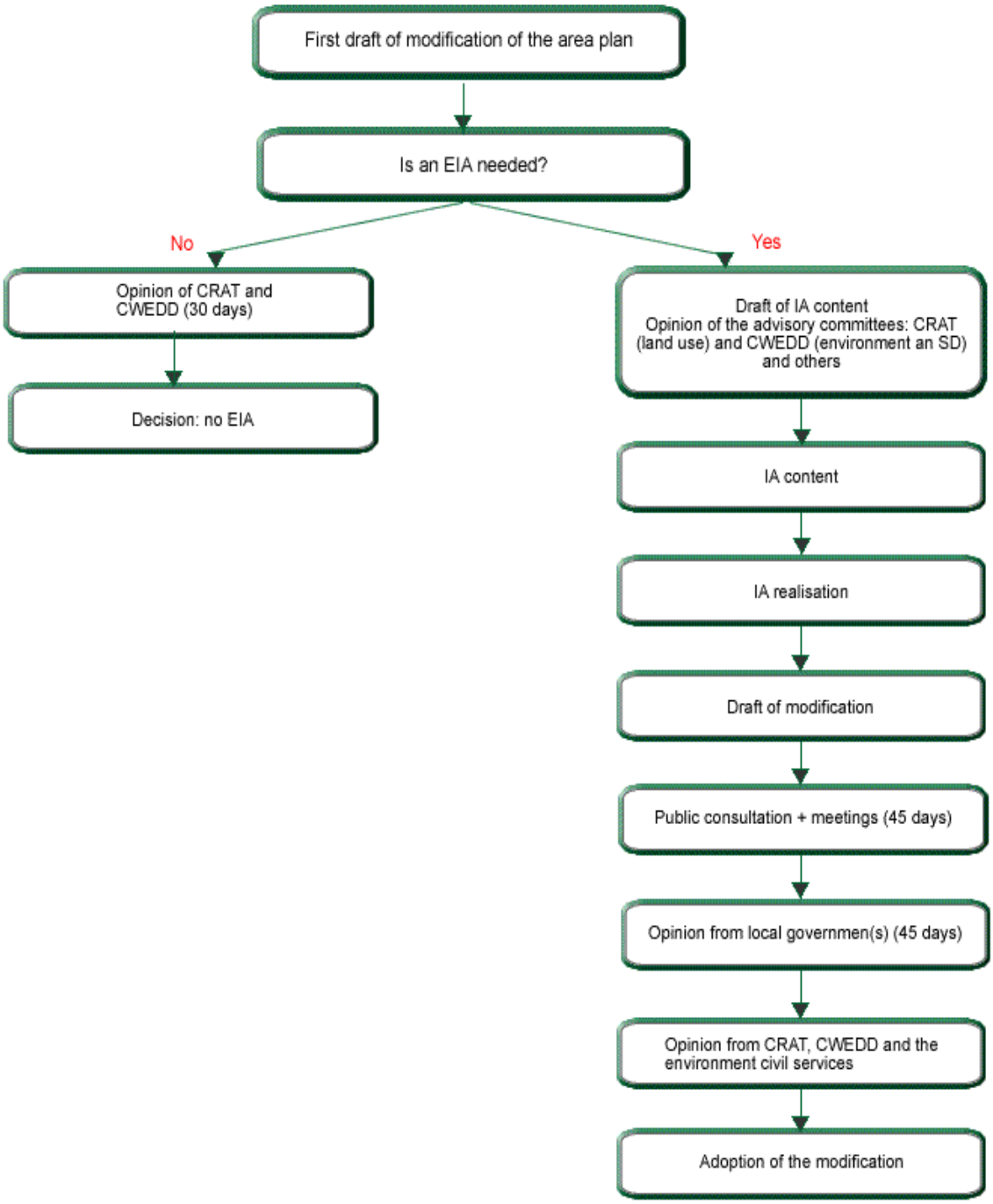
Non immediate industrial zone

The non urban development areas include: Agricultural zones, Forest zones, Green areas zones, Natural zones and Park zones.

The general rule is that any inscription of a new urban development zone has to fulfil several conditions, a.o.: To border another urban development zone, to be *compensated* by the inscription of an equivalent area in a non urban development zone or by any other alternative measure defined by the government. This means that *any inscription of a new extraction zone has to be compensated*. The area plan modification procedure is summarised hereafter.

- An area plan modification must initiated by the government
- The government passes a “first draft of modification”
- Except in a case of exemption, any “first draft of modification” draft is submitted to an IA (the content of the IA is defined by the CWATUP)
- The draft IA content and the “first draft of modification” are submitted to at least two advisory committees: CRAT (land use) and CWEDD (sustainable development) where several stakeholders are represented (industries, ENGO’s, cities and communes, universities, farmers, trade unions)
- On the basis of these opinions, the government set the extent and the precision to be reached by the IA.
- The government chooses an author for the IA. This author has to be recognized by the government as competent according to both the CWATUP and the environment legislation
- The government passes then the “draft of modification”.
- This “draft of modification” is the submitted to a public consultation (45 days). A meeting with the stakeholders has to be organized.
- The “draft of modification” is then submitted to the local governments of the concerned communes and to the CWEDD and CRAT.
- At the end of this procedure, the regional government once and for all passes the modification.

Figure 24: Modification of an area plan in the Walloon region



7.3 Additional information to Chapter 4

Organigrams of permitting procedures

Figure 25: Permitting procedure in Wallon Region /Belgium – Organigram

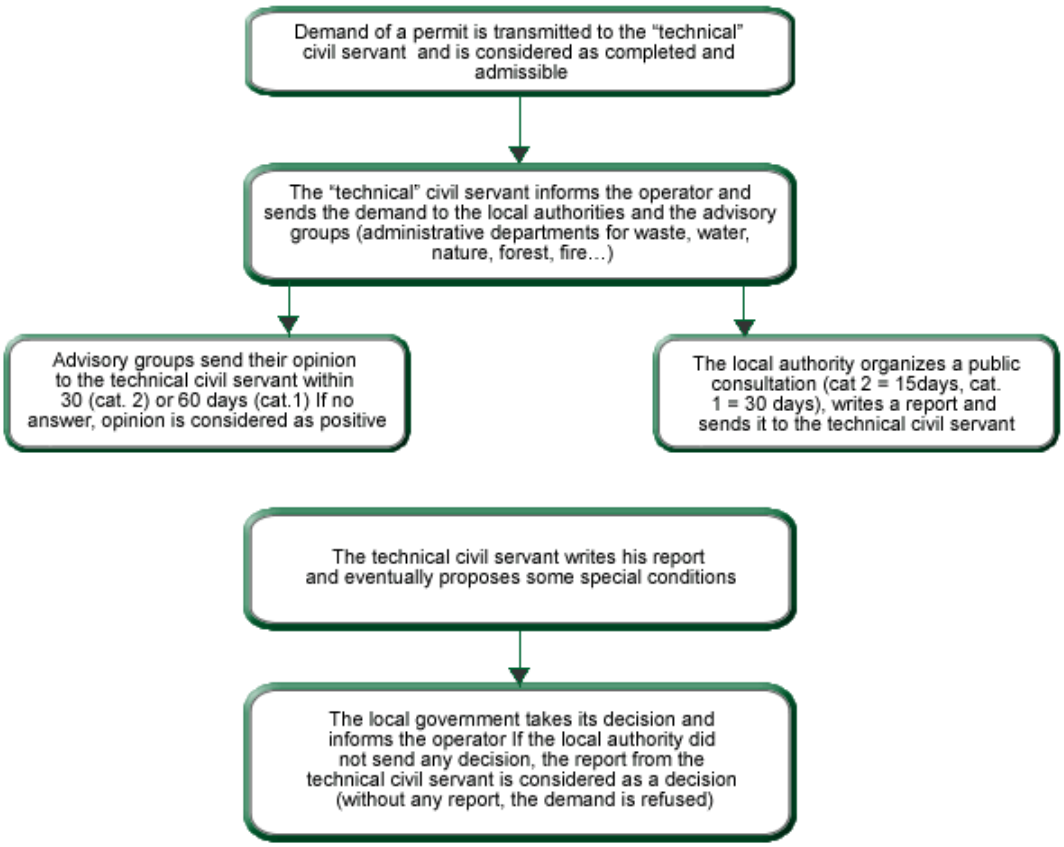


Figure 26: Permitting system in Croatia (Mikulčić Predrag, Croatian Association)