A Vision of Best Practices for Aggregates Planning in South East Europe

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A Vision of Best Practices for Aggregates Planning in South East Europe

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Foreword

The countries in South East Europe (SEE) are rich in construction aggregates, i.e. crushed stone, gravel, sand and other granular inert materials used in the construction industry; however, these resources are not evenly distributed across the region resulting in abundance in some areas and shortage in others. Furthermore, access to these resources is becoming increasingly difficult due to other infrastructural developments and environmental pressures. As aggregates are heavy and bulky, transport is expensive. Therefore access to resources

local to the market is crucial. The SEE region will probably require 50% higher output of aggregates by 2020 in order to build its growing infrastructural needs.

Hence, there is a need to shift to sustainable aggregate resource management (SARM) and provide a sustainable supply mix (SSM) of aggregates to the region to enhance resource efficiency and support sustainable development. SARM is efficient, low socio-environmental impact quarrying and waste management, coupled with broad stakeholder engagement. A SSM is composed of aggregates from multiple sources, including recycled construction and demolition wastes and industrial by-products (slag), as well as both domestically produced and imported primary materials, that together maximize net benefits of aggregate supply across generations.

Implementing SARM and SSM requires a supporting policy and planning framework. Due to regional differences and historical development, approaches to aggregates policy, planning and management differ at various political scales within and across SEE and in few cases are fully comprehensive. Challenges include policies and plans affecting aggregates management and provision that are distributed among many different legal documents, making coordination and a comprehensive understanding difficult. There is also a lack of coordination on planning for supply from primary and secondary aggregates. SEE lacks sufficient data to support aggregates planning, inadequate capacity and competence for addressing either primary and/or secondary aggregates planning, and insufficient stakeholder participation in the development of aggregates management plans. The SNAP-SEE Project has addressed these deficits in order to foster the growth of a vibrant, responsible and sustainable aggregates industry in the SEE region.

The specific purpose of the Sustainable Aggregates Planning in South East Europe (SNAP-SEE) project was to create and disseminate a Toolbox for Aggregates Planning to help governments and stakeholders in SEE collaborate to enhance their aggregates planning and management processes. SNAP-SEE built on the results of the Sustainable Aggregates Resource Management (SARMa) project, a preceding SEE Transna-

tional Cooperation-funded project (<http://www.sarma.eu>). SNAP-SEE was also funded by the EU South East Europe (SEE) Transnational Cooperation Programme (SNAP-SEE, SEE/D/0167/2.4/X) and had 27 partners from 12 SEE countries and Turkey. The University of Leoben, Austria, was the Lead Partner. SNAP-SEE was a 2 year project that ended in November of 2014.

The SNAP-SEE Toolbox for Aggregates Planning comprises 4 products that are inter-related and mutually supporting.

1. A Vision of Best Practices for Aggregates Planning in South East Europe

This document presents a Vision for a transition to integrated, comprehensive sustainable planning in SEE. It includes discussions of the issues that need to be addressed, interim steps that can be taken toward more sustainable planning, and a review of the components a sustainable plan should contain.

2. How to Build a Sustainable Aggregates Plan

The 'How to' document represents a roadmap for planning, including discussions of the planning process itself and its various steps. Examples of well written planning modules are provided that embody the principles, approaches and actions necessary to achieve the goals of the Vision laid out in the Best Practices report.

3. Consulting Stakeholders when Applying Best Practices in Sustainable Aggregates Planning

The 'Consultation' document provides a step-by-step guide for how to plan and conduct stakeholder consultations so as to ensure that industry, government, non-governmental organizations and civil society can provide input to and participate in the planning process. Capacity building materials are also provided.

4. Data and Analysis Methodologies for Aggregates Planning: In Support of Best Practices in Sustainable Aggregates Planning

The 'Data and Analysis' document discusses the various types of data that provide essential background information for the planning process. Data definitions, significance, availability, structure and needs are addressed. Methods for validating and analyzing data are presented, including approaches to demand forecasting.

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1. Introductory Information

A planning process that clearly serves social needs within a state or region is both a complex and an essential institution. Therefore, the state needs adequate information about the situation of the planning sector for both primary and secondary aggregates, and the best planning methodology and guidance on the steps that lead to sustainable aggregate/mineral resource management. For comprehensive, integrated planning to take place, the location of all text related to aggregates planning and their scope must be determined, as well as how each of the planning modules interrelates and the degree to which the whole contributes to resource efficiency and sustainability.

The identified gaps in planning, excellence in planning, overlaps or inconsistencies among sectors, and needs and preferences for both the primary and secondary aggregates sectors are important issues during the analysis of planning cycles in each countries.

Based on the presentation of the state of the planning in SEE partner countries, the best guidance for the sustainable aggregates planning and the joint vision, including the main topics should be developed in the near future, this Handbook contributes to more consistent, integrated, re-source efficient aggregates planning at the national/regional levels.

1.1 The Importance of Aggregates Planning

Primary aggregates are mainly sand, gravel, crushed stone; **secondary aggregates** can be recycled construction and demolition waste, manufactured aggregates, excavated materials from civil works, etc. (SARMa Glossary). Based on UEPG data (Tiesse 2010) on economic growth, more aggregates will be required in South East Europe in the future. Aggregates have essential importance to the economic growth. Although the aggregates resources seem to be unlimited (most deposits are known), the access to those is becoming increasingly difficult. Not only protected areas (e.g. biodiversity conservation and cultural heritage sites) and social attitudes, but also the development of buildings and roads obstruct access to aggregate resources by occupying and sterilising areas with resource extraction potential. Therefore, planning of aggregate supply is essential.

Although societal needs for aggregates are met by the private aggregate sector, the state is responsible for ensuring its bases through aggregates planning, which refers to a range of public policies intended to assure secure supply of aggregates needed for everything that is built in a country or region, from buildings to infrastructure. The state has, or should acquire, all the necessary information on national primary and secondary aggregates resources, and manage these inventories. Legislation and the determination of future directions in development also fall within the competence of the state. Therefore, using all this information, a comprehensive aggregates planning can only be developed by the state, and should be harmonized on state, regional and local levels.

The planning system has a fundamental role in providing a framework within which sound and consistent decisions on mineral development proposals can be taken. Mineral plans, especially when they are integrated into spatial land use plans, help the industry and relevant authorities to establish a stable planning framework for mineral extraction over the long term. They are also very effective at creating a more integrated sustainable development strategy that takes account of wider societal concerns, such as nature conservation, at a very early stage in the decision making process. Thus, authorities should seek through their development plan policies and decisions to take account of all costs and benefits associated with mineral working in accordance with the principles of the Sustainable Development. The main aims that relate to minerals planning as follows:

- ✓ Social progress which recognizes the needs of everyone: to provide for the benefits of increased prosperity through an adequate supply of minerals that society needs now and in the future, together with protecting and improving amenity;

- ✓ Effective protection of the environment: to protect things that are highly cherished for their intrinsic qualities, such as wildlife, landscapes and historic heritage; and to protect human health and safety by ensuring that environmental impacts caused by mineral extraction and transportation are within acceptable limits; and to secure, without compromise, restoration and aftercare to provide for appropriate and beneficial after-use;
- ✓ Prudent use of natural resources: to help conserve non-renewable resources for future generations through efficient use, recycling and minimization of waste; to protect renewable resources from serious harm or pollution; and to promote the use of appropriate alternative materials; and
- ✓ Maintenance of high and stable levels of economic growth: to ensure an adequate supply of minerals that are needed at prices that are reasonable; and to safeguard mineral resources for future generations.

1.2 The Special Characteristics of Aggregates Planning

Planning for the supply of minerals has a number of special characteristics that are not present in other development (<http://planningguidance.planningportal.gov.uk>):

- ✓ minerals can only be worked (i.e. extracted) where they naturally occur, so location options for the economically viable and environmentally acceptable extraction of minerals may be limited. This means that it is necessary to consider protecting minerals from non-minerals development and has implications for the preparation of minerals plans and approving non-mineral development in defined mineral safeguarding areas;
- ✓ working is a temporary use of land, although it often takes place over a long period of time;
- ✓ working may have adverse and positive environmental effects, but some adverse effects can be effectively mitigated;
- ✓ since extraction of minerals is a continuous process of development, there is a requirement for routine monitoring, and if necessary, enforcement to secure compliance with conditions that are necessary to mitigate impacts of minerals working operations; and
- ✓ following working, land should be restored to make it suitable for beneficial after-use.

1.3 The Scope of the Handbook

Aggregates planning policies are declared governmental objectives in the field of aggregates; planning is the creation of formal procedures to be followed to achieve objectives; and management is the administration and implementation of plans. The project SNAP-SEE – Sustainable Aggregates Planning in South East Europe (SEE) ad-

addressed a key question: how can SEE countries and regions improve their aggregates planning processes, integrate planning for primary and secondary aggregates to increase resource efficiency, and raise capacity levels among stakeholders, such as competent authorities, industry and civil society with respect to aggregates management, planning and supply.

Therefore, the state of planning, the best practice in planning (guidance), and the main topics that should be included, i.e., the joint vision, are fundamental components in improving the policies and the legal-regulatory framework, and in this way, sustainable aggregates planning.

1.4 *The Structure of the Handbook*

The Handbook is organized as follows. Chapter 2 introduces the results of the Multi-sectoral Analysis of State of Planning, first discussing all the related policies, then the aggregates planning, its regulatory framework and legal barriers.

Chapter 3 is a Guidance showing how to make the planning better. This chapter provides general information on mineral planning and documents (knowledge base, demand for aggregates, aggregates supply of potential, impacts, life cycle analysis) and presents the content of the planning documents and methods (planning authorities, aggregate potential, inventory, aggregate economy, spatial planning, social aspects, restoration etc.).

Chapter 4 contains a Joint Vision for South East Europe regarding Aggregates Planning. An ideal, future legal-regulatory framework is introduced on the national/regional and EU levels. Then the related environmental (air pollution, noise, water, mining waste, biodiversity and restoration), social, economic issues (cross-border SARM policy, taxation), and professional tasks (inventory, aggregate potential, mineral safeguarding) are discussed. Finally, technology (recycling, blasting, safety) and transport are presented.

Chapter 5 summarizes the most important recommendations regarding aggregates planning.

2. Multisectoral Analysis of the State of Aggregates Planning

The goal of Multisectoral Analysis is to determine how planning is carried out in partner countries, including where each partner country is in the planning cycle. Planning for aggregates supply is a governmental activity, the purpose of which is to determine the policies, legal framework, actions, and information that will be needed to ensure the availability of adequate amounts of primary and secondary aggregates to national/regional economies in the near, medium and long term. Planning requires consideration of expected demand, sources of supply and constraints thereto, the current policy, legal and regulatory framework and its effectiveness, and many other variables.

2.1 Introduction

Multisectoral analysis of aggregates resources management is needed because of the complexity of planning practices from different authorities. It is a method for revealing where and how aggregates are mentioned in legal documents representing different sectors that could have impact on aggregates supply.

The sectors related to aggregates are:

- ✓ mining/minerals management
- ✓ environment, including water management and nature conservation
- ✓ green public procurement
- ✓ waste management
- ✓ recycling
- ✓ land use planning

Figure 2.1 illustrates the sectors related to aggregates planning policies.

Figure 2.1. Sectors related to aggregates planning policies

These sectors are covered by regulations and policies, such as sustainable development policy, minerals policy, land use planning policy, waste management policy,

recycling policy (which is often part of either the waste or the minerals policy), and environmental policy. Land use planning and sustainable development policy cover several sectors. Sustainable aggregates planning policies should consider primary and secondary aggregates (the latter from wastes, end-of-wastes and by-products) collectively.

2.2 Policies related to Aggregates Planning

This multisectoral analysis in Figure 2.2 presents the state of aggregates planning in Albania (AL), Austria (AT), Herzegbosnian Canton (Bosnia-Herzegovina; BA), Croatia (HR), Greece (GR), Hungary (HU), Emilia-Romagna Region (IT-ER) and Autonomous Province of Trento (IT-T) (Italy), Montenegro (ME), Romania (RO), Serbia (RS), Slovakia (SK), Slovenia (SI) and Turkey (TR). Many SEE countries/ regions are based on sustainable development, include minerals policies, land use planning framework, waste management and environmental policies. However, only a few of them are taking into account aggregates planning policies and recycling.

Figure 2.2 Illustration of Sustainable Development Policy, Minerals Policy, Land Use Planning Policy, Waste Management Policy, Recycling Policy, Environmental Policy and Aggregates Planning Policy in SEE countries. PA: primary aggregates; SA: secondary aggregates

Eleven countries or regions have **Sustainable Development Policies**. Seven of them address minerals, but mainly stating general purposes such as rational mineral management and resource efficiency. Five partners address aggregates and 8 countries or regions address recycling in their Sustainable Development Policy, while only 4 partners consider green public procurement. Many partners' Sustainable Development Policies mentions rational and sustainable minerals management relating all types of minerals, but only in general terms.

Nine countries or regions have a **minerals policy framework**; all of the partners address aggregates in their minerals policies (Figure 2.3). Eight partner countries/regions deal with land use planning. Greece, Slovakia and Slovenia consider recycling; Albania, Greece and Slovakia consider waste management.

Figure 2.3. Minerals Policy in South East Europe

Twelve countries or regions have **Land Use Planning Policies**. Ten of them ensure minerals accessibility, protection and sustainable usage. Eight of them specifically address aggregates. Four countries mention recycling in their Land Use Planning Policies. Only Austria considers green public procurement.

All partners except the Herzegbosnian Canton and Emilia-Romagna Region (IT) have **Waste Management Policies**, although the Waste Management Policy of Emilia-Romagna Region (IT) is an on-going process. Ten of them address recycling. Seven countries or regions consider minerals and 5 partners deal with aggregates explicitly. However, the Hungarian and Montenegrin Waste Management Policies do not address all kinds of aggregates, only C&D waste. Four partners mention green public procurement in their Waste Management Policies. Only Greece addresses zero waste. Ten countries or regions have adopted European Commission legislation, so

their Waste Management includes an incentive plan for recycling. Only 4 countries have **Recycling Policies** separated from Waste Management Policies.

All partners except Montenegro have **Environmental Policies**. Seven countries consider minerals and recycling in their Environmental Policy, though in Hungarian and Serbian Environmental Policies recycling is considered independently of aggregates. Six partners deal with aggregates in their Environmental Policies. Austria, Hungary and Emilia-Romagna Region (IT) mention green public procurement.

Handling of potential secondary raw materials (e.g. mining waste, C&D waste, ash and slag from power plants, incineration plants and smelters) is not uniform in SEE region. In Slovenia recycling is legally binding. In Hungary recycling is supported but not always obligatory; separate collection and disposal are also regulated. In Montenegro recycling is not included in law, but management of mining waste belongs to the mining activity. In Serbia almost all types of secondary raw materials are landfilled. In practice, secondary raw materials are disposed (Serbia), collected separately and reused (Autonomous Province of Trento (IT), Slovenia, Austria) or treated combined (Hungary, Croatia, Montenegro, Albania).

2.3 Aggregates Planning Policy

Only 3 partners (Austria, Slovenia and the Autonomous Province of Trento (IT)) have Aggregates Planning Policies which consider both primary and secondary aggregates. In other 4 countries or regions (Albania, Croatia, Greece and Emilia-Romagna Region (IT)) Aggregates Policies consider primary aggregates only (Figure 2.4).

The authorities responsible for aggregates planning are primarily mining, land use planning and other authorities e.g. economy, sustainability, water management authorities and regional or local governments. In all countries where aggregates planning (plans) exists it was created through stakeholder (local governments, public and private bodies) involvement. These aggregates policies/plans are reviewed regularly (in Autonomous Province of Trento (IT) in every ten years, in Croatia 10-12 years), depending on the needs and the type of document.

Some of the countries (Austria, Croatia, Slovenia and the Autonomous Province of Trento (IT)) address supply-demand balance; future demand is mainly estimated on the basis of recent aggregates production and future land use development plans.

In terms of evaluation of aggregates extraction and other (potential affected) utilization claims mainly GIS data are utilized. For example, data of morphology, infrastructure, quarry location, hydrogeological and environmental risks and protected areas

(nature or heritage) are available in GIS format. In the Autonomous Province of Trento (IT), Croatia and in some of the Austrian regions statistical data (e.g. production, consumption, type, recycling) are also applied.

Figure 2.4. Aggregates Planning Policy in South East Europe

Aggregates plans integrated in the land use planning framework address several other topics e.g. nature conservation, social impacts, economic contribution, transportation, aftercare etc. In the Autonomous Province of Trento (IT) and Emilia-Romagna Region (IT) environmental protection is of the utmost importance. In Slovenia several topics such as hunting, beekeeping and education are also included. Aggregates Planning Policies refer to other laws, e.g. Land Use Planning, Waste Plan, Environmental Policy and Transport regulations.

2.3.1 Legal and regulatory framework related to aggregates

In harmony with the results of the SARMA project’s legal report (Háamor 2011) the owner of aggregates extraction (i.e. mining) rights is mainly the state; whereas it is the landowner in Austria, Greece, Slovakia and Emilia-Romagna Region (IT); and in the Autonomous Province of Trento (IT) both (Figure 2.5).

Figure 2.5. The ownership of primary aggregates in South East Europe

The mining (and geological) authority plays an important role in licensing steps related to aggregates planning. In several countries environmental authority, local government, land use planning and other authorities are also responsible for licensing.

In all partner countries nature protection issues are dealt with and incorporated into the environmental licensing considering aggregates issues. Except Romania and Turkey, in all countries the transposition of this legislation leads to designation of 'no-go' areas for aggregates extraction.

The public participation is ensured during the licensing phase in all countries; in Albania by public hearing, in Italy and Turkey in written form, while all the other SEE countries use both ways. The permitting procedure is not uniform in SEE countries. Mainly the one-stop-shop, but the parallel assessment or mixed models, i.e. partly as a one-stop-shop and partly as parallel assessment, are also applied (Figure 2.6).

Figure 2.6. Licensing model in South East Europe

2.3.2 Legal barriers against aggregates planning development

In SEE countries different legal and regulatory barriers related to aggregates planning development exist. Lack of uniform terms harmonizing with EU project suggestions (e.g. SARMA glossary) is a problem in Hungary and Romania. In the Autonomous Province of Trento (IT) the legal definition of the material (natural, waste or products) differs largely in the production process; in this way there are different types of procedures for the same material in function of the legal form. Thus the aggregates, excavated in a quarry, differ, from a legal point of view, from the aggregates of a civil work, although both aggregates are geologically identical. This involves bureaucratic procedures, which are very different, despite the aggregates have the same technical and geological features.

Extracting aggregates from below the water table is a sensitive issue in Austria; in Croatia only active quarries are considered by the spatial plan and are designated as mining areas; in Montenegro there are mismatches of spatial plans of local municipalities with the National Spatial Plan. The NATURA 2000 areas limit partly the quarrying in several SEE countries for instance in Austria, Hungary and Slovenia. In Emilia-Romagna Region (IT) the main problem is the strong hierarchy of the planning and

authorizing system that creates long wait times. In Herzegbosnian Canton and Serbia there is a lack of regulations on aggregates planning. The ownership of the land causes problems in Albania and Slovakia. Lack of coordination between involved and responsible institutions, and small or no investment in underground and undersea researches of possible resources is the problem of Slovenia.

2.4 Conclusions

Aggregates planning policy framework (based on land use planning) exists in Austria, the Autonomous Province of Trento (IT), and Slovenia. In other partner countries the **most important documents related to aggregates planning policy** are the Mining/quarrying Act or Plan, Law on Concession, Environmental Act, Sustainable Development Strategy, Waste Act or Strategy, and Land Use Planning Act. The Autonomous Province of Trento (IT), Austria, Slovenia and Albania have minerals plans (quarrying and mineral resources plan, mining strategy); while in other SEE countries the mining law (Hungary, Herzegbosnian Canton, Croatia, Montenegro), and the law on concession (Herzegbosnian Canton, Montenegro) deals with aggregates.

In most SEE countries **primary and secondary aggregates** are managed separately e.g. the responsible authority is different; or the aggregates management has not even started yet (Herzegbosnian Canton, Hungary, Montenegro, Romania, Serbia, Slovakia and Turkey). The secondary aggregates are considered mainly by the Waste Management Policy of the country or region. The waste management is in progress (on different levels) and separated from resource management. Not all types of secondary aggregates are treated; mostly the construction & demolition waste and the mining waste are treated by the regulatory framework.

The **support of SARM** (Sustainable Aggregates Resource Management) and **SSM** (Sustainable Supply Mix) is variable: in some countries they are supported at least in theory (Slovenia, Croatia, Serbia, and Montenegro), in other countries they are not known and not supported (Hungary, Herzegbosnian Canton).

The potential conflicts of quarrying and nature protected areas are not treated adequately during in all partner countries. This results in designation of absolute ‘no-go’ areas for aggregates extraction in almost every partner country (except Romania and Turkey), although according to the Guidance Document of Non-energy Mineral Extraction and Natura 2000 ‘There is no automatic exclusion of NEEI (Non-Energy Extractive Industry) activities in and around Natura 2000. Instead, extractive activities shall follow the provisions outlined in Article 6 of the Habitats Directive to ensure that these activities do not adversely affect the integrity of Natura 2000 sites’ (EC 2010a, p. 7.). The designated ‘no-go’ areas cause serious problems in many SEE coun-

tries, which could be solved or eased by the consultation of the most important stakeholders (e.g. decision makers, environmental authorities, extracting industry).

In several partner countries the **Land Use Planning Policy Framework** contains important information for Aggregates Planning: e.g. protected areas of nature or culture – however regarding the designated mining areas there is a lack of information for aggregates.

3. Guidance on Aspects to be considered in Aggregates Plans

The goal is to determine how to make planning better in Partners' respective countries. They were asked to create a guidance document that reflects the situation in each country, and the input of their stakeholder network. They should also identify planning aspects that are applicable and relevant in all SEE countries because their inclusion in the Joint SNAP-SEE Vision and the Aggregates Planning Scheme would increase cohesion and harmonization.

3.1 Introduction

The minerals planning policy is part of the national minerals policy framework (Tieess 2011; EC 2010b). A national 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 (Tieess 2011). It involves protection of aggregates deposits through land use planning (i.e., securing raw materials). In the context of this framework, at the national level an aggregates planning policy must be developed considering strategic issues which are then 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 evolves to the detailed scale (regional: 1:25 000; local 1:5 000).

Figure 3.1. National Mineral Planning Policy (Tieess 2011; EC 2010b).

‘A National Minerals Policy first has to provide a “Mineral Statement”. 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 resource 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’ (Tieess, p. 15, 2010).

The step of regional planning is especially important for the regulation of raw materials issues. With the help of well-established statements, regional plans (based on broader development programs, like national and super-regional ones) determine the regional goals of land use planning for the development of single districts. A regional land use plan designed for the extraction and protection of mineral resources must contain a precise planning flow chart and a textual statement. The textual statement included in the plan must define ‘aggregates priority zones’ that should be safeguarded, while carefully considering the medium and long-term mineral resources demands, and the limited availability of mineral resources deposits.

The determination of ‘aggregates priority zones’ encroaches on basic property rights and thus requires a settlement with the concerned landowner. It shall be justified if there is the need of public interest, which is relevant and valid in the case of aggregates supply/extraction, since aggregates are required for economic development. However, the quantity, quality, and the applications for which the resources will be needed in the mid- and long-term should be clear. To justify the designation of an area as ‘aggregates resource priority zone’ requires an analysis of the aggregates’ market structure and a material flow analysis.

From a methodological viewpoint, two different approaches can be used in land planning. The first approach is to limit the planning by excluding certain usages for a specific area. This method has the disadvantage that a sustainable aggregates supply, i.e. the systematic securing of aggregates resource areas with priority, is not possible. In the second, alternative approach the fields of other usage priorities reduce deposits that are worth extracting while the remaining fields become priority aggregates resource areas. The advantage of this approach is that the authorities can develop a concrete aggregates resource policy, despite the fact that land speculation may occur. It is necessary to develop long-term plans that account for aggregates demand, aggregates availability, and that forecast impacts during the whole life cycle of the products (sustainability). The final goal is to achieve supply security and resources efficiency.

3.2 The content of the planning documents and methods

The authorities responsible for aggregates planning **are mining, land use planning and other authorities** at national and regional level. Their competence (except Autonomous Province of Trento(IT)) cover only primary aggregates.

In 5 countries (Albania, Herzegbosnian Canton (Bosnia and Herzegovina), Croatia, Slovenia and Autonomous Province of Trento(IT)) aggregate planning documents are predefined by an Act or an Ordinance. The planning documents for aggregates planning are Mining Strategy, Mining Act, and Regulations on procedure for granting concessions. In other countries (Hungary, Romania and Serbia) the content of aggregate planning documents is not predefined by an Act or an Ordinance, e.g. in Austria where the AUT MINPLAN has no legal character.

In the most SEE countries the main responsible authority (coordinator) for the development of a plan is Ministry of Economy (department of mineral policy) - in close cooperation with national geological survey and the land use planning authorities, and other ministries e.g. environmental and land use planning (Ministry of Physical Planning and Spatial Plan).

The aggregate plans in most of the countries are updated every 5 to 10 years depending on the needs of the community or society, except the Albanian where mining strategy cover 15 years and Herzegbosnian Canton (Bosnia and Herzegovina), Serbia and Romania where laws on mining do not address specifically to the field regarding frequency of updating the aggregate plans.

Generally an aggregate plan should be based on land use planning. Aggregate plans, integrated into land use plans, support the industry and relevant authorities to establish a stable aggregates planning framework over the long term. By overlaying mineral resource maps with areas reserved for other land-use purposes can help to identify potential areas of conflict so that future developments can be zoned away from these areas wherever feasible.

3.2.1 Why should authorities plan for minerals extraction?

The most comprehensive answer for the above question can be cited from the Slovenian stakeholders consultation.

The interactive workshop results and a discussion suggested many possible ways to improve practices and legislations towards better aggregates supply planning in Slovenia, including a need for national spatial planning and mining strategies, improvement of recycling of construction waste legislation, a suggestion for a better involvement of different stakeholders in aggregates planning process, a need for better distribution of concession fees among local communities/state and an importance to use best available technologies for mining and processing.

3.2.2 How should aggregates planning authorities plan for minerals extraction?

Aggregates planning authorities should plan for the steady and adequate supply of minerals in one or more of the following ways (in order of priority):

1. designating areas – where viable resources are known to exist, landowners are supportive of minerals development and the proposal is likely to be acceptable in planning terms. Such sites may also include essential operations associated with mineral extraction;
2. designating areas of known resources where planning permission might reasonably be anticipated. Such areas may also include essential operations associated with mineral extraction; and/or
3. designating areas where knowledge of mineral resources may be less certain but within which planning permission may be granted, particularly if there is a potential shortage in supply.

Planning process-operating/permitting process SARM requirements include the need for the adoption of long-term planning to guarantee enough time to ensure the return on investment required to start a new quarrying activity. In the SEE Partner countries the most comprehensive minerals resources plan achieved at the national level is the Austrian Mineral Resources Plan (AMRP) (published in 2010). It was developed in close cooperation with the regional governments. The mineral resources plans of countries like Croatia (County Minerals Plans), Slovenia (National Programme for Mineral Resources Management -NPMRM) and the Autonomous Province of Trento (IT), follow the principles outlined by (Cibin et al, 2011.):

1. Aggregates demand and supply sources: It is recommended to include a forecast of the future demand for aggregates, based on a detailed aggregates market analysis and material-flow analyses. If possible, such analyses should include the final intended use of the materials (different kind of concrete, fill materials, road bases, road surfaces, etc.).
2. Aggregates availability: The supply plan should include the location of natural and alternative aggregates. These should include all the possible alternative sources, and resources should also be described in terms of their quality. It is recommended to assess the expected depletion of non-renewable resources that will have to be extracted to meet the forecasted demand. The aim is to reduce this value to the minimum.
3. Potential impacts: Quantification of all local impacts is necessary (noise, air, water resources, biodiversity, etc.); an analysis of the principal trading routes that will be used to transport the supply should be examined including the expected impacts on those routes.

4. Life Cycle Analysis: The destination of aggregates (recycling/disposal) at the end of their life-cycle is important, as are the restoration modalities of all exhausted quarry areas.
5. Scenarios (supply/demand): Alternative approaches to fulfilling aggregates demand need to be considered.

As noted in the Introduction, deposits of construction minerals, i.e. aggregates, possess three main characteristics, namely their location-bound nature, regional application and exhaustibility. Due to these properties the existence of deposits, as well as their extent and constitution need to be determined as early as possible. Whether or not a deposit can be used later on depends on land use planning in consideration of all relevant aspects. Timely and complete information on deposits helps to improve the resolution of potential use conflicts in land use planning. Thus the previous points comprise the knowledge base necessary to develop an aggregates-supply plan. It is most efficient and desirable to achieve the collection of this data at the highest (strategic) level (regional to national), and then to provide it to the local level (to the competent authorities). This will be crucial for monitoring the development of aggregates markets in the mid- to long-term, and for reducing the diversity in plans across adjacent regions. (Cibin et al, 2011).

Example: Contents of a Regional Minerals Plan (Croatia)

1. Geological mineral resource potential maps (scale from 1:10 000 to 1:100 000)
2. Data bases of mineral resource sites
3. Exploitation areas
4. Production and reserves data
5. Environmental protection conditions and restrictions
6. Market and development needs
7. Restoration recommendations
8. Delineated areas most favourable for extraction sites (areas with mineral commodities not in conflict with other land uses)
9. Stakeholder opinions on mineral policies (Local authorities, operators, NGOs, municipality officials)

Example: The Austrian Mineral Resources Plan

The Austrian Mineral Resources Plan (AMRP) indicates aggregates zones which are/could be relevant for regional planning process: each land use planning law is considering so called aggregates priority zones which should be kept free from other development/utilization claims. Such zones are based on the AMRP and shall be in-

cluded in the regional land use plans (ongoing process). As regional planning has to be accepted from the local government, those aggregates priority zones – covered by regional plans – also have to be accepted from the local government (planning hierarchy). If an operator wants to extract aggregates he can refer to those zones.

(See also examples in section 3.2.3)

3.2.3 Geology and aggregate potential

In official planning documents in the SEE countries, geological (potential) maps exist at various scales starting from 1:500 000 the scale at national level (Hungary - National Land Use Plan, Romania), with details 1:50 000 for the most interesting areas (Romania, Hungary - a location map of areas of mineral resources management is part of the National Land Use Plan, and mining sites are marked in county and local land use plans), and in the Autonomous Province of Trento (IT) provincial geological maps – scale 1:10 000. The geological map of Albania exists in various scales e.g. 1:200 000, 1:50 000 and 1:25 000. Almost 75% of the territory are realized the geological map at the scale 1:10 000. In Austria data for the entire country is available on a scale of 1:50 000. In Croatia limited geological data exists, in land use plans at the scale 1:100 000 (Regional Land Use Plan). In Slovenia all geological data is within work of the Mining Public Service, with the Geological Survey providing reviews, opinions and guidance (which are based on available geological data, including data bases and maps) for spatial planning to the authorities. In Serbia there exists basic geological data and some general mineral maps, but they are not included in spatial plans. In majority of the countries data are in a GIS system that can ensure in the future that calculations, calibrations and fine adjustments could mostly be made automatically and that the plausibility of the results could be verified at any time.

Minerals can only be extracted where they naturally occur, so location options for the economically viable and environmentally acceptable extraction of minerals may be limited. This means that it is necessary to consider all geological information (maps, reports, etc.) on aggregate occurrence both on a national and on regional scale. The principles outlined in the Austrian Mineral Resources Plan (AMRP) are an example that should be followed when preparing the geological framework for an aggregate planning document. In geology as in spatial planning evaluations are based on map scale which can be different in each country mainly depending on the Geological Mapping Programs. In the SEE countries the scale varies from 1:10 000 to 1:200 000. The preferred regional scale varies from 1:25 000 to 1:50 000.

Example: Sand and gravel maps

The evaluation of the occurrences of sand and gravel was based upon the compiled map of unconsolidated Paleogene, Neogene and Quaternary sediments of Austria (AMRP) on a scale of 1:50 000. This map shows both the regional and facies of unconsolidated sediments, while providing information about the most important lithological characteristics of the material. A similar approach is also done in Croatia where data is available on a scale of 1:100 000.

The evaluation of sand and gravel occurrences is based on the quality and quantity of the raw material and on the importance of the occurrence for local or regional supplies. These three criteria were combined in a 3D matrix in order to deduce the geological suitability of the sand and gravel in a Geographic Information System (GIS). The assessment of the quality of the raw materials is based upon two factors: (1) the lithological description of the material and (2) the use of the raw material.

To calculate the geological potential of a body of sediment, the quality and quantity of the material were combined in a first matrix. Different matrices were used to calculate potential in the foreland and in mountainous areas so that specific regional geological features could be taken into account, especially as small occurrences in alpine valleys can be just as important for local supplies as large occurrences in areas close to major towns. The resulting five stage quantification of the potential describes the relative capacity of the sediment bodies to supply sand and gravel as a construction material.

Example: Crushed rock/natural stone maps

The geological classification of the occurrences and deposits was carried out on the basis of the geological maps of Austria on a scale of 1:200 000 and, where available, on a scale of 1:50 000. The source for the survey of the mining sites was the Geological Survey archive on quarries and the accompanying digital catalogue and search system, the database of mining sites, which is regularly updated.

In the construction industry and civil engineering they include crushed products (crushed stone, stone chippings, high-quality chippings, crushed sand) as well as dimension stones. The solid rocks were broken down into (1) magmatic rocks, (2) metamorphic rocks and (3) sedimentary rocks. For each of these raw material occurrences, there is evidence of indicated or explored occurrences (raw material areas in the broad sense) or of use in the form of extraction sites (usually quarries, rarely underground mining).

3.2.4 Minerals/Aggregate inventory

Minerals/aggregates inventories exist in the majority of the SEE countries, except in the Herzegbosnian Canton (Bosnia and Herzegovina) and Serbia. In other SEE countries inventories exist and they include all the data for the mining area with coordinates from GIS, position, size of the area, type of mineral, form of the activity (exploration, or exploitation), type of reserves and quantity of reserves, qualitative data on minerals such as percentage of valuable mineral.

Primary aggregates resources and reserves and production data linked as a part of a minerals GIS should ideally consist of:

1. Spatial data related to the dimensions and shape of the exploitation field
2. Proven reserves
3. Type and Quality of aggregate

The public availability of data in most countries is limited due to confidentiality but is usually collected on an annual basis by mining authorities.

3.2.5 Secondary aggregates inventory

In most SEE partner countries the secondary aggregates have poor inventories. A country's national Ministry or Environmental Agency provides data on waste (C&D waste, mining waste, secondary aggregates) in accordance with the Waste Act or similar Acts. Four SEE partner countries do not have a secondary aggregates database inventory or they have some collected data on secondary aggregates (Herzegbosnian Canton (Bosnia and Herzegovina), Serbia, Albania and Romania).

Example: The Autonomous Province of Trento (IT)

C&D waste plan has the following the contents:

1. A technical report including:
 - a. Types and quantities of the wastes to manage;
 - b. Treatment methods;
 - c. User base size;
 - d. Organization criteria and management;
2. Localization of the disposal and recycling plants and individuation of the adequate areas, where such plants can be located;

3. Individuation of the adequate areas for the localization of disposal and recycling plants complying with the provisions and forecasts of the provincial urban planning plan and the other plans, which are more relevant in the planning hierarchy;
4. The criteria and the technical standards for the design, installation and management of the plants;
5. The identification of the access to the plants;
6. Graphs in an adequate scale to highlight the contents of the plan.

The mining service of the Province is responsible for the quarrying plan and makes the plan. APPA is responsible for the C&D waste plan and makes also the plan. In both cases the aid of other public services and stakeholder association is usually requested: e.g. the geological service and the extraction union. External organizations, such as professional studios, may be involved in the making of the plan through a public procurement: e.g. the C&D waste plan has been made with the collaboration of an external expert. The plans have to be adopted by the provincial government in order to become binding.

Example: Methodology to Track Recycled Aggregate (Ontario, Canada)

Based on the results of a survey of public agencies and a review of similar international systems, the following is the recommended method for tracking recycled aggregate in Ontario:

7. Guidelines on how and what materials to be tracked should be developed in order to standardize the data being put into the system from across the province.
8. An online computer database should be developed to provide a means for the public agencies to record their information about the use of recycled aggregate.
9. In order for public agencies to be able to do this additional work, they will require more funding for staff and training.
10. In order to hold public agencies accountable for this additional work, the additional funding should be tied to proper recording of the data.
11. In order to promote the social benefits of recycling, annual report cards should be created outlining the successes and opportunities for improvement in the use of recycled aggregate across the province.

Source: Ontario Ministry of Natural Resources (2010)

3.2.6 Aggregate Economics

Most SEE partner countries do not collect statistical data, models or forecasts about the trend of consumption of aggregates and the trend of production of aggregates. Only the Autonomous Province of Trento (IT) has data about the construction volumes, but a model is not currently implemented.

The assessment of aggregate economics should rely on the Sustainable Supply Mix (SSM) concept. The SSM uses multiple sources that together maximize the net benefits of aggregates supply across generations (Shields et al., 2006). SSM planning is related to the planning/development process by the respective stakeholders/authorities using these multiple sources in order to secure a sustainable supply of aggregates. All of the concerned stakeholders, e.g., those responsible for land use planning or for regulating the planning process of recycled aggregates and the sustainable use of natural resources, should act in close cooperation. The SSM planning framework provides 'basic operation rules' for the primary and secondary aggregates industry. The aggregates industry itself is responsible for the entire quarry life-cycle including exploration, exploitation, processing and rehabilitation of the sites, and they should accordingly plan their business). The question arises (social issues) to which 'degree' the operators and the affected municipalities should be involved in the SSM planning process. For instance, the operators often are not satisfied in terms of technical priorities with the selected aggregates priority zones with regard to the land prices.

Example: Mineral aggregate market

The mineral aggregate market of the Eastern USA is quantitatively modelled and the interaction of its components measured. Systematic study of supply, demand, price and transport characteristics of aggregate identified relevant modelling parameters. The supply model is based on production data. Demand estimates overall consumption on the basis of per capita output and interest rates. Price depends mainly on geological availability and on market size, size of operation and average annual per capita income. Distribution is the least cost way of balancing production and consumption, given the constraints imposed by transport costs.

Although prices vary from country to country, aggregates are relatively low value products. Industry profit margins are usually very tight and the aggregates sector is often very sensitive to any external direct or indirect factors that may influence prices. Aggregates are very bulky and are usually consumed by markets close to the point of extraction. Transportation is a key element of the supply process and a large part of the delivered price. The cost of a lorry load of aggregate doubles by moving it 40 km. Aggregates supply and management concepts should be based on detailed ag-

gregates market analyses, material flow analyses and trend simulations. In these respects, it is important to distinguish between consumption and production, as well as between internal (local/regional) and external (inter-regional, trans-regional) aggregates supply. An SSM policy framework should provide the aggregates industry with the necessary support, e.g. access to land, and relevant information like transport logistics.

Source: Poulin and Bilodeau (1993)

3.2.7 Spatial planning and environmental impacts

Most of the SEE partner countries have some procedure and criteria for identification of exploitations fields. Some countries have very well defined conditions. The land use planning framework in Austria is very complex and complicated, while in the Autonomous Province of Trento (IT) there are two instruments for assessing: interdisciplinary committee and EIA. An EIA is obligatory for all mining activities and all other intervention with regard to the environment in most of the countries. In some countries there is not enough cooperation between authorities in determining the environmental criteria, buffer zone and transport.

The principal issues that related to aggregate planning authorities should address in planning documents, bearing in mind that not all issues will be relevant at every site to the same degree, include:

- ✓ noise associated with the operation
- ✓ dust;
- ✓ air quality;
- ✓ lighting;
- ✓ visual impact on the local and wider landscape;
- ✓ landscape character;
- ✓ archaeological and heritage features
- ✓ traffic;
- ✓ risk of contamination to land;
- ✓ soil resources;
- ✓ geological structure;
- ✓ impact on best and most versatile agricultural land;
- ✓ blast vibration;
- ✓ flood risk;
- ✓ land stability/subsidence;
- ✓ internationally, nationally or locally designated wildlife sites, protected habitats and species, and ecological networks;

- ✓ impacts on nationally protected landscapes (National Parks)
- ✓ nationally protected geological and geo-morphological sites and features;
- ✓ site restoration and aftercare;
- ✓ surface and, in some cases, ground water issues;
- ✓ water abstraction.

Example: Transport issues and environmental impact

In Phase 2 of the Austrian Mineral Resources Plan, the raw material areas identified and mapped in Phase 1 were digitally merged with those regional development plans which prohibit or hinder the extraction of raw material (conflict elimination). In the case of surface-near raw materials, the areas were chosen on the basis of need. An effort was made to minimize the distance from the producer to the consumer. Reducing transport distances by an average of 10% could cut annual emissions of CO₂ by more than 1 million tons. Transport causes vibration, noise and dust which often cannot be avoided. The operators try to find adequate routes to minimize the number of neighbours affected. This often results in increasing transport distances.

3.2.8 Methodological procedure – aggregates protection/extraction and land use planning

The Joanneum Research developed an effective methodology for assessing the conflicts that might occur over mineral extraction which was within the frame work of the Austrian Mineral Resource Plan (Figure 3.2). The core of this procedure is the utilization of various thematic maps, so-called natural potential maps, where certain information has been purposely selected and overlapped, with respect to, and serving the interests of, raw-material extraction. The thematic overlap of different forms of utilization identifies certain conflicts, which are ranked according to their priority and then resolved.

The assessment procedure includes the following steps in evaluating:

- ✓ All relevant utilization structures
- ✓ The hydrological situation
- ✓ Near-surface mineral deposits

A set of thematic maps has thus been obtained containing significant information and parameters for planning. Based on these settings, so-called ‘positive and negative areas’ regarding raw-material extraction have been identified and form the basis for decision makers. The concept and method used in the preparation of the maps was governed by two overall goals: first, to develop a system for planners which

would be transparent and flexible to allow for the input of new information and, therefore, to identify new products; secondly, to provide a basis for other planning uses in order to make the map system as versatile as possible.

Figure 3.2. Applied Planning Method within the frame work of the Austrian Mineral Resource Plan (i.e. national and regional planning level are taken into account)

Analysis and determination of the spatial definition of raw material priority zones is based on the following steps:

1. Exclusion of mining prohibition areas according to provisions of the Mining Law (Article 82): housing development area (including centre area) and a 300m clearance, further building land, water protection areas and protected areas;
2. Conflict resolution with relevant surface claims as agricultural priority zones, green zones) and restriction related to other laws (water bodies and forests areas);
3. Conflict resolution with the local land use planning, flood water flow areas and planning of road transport projects.

The suitability zone maps drawn up using geoscientific methods were digitally overlaid on the digital regional planning data made available by the provincial governments. The respective regional planning specifications were broken down into so called prohibition and conflict zones. Prohibition zones are those areas in which the extraction of mineral raw materials is forbidden by federal or provincial law. Conflict zones are defined as those areas in which there are obstacles to extraction. These areas include, for example, Nature 2000 areas, where raw materials can only be extracted if there has been a positive nature compatibility analysis. The individual provinces define the conflict zones very differently, both in terms of their content and scope.

The results of the overlay of the suitability zone maps with the prohibition zones were referred to as Scenario 1. Subsequently, the conflict zones were cut out and the remaining areas (residual representation) depicted as Scenario 1. These residual areas are basically raw material areas where conflicts have been eliminated, but which still required detailed revision, particularly as a number of residual areas are either too small to allow economically viable extraction or there are other reasons which militate against future extraction (e.g. wind parks, electric power lines, gas pipes etc.).

3.2.9 Separation distances/buffer zones

Separation distances/buffer zones may be appropriate in specific circumstances where it is clear that, based on site specific assessments and other forms of mitigation measures (such as working scheme design and landscaping) a certain distance is required between the boundary of the minerals extraction area and occupied residential property. Any proposed separation distance should be established on a site-specific basis and should be effective, properly justified, and reasonable. It should take into account the:

- ✓ nature of the mineral extraction activity;
- ✓ need to avoid undue sterilisation of mineral resources,
- ✓ location and topography;
- ✓ characteristics of the various environmental effects likely to arise; and
- ✓ various mitigation measures that can be applied.

Once the residual areas from both scenarios had been consolidated in this fine tuning process, a volumetric analysis was carried out.

The Austrian Mineral Resources Plan (AMRP) – as mentioned above – is interrelated with the regional land use plans. Regional plans are based on land use planning laws

and development programs (regional level) and have to be reflected by local land use plans. A regional land use plan designed for the extraction and protection of mineral resources has to contain a precise planning depiction and a textual statement. The textual statement included in the plan has to define the term ‘raw material priority zones’ so that these areas serve the purpose of extraction in the parts of the planning area, in which the extraction of minerals should be guaranteed, while carefully considering the medium and long term mineral resource demands, and the limited availability of mineral resource deposits (respectively matters of restoration).

3.2.10 Analysis of aggregates priority zones

In Austria the analysis of aggregates priority zones is based on:

1. Exclusion of mining prohibition areas according to provisions of the Mining Law (Article 82): housing development area (including centre area) and a 300m clearance, further building land, water protection areas and protected areas;
2. Conflict resolution with relevant surface claims as agricultural priority zones, green zones) and restriction related to other laws (water bodies and forests areas);
3. Conflict resolution with the local land use planning, e.g. planning of road transport projects.

3.2.11 Social aspects

Most of the SEE partner countries have obligatory public hearings during the licensing process, and in that way stakeholders are involved in spatial planning. In some countries social aspects are treated by expert opinion in the Geological report and in Mining plans and documents (Serbia, Romania, and Slovenia). But aggregates production is not evaluated through methods based on multi-criteria analysis which is based on the rating and preference of members of various stakeholders.

3.2.12 Restoration, and beneficial after-use

In most SEE partner countries a quarrying company has an obligatory condition for getting the aggregate license that is to elaborate the restoration plan. This is written in the Mining Act, General Plan of the National Programme for Mineral Resources Management that contains general guidelines for restoration, or Regional Development Program. The problem is inactive (abandoned) quarrying sites. In the Autonomous Province of Trento (IT) an abandoned quarry without restoration does not reflect the legal practice, but in that case the municipality is in charge of the restoration

using even the caution money: indeed the quarrying company has to pay back all the missing restoration costs to the municipality and, if the company goes bankrupt, it will lose the deposit in favour of the municipality.

The Mining authority (inspectors) checks whether the production is the same as the entrepreneur has reported. The mining authority monitors randomly selected quarries or based on notifications. Responsibility for the restoration and aftercare of mineral sites, including financial responsibility, lies with the minerals operator and, in the case of default, with the landowner.

The most appropriate form of site restoration to facilitate different potential after uses should be addressed in both local minerals plans, which should include policies to ensure worked land is reclaimed at the earliest opportunity and that high quality restoration and aftercare of mineral sites takes place, and on a site-by-site basis following discussions between the minerals operator and the mineral planning authority.

The level of detail required on restoration and aftercare will depend on the circumstances of each specific site including the expected duration of operations on the site. It must be sufficient to clearly demonstrate that the overall objectives of the scheme are practically achievable, and it would normally include:

- ✓ an overall restoration strategy, identifying the proposed after-use of the site;
- ✓ information about soil resources and hydrology, and how the top-soil/subsoil/overburden/soil making materials are to be handled whilst extraction is taking place;
- ✓ where the land is agricultural land, an assessment of the agricultural land classification grade; and
- ✓ landscape strategy.

Where working is proposed on the best and most versatile agricultural land the outline strategy should show, where practicable, how the methods used in the restoration and aftercare enable the land to retain its longer term capability, though the proposed after-use need not always be for agriculture.

There are many possible uses of the land once minerals extraction is complete and restoration and aftercare of land is complete. These include:

- ✓ development of new habitats and biodiversity;
- ✓ agriculture;

- ✓ forestry;
- ✓ recreational activities;
- ✓ waste management, including waste storage; and
- ✓ built environment, such as residential, industrial and retail where appropriate.

4. Joint Vision on the Optimal Contents of Aggregates Plans

Securing reliable and undistorted access to raw materials is an increasingly important factor for the EU's economic competitiveness. One of the pillars of The Raw Materials Initiative (adopted by European Commission in Nov. of 2008) is setting the right framework conditions within the EU in order to foster a sustainable supply from European sources (EC Guidance 2010).

The most important aspects of aggregates planning (outside of the SEE region: e.g. British planning, inside the SEE region: e.g. Austria) are to be balanced and to have sustainable mineral resources policy. Two things need to be coordinated. First the conditions of the society wants and their well-being will not be compromised.

This is an important challenge for the 13 SEE countries and for these purposes the more efficient use of secondary raw materials is essential. This joint vision is necessary for the development of the national, transnational and for EU-regional strategies can be operated well.

4.1 Introduction

The joint vision was made based on the results of the multisectoral analysis, the guidance of the aggregates planning, the experiences of the stakeholder consultations, the SWOT analysis (mainly according to the British Geological Survey), the SARMa (Sustainable Aggregates Management) recommendations and on other aspects (e.g. SIP EIP RM 2013) (Figure 4.1).

Figure 4.1. Data sources for the Joint SEE Vision

The joint vision for aggregates planning in the South East European countries is arranged by the following topics: legal-regulatory framework (national level, aggregates planning, other related policies, permitting procedure, stakeholder involvement, local planning, authority, EU issues), environmental issues (air pollution, noise, water, quarry fines and waste, ecological offsets), social issues (increase knowledge and awareness), economic issues (cross-border SARM policy, taxation), professional tasks (inventory, mineral safeguarding), technology (recycling, blasting, restoration, safety), and general (transport).

The text is written in declarative sentences indicating that, hopefully, the tasks to be completed will be mostly fulfilled in all SEE countries by approximately 2020. After that period the state of the sustainable aggregates planning will depend on the changes of national and EU legislations.

4.2 Legal-regulatory framework

4.2.1 National level

Aggregates planning

Aggregates Planning is done on state, regional and local levels, and these levels are harmonized. The national planning is a general approach, while the regional and local plans are more detailed and have a higher resolution. The Aggregates Planning Policy is based on the Land Use Planning Policy integrating other policies (mineral planning, sustainable development, environmental, waste management and recycling policies). In aggregates planning **primary and secondary aggregates are managed together** in order to protect the primary aggregates resources and prevent waste disposal. The contribution of secondary materials is taken into account in local plans before considering extraction of primary materials. Planning is managed by **planning authorities in co-operation with different sectors** (planning authority, geological and mining authorities, aggregates industry, government departments, national environmental and heritage organizations). During the development of the Aggregates Planning Policy, the relevant stakeholders are involved, so the Policy goes through a **public consultation procedure**. Because of that increasingly difficult access to resources, Aggregates Plans must look at least 20 years ahead and **updated regularly, e.g. in every 5–10 years**, depending on the needs of community or society. **Demand forecast** is projected forward 10–15 years and revised annually, based on a rolling average of 10 years sales data and other relevant information, and an assessment of all supply options (including secondary sources). The aggregates plan is developed to meet these needs. The permitted reserves meet the needs for at least 5–10 years. Aggregates planning takes into account the **optimization of trading/transport routes** and the **Life Cycle Analysis** of aggregates. Aggregates are extracted mainly from outside National Parks, World Heritage sites and other protected areas. **Illegal quarrying activities** are prevented by efficient monitoring systems, high penalties and certificates on the origin of the sold aggregates. **Aggregates safeguarding areas** are defined in order that known locations of specific minerals resources of local and national importance are not needlessly sterilised by non-mineral development, whilst not creating a presumption that resources defined will be worked. In these areas other development proposals are not normally permitted. Worked land is **reclaimed** at the earliest opportunity carried out according to high environmental standards. The aggregates Planning deals with the finance of the restoration. The implementation of the Aggregates Planning Policy is **monitored** regularly.

Other related policies

All SEE countries have all policies related to aggregates (Sustainable Development Policy, Environmental Policy, Minerals Policy, Waste Management Policy, Recycling Policy and Land Use Planning Policy) on a similarly developed level. **Mineral resources including aggregates are considered equivalent to other natural earth resources.** Land use limitations are eased compared to 2014. The **Land Use Plans** are made on national, regional and local level. They contain designated areas for extraction and protection of mineral resources, so Minerals Planning is a part of Land Use Planning. **Sustainability** assessment screening is obligatory. Strategic Environmental Impact Assessment (SEIA) is applied as a preceding collateral exercise to minerals planning. Quarrying in nature conservation areas are regulated based on **the related guideline document published by the European Commission in 2010.** This document presents how the extraction of aggregates and the biodiversity goals can be managed in harmony. Land areas where geological aggregate resources exist are **designated in land use plans** to take into account future aggregates extraction in order to avoid sterilization of the resources. **Waste Management Policies** support the recycling of mining waste, construction & demolition waste, excavated soils and rock from civil works and industrial waste as aggregates. There is no bureaucratic obstacle of recycling. The transition from waste to secondary raw materials is encouraged; **construction and demolition waste is recycled at least in 70%.**

Permitting procedure

The permitting process for quarrying of primary aggregates is simple, fast and effective, led by a major regulatory body. The involved authorities co-operate efficiently. ‘One-stop-shop’ model is applied, which is the most client-friendly solution. Efficient permitting systems provide access to raw materials resources close to the major markets, thereby also optimize transport efficiency, together with minimisation of over-ordering by customers and effective end-use designs that remove any wastage. The **processing deadlines** are clearly regulated for both the authorities and the clients. The intervening **stakeholders** are involved into the process. **E-government** (including e-application forms, automatic deadline monitoring, digital documentation) is used during the process. Because of the major investment involved, extraction permits must be typically 10–20 years for sand and gravel pits, and typically 20–50 years for hard rock quarries, depending on scale in both cases. The use of time-linked progressive financial regulatory tools (e.g. land use fees) guards against speculative land occupation.

Stakeholder involvement

The conflict of different land uses (e.g. quarrying and protected areas) is solved by consultations with co-authorities, NGOs, local communities and industry. The stakeholders are involved into the planning process. The quarrying sector co-operates with agriculture and environmental authorities. Local communities benefit from mining royalty income so they are interested in exploitation.

4.2.2 Regional and local level

Regional and local planning authorities also participate in planning by preparing regional and local plans based on regional and local demand. For **local plans** local landscape assessment baseline studies and environmental impacts assessment are prepared. A landscape strategy and restoration plans are developed from the beginning considering the after closure use of the site. The local planning authority sets out **environmental criteria** to ensure that permitted operations do not have unacceptable adverse impacts on the natural and historic environment or human health.

4.2.3 EU issues

A coherent **community aggregates policy** is developed that takes balanced consideration of economic, environmental, and social aspects to ensure the sustainable practices of aggregates industry (Hámor et al. 2011). An up-to-date **legal terminology for aggregates** (primary and secondary aggregates) is used and adopted by the member states. Product-specific **eco-label and eco-award legislation** are extended to both primary and secondary aggregates production schemes. Technical **guidelines are developed** that include provisions on how this mining waste management corresponds to aggregate reserves. **The Natura 2000 framework is implemented homogeneously** in the different Member States in order to avoid the distortion of market conditions, and the transboundary exportation of environmental impacts.

4.3 Environmental issues

Public procurements are mostly green, using recycled aggregates. The **Aggregates Industry addresses water management, landscaping and soil management** during extraction of aggregates through best available technologies and exchange of good practice. Worked-out quarries and pits are restored after use or converted to other uses beneficial to the local community. The network of aggregates sites contributes to the development of green infrastructure, creating 'stepping stones' for biodiversity. **Environmental Impact Assessments (EIA)**: The procedure is simplified, works as a **one-stop shop procedure**, better and more timely adherence to the procedures de-

fined in the EIA Directive itself. **The coordination between the EIA and other EU directives and policies**, particularly with SEA (Strategic Environmental Impact Assessments) and AA (Appropriate Assessments) works well.

4.3.1 Air pollution

Keeping the air pollution below thresholds: measures are taken to **reduce dust and gas emissions** (by de-dusting systems collecting fine waste materials; using dust exhausting systems at the mills; covering the conveyor / crushing systems and vehicles; keeping the road or pit areas moistened). Dust and gas emissions are **monitored** and evaluated systematically.

4.3.2 Noise

Keeping the noise below thresholds: unnecessary noise is eliminated and **noise emission is reduced** (e.g.: by using noise suppression systems, switching off equipment when not in use, avoiding unnecessary revving of engines; using rubber linings in chutes, dumpers, trucks, transfer points; using appropriate blasting technique and blasting material; constructing new roads to bypass residential areas). A regular **monitoring** of noise is applied and the results are compared to legislation limits and site specific environmental terms.

4.3.3 Water

In order to improve the groundwater quality: **Responsible and sustainable water management** is ensured by several means, e.g. water management plan (covering both surface and groundwater), water recycling and control of any discharge from site. **Water quality protection structures** are used (e.g. impermeable geotextiles to cover the equipment maintenance area, drainage channels surrounding the exploitation area) to avoid potential contamination of ground waters. **The quality of both surface and ground waters is monitored**. Hydro-geological studies are conducted to monitor changes in water quality. **During the rehabilitation process** lakes and wetlands are created, which provide ecosystem services such as biodiversity havens, flood management and water purification.

4.3.4 Mining waste

Management of waste produced is practiced throughout the life of the quarry operation. **Mining waste** is used as secondary aggregate or for landscaping, remediation, or as backfill material. If recovering is not possible, **waste heaps** are landscaped and vegetated as soon as possible. Waste management works according to the **hierarchy**

set in Waste Framework Directive: prevention of waste creation, preparing for re-use, recycling, recovery and dispose as a last resort.

4.3.5 Biodiversity and ecological offsets

According to the **European Commission Guidance Document on NEEI and Natura 2000** (EC 2010a, p. 74) Biodiversity offsets are ‘measurable conservation outcomes resulting from actions designed to compensate significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably no net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people’s use and cultural values associated with biodiversity.’ Exploitation activities always have an environmental/landscape impact that cannot be recovered. But, in spite of financial offset or tax **restoration is the best methodology** for the aggregates industry to develop a new biodiversity in an exploited area. Restoration of an area is achieved both through actions of mitigation and progressive restoration during operations and final restoration. Restoration should always be the preferred way of halting the loss of biodiversity, and offsets considered as a last resort to compensate for unavoidable residual impacts. The restoration is implemented in a **landscape context**, taking into account **biological, social, and cultural values**.

4.3.6 Restoration

Before the restoration, an **overall restoration strategy**, identifying the proposed after-use of the site is developed. It contains **information about soil resources and hydrology**, and how the topsoil/subsoil/overburden/soil making materials are to be handled whilst extraction is taking place; an assessment of the agricultural land classification grade; and landscape strategy. Restoration starts **from the beginning of an operation, and this continuous restoration process must be in accordance to the final restoration plan**, making the process easier and more effective. A balanced approach is adopted between nature conservation and extraction activities. **Restoration plans** are discussed prior implementation with **local stakeholders**. The restoration plan is adjusted in advance according to the potential subsequent use of the quarry site after closure (if specified in the local development plans). When restoration plan is related to change in land use, **new facilities** are created such as lakes in cases of deep quarries with impermeable bottoms or sports facilities or recreational parks or wetlands. **The natural features** (e.g. streams) are restored and plant nurseries are developed during the life time of the quarry to facilitate the restoration phase with local species. **The degraded land** is restored by utilizing either the topsoil

removed and stored during the initial development of the quarry or even topsoil from other areas. **Residual contamination** is prevented.

4.4 Social issues

An enhanced and sophisticated involvement of local society is ensured in SEE countries by the state or by the aggregate companies on a voluntary basis. This way the social acceptance of aggregate quarrying is ensured from the planning stage. Local stakeholders are objectively informed and educated about primary and secondary aggregates through, e.g. a series of meetings, workshops, listening sessions, land use maps, newsletters, leaflets and posters. **The local communities' needs** are considered and respected by both regional planning authorities and aggregate companies. Local communities are aware of the **local mineral plans**, and the availability of and requirement for mineral resources. Aggregate companies employ **local employees**.

4.5 Economic issues

The import dependency has been reduced in the SEE countries due to the comprehensive mineral policy for both energy and non-energy mineral raw materials including both primary and secondary aggregates. In addition the production and export of aggregates are promoted by **improving supply conditions from EU, diversifying raw materials sourcing and improving resource efficiency (including recycling)** and finding alternative raw materials. The assessment of aggregate economics relies on the **Sustainable Supply Mix (SSM) concept**. The **entire quarry life-cycle** including exploration, exploitation, processing and rehabilitation of the sites is planned comprehensively.

4.5.1 Cross-border SARM policy

Analysis of cross-border aggregates market structures is regular. Demand and supply (sources) are well known and published, as well as the mid- and long-term demand scenarios and the possible supply options. Both the demand and supply of aggregates may be influenced by the cross-border SARM policy (which in turn must be based on such market analysis). **Cross-border SARM policy framework is implemented in SEE countries** in order to meet the increasing demand for aggregates, particularly in larger cities located at border areas. In the frame-work of international tenders regarding road and railway (cross-border) construction, **the needs for aggregates and transport logistics is clearly defined**. Most **financial instruments are within the domain of national sovereignty**. It is up to the government to establish these economic drivers along with national policy; however, significant differences in the financial instruments may lead to distorted competition in cross-border regions. **Financial instruments are harmonized in SEE countries. Data and knowledge ex-**

change between stakeholders taking into account the transnational policy level is improved. Stakeholder consultations are regular, at least annual discussions are effective. The **SARM policy framework** is implemented in the transnational European transport network: the relationship between ‘aggregates and construction’ at the transnational level is considered, include it in the **ERDF objectives and strategies**.

4.5.2 Taxation

Tax on C&DW disposal promotes the shifting of consumption from primary to secondary aggregates. **Financial measures** are instituted in order to support construction and demolition waste recycling. **Landfill taxation** promotes the waste minimization and recycling. The purpose of the tax is to encourage business and consumers to produce less waste, to discourage landfill and to encourage waste minimization and investment in other forms of material recycling and/or resource recovery. **Aggregates levy**: To protect international competitiveness the tax is also levied on imports but exports are relieved. The levy is intended to address the environmental costs associated with quarrying operations (noise, dust, visual intrusion, loss of amenity and damage to biodiversity) in line with the Government's statement of intent on environmental taxation. Its objective is to reduce demand for virgin aggregate and encourage the use of recycled materials and secondary aggregates such as china clay waste, slate waste and colliery spoil, which are exempt. Based on the fact that taxation on primary materials extraction or resource use is not an appropriate tool to increase resource efficiency **positive stimuli assist greatly the aggregates industry**.

4.6 Professional tasks

4.6.1 Inventory

Comprehensive inventories of primary and secondary aggregates are developed in SEE countries including inert mining and construction and demolition wastes or having access between them. The comprehensive **inventory of primary aggregate** resources and reserves and production data consist of **spatial data** related to the dimensions and shape of the exploitation field, **proven reserves, type and quality of aggregates**. The **inventory of secondary aggregates** contains information on technical characteristics (type, quantity, treatment method, etc.), location, recycling plants, technical standards etc. The inventory requires **additional funding for staff and training**. **The relevant knowledge about raw materials in Europe** is gained and all the stakeholders, including the relevant authorities, raw materials and downstream industries, research communities and society work towards the same objectives. **New reliable data-base** (link to EU mineral potential) is built in order to feed the EU knowledge base on primary and secondary raw materials in a **harmonized**

and standardized way. The aim is **to enhance the EU knowledge base** in order to improve the sustainable and safe raw materials supply to the EU economy and society, which includes: (a) building an innovative knowledge base of EU resources, both primary and secondary and (b) improving the quantity and quality of higher education (skilled experts) in conjunction with research and business in the EU for the entire raw materials value chain. **Dynamic modelling system** for primary and secondary raw materials is developed and commonly used in aggregates planning. Inventories: **On-line, easily accessible** (or even publicly available) service providing aggregates information for both primary and secondary aggregates supply (and demand) sources is needed in all countries. Based on necessary professional competence, existing databases and regulatory tasks, the geological surveys and mining authorities are managing to run such a system. Due to other traditions in certain countries, there are good co-operation between geological surveys and mining authorities and **regional planning authorities and state environmental bodies**. National ministries accept the importance of possessing more reliable and complete statistics on aggregates.

4.6.2 Geology and aggregate potential

The evaluation of the occurrences of sand and gravel is based on the **compiled map of unconsolidated sediments**. This shows both the regional distribution of the geological units of unconsolidated sediments and their facies, while providing information about the most important lithological characteristics of the material. The geological classification of crushed stone occurrences and deposits is carried out on the basis of the **geological maps**. The **quality and quantity** of the raw material and the **importance of the occurrence for local or regional supplies** are taken into consideration. All of these data are managed in a **GIS-based inventory with on-line access to everybody**.

4.6.3 Mineral safeguarding

The **concept of Mineral Safeguarding Areas** is widely known and applied. ‘The presence of an MSA neither precludes other forms of development from being permitted nor conveys any presumption that the mineral will be worked. MSAs simply provide a policy tool which will be an alert to the fact that minerals may be sterilized by the proposed non-minerals development and that this should be taken into account by the planning process...’ (Wrighton et al. p. 1, 2011).

4.7 Technology

The aggregate industry uses the **Best Available Technologies** to ensure the most efficient extraction and green technology to the highest possible degree, minimising its

land footprint, minimising environmental impact including water usage, preserving and fostering biodiversity in both operating and restored quarries and pits.

4.7.1 Recycling

Secondary raw materials, such as mining waste, construction & demolition waste, excavated soils and rock from civil works and industrial waste, are used as aggregates. **Construction & Demolition Waste (C&DW)** is recycled at least in 70% as it is prescribed by the 2008/98/EC Directive. C&DW recycling offers important opportunities: reduce land disposal requirements for landfilling (i); avoid overconsumption of natural non-renewable aggregate resources, by introducing alternative and supplementary materials onto the aggregate market (ii); create new business opportunities from waste recycling (iii). C&DW is pre-sorted at source into homogeneous segments. This **selective demolition** reduces recycling or disposal (where applied) costs and ensures better quality for the recycled products. Recycled aggregates are widely used in bulk unbound applications for infrastructure works (road and railway foundations), for environmental restoration and for the preparation of low strength concrete mixtures. The choice of aggregates for a specific application **depends only on the material's characteristics** and not on its origin. The European technical norms of use do not distinguish aggregates according to their origin but according to their **characteristics**. So recycled aggregate products that meet the prevailing European norms and specifications and are CE marked can compete with conventional aggregates. The integrated use of natural and recycled aggregates, besides an appreciable saving of natural resources, enables a better exploitation of the available resources according to the different uses.

4.7.2 Blasting

Aggregate industry applies sequential blasting and modern technology to reduce vibrations and noise which are monitored. If natural circumstances allow alternative extraction methods blasting is avoided.

4.7.3 Safety

Aggregate companies pay attention to **health and safety**, focus on **Zero Harm** by preventing death, injury and ill health in workplaces. This requires not only a fully competency-assured workforce, but all elements of the supply chain working in concert to ensure that employees are provided with safe plant and equipment meeting the requirements of SAFER BY DESIGN guidance.

4.8 Transport

Maximum transport efficiency is achieved through strategic planning of rail and water networks so that more aggregates are transported by these media. National aggregates planning policies are integrated with rail and water transport development strategies to ensure the optimal aggregates supply and transport solutions for governments, the aggregates industry, transport operators and society. Road transport is **optimised through enhanced access to resources** as close as possible to the major markets. Transportation distances are reduced by the use of local resources. This also **minimises associated CO₂ emissions** and energy consumption, as well as reducing environmental impact and transport congestion. The use of larger payload trucks reduces further the number of truck movements, fuel usage and CO₂ emissions. The cost of transporting sand and gravels across distances of more 30 km exceeds the value of the raw material, so efficiency of transport costs is achieved by the use of local aggregate resources.

Figure 4.2. Addressed topics regarding Joint Vision

5. Recommendations on Best Practices in Aggregates Planning

As a summary, recommendations are collected from the chapters. They provide the most important statements that need to be considered when starting or operating a comprehensive and integrated aggregates planning.

The recommendations are based on the results of the multisectoral analysis, some good practices of aggregates planning, and on the experiences of the SNAP-SEE project partners including the consultations they have held. We encourage the readers distributing this handbook and considering to follow the proven steps towards establishing the sustainable aggregates planning in South East Europe.

Aggregates Planning

- ✓ Aggregates Planning Policy is required to ensure the sustainable supply of aggregates. In this planning policy the primary and secondary aggregates should be managed together in order to protect the primary resources and to reduce the volume of mining and C&D waste and industrial by-products. In order to ensure the access to aggregate resources, Aggregates Plans must look at least 20 years ahead and should be updated at least in every 5-10 years.
- ✓ The Aggregates Planning should be implemented on national, regional and local levels. The national planning is a general approach, while the regional and local plans are detailed.
- ✓ During the development of the Aggregates Planning Policy, the relevant stakeholders should be involved; this way the Policy goes through a public consultation procedure.

Permitting procedure

- ✓ The permitting process for quarrying of primary aggregates should be simple, fast and effective, led by a major regulatory body. The 'One-stop-shop' model seems to be the most client-friendly solution and can be very efficient in a bureaucratic administration. Because of the major investment involved, extraction permits must be typically 10–20 years for sand and gravel pits, and typically 20–50 years for hard rock quarries.

Social issues

- ✓ An enhanced and sophisticated involvement of local society should be ensured in the SEE countries by the state or by the aggregates companies on a voluntary basis.
- ✓ The conflicts of different land uses should be eased by consultations of the relevant stakeholders (e.g. decision makers, environmental authorities, extracting industry, NGOs).

Environmental issues

- ✓ The Natura 2000 framework should be implemented homogenously in the different Member States in order to avoid the distortion of market conditions, and the transboundary exportation of environmental impacts.
- ✓ The Aggregates Industry should address water management, landscaping and soil management during extraction of aggregates through best available technologies and exchange of good practice.

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