Trans Adriatic Pipeline

ESIA Albania
Section 5 – Baseline and Impact Assessment Methodology

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF BOXES

5 BASELINE AND IMPACT ASSESSMENT METHODOLOGY

5.1 Introduction and Overview of the ESIA Process

This section summarises the key stages for the ESIA process undertaken by TAP AG in Albania. As such, it presents the approach that has been adopted for the execution of this ESIA and defines the methodology that has been used for the collection of data and the assessment of impacts. Parallel approaches have been undertaken in the other countries traversed by the TAP pipeline, *i.e.* Greece and Italy.

5.1.1 ESIA Requirements

While the Albanian regulatory framework refers to Environmental Impact Assessment (EIA) only, TAP AG is also looking at the social implications of the Project as per international best practice. Through the Environmental and Social Impact Assessment (ESIA) process, TAP AG identifies, addresses, and manages all social, environmental and cultural heritage impacts, risks and opportunities in a systematic and comprehensive manner.

As described in *Section 3*, in addition to the Albanian local standards TAP AG has selected the Performance Requirements (PR) of the European Bank for Reconstruction and Development (EBRD) to serve as the benchmark to assure that adverse impacts on people, their rights, livelihoods, culture and environment is avoided or, where avoidance is not possible, minimised, mitigated, offset and/or compensated. This approach also provides for conformance with European Union (EU) Directives and further with the requirements of the Performance Standards (PS) of the International Finance Corporation (IFC) and other international project finance institutions (IFIs) who refer to these standards (e.g. Equator Principles IFI). TAP AG, are committed to fulfil the above principles and the requirements of the PRs and have set this out in a policy document on ESIA for the Project.[1]

5.1.2 ESIA Legislation and Standards

Pertinent Albanian, EU and international legislation and standards for the protection of the environment and people were reviewed during the development of significance criteria for the ESIA. Many legislative instruments set out standards of environmental performance and expectations for ambient environmental quality that are pertinent to the Project. Where this is the case they have been used to develop impact significance criteria (see *Annex 5 – Baseline and Impact Assessment Criteria*).

For some environmental and social aspects the requirements contained within Albanian Law and international standards are expressed in qualitative terms and rely upon professional judgement for evaluating significance. In these cases, a review of published guidance, expert opinion and input from stakeholder consultation during the scoping phase, has been used to develop appropriate impact significance criteria.

[1] http://www.trans-adriatic-pipeline.com/tap-project/health-safety-and-environment/corporate-social-responsibility/

5.2 Stakeholder Engagement

As part of the ESIA process, stakeholder engagement was undertaken to comply with the Albanian EIA requirements and the EBRD PR10 on '*Information Disclosure and Stakeholder Engagement*'. PR10 sets out the requirements for project proponents:

> *"… to identify stakeholders potentially affected by their projects, disclose sufficient information about issues and impacts arising from the projects and consult with stakeholders in a meaningful and culturally appropriate manner".*

Accordingly, TAP AG has set out a stakeholder strategy[1] and prepared and is implementing a stakeholder engagement plan (SEP, TAP-FEED-AL-EIA-REP-7009*)* respectively. This has provided a systematic framework for the Project's engagement with national, regional and local stakeholders as well as its engagement with international ones.

The main goals of the SEP are to ensure that:

- Adequate and timely information is provided to Project-affected people and other stakeholders;
- Stakeholders are given sufficient opportunity to voice their opinions and concerns; and
- Stakeholder feedback influences Project decisions.

TAP AG has informed and engaged with stakeholders via a variety of mechanisms. These have included a Scoping tour in municipalities along the proposed route (see *Section 7*), the involvement of stakeholders in the development of the ESIA baseline, consultation with stakeholders on key issues of relevance to the Project and the ESIA, publication of the information about the Project, formal and informal meetings with stakeholders and the presentation of the draft ESIA in accordance with national and international requirements.

Further information on the SEP implementation and statutory and public stakeholder consultation including a summary of the issues and concerns raised by stakeholders and how the project has responded and addressed these is provided in *Section 7* and *Section 8*.

5.3 Scoping

5.3.1 General Considerations

As per EU guidance on Scoping[2], a key aim at an early stage of the ESIA is to identify the likely significant impacts of the Project that will require investigation and to develop the resulting terms of reference for the assessment studies.

Therefore as an initial step of the ESIA process, TAP AG has undertaken project scoping to establish key issues for the project and to define the full scope of the ESIA.

[1] http://www.trans-adriatic-pipeline.com/tap-project/health-safety-and-environment/stakeholder-engagement/
[2] http://ec.europa.eu/environment/eia/eia-guidelines/g-scoping-full-text.pdf

The Albania ESIA Scoping Report (TAP-FEED-AL EIA-REP-7028) was prepared by TAP AG in April 2011. It described the process of route alternatives investigation and route selection, main components and salient features of the project, the potential environmental and social issues involved with project implementation, potential mitigation, and the proposed ESIA study programme including foreseen further consultation steps. This Report was submitted to the Ministry of Environment Forestry and Water Administration (MEFWA) as a voluntary best practice measure (Scoping as such is not foreseen as a procedural step in the Albanian EIA regulation) and was subsequently published on the TAP website.[1] Due to the lack of regulatory requirement at the time, no formal feedback on the Scoping Report was received by TAP AG.

5.3.2 The Technical Scope

The Project is defined as including all those actions and activities which are a necessary part of the development including all related and ancillary facilities without which the Project cannot proceed.

The definition of the Project excludes activities which are prompted to occur by the Project but which are not essential to its development and are undertaken by others. However, the impacts of such activities will nevertheless be taken into account in the assessment under the aspect of cumulative impacts (see *Section 5.7.6*).

5.3.3 The Spatial Scope

The ESIA clearly sets out what is variously referred to as the 'spatial scope', 'study area' or 'area of influence' for the Project and its ESIA. EBRD specifically defines areas of influence in the following terms which are reproduced below with comments on their application to the TAP Project ESIA. The below has been used as guidance to determine the project elements subject to study in this ESIA.

Box 5.3-1 EBRD Definitions of Areas of Influence

(i) "The assets and facilities directly owned or managed by the client that relate to the project activities to be financed (such as production plant, power transmission corridors, pipelines, canals, ports, access roads and construction camps)." These will be assessed as a matter of course in the ESIA.

(ii) "Supporting/enabling activities, assets and facilities owned or under the control of parties contracted for the operation of the clients business or for the completion of the project (such as contractors)." At this stage of the Project development such matters are still to be resolved. However the ESAP will clearly set out the management measures that TAP AG will take in regard to such matters as contractor management and procurement of goods and services.

(iii) "Associated facilities or businesses that are not funded by the EBRD as part of the project and may be separate legal entities yet whose viability and existence depend exclusively on the project and whose goods and services are essential for the successful operation of the project." The position at this stage is that any facility that is essential for the successful operation of the Project is part of the Project and therefore will be subject to lender requirements. Therefore at this stage these matters are not believed to be pertinent to the Project.

(iv) "Facilities, operations, and services owned or managed by the client which are part of the security package committed to the EBRD as collateral". Such matters are yet to be determined but are not anticipated to have an influence on the spatial scope of the ESIA.

[1] http://www.trans-adriatic-pipeline.com/fileadmin/pdfs/TAP-FEED-AL-EIA-REP-7028_ESIA_Scoping_Rep_Albania.pdf

(v) "Areas and communities potentially impacted by: cumulative impacts from further planned development of the project or other sources of similar impacts in the geographical area, any existing project or condition, and other project-related developments that can realistically be expected at the time due diligence is undertaken". These will be assessed as a matter of course in the ESIA.

(vi) "Areas and communities potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location. The area of influence does not include potential impacts that would occur without the project or independently of the project". These will be assessed as a matter of course in the ESIA.

Collated by ERM (2012)

The spatial scope varies depending on the type of impact being considered and in some cases has been refined as the assessment has proceeded. In each case it includes all areas within which significant impacts are likely to occur and takes into account the following considerations:

- The physical extent of the proposed works, defined by the limits of land to be acquired or used (temporarily or permanently) by the Project.
- the nature of the baseline environment and manner in which impacts are likely to be propagated beyond the Project boundary.

The area of influence may also extend across administrative or national boundaries and the assessment has therefore considered such trans-boundary effects.

5.3.4 The Temporal Scope

Impacts have been identified and assessed for all phases of Project development from initial site preparation, including any advance works, through construction, commissioning and operation, to decommissioning, restoration and after use (to the extent these latter three items can be understood at this time).

Since the design lifetime of the Project is considered to be 50 years[1], the assessment also considers the autonomous development of pertinent aspects of the baseline over this time and assesses the extent to which projected changes and trends influence impacts.

[1] The TAP facilities (compressor stations, equipment) will be designed for a lifetime of 25 years, while the pipeline itself is designed for a life time of 50 years. After 25 years the station equipment will be replaced. It should be noted however, that the pipeline system with good maintenance in place could have an actual technical lifetime which is much longer than the nominal design lifetime.

5.4 ESIA Report

The following subsections present the key Terms of Reference of this ESIA Report: ESIA Objectives; ESIA Steps; and definition of Project Area and Areas of Influence.

5.4.1 Objectives

The purpose of the ESIA is:

- To identify the legal framework applicable to the project;
- To describe the principal project features and technical specifications;
- To summarise the approach used by TAP AG for design the pipeline and assessment of alternatives for the project;
- To describe the social and environmental baseline of the project in terms of key sensitivities and potential constraints on the construction, operation and maintenance of the pipeline;
- To assess the potential negative and positive impacts and risks of the project and project-related activities on the environment (including biophysical and socio-economic resources); and
- To design mitigation or enhancement measures to maintain positive impacts and avoid, remove or reduce negative impacts and risks to the environment.

5.4.2 ESIA Phases and Steps

The key phases and steps in the ESIA process are described below.

Phase I, Route Selection and Refinement (see *Section 2* for details): the route selection and initial refinement was performed prior to the commencement of the ESIA. However, the route refinement phase has continued in parallel to the ESIA study, taking into consideration the key environmental, social and cultural findings identified. The route refinement process has in turn fed the ESIA process, so the ESIA Report has been updated based on the refined route. Therefore, this phase is an overarching phase that has accompanied the sequential ESIA steps below.

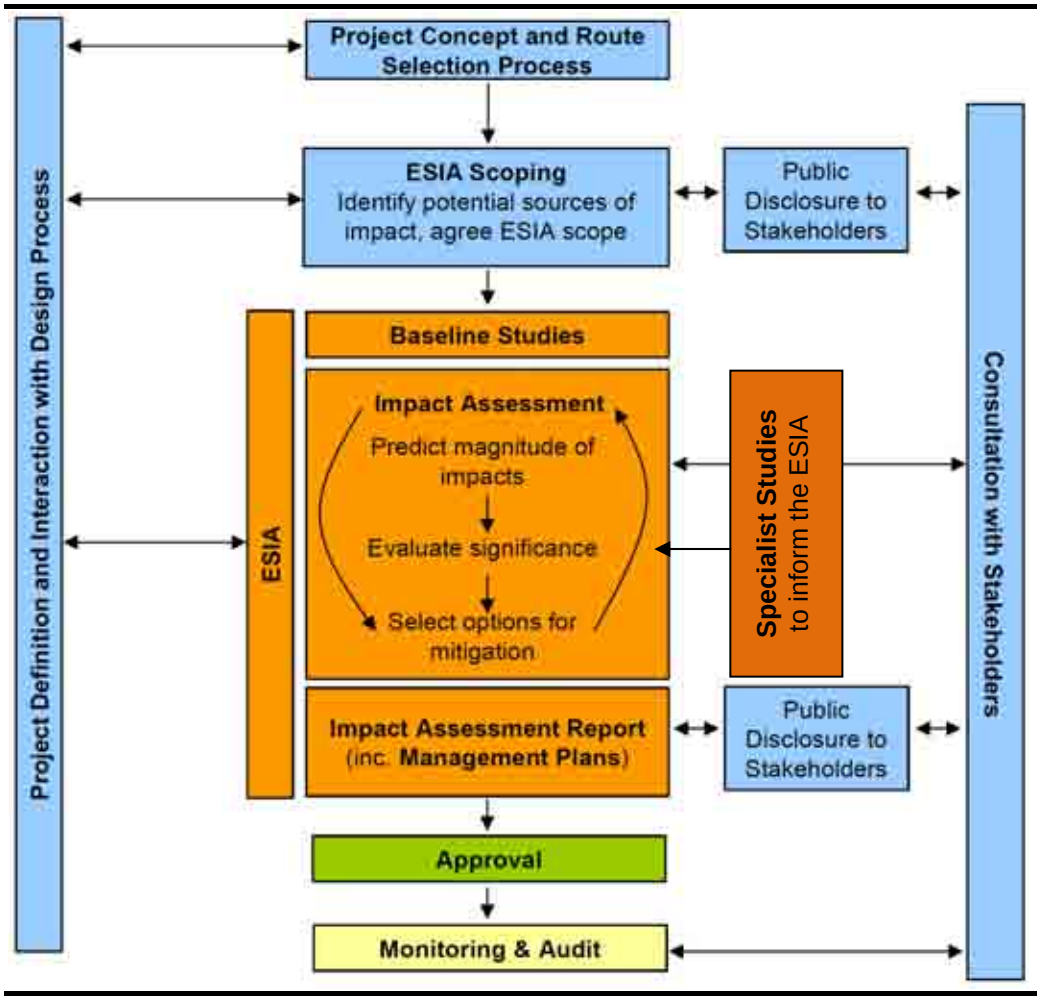
Phase II: ESIA Study

- **Pre-study activities** such as screening, preliminary assessment and scoping. This phase establishes the environmental, social and cultural considerations in advance of detailed studies.
- **The ESIA study,** which results in the identification and assessment of impacts. Integral to this study is the development of measures to mitigate and reduce or remove adverse impacts, and to maintain or enhance positive impacts.

- **The post-study stage,** which includes steps undertaken for review and monitoring to ensure that mitigation measures are implemented, and that they are effective during construction and operations.

In summary, the ESIA follows a systematic and iterative process of examining the environmental, socio-economic and regulatory context within which the project is situated. *Figure 5.4-1* graphically presents the ESIA process.

Figure 5.4-1 Schematics of the ESIA Process



ERM (2012)

5.4.2.1 Project Footprint

As described in *Section 2*, the route of the TAP in Albania has been selected following an extensive and thorough alternatives route assessment process performed by TAP with the aim to select a technically feasible pipeline route with the least environmental, socioeconomic and cultural heritage impacts.

Upon the selection of the preferred route (or '*base case'*) from a process of route refinement commenced with the aim to optimise the route, particularly through those sections which present greater technical, environmental, socioeconomic and cultural heritage challenges. The route refinement process of the *base case* at a macro and meso-scale can be considered completed at the time of writing this report. As a result of this process, described in detail in *Section 2*, a large number of significant environmental, social and cultural impacts have been avoided.

The TAP Project area includes the footprint of all project activities, where work is directly going to be performed. This includes the working strip), access roads, compression stations, block valve stations and temporary laydown and storage areas and the construction camps (see *Section 4*).

5.4.2.2 Project Area of Influence

For the purpose of this ESIA, the area of influence for the TAP Project activities has been defined as the area in which a direct or indirect impact on the physical, biological, social or cultural environment might occur (refer to *Box 5.3-1*). For the detailed analysis of the current baseline of the project, the following areas of influence have been defined.

Onshore Environment:

- For environmental impacts, the area of influence is defined as a 500 m corridor along the proposed pipeline centre line (250 m wide either side) and 500 m from the boundary of proposed construction camps, BVSs, pipe yards and compressor stations. This area is considered sufficient to encompass the area physically affected by project activities and most off site environmental impacts (e.g. noise and air quality impacts).
- For socioeconomic impacts, the direct area of influence is defined as a 2 km corridor along the proposed pipeline centre line (1 km wide either side) and 1 km from the boundary of proposed construction camps, BVSs, pipe yards and compressor stations. Settlements within this area will be most significantly affected by direct impacts area such as land use, disruption to infrastructure and reduced environmental quality.
- For cultural heritage impacts, the area of influence is defined as a 50 m corridor along the proposed pipeline centre line to accommodate for physical disturbance impacts created by the working strip. The area of influence for the construction camps, BVSs, pipeyards and compressor station will similarly be delineated by their physical footprint.
- Specific areas of influence for different receptors: The specific direct area of influence for certain receptors is in some cases wider than the 2 previously described corridors. For these cases, specific areas of influence have been defined in their respective sections of the baseline chapter. Examples of these include the following:
    - The discharge areas of rivers directly affected by project activities, or other rivers that cross in the vicinity of project area but for which indirect impacts are considered as possible from the project;

- Mobile species that may travel across the site (on migration) or may be associated with a protected area and use other habitat in the wider area (as often occurs with bird species and estuaries) and therefore could be directly or indirectly affected by project activities;

- Major populated areas outside the 2 km corridor may be directly or indirectly affected by project activities (e.g. network of supplies, infrastructure and transport system, employment base, services, etc.).

Offshore Environment:

- For environmental impacts, the area of influence is defined as
  - For the nearshore area the maximum extent of the associated sediment plume according the sediments modelling results. This is based on a maximum detectable sediment plume extent of 7300 m to the North of the trenching activities and a residual 200 m extent south. The activities within the nearshore include dredging which will create a trench of ~2 km in length from the coast to Kp 2 with a maximum width of 160 m and a depth of 7 m. This area is considered sufficient to encompass the area physically affected by project activities and most off site environmental impacts (e.g. noise and air quality impacts). After Kp 2 the dredging will be considerably smaller with a maximum width of 1 m with a depth of 0.5 m.
  - For the offshore area during construction a moving circle (according to a rate of 2-3 km of pipe laid per day) around the lay barge of about 2-3 km radius (depending on use and type of the anchor spread) will be the area where the impacts will be introduced.
- For socioeconomic impacts, the direct area of influence is defined as:
  - For the nearshore area during construction a corridor of approximately 2 km width along the proposed pipeline centre line (1 km wide either side), according to the restriction of navigation.
  - For the offshore area during construction a moving circle around the lay barge of (safety zone) of about 2-3 km radius (depending on the anchor spread) will be adopted to avoid incident with marine traffic.
- For cultural heritage impacts, the area of influence is defined as:
  - For nearshore a 350 m width corridor along the proposed pipeline centre line to accommodate for physical disturbance impacts created by the 160 m trench and the temporary dredge spoil ground parallel with the corridor.
  - For offshore area the immediate vicinity of the pipeline.

5.5 Baseline Study Methodology

For the provision of the environmental baseline of the TAP route in Albania, different topic specific methodologies were employed. This section provides a summary of the methodologies utilised for each of the environmental, social, and cultural disciplines as well as providing criteria from which baseline conditions and importance of features and their sensitivities can be evaluated. Limitations have been explained where appropriate. Details of methods for particular analysis (e.g. water samples) can be found in the technical *Annex 5* and *Annex 6 Baseline Data*. Furthermore, mapping providing sample points and the survey area is also provided in *Annex 4*.

A good understanding of the baseline is key to understanding the nature and significance of project impacts and in feeding back to project design and routing / sitting decisions. Data were collected are described in detail in *Section 6*.

Baseline information was collected during the different stages of route development and in particular for the finally selected route (the *base case* route upon which this ESIA is based on).

5.5.1 GIS, Mapping and Indicators

Information collected during the field survey, together with high resolution satellite imagery and relevant thematic maps, was integrated to create an interactive tool using a Geographical Information System (GIS). This tool allowed for the findings of the different disciplines to be integrated and for maps and figures to be created showing different combinations of relevant data. A GIS database was created for each site of interest, so that information on the relevance of the site could be drawn and associated photographs could be linked.

The use of a GIS was important both in interpreting the data collected and in analysing and presenting relevant information on maps and charts of the study area.

5.5.2 Specific Topical Methodologies

Specific methodologies have been used to develop the baseline data for the different disciplines. Detailed information on the methodologies used to obtain environmental, social, and cultural data is provided in *Annex 5*.

5.6 ESIA Considerations in Project Planning and Design

To date, a substantial amount of design work, including the evaluation of alternatives, has been undertaken by TAP AG to provide definition to the Project.

Development of the ESIA required coordination and interaction between the ESIA team and the Project design teams on matters that include the following:

- Evaluation of alternative technologies and working methods, for example different water courses crossing techniques, to demonstrate the application of the mitigation hierarchy so that impacts are either avoided or the residual impacts are reduced to as low as reasonably practicable and/or to a level that would be deemed acceptable.

- Identifying the mitigation measures already integrated into design.
- Quantifying employment, resources use, landtake, emissions, discharges and wastes to feed into the impact predictions.
- Interfacing with safety studies to understand and assess potential major hazards that may result in potential impacts to environment or community safety.
- Further consideration of alternative approaches to offset and compensate impacts.
- The development and agreement of further mitigation measures during the operation phase.

Interaction between the ESIA and design teams and TAP AG decision-makers also included structured workshops focused around mitigation assumed to be built into design and good construction practice, the need for additional mitigation and options for addressing some of the key issues for the Project.

Although this ESIA Report presents comprehensive information on the planned activities to be undertaken during the construction and operation of the TAP, as a process the ESIA will continue to influence the management of project design, implementation, commissioning and operation. A key element in achieving the Project's environmental and social management obligations will be the ongoing interaction between design, construction, commissioning and operating engineers, contractors and environmental and social specialists. A key vehicle for the management of this interaction is the suite of management plans, provisions and guidelines to be contained within the Project Environmental and Social Action Plan (ESAP). The ESAP will be supplemented and amended by ongoing stakeholder consultation, environmental and social studies and design review.

5.7 Impact Assessment Methodology

5.7.1 General Considerations

The assessment of impacts is an iterative process that considers four questions:

- Prediction - what will happen to the environment and people as a consequence of the potential impacts and risks associated to the TAP Project?
- Evaluation - does this impact matter? How important or significant is it?
- Mitigation – if it is significant can anything be done about it?
- Residual Impact /risk – is it still significant?

Where significant residual impacts or risks remain further options for mitigation may be considered and impacts re-assessed until they are as low as is technically and financially feasible for the Project and would be deemed to be within acceptable levels.

The following sections describe some of the general principles that underpin the assessment approach. *Annex 5* contains information on the methodologies, and more specifically the significance criteria (and their derivation) applied for the following topic areas in the ESIA Report:

- Physical Environment;
  - Air Quality;
  - Noise;
  - Water Resources (Freshwater – Surface and Groundwater, Marine);
  - Geology, Geomorphology, Soil and Seabed Quality;
  - Landscape and Visual Amenity.
- Biological Environment;
  - Ecology – Habitats;
  - Ecology – Species;
- Social Environment;
- Cultural Heritage.

5.7.2 Impact Prediction

The ESIA describes what is anticipated to happen by predicting the magnitude of impacts (and quantifying these to the extent practicable, which varies depending on the topic being assessed). The term 'magnitude' is used as shorthand to encompass all the dimensions of the predicted impact including:

- The nature of the change (what is affected and how);
- Its size, scale or intensity and direction (*i.e.* whether adverse or beneficial);
- Its geographical extent and distribution;
- Its duration, frequency, reversibility;[1]
- Where relevant, the probability of risks occurring as a result of accidental or unplanned events.

The assessment of the magnitude of impacts to human receptors, for example a household, community or wider social group, takes into account their likely response to the change and their ability to adapt to and manage the effects of the impact.

The prediction takes account of mitigation measures that are already an integral part of design. The prediction also takes into consideration any uncertainty about the occurrence or scale of the impact, expressed as ranges, confidence limits or likelihood (a distinction is made here between (i) the probability of risks arising from a non-routine event such as leaks and potentially subsequent explosion, and (ii) the likelihood of an uncertain impact; for example it may not be certain that migrating species will be present during construction; that health will be affected by emissions to atmosphere or that local people will be employed by the Project).

[1] The definitions for these impact characteristics vary with each environmental/social component and are described in more detail in *Annex 5* where applicable. Impact characteristics need to be discussed in their context. An example to illustrate "reversibility" is loss of habitat: The loss of meadow vegetation through establishing the construction strip is largely reversible by proper habitat reinstatement once the pipeline is laid, whilst the loss of old growth forest habitat is not reversible, since the (i) 8 m wide pipeline protection strip (PPS) does not allow replanting of trees, and (ii) where trees can be replanted outside of the PPS, they will take decades to mature.

An overall grading of the magnitude of impacts is provided taking into account all the relevant variables noted above to determine whether an impact is of negligible, small, medium or large magnitude. This scale is defined differently according to the type of impact. For readily quantifiable impacts, such as noise, numerical values are used whereas for other topics (e.g. ecology) a more qualitative classification is necessary. Environmental and social risks during construction (e.g. pollution of soil and water from accidental spills or social frictions amongst local population and construction workers), and risks related to non-routine events during operation, are addressed qualitatively (although referencing quantitative risk assessments completed at this stage of the Project where available). Mitigation measures are considered for determining the residual impact or risk, whether impacts are detailed through quantitative or qualitative means. The details of how magnitude of impacts and risks has been predicted and described are presented in *Annex 5*.

5.7.3 Evaluating Significance

The next step in the assessment was to take the information on the magnitude of impacts, and explain what this means in terms of its importance to the natural, social and cultural society and the environment, so that decision makers and stakeholders understand how much weight should be given to the particular issue in determining their view of the Project. This step is referred to as the 'evaluation of significance'.

There is no agreed definition of significance (in the context of ESIA); however, for the purposes of this ESIA, the following practical definition is used:

> *An impact is significant if, in isolation or in combination with other impacts, it should, in the judgement of the ESIA team, be reported in the ESIA report so that it can be taken into account by others in making decisions on the Project.*

This recognises that evaluation requires an exercise of judgement and that judgements may vary between parties involved in the process. The evaluation of impacts presented in the ESIA Report is based on the judgement of the ESIA team, informed by reference to legal standards, national and regional government policy, lenders' requirements, current international good practice and the views of stakeholders.

In order to maximise the transparency of the ESIA, criteria for assessing the significance of impacts are defined for each issue and type of impact. Typically these criteria take into account whether the Project will:

- Cause legal or accepted environmental standards to be exceeded, e.g. air, water or soil quality, noise levels, or make a substantial contribution to the likelihood of exceedances.
- Adversely affect protected areas or features, or valuable resources, e.g. nature conservation areas, rare or protected species, protected landscapes, historic features, high quality agricultural land, important sources of water supply, other key ecosystem services.

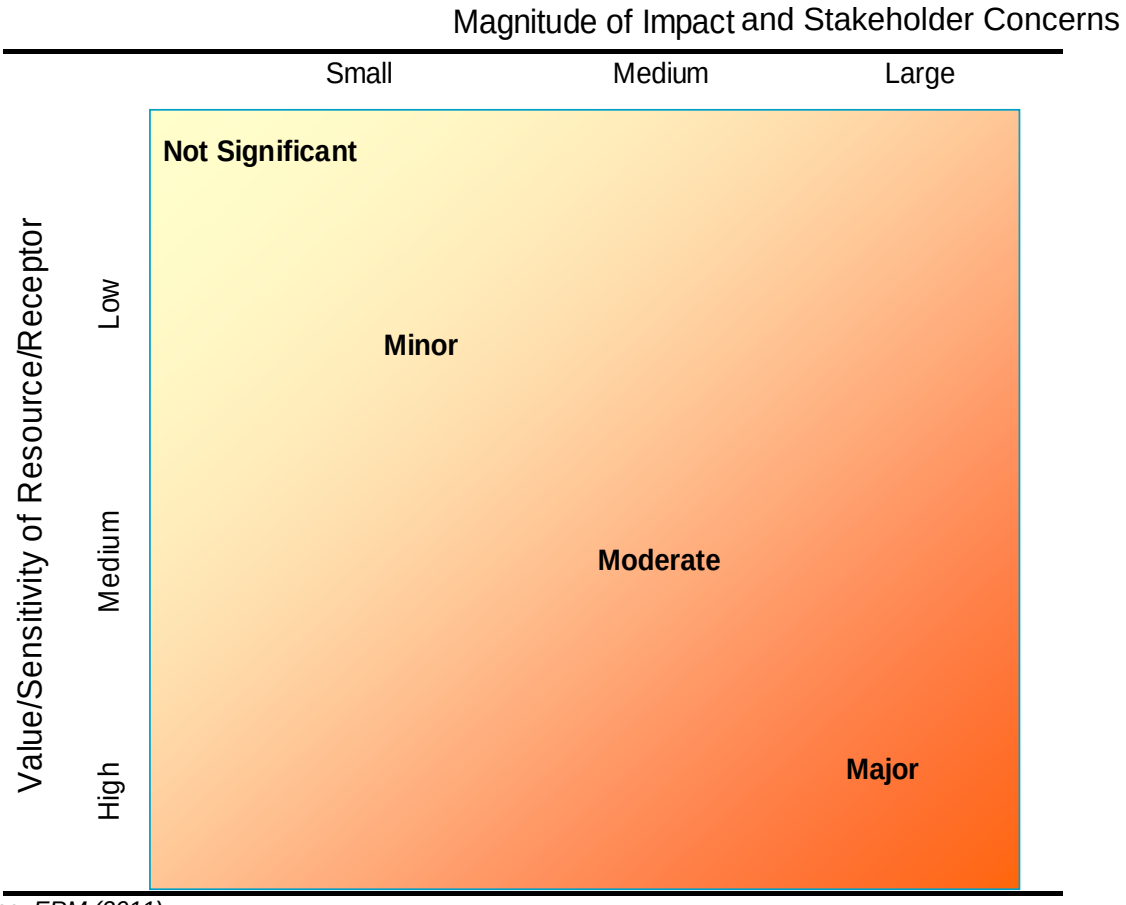
- Conflict with established government policy *e.g.* to reduce CO_2 emissions, recycle waste, regenerate deprived urban areas, protect human rights.
- Have a beneficial effect on the natural, social or cultural environment e.g. creating local jobs and/or benefiting the local community and economy;

Where standards were not available or provide insufficient information on their own to allow grading of significance, significance has been evaluated taking into account the magnitude of the impact and the importance or quality (and in some instances, the sensitivity or vulnerability) of the affected resource or receptor. The quality or importance of a resource or receptor has been judged taking into account, for example, its local, regional, national or international designation, its importance to the local or wider community, its ecosystem function or its economic value.

For a household, community or wider social group, the assessment of significance takes into account stakeholder views as articulated in existing policy or plans or expressed directly as a result of Project related stakeholder engagement.

Magnitude and quality/importance or sensitivity have been looked at in combination to evaluate whether an impact is significant and if so its degree of significance. The principle is illustrated in *Figure 5.7-1*.

Figure 5.7-1 Evaluation of Significance



Source: ERM (2011)

5.7.4 Mitigation

Impact assessment is designed to ensure that decisions on Projects are made in full knowledge of their likely impacts on the environment and society. A vital step within the process is the identification of measures that will be taken by a project to mitigate its impacts.

In some instances, mitigation will be inherent in design and in others mitigation measures will need to be identified during the ESIA process. The ongoing ESIA process has therefore involved identifying where significant impacts could occur and then working with the Project team to identify and develop technically and financially feasible and cost-effective means of mitigating those impacts to levels that are deemed acceptable. These measures have then been agreed with the Project and integrated into the Project proposals and the ESAP as clear unambiguous commitments.

Where a significant negative impact is identified, a hierarchy of options for mitigation was typically explored as follows.

- **Avoid at source** – remove the source of the impact.
- **Abate at source** – reduce the source of the impact.
- **Attenuate** – reduce the impact between the source and the receptor.
- **Abate at the receptor** – reduce the impact at the receptor.
- **Remedy** – repair the damage after it has occurred.
- **Compensate / Offset** – replace in kind or with a different resource of equal value.

Compensation/offset is typically seen as a last resort but may be required in terms of Local legislation (sometimes independent of the significance of an impact). Compensation or offset does not, however, automatically make an impact 'acceptable' or excuse the need to consider other forms of mitigation as discussed in the hierarchy. EBRD performance requirements highlight the need to explore alternatives to avoid or reduce impacts.

5.7.5 Assessing Residual Impacts

Following agreement on technically and financially feasible and cost-effective mitigation, the ESIA experts, where necessary, re-assessed the impacts taking into account the further mitigation commitments integrated into design and operation of the Project. This iterative process continued until an impact was deemed acceptable within the confines of what was regarded to be technically and financially feasible and cost-effective.

All residual significant impacts are described in the ESIA Report in terms of their overall significance. Where an impact is of more than minor significance the ESIA explains in greater detail how the mitigation hierarchy has been applied (and where appropriate the other mitigation options considered in the assessment and the reasons for their rejection) to reduce an impact to a level that is deemed to be acceptable.

The degree of significance attributed to residual impacts is related to the weight the ESIA team considers should be given to them in making decisions on the Project and developing conditions.

Box 5.7-1 Significance of Residual Impacts

Any residual ***major impacts***, whether positive or negative, are considered to warrant substantial weight, when compared with other environmental, social or economic costs and benefits, for those making decisions on the Project; conditions will be expected to be imposed to ensure adverse impacts are strictly controlled and monitored and beneficial impacts are fully delivered.

Residual ***moderate impacts*** are considered to be of lesser importance to making decisions, but still warranting careful attention to conditions regarding mitigation and monitoring, to ensure best available techniques are used to keep adverse impacts within levels deemed to be acceptable and to ensure beneficial impacts are delivered.

Minor impacts are brought to the attention of decision-makers but are identified as warranting little if any weight in the decision; mitigation will be achieved using normal good practice and monitoring will be expected to be carried out to confirm that impacts do not exceed predicted levels.

5.7.6 Cumulative Impacts

In the context of the TAP Project, cumulative positive or negative impacts[1] resulting from several or from the same source and affecting a specific environmental, social or cultural receptor will be taken into consideration during the evaluation of identified impacts. Where appropriate, their combined effect on the receptor will be defined.

In addition, cumulative impacts that can potentially occur from the combined effects of the TAP Project with other presently ongoing or reasonably foreseeable future activities in the project area will also be taken into consideration and assessed in *Section 8.22*.

The assessment of cumulative impacts will be performed, in general terms, in a qualitative manner based on the existing information of the present or future activities taken into consideration and the judgment of the ESIA team.

5.7.7 Transboundary Impacts

The term transboundary impact refers to an impact which occurs across political boundaries, be it because of the movement of an impacting item (such as waste) across said boundaries; or because of a medium, which in itself is of a transboundary nature, being impacted on (such as atmospheric emissions).

In the context of the TAP Project, which is planned to run across the Republic of Albania for east to west (from the Greek border to the Adriatic Sea), transboundary impacts should be taken into consideration. The key aspects to be considered when analysing potential transboundary impacts of the TAP are related to impacts on biological resources (primarily migratory bird populations and large carnivores); landscape and visual aspects, and noise and air emissions from the CS02 (located near the Albanian-Greek border).

The methodology used to evaluate the potential significant of transboundary impacts will be the same as that used for all types of impacts.

5.7.8 Management and Monitoring

A wide range of different measures to mitigate impacts have been identified in the ESIA and TAP AG is committed to their implementation. These measures are set out in the Project Description for intrinsic design measures and in the mitigation sections for specific mitigation items. The Environmental and Social Management Plan (ESMP) describes how the mitigation commitments will actually be delivered, together with the role of monitoring, inspection, audit and reporting. Where necessary, additional details in the form of outline topic-specific plans (e.g. for waste management) are provided for issues of critical importance.

[1] Cumulative impacts result when the effects of an action are added to or interact with other effects in a particular place and within a particular time. Thus the cumulative impacts of an action or activity can be viewed as the total effects on a resource, ecosystem, or human community of that action and all other activities affecting that resource (US EPA, 1999, see: http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf).

5.8 Dealing with Uncertainty and Difficulties Faced in Undertaking the ESIA

5.8.1 General Considerations

Like most ESIAs for large scale projects, the TAP ESIA faced a number of challenges in terms of retrieving baseline information, the level accuracy of predicting impacts, and developing appropriate mitigation. Furthermore, even with a firm Project design and an unchanging environment, predictions are by definition uncertain.

In order to facilitate decision-making, areas of uncertainty, data gaps and deficiencies, and additional work required during further stages of Project development have been highlighted within the ESIA report and mainly stem from the issues discussed below (for a more detailed discussion of difficulties and limitations see *Annex 5*).

5.8.2 Difficulties and Uncertainties regarding Baseline Conditions

Various physical, geotechnical, biological and archaeological surveys were carried out in the study area by established scientists with a detailed knowledge of Albania. There has also been substantial data gathering on socioeconomic conditions in the area. The surveys and data gathering were planned in such a manner so as to satisfy any specific local information needs. Surveys complied with established Albanian standards and practice for baseline data collection and relevant scientific protocols, but were also designed and undertaken to be suitable for an international ESIA. The information gathering combined field surveys and consultations with secondary data sources, i.e. researched the extensive body of information available in the scientific literature, grey literature and NGO and government documents.

Despite the extensive effort put into baseline data collection, it is unavoidable that some gaps in knowledge remain. In such cases, use has been made of information on similar environments or expert judgment, together with the application of a conservative approach to evaluating impact significance where appropriate.

The extent to which such uncertainty influenced the impact assessment is addressed in *Annex 5.*

5.8.3 Evolving Project Design

While ESIA is generally a process that interacts with design, it relies on design at a reasonably concrete level for certain data to provide the basis for impact assessment. In a project of the scale and complexity of the TAP there were inevitably issues that have yet to be fully resolved in terms of the precise nature of project activities. The majority of these are construction related. In particular, the ESIA relies on a preliminary logistics concept that only at later stage will be set out in detail by the main contractor.

Where the stage in design process results in uncertainty that is material to the findings of the ESIA, this is clearly stated and in some instances more than one option has been assessed. The general approach has been to take a conservative view of the likely residual impacts, to identify standards of performance which the Project will meet where firm predictions cannot be made, and to propose monitoring and further contingency measures.

5.8.4 Accuracy of Impact Prediction and Effectiveness of Mitigation

The accuracy of impact prediction is affected by both the issues discussed above, together with the prediction technique used. This is in part because ESIA predictions are made using methods ranging from qualitative assessment and expert judgement to quantitative modelling. The accuracy of predictions depended on the assessment method and the quality of the input data on the Project and its environmental and social context. Where assumptions have been made, the natures of any uncertainties which stem from these have been presented in the topic specific sections of the ESIA Report. In all instances, the significance criteria have been applied conservatively to ensure that the effectiveness of mitigation is not overestimated.

5.8.5 Managing Uncertainty

Managing residual uncertainty is a key role of the ESMP. Impacts will be monitored, as will the effectiveness of mitigation. Where impacts are found to be unacceptably high and/or mitigation fails to achieve its objectives, corrective actions will be implemented.

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