Integrated ESIA Greece
Section 5 - ESIA Approach and Methodology
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5 ESIA APPROACH AND METHODOLOGY

5.1 Introduction and Overview of the ESIA Process

This Section summarises the key stages of the ESIA process undertaken by TAP AG in Greece. 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 baseline data and mainly for the assessment of impacts. Parallel approaches have been undertaken in the other countries traversed by TAP, i.e. Albania and Italy.

It is highlighted that the TAP project in Greece initially consisted of a West Section (Nea Messimvria near Thessaloniki to the Albanian border). This was later extended with an East Section (Greek/Turkish border to Nea Messimvria). For both Sections similar approaches to the ESIA have been used. However, the main difference is that the East Section generally follows the route of the existing natural gas network whilst the West Section crosses areas where there is no similar infrastructure. Although the the ESIA process was carried out sequentially starting with the West Section this document provides an integrated ESIA that covers the whole of the TAP project in Greece.

5.1.1 ESIA Requirements

While the Greek 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 – Legislative and Policy Framework, in addition to the Greek 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 give assurance that adverse impacts on people, their rights, livelihoods, culture and the physical and biological environment are 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, is 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 EIA Legislation and Standards

The pertinent Greek, EU and international legislation and standards for the protection of the environment and people were reviewed during the development of evaluation criteria for impact significance 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 (further detail is presented in Annex 5 - ESIA Approach and Methodology Assessment Criteria).

For some environmental and social aspects the requirements contained within the Greek 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.

5.2 Stakeholder Engagement

As part of the ESIA process, stakeholder engagement was undertaken to comply with the Greek 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 Strategy2 and prepared and is implementing a Stakeholder Engagement Plan (SEP)3 respectively (one for the East Section and one for the West

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Section). This has provided a systematic framework for the Project’s engagement with national, regional and local stakeholders as well as its engagement with international stakeholders.

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.

In Greece, TAP AG has informed and engaged with stakeholders via a variety of mechanisms. These have included: two scoping tours (one in the West section in July 2011 and one in the East section in December 2012) in municipalities along the proposed route (see Section 7 Stakeholder Engagement) – an international best practice activity not prescribed by Greek EIA regulations at that time; 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 Stakeholder Engagement and Section 8 Assessment of Impact and Mitigation.

### 5.3 Scoping and Preliminary EIA

5.3.1 Scoping

5.3.1.1 General Considerations

As per EU guidance on Scoping⁴, a key aim at an early stage of the ESIA is to identify the likely significant environmental and social impacts (both positive and negative) of the Project that will require investigation and to develop the resulting terms of reference for the assessment studies.

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The TAP Project consists of two sections: (i) the West section (TAP Greece West) and (ii) the East section (TAP Greece East). Initially the pipeline through Greece consisted only of the West section. As an initial step of the ESIA process, TAP AG undertook a scoping exercise to establish potential key issues for the Project and to define the full scope of the ESIA. A Greek ESIA Scoping Report\(^5\) referring to the West Section was prepared by TAP AG in June/July 2011. It was submitted to the Ministry of Environment, Energy and Climate Change (MEECC) as a voluntary best practice measure, and subsequently published on the TAP website.

At the beginning of 2012, TAP shareholders decided to extend the TAP Project further towards the east. Therefore, a Scoping Report for the East Section was prepared by TAP in December 2012. TAP has opted to submit the Scoping Report for the East Section directly to the relevant stakeholders following the Performance Requirements of EBRD. A copy of the Scoping Report referring to the East section has been published on the TAP website.

Both Scoping Reports 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.

5.3.1.2 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).

5.3.1.3 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 general terms\(^6\) which are reproduced below with comments on their application to the TAP Project ESIA. These have been used as guidance to determine the Project elements which are subject to study within this ESIA.

**Box 5-1 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. |
| (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. |

*Source: EBRD (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.

5.3.1.4 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.

Since the design lifetime of the Project is considered to be 50 years, 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.

5.3.2 Preliminary EIA

In line with the Greek EIA regulations in force at the time when TAP AG started the EIA process in Greece, a Preliminary Environmental Impact Assessment (PEIA) was prepared and submitted to the MEECC in September 2011 for the West Section. At the same time the PEIA was disclosed on TAP AG’s website. Subsequent to a completeness check by the MEECC, and a revision to the Project design due to ongoing technical advances, all requested hardcopies of the PEIA (26 in total) were formally submitted to the MEECC for distribution to the statutory consultees in February 2012. The updated PEIA documentation was also made available on TAP AG’s website.

The key focus of the PEIA was to present the route selection process and the rationales used for the preferred routing and siting alternatives. The route of the TAP in Greece has been selected following an extensive and thorough assessment process of alternative routes performed by TAP AG with the aim to select a technically feasible pipeline route with the least environmental, socioeconomic and cultural heritage impacts. This has been an iterative process taking place for the past three years.

Upon the selection of the preferred route (or ‘base case’) in the PEIA, further route refinement has taken place to avoid constraints at a more detailed scale level.

7 The TAP facilities (compressor stations, equipment) will be designed for a life time of 25 years, while the pipeline itself is designed for a technical life time of 50 years. Therefore, for the sake of the ESIA the design life of the Project has been considered to be 50 years, although it should be noted that after 25 years the Compressor equipment will be replaced by BAT at that time.
8 Compressor station CS01 was removed and no longer considered for this section of the Project.
It is highlighted that a Preliminary EIA was applicable only for the West Section of the TAP in Greece. After the implementation of the new environmental permitting law (Law 4014/2011), PEIA has been replaced by Scoping (called ‘Preliminary Determination of Environmental Requirements’). According to Article 2 the owner of a project may perform public consultation and disclosure presenting the basic technical characteristics of the project and its main environmental impacts. The PEIA has been approved in the second quarter of 2013.

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 Report is:

- To identify the environmental 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 of 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 impacts of the Project and Project-related activities on the environment (including biophysical and socioeconomic resources); and
- To design measures to maintain or enhance positive impacts and avoid, remove or reduce negative impacts and risks on the receiving environment;
- To outline Management Plans, which will be produced and implemented during the further development of the project.

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 or Route Verification*
The term route selection and initial refinement refers to the West section only where an assessment of route alternatives with the aim to identify the project alternative with the least environmental and social impacts was conducted. This phase for the West section of the project was performed prior to the commencement of the ESIA (refer to Section 2 for further detail).

The term route verification refers to the East section and it involves an assessment of feasibility of bundling with the existing pipeline and assessment of local re-routings (refer to Section 2 for further detail).

Phase I for both sections has continued in parallel to the ESIA study, taking into consideration the key environmental, socioeconomic and cultural heritage findings identified. The route refinement or route verification process has in turn fed into the ESIA process, so the ESIA Report has been updated on the basis of the selected route. Therefore, this phase is an overarching phase that has accompanied the sequential Phase II ESIA steps.

**Phase II: ESIA Study**

- **Pre-study activities** such as screening, preliminary assessment and scoping and PEIA (only for the West Section). This phase establishes the environmental, social and cultural heritage 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.

- **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, socioeconomic and regulatory context within which the project is situated. *Figure 5-1* graphically presents the ESIA process.

It should be noted that for TAP Greece East primary sampling and biodiversity fieldworks were conducted at selected sites (mainly related to the protected areas) prior to the submission of the Scoping Report for TAP Greece East. This was necessary in order to retrieve valid ecological data, prior to the migration of bird species, hibernation of animal species and vegetation defoliation as well as meeting the scheduled time scales of the project.
5.4.2.1 Project Footprint

As described in Section 2, the route of the TAP in Greece has been selected following an extensive and thorough alternative 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. This was mainly the case for the West Section, whilst for the East Section, alternative route assessment was only applied to those areas where the pipeline could not be parallel to the existing pipeline or wherever a more sustainable solution could be identified.

Upon the selection of the preferred route (or ‘base case’) 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. As a result of
this process, described in detail in Section 2, a large number of significant environmental, social
and cultural heritage impacts have been avoided.

The TAP Project footprint includes all project activities, where work is directly going to be
performed. This includes the working strip, access roads that need to be upgraded, the
compressor station, block valve stations (BVSs) and temporary laydown and storage areas (pipe
yards) and the construction camps (see Section 4).

5.4.2.2 Project Specific 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
heritage environment might occur. For the detailed analysis of the current baseline of the Project,
the following areas of influence have been defined.

- For environmental impacts, the area of influence is defined as a 500 m corridor along the
proposed pipeline centre line (i.e. 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 different areas of influence were selected for the two sections of
TAP in Greece: (i) for the West Section, the direct area of influence is assumed as a 2 km
corridor along the proposed pipeline centre line (i.e. 1 km wide either side). This was chosen
since the project was crossing a ‘green field’ area in respect of pipeline projects. (ii) for the
East Section the direct area of influence is assumed a corridor of 1 km along the proposed
centreline (i.e. 500 m on each side of centreline), for the pipeline route running parallel to the
existing Greek pipeline network and a corridor of 2 km along the proposed centreline (i.e. 1
km on each side of centreline) for the pipeline route deviating from the existing Greek
pipeline network. This was chosen since the project was following the existing natural gas
network for most of its length. A direct area of influence of 1 km from the boundary of
proposed construction camps, BVSs, pipe yards and Compressor Stations was also chosen.
Settlements within this area are potentially affected by direct impacts that may occur from
changes to 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 38 m working strip. The area of influence for the construction camps, BVSs, pipe yards
and compressor stations will similarly be delineated by their physical footprint.
Specific areas of influence for certain receptors: The specific, direct area of influence for certain receptors is in some cases wider than the previously described corridors. For these cases, specific areas of influence have been defined in their respective sections of Section 6. 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 the Project area but for which indirect impacts are considered as a possibility 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 that may be directly or indirectly affected by Project activities (e.g. network of supplies, infrastructure and transport system, employment base, services, etc).

5.5 Baseline Study Methodology

For the provision of the TAP environmental baseline through Greece, a wide range of topic specific methodologies were employed. These methodologies are presented in its correspondence Annex (see Annex 6). Limitations have been explained where appropriate. Details of methods for particular analysis (e.g. of water samples) can be found in the technical Annex 5. Annex 6 - should be read in conjunction with this document for further details. Furthermore, mapping providing sample points and the survey area is also provided in Annex 4 which should also be referred to throughout as necessary.

A good understanding of the baseline information is the key to understand the nature and significance of Project impacts and in feeding back to project design and routing / siting decisions. The baseline information collected is 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 (i.e. the base case route upon which this ESIA is based).
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 GIS (Geographic information system). 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 on and used and associated photographs could be linked in.

The use of a Geographical Information System (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 heritage data is provided in the respective field reports presented in Annex 6.

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, so as 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 the design.
- Quantifying employment, use of resources, land-take, 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.

The interaction between the ESIA and design teams and TAP AG decision-makers also included structured workshops focused around mitigation that could then be assumed to be built into design and good construction practice, together with 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 on-going 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 on-going 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 associated with the TAP Project?

• Evaluation - does this impact matter? How important or significant is it?

• Mitigation – if the impact is significant can anything be done about it?

• Residual Impact/risk – is it still significant?
Where significant residual impacts remain then 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. Information on terminology and definitions is also presented. *Annex 5* contains more detailed information on the methodologies, and more specifically the significance criteria (and their derivation) applied for the following topic areas in the ESIA:

- Physical Environment;
  - Soils
  - Water Resources
  - Landscape and Visual Amenity
  - Noise
  - Ambient Air Quality
- Biological Environment;
  - Ecology - Habitats
  - Ecology - Species
- Socioeconomic Environment; and
- Cultural Heritage.

### 5.7.2 Impact Prediction

The ESIA describes what will happen by predicting the magnitude of impacts (both positive and negative) 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;
- Its geographical extent and distribution;
- Its duration, frequency, reversibility\(^9\);
- Where relevant, the probability of the impact 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 (e.g. a distinction is made here between (i) the probability of impact arising from a non-routine event such as an accidental 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).

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. Regarding risks related to non-routine events during operation, hazard identification and relevant scenario probabilities are provided in the preliminary Risk Assessment Report\(^10\) which has informed the Integrated ESIA in a (semi-) quantitative form. 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) can only be addressed in a qualitative manner (nevertheless, for all cases mitigation measures are considered for determining the residual impact or risk). The details of how magnitude has been predicted and described for each impact are presented in Annex 5.

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\(^9\) 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 metres 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.

\(^10\) A full HAZOP/Hazid and Quantitative Risk Assessment are currently under preparation, the results of which will be utilised in the final design and routing of the pipeline.
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 experts, 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 CO₂ and NOx emissions, recycle waste, regenerate deprived urban areas, protect human rights.
- Have a beneficial effect on the natural, social or cultural heritage environment e.g. creating local jobs and/or benefiting the local community and economy;
Where standards were either not available or provided 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 of the impact and quality/importance or sensitivity of the receptor have also been looked at in combination to evaluate whether an impact is significant and if so its degree of significance. This principle is illustrated in Figure 5-2.

**Figure 5-2 Evaluation of Significance**

<table>
<thead>
<tr>
<th>Magnitude of Impact</th>
<th>Value/Sensitivity of Resource/Receptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>Low</td>
</tr>
<tr>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Large</td>
<td>High</td>
</tr>
<tr>
<td>Not Significant</td>
<td>Minor</td>
</tr>
<tr>
<td>Minor</td>
<td>Moderate</td>
</tr>
<tr>
<td>Major</td>
<td>ERM (2011)</td>
</tr>
</tbody>
</table>
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 very important 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 the design, and in other cases mitigation measures will need to be identified during the ESIA process. The on-going 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 also in 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). Providing compensation or offsetting 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 the 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 describes 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 “level of weighting” that the ESIA team considers should be given to them in making decisions on the Project and developing conditions (refer to Box 5-2).

Box 5-2 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.

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5.7.6 Cumulative Impacts

In the context of the TAP Project, cumulative positive or negative impacts\textsuperscript{11} resulting from several or from the same source and affecting a specific environmental, social or cultural heritage receptor

\textsuperscript{11} 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 timeframe. 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. 
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 on-going or reasonably foreseeable future activities within the Project area will also be taken into consideration and assessed in Section 8.19.

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 for 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). The Espoo Convention sets out the obligations of Parties to assess the environmental impact of certain activities, such as pipeline construction, at an early stage of planning. It also lays down the general obligation of States to notify and consult each other on all major projects under consideration that are likely to have an environmental impact across boundaries.

In the context of the TAP Project, which is planned to run across the north part of Greece from Kipoi to Albania, the topic of transboundary impacts has been taken into consideration. The key aspects to be considered when analysing the TAP potential transboundary impacts are related to impacts on water resources; impacts on biological resources (e.g. primarily large carnivores in the border lands); social aspects (e.g. routing and border crossing point), and atmospheric emissions (e.g. compressor stations near the Greek – Albanian border and near Greek-Turkish borders). The methodology used to evaluate the potential significance of transboundary impacts is 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 and Monitoring Plan (ESMMP) 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.

5.8 Dealing with Uncertainty and Difficulties Faced in Undertaking the ESIA

5.8.1 General Considerations

Like most ESIA, the TAP ESIA faced a number of challenges in terms of retrieving baseline information, the level of 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, then areas of uncertainty, data gaps and deficiencies, and additional work required during further stages of Project development have been highlighted within the ESIA report. These areas 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 Northern Greece. 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. All surveys complied with established Greek 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 exercise combined field surveys and consultations with secondary data sources, i.e. it 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 definitive 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 a later stage will be set out in detail by the main contractor.

Where the stage in the 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 nature of any uncertainties which stem from these have been presented in the topic specific sections of the ESIA Report. In general, 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 in the ESMMMP. 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.