

Chapter 11 Cumulative and Transboundary Impacts



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11 CUMULATIVE AND TRANSBOUNDARY IMPACTS

11.1 Introduction

This chapter presents the assessment of potential cumulative, in-combination and transboundary impacts that may result from the WREP-SR Project. These impacts are defined in the paragraphs below.

Cumulative impacts are those that may result from the combined or incremental effects of the Project together with other activities (e.g. developments currently in planning or under construction). While a single activity may itself result in an insignificant impact, it may, when combined with other impacts (significant or insignificant) in the same geographical area and occurring at the same time, result in a cumulative impact that is significant. This chapter identifies the aspects of constructing the WREP-SR Project that may interact with other planned developments in the Project area (to the extent that these are known at the date of this report) and assesses whether the WREP-SR Project is likely to contribute significantly to the cumulative impact of developments on the identified sensitive environmental and social receptors in the Project area. Projects which have the potential to produce cumulative impacts with WREP-SR are described in Section 11.3.

Chapter 10 has already considered the cumulative impacts of the proposed WREP-SR Project with existing developments such as the existing operational BTC, SCP and GOGC pipelines, as they are part of the existing baseline environment.

In-combination impacts occur where different types of impact from the Project being considered are likely to affect the same environmental or socio-economic features. For example, a sensitive receptor being affected by both noise and dust during construction could potentially experience a combined effect greater than the individual impacts in isolation.

This chapter also provides an assessment of the potential for transboundary impacts resulting from the WREP-SR Project. It assesses the potential for the Project's significant environmental and social impacts to extend beyond the borders of Georgia and affect sensitive receptors in other countries.

11.2 Spatial and Temporal Boundaries

The cumulative effects of the Project are considered in this section at a national and local level. Transboundary effects of the Project are considered at an international level.

Cumulative

National level: In this ESIA report, national level cumulative effects refer to those that could occur within Georgia as a result of the interaction between the various projects taking place within the country. These include other oil and gas related projects in Georgia (e.g. construction of the SCPX pipeline) and other non-oil and gas major projects in the area (e.g. upgrading of the east-west highway).

Local level: Local level cumulative effects refer to those that could occur at the route level.

Temporal: The temporal boundary of the assessment has been set at 12 years which encompasses the 2 year construction period and the first 10 years of operation during which recovery following reinstatement and bio-restoration is expected to occur.

Transboundary

International level: Transboundary effects relate to pathways by which contaminants could be transported to sensitive receptors located in Azerbaijan. In practice this is limited to potential contaminants that might affect the water quality in the Mtkvari River that flows from Georgia into Azerbaijan.

11.3 Projects Overview

This section identifies developments that may interact with the WREP-SR Project either during construction or the first 10 years of operations (the recovery period). Projects that may happen at some date in the future, but for which there are no clearly defined proposals in the public domain have not been included.

11.3.1 SCPX Project

SCP Company is currently constructing the expansion of the South Caucasus natural gas pipeline (SCP) system in Azerbaijan and Georgia to provide increased gas throughput. The scope of work in Georgia is the construction of two new compressor stations, a pressure reduction station and a short pipeline loop of approximately 63km. No cumulative interactions are anticipated between WREP-SR Project in Georgia and the expansion works within Azerbaijan due to their spatial separation. .

The new pipeline, known as SCPX, will run from the Azerbaijan/Georgia border to a new compressor station (CSG1) approximately 3 kilometres inside the Georgian border. It will then continue along an alignment that is generally parallel to SCP, to approximately KP 63 on the existing SCP pipeline. A second compressor station will be built at approximately KP142 on the existing SCP pipeline.

The new SCPX pipeline will run approximately parallel to the existing WREP from the Azerbaijan/Georgia border to c. AM 20, where the routes diverge; SCPX will run to the south of Tbilisi (as do BTC and SCP) while WREP passes to the north of the city. The most easterly section of the WREP-SR Project is RP-001a which begins at AM 52 on the existing WREP pipeline, some 25km north of the proposed SCPX route. This separation significantly reduces the potential for cumulative impacts during the construction or operational phases of SCPX.

Construction of the SCPX pipeline is underway and is expected to continue until 2018.

11.3.2 East-West Highway Upgrading

Upgrading of the main east-west highway in Georgia is a major ongoing construction project that is supported by international finance institutions. The project is expected to contribute to the gradual reduction of road transport costs, improve the ease of transit and safety along the central part of Georgia's east-west corridor and contribute to capacity building, particularly in terms of road maintenance and traffic safety.

Several sections of the road have already been upgraded to a four-lane highway, including the section between Tbilisi and Sveneti. Works on the more westerly sections are ongoing but should be substantially complete by 2018.

According to the ESIA of works for upgrading section between Zemo Osiauri and Chumateleti¹, the main environmental impacts of the East-West Highway are expected at the construction phase and will result from:

- Clearing of the ROW for widened and re-aligned sections, which will need removal of topsoil, cutting of shrubs and trees, and clearing of some buildings
- Establishment and operation of worker camps and temporary access roads. This will be associated with the generation of solid waste and waste water, compression of soil, and noise disturbance for nearby population as well as animals
- Operation and servicing of construction machinery which presents risks of operational spills of oils and lubricants and the generation of noise, vibration, dust, and air emissions
- Sourcing of construction materials, i.e. asphalt, stone and gravel, which may carry the risk of disturbance of landscape and soil as well as emissions to air, the generation of noise and increased traffic
- Earth works with associated air and noise emissions
- Works in, over or near waterways that present a risk of sediment release or fuel/oil spillage.

Construction works will also have implications for the occupational health and safety of workers/personnel.

Impacts of the improvement of the highway during its operational phase will be less significant and diverse. Three environmental impacts of the highway operation will be air pollution from automobile emissions, noise, and pollution of soil and surface water with litter and drainage from the highway. Traffic safety will also be an important issue with health, social, and environmental implications. Safety will, however, be improved from the current situation by providing a dual-carriageway road.

11.3.3 Mtskheta Bridge Project

A new four-lane concrete arch bridge across the river Aragvi is planned to improve accessibility of the historical town of Mtskheta from Tbilisi and the East-West Highway, and thereby support increasing tourism in this area². The proposed location for the bridge is approximately 200m upstream from the confluence of the rivers Aragvi and Mtkvari, and falls within the Mtskheta LPZ (see Section 7.10.5 for LPZ description). The bridge is expected to be constructed before the end of 2018, possibly overlapping in time with WREP-SRP construction activities. The impacts from the bridge construction will be similar to the East-West Highway upgrading project described above, but smaller in scale. In addition, the new bridge will have a permanent change the local views over the river Aragvi.

11.3.4 Jvari Monastery Conservation and Tourist Infrastructure Works

During elaboration of the Mtskheta heritage impact assessment, ICOMOS Georgia identified two developments that relate to Jvari Monastery and are scheduled to start during 2016:

- Stone conservation works at the monastery. Exact dates are unknown but the works are likely to start in July and last for approximately 5 months

¹ COWI Lietuva and Gamma. (2015). Environmental and Social Impact Assessment of works for upgrading E-60 East-West Highway section between Zemo Osiauri – Chumateleti (km 126-km 143). Available from http://www.georoad.ge/uploads/files/EWHCIP_ESIA_2015_final%20ENG.pdf.

² Foundation WEG. (2012). Mtskheta Bridge Detailed Design Project. Initial Environmental Examination. Available at <http://www.adb.org/sites/default/files/project-document/73310/42414-033-geo-iee-03-0.pdf>.

- Development of an information centre and tourist infrastructure in an area adjacent to the monastery. This work is being undertaken by the Municipal Development Fund of Georgia, in cooperation with the World Bank. The proposed start date and duration are not known.

Both developments will generate construction traffic which will use AR69 which is the main road to Jvari Monastery.

11.3.5 Abasha to Kobuleti Pipeline

GOGC is planning construction of a 60km, 20" diameter, gas pipeline from Abasha to Kobuleti as part of the Kobuleti gasification project. The proposed route includes a crossing of the river Supsa that will be very close to the proposed WREP-SRP crossing. Discussions between BP and GOGC are ongoing to determine mutually acceptable routes for both pipelines. The WREP-SR crossing of the river will be a buried pipe installed by HDD, whereas the GOGC pipeline is likely to be an aerial crossing (c. 270m long) to avoid having two HDDs in close proximity. Early indications are that the GOGC pipeline will probably be installed first, with works completed before installation of the WREP-SR section begins.

11.3.6 General Construction Activity

Between 2004 and 2007, Georgia experienced a surge in construction with turnover from the construction industry increasing fourfold (Figure 11-1). After levelling out for a few years, there was a dramatic doubling of turnover between 2010 and 2011, with peak turnover achieved in 2012. Despite somewhat declining in 2013-2014, construction turnover stays high, and there is likely to be a considerable amount of construction activity and associated vehicle movements in the vicinity of the WREP-SR Project.

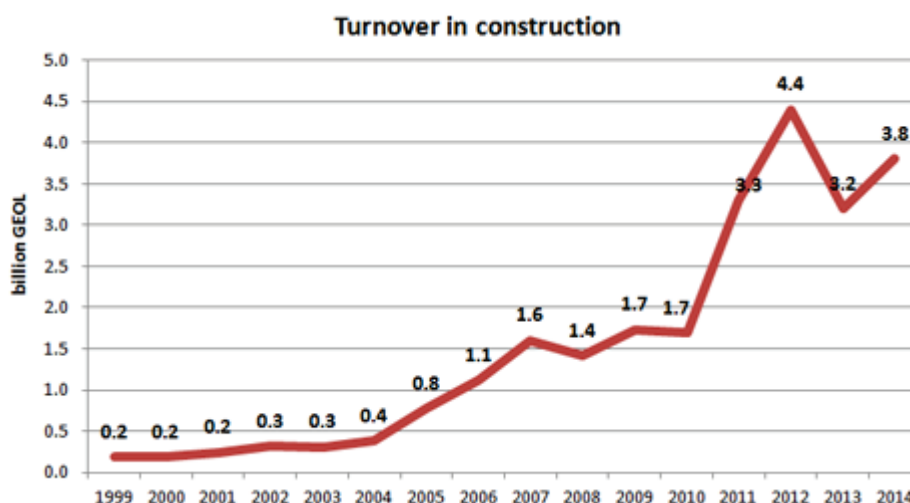


Figure 11-1: Turnover of Georgian Construction Industry

From Government statistics <http://www.geostat.ge>.

11.4 Assessment of Potential Cumulative Impacts

The potential cumulative impacts in the following sections are assessed against the baseline conditions described in Chapters 7 and 8. Limited information about the other projects has precluded using the significance criteria and ranking system described in Chapter 3 Approach and Methodology. Instead, professional judgement has been used to identify whether the potential residual impact is likely to be beneficial, negative or neutral (i.e. no cumulative impact).

Table 11-1 provides an indication of the type of potential cumulative impacts that could occur as a result of the WREP-SR Project when considered along with other proposed developments that are known about, and for which there is some available information. Topics for which there may be potential cumulative impacts are discussed below.

Table 11-1: Potential Cumulative Impacts

Aspect	SCPX Pipeline	East-West Highway Upgrading	Mtskheta Bridge	Jvari Monastery Works	Abasha-Kobuleti Pipeline	Other Construction Projects
Use of aggregates and resources	-	-	-	-	-	-
Soil resources					-	
Landscape			-	-	-	
Water resources					-	
Ecology					-	
Air quality					-	-
Noise and vibration					-	-
Cultural heritage	+	+	+	+	+	+
Traffic and community safety		-	-	-		-
Employment	+				+	+
Skills	+				+	
Livelihoods						

Key

-	Potential negative cumulative impact
+	Potential beneficial cumulative impact
	Neutral (i.e. no anticipated cumulative impact)

11.4.1 Use of Aggregates and Natural Resources

All of the construction projects considered in this assessment will need aggregates and will use natural resources such as fuel, water and other raw materials. Collectively they will contribute to a small reduction in the availability of such finite resources for future projects and/or higher prices, although no specific strain on the supply system has been identified.

Use of natural resources by a number of projects could lead to a potential negative cumulative environmental impact, and could be accompanied by a small beneficial cumulative impact on income from the local purchase of such materials.

11.4.2 Soil Erosion

Construction of the WREP-SR Project shortly after installation of the Abasha-Kobuleti pipeline across the river Supsa is expected to result in an increased area where soils are disturbed and exposed to wind and water erosion. With the lack of vegetation over the temporary works areas, a greater proportion of soils will be more susceptible to erosion. Other construction projects will not contribute significantly to this impact unless they involve the removal of soil from extensive areas.

Overall there is expected to be a negative cumulative effect, but this will be of low significance.

11.4.3 Landscape

The proposed Mtskheta Bridge, works at Jvari Monastery and a section of RR-001 (KP6.5–7.6) are located within the Mtskheta LPZ, within a 2.5km radius from each other. Construction of the new bridge, information centre, tourist infrastructure and RR-001 ROW will permanently modify the views in this area but are unlikely to be viewed together because of the topography. Due to their mutual proximity, the projects will have a cumulative negative impact on a high sensitivity landscape receptor (i.e. the LPZ) that is marginally higher than for any of the projects alone.

There may be a small negative cumulative impact with the Abasha-Kobuleti pipeline at Supsa if GOGC's temporary works areas have not revegetated before construction of the WREP crossings begins, and if the areas can be seen from the same viewpoint(s). After completion of construction, the temporary works areas will be reinstated and this impact will be temporary.

The Abasha-Kobuleti pipeline is planned to remain visible if it is an aerial crossing, but this will not contribute to a cumulative impact as the only permanent structures associated with this section of the WREP-SR Project will be marker posts at 1km intervals.

The cumulative negative impact on visual receptors is categorised as being of low significance as there are few locations, if any, where any of the project areas will be seen together by more than a few people.

11.4.4 Water Resources

There may be an increased risk of sediment-laden run-off entering the river Supsa if the temporary works areas for the Abasha-Kobuleti pipeline have not revegetated before construction of the WREP-SR sections begins. The risk will be small as both companies plan sediment management measures to avoid run-off reaching the river.

The WREP-SR Project and other developments will have a need for potable and non-potable water. Like WREP-SR, the other projects are also anticipated to discuss their water requirements with the local water company who will advise on the adequacy of the water supply.

11.4.5 Ecology

Construction of the WREP-SR Project and the Abasha-Kobuleti pipeline will inevitably cause some disturbance and degradation of ecological resources and loss of biodiversity in the immediate area. The contribution of other construction projects will depend on their nature and location; many will be on previously developed land with negligible biodiversity interest and will not therefore contribute to any cumulative impact on ecological resources.

The impacts on protected species resulting from the WREP-SR Project will be mitigated as described in Section 10.7. If GOGC's pipeline is built in the season before the WREP-SR crossings there may be a small cumulative impact on animal behaviour and possibly breeding as there may be disturbance in two consecutive seasons.

The negative cumulative impact on ecological receptors is considered to be of low significance.

11.4.6 Air Quality

Concurrent construction of the WREP-SR Project in close vicinity to other (currently unknown) construction projects may cause a small localised increase in air-borne dust from earthworks or vehicle movements. There may also be a small cumulative impact in terms of vehicle emissions causing a degradation of air quality. All known projects are geographically remote from the WREP-SR project except for the Abasha-Kobleti crossing of the river Supsa which is expected to be complete by the time work begins on WREP-SR.

Overall, the negative cumulative impact in terms on air quality will be of low significance and will be very localised.

11.4.7 Noise and Vibration

Concurrent construction of the WREP-SR Project in close vicinity to other construction projects may also lead to a small cumulative increase in noise and vibration. Construction noise from these combined developments may be audible to nearby residents but should be of short duration and is considered to be of low significance.

It is considered unlikely that construction vehicles from other projects will be using the same village roads at the same time as those for WREP-SR Project, but this cannot be precluded. If this were to happen, the risk of damage from vibration would be increased for the most vulnerable properties. Damage of properties adjacent to more major roads is considered less likely as they are generally set back further from the road where traffic volumes are higher; if buildings are vulnerable to vibration, it is more likely that damage will have already occurred and will not be directly attributable to any of these projects. Potential negative cumulative impacts from vibration could arise, the significance of which will vary depending on the vulnerability of individuals to vibration and the frequency and volume of traffic movements.

11.4.8 Cultural Heritage

Pre-construction archaeological surveys and watching briefs have been, or will be, carried out for the WREP-SR Project, the east-west highway improvements, the Mtskheta Bridge project and SCPX. This has led to significantly increased knowledge and understanding of archaeology within the area and is a beneficial cumulative impact. The proposed conservation works at Jvari Monastery seek to preserve this outstanding cultural heritage monument and the proposed information centre and tourist infrastructure improvements will enhance visitor experience. Watching brief and chance finds procedures will be used during construction of WREP-SRP to mitigate the potential loss or disturbance of unknown cultural heritage.

11.4.9 Traffic and Community Safety

Concurrent construction of other projects using the same delivery routes as WREP-SRP could have a cumulative, although temporary and localised, impact on traffic volumes. In most cases this will not be noticeable, but during the movement of pipe and plant to the pipeline ROW, some road users may experience additional delays that could be exacerbated by other construction traffic. There is also expected to be a small increase in the risk of accidents associated with increased vehicle movements.

There is considered to be the potential for a negative cumulative impact which is expected to be of low significance.

11.4.10 Employment and Skills

The combined effect on livelihoods and income are generally beneficial, as the projects have provided employment and training opportunities. As the number of projects has

increased, so has the skills base and therefore the number of local people who have the necessary skills to work on the projects. The concurrent construction of any of the projects will slightly increase the number of jobs available to the local population, which should have a synergistic, but small beneficial impact.

11.4.11 Livelihoods

The potential for cumulative impacts on livelihoods will be very localised and small. The impact is expected to be beneficial for those businesses and individuals who are able to provide goods or services to more than one of the projects.

Compensation will be paid to offset any negative livelihood impacts resulting from the WREP-SR Project. Any farmers who own land that is crossed by the Abasha-Kobuleti pipeline as well as the WREP-SR Project will experience greater disruption to their farming practices for a longer time than if only one of the projects went ahead. The negative cumulative impact is considered to be of low significance.

11.5 Assessment of Potential In-Combination Impacts

There is no established ESIA methodology for assessing and quantifying the combined effects of individual impacts. Accordingly, it has been necessary to undertake a qualitative assessment of potential interactions using available information and professional judgment and experience, in order to identify key residual impact interactions (or in-combination impacts) on receptors and resources that may occur.

The assessment of in-combination impacts focuses on situations where adverse residual impacts of medium significance and above and/or beneficial effects were recorded in individual topic areas for the construction and operational phases of the proposed WREP-SR Project.

For some topic areas, there are considered to be direct inter-relationships between effects that could potentially occur in conjunction (i.e. interactively) to generate a combined effect on sensitive receptors. Examples include the combined effects of noise, vibration, traffic, dust and visual intrusion during construction.

For other topic areas, limited or no potential is thought to exist for combinations of effects to occur on receptors. Such examples include topics where negligible or no residual effects were recorded (e.g. geology and geomorphology), and/or where no clear inter-relationship exists between different topic areas (e.g. cultural heritage and terrestrial ecology). In such instances, these aspects were not considered further in the interactions assessment.

The key interactions are generally confined to effects experienced on human receptors that have a direct relationship to the various Project components (i.e. residential receptors, schools and tourist facilities close to the pipeline ROW, access roads, users of water resources, and wider settlements and communities (PACs)).

The assessment of in-combination impacts is restricted to the construction phase. The assessment has identified that properties/communities in close proximity to the proposed pipeline ROW will potentially experience a combination of temporary effects associated with increased noise, vibration, localised dust generation, visual intrusion and potentially degradation in air quality due to the number and proximity of vehicle movements while construction is being undertaken in that area. The areas where these in-combination impacts have been identified as a potentially significant issue, where dwellings are in very close proximity to the ROW or access roads are as follows:

- Stone house/farm near RP-001a KP1.0
- Houses close to RR-001 KP0.0 (tie-in area) and AR63

- Houses and cemetery along AR63
- Summer houses close to RR-001 KP2.0
- Houses along AR65
- Communities along the AR to PRS1:
 - Korbouli village - closest houses approximately 5m from the road
 - Shomakheti village - closest building is a school approximately 10m from the road
 - Usakhelo village - school approximately 20m from the road
 - Zeda Usakhelo/Tsiteli Eklesia settlement - within 50m of village cemetery
- Schools, shops and houses along AR223
- Summer houses near AR225
- Jvari Monastery, a UNESCO World Heritage Site and major cultural and tourist attraction; the access road to the monastery will also be used by construction traffic travelling to/from AR69
- Supsa Export HDD crossing tie-in area and AR373a - a house and a farm within 50m of the tie-in area and access road; houses and a shop along the access road.

A summary of the key in-combination impacts predicted during construction is provided in Table 11-2.

Table 11-2: Summary of Significant Construction-phase In-combination Impacts

Location	Air Quality (Dust)	Traffic	Noise and Vibration	Landscape and Visual	Livelihoods	Community Safety
Stone house/farm near RP-001a KP1.0 (AM 53)						
Houses close to RR-001 KP0.0 (tie-in area) and AR63						
Houses and cemetery along AR63						
Summer houses close to RR-001 KP2.0						
Houses along AR65						
Several villages along AR to PRS1: • Korbouli (including Korbouli school #1, a new school under construction, Korbouli school #2) • Shomakheti (including Shomakheti school) • Usakhelo village (including Usakhelo school)						
Schools, shops and houses along AR223 (Mandaeti)						
Summer houses near AR225						
Jvari Monastery (UNESCO World Heritage Site) (AR 69)						
A farm, houses and a shop near Supsa Export HDD crossing tie-in area and AR373a						

Grey cells indicate significant in-combination impact

Landowners and tenants of affected landholdings may be subject to a combination of localised disruption to their current agricultural regimes and construction effects of the type described above.

Given the temporary nature of construction works and the fact that works along the pipeline ROW are scheduled to progress in a linear manner, any such effects are anticipated to be short term, the significance of which are expected to vary depending on the timing, extent and nature of operations undertaken and the effectiveness of the mitigation employed.

During the operational phase, no significant in-combination effects are anticipated.

11.6 Assessment of Transboundary Impacts

Transboundary impacts are impacts that affect the natural environment and/or socio-economic conditions outside of the country in which project activities are proposed to occur. Potential transboundary impacts are not necessarily limited to those countries that directly neighbour the Project's host countries and can affect countries or areas some distance away.

11.6.1 Air Quality

Throughout the duration of the Project, several activities are expected to lead to the release of a number of potentially polluting gases to the atmosphere. These gases have a number of potential effects upon the environment (see Chapter 10) including potential transboundary impacts in terms of acid deposition and deterioration of air quality.

The potential for gases to give rise to transboundary impacts is dependent upon the residence time, the behaviour of the gas once released to the atmosphere and the distance the pollutant travels from its source. For the majority of gases, the residence time (or atmospheric lifetime) in the atmosphere following release is only one or two days. The distance that such gases may travel and the direction in which they travel is primarily related to meteorological conditions, in particular wind speed and direction.

NO_x and SO_x may undergo transformation in the atmosphere to acidic compounds (e.g. nitric and sulphuric acids) potentially leading to acid rain deposition. These transformations represent important removal mechanisms for these compounds from the atmosphere, however, their presence may lead to the formation of 'acid rain'. Acid rain has historically been shown to lead to stress of ecosystems and damage to structures, particularly those constructed of limestone.

It is not anticipated that the potentially acidifying compounds from the WREP-SR Project will lead to any noticeable stress upon sensitive transboundary ecosystems downwind of the proposed developments sites. The concentration of gases released is expected to be extremely small and therefore the Project will not contribute in any measurable way to a deterioration of air quality in Georgia or other countries. Any transboundary impact on air quality is thus expected to be negligible.

11.6.2 Water Quality

The primary driver for the WREP-SR Project is to reduce the risk of oil spill by replacing the sections of pipe that are currently routed through areas of geo-technical or riverbed instability. The Project will therefore help reduce the risk of oil reaching the Mtkvari river, which flows into Azerbaijan³ some 78km from the crossing of the Aragvi/Mtkvari confluence at Mtskheta. The WREP crosses the Aragvi river approximately 4km upstream of this point. Many of the smaller watercourses crossed by the WREP flow into the Aragvi or Mtkvari (see Section 7.5).

³ Within Azerbaijan, the Mtkvari River is known as the Kura River. It ultimately flows into the Caspian.

In the event of a catastrophic release of oil, it would be possible for oil to reach Azerbaijan. There is however an established network of containment sites and spill clean-up equipment, as well as an approved Oil Spill Response Plan for the WREP (see Chapter 12). The chance of such an event occurring is therefore considered extremely unlikely and will be further reduced by implementation of this Project. The risk posed by a loss of containment during de-oiling is assessed in Chapter 12.