

Construction Environmental Monitoring of Transport Projects and its Relevance to Climate Change

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Abstract: During the construction period, inspectors pay much attention to schedule and cost factors. Unfortunately environmental monitoring is regarded only as documentary requirements for implementing agencies and at times by the funding institutions. In fact, apart from compliance to current regulations, a more important objective is protection of the environment and minimization of impacts to the ecology of the project area. Awareness on the effects of climate change, on the part of those concerned, is still rudimentary. It is important that new perspectives be brought forward in order to tie-up environmental impacts of transport projects to climate change. In this paper, two projects are presented as case points. The first is the Institutional Strengthening of Road Sector Project (Part of the ADB's East-West Highway Project) in Azerbaijan, by Finnroad, Ltd. (Finland); and the second is the Environmental Monitoring by Kocks Consult GMBH (Germany) of the Ankara-Istanbul High Speed Train Project in Turkey, funded by European Investment Bank. The first project deals with institutional capacity building while the second presents instances of intensified environmental management and monitoring activities. Both projects play crucial role in contributing to the minimization of impacts of these projects on climate change, which can serve as lessons learned in the implementation of transportation infrastructure projects.

Key Words: transport infrastructure, environmental impact assessment, environmental management plan, environmental monitoring, institutional strengthening, road sector, railway sector, high-speed train

1. INTRODUCTION

The issue of Climate Change has become a pressing issue as people all over the globe feel and notice extreme climatic and weather changes that are affecting regional economies, general ecology, geologic stabilities and practically the way of life. With the demand for energy coming from fossil fuels ever increasing, the emission levels for greenhouse gases (GHGs), particularly carbon dioxide, is also increasing, thus accelerating the temperature rise of the planet and eventually changing the global climate.

The transport sector is regarded as one of the main culprit for this rise in temperature due to the emissions coming from various types of motorized transportation used by people in moving from place to place around the world. As people move from point to point within land masses, the contribution to emissions of land-based vehicles to the transport sector is

enormous. Although this is a concern with the necessity to improve access, transit, and safety, the investment in land transport, such as roads and rail, has been growing.

In the past the construction and implementation of physical projects give very little regard to ecological considerations. With the growing awareness on the need for environmental protection and preservation the awareness and acceptance of environmental considerations in project cycles have intensified. One important consideration now in the project conceptualization is the minimization if not elimination of environmental impacts. Project proponents, both government and private sectors, along with the funding institutions subscribe to the principles and procedures of the Environmental Impact Statements (EIS) for physical projects as a way to identify, minimize and mitigate environmental effects. This has become an accepted norm for processing projects especially if international funding assistance, whether loan or grant, would be needed.

The major funding institutions such as the Asian Development Bank, World Bank, European Investment Bank, etc. have set up their policies and guidelines for environmental safeguards and Environmental Impact Assessments. The member countries or eligible countries under these funding institutions have their own system of undertaking environmental impact assessments and studies. More often, when assistance from a funding institution is needed, the beneficiary countries abide by the EIS requirements and guidelines of these institutions.

As observed, the EIS system for Transport Infrastructure Projects (e.g. roads and railways) under the funding agencies seemed adequate with the thorough documentary checking and monitoring mechanisms in place. What is lacking, however, is the direct link to Climate Change with the transport infrastructure. The ADB guideline – Environmental Assessment Guideline discusses the climate change issues in C-Setting Environmental Standards, under the Chapter XI-ENVIRONMENTAL STANDARDS AND EMISSION LEVELS. The EIB's Environmental and Social Practices Handbook also carries provisions for climate change in the Appraisal portion, particularly B4- Climate Change. However, with respect to the construction and implementation of road and rail the relevance of climate change to the required mitigation measures is ambiguous. Accordingly, the EIS documents, along with the mitigating measures for environmental protection is confined only to the defined primary impact areas, which are the route corridors and secondary impact areas, which are defined within the context of the physical or ecological features.

Governments of individual countries are trying to improve and update their existing frameworks, policies, and legislations, regulations and procedures on local environmental management. The EIS systems in individual countries are also evolving to become more comprehensive and responsive due to increased awareness and better information sharing. Climate change concerns still are at best at the policy level and do not permeate into the realm of project implementation where it can contribute to global objectives. This by itself needs to be looked into.

In order to emphasize the importance of climate change in the overall arrangement, its relevance should permeate into the documentary requirements as well as in actual implementation of mitigating measures. Monitoring activities should include new aspects which can consequently, even though not directly, lead to minimization of factors that can contribute to climate change.

Two cases are presented in this paper, though different in their respects – as one is on road sector institutional strengthening while the other is on railway construction supervision; but both with the objective of minimizing environmental impacts. These two projects describe current environmental considerations in both ADB and EIB-funded projects as per their respective guidelines. Although these projects are correctly being undertaken based on their respective Terms of Reference, the concerns of Climate Change are not clearly being described. With the discussion in this paper, it is hoped that the current inadequacies of linking physical projects to climate change can be addressed in the future.

2. AZERBAIJAN PROJECT: ADB INSTITUTIONAL STRENGTHENING OF ROAD SECTOR PROJECT

The Institutional Strengthening of Road Sector Sub-Project in Azerbaijan is a component of the Asian Development Bank's financed East-West Highway Improvement Project. The Project's larger components include reconstruction of two road sections: Yevlakh – Ganja section via the Ganja bypass and the Qazakh – Georgian border section; as well as improvement of local roads. The beneficiary of the institutional strengthening component is the Azer Road Service (ARS), a department of the Ministry of Transportation and has jurisdiction of major roads in the country.

The Finnroad Ltd., has been selected to provide the capacity and capability building component of the Project which was initiated in January 2009. The Environmental Component of the Institutional Strengthening of the Road Sector Project involves developing the guidelines on environmental and social assessments and management for road projects, including preparing and implementing resettlement plans, environmental and social management plans, and monitoring and evaluation of environmental and social impacts from construction, rehabilitation, operations, and maintenance of the road network; and providing training to ARS staff on project management and implementation, covering procurement; recruitment of consultants; implementation and monitoring of social and environmental management plans; reporting; and monitoring and evaluation of project performance and impacts.

The Environmental Manual/ Guideline for Road Projects will basically be an instructional and procedural guide for Environmental Managers and Monitors of Road Projects in Azerbaijan. It will conform to the EIA requirements of the country as well as the guidelines of MENR and ADB on environmental protection. Social, health and safety provisions will be incorporated since the community is salient part of the environment. The Manual or Guide will enable the managers and monitors to determine and spot environmental issues before they become untenable and will be able to notify project proponents and supervisors to take preventive measures. Should environmental eventualities occur, e.g. spills, contamination, etc, the guide can serve as reference for remedial methods to be undertaken. On a day-to-day basis on road construction the Manual can provide inspector what to anticipate in similar situation and prevent the impending issues from progressing further and become a critical problem.

The larger part of the manual will be treatment on environmental aspects on the project cycle of the road project from conceptualization, feasibility stage, detailed design, construction, and into the operation stage. Physical, biological and sociological aspects will be presented and the underlying issues will be discussed. Corresponding to the issues will be proposed mitigating measures that the proponent will undertake to minimize if not eliminate the impacts.

Examples will be presented in order to provide reference cases in which the practitioners can base their judgement on. The manual, written in semi-technical manner in order to be user-friendly to those without technical background, will be illustrative of actual environmental situations for road projects and serve as quick reference during emergency situations. It will also serve as a reference guide for the ARS staff to become efficient and effective in monitoring the road project throughout the entire project cycle from conceptualization, feasibility study, detailed engineering, and construction.

The seminar workshop to be provided to ARS personnel on Environmental Requirements of the Road Projects, will cover Environmental Assessment, EIA process, Environmental Management and Monitoring. This will be undertaken with the Consultants, presentors, discussants, some of the staff of the ARS who hold responsibilities directly (Ecology Department and Safety Department) or indirectly (Road Maintenance Department), and Road Maintenance Units (RMUs) in the Rayons (provinces).

The institutional strengthening ultimately aims to develop capacities and capabilities in local agencies to undertake construction supervision and management on their own with high level of quality and efficiency.

A higher degree of understanding on the procedure and requirements of effective monitoring will help to realize the goals of environmental management. For example, protection of trees along road projects in order to reduce the release of CO₂ in the atmosphere and also provide as carbon sinks, replacement of felled trees or reforestation to increase capture of carbon dioxide, restoration of quarry sites for revegetation, prevention of water and soil contamination allow plants to thrive and the maintenance of natural environment for ecological balance, all points to providing greater chances for carbon sequestration. It therefore follows that, a more efficient and effective monitoring of road projects will minimize environmental impacts and consequently minimize carbon dioxide emissions that can aggravate climate change.

3. EIB PROJECT: ANKARA-ISTANBUL HIGH SPEED TRAIN PROJECT

The Ankara-Istanbul High Speed Train Project (AIHSTP) involves constructing high speed train tracks to improve the rail connectivity between the major cities in the Republic of Turkey namely Ankara, the capital city, and Istanbul, Turkey's largest city and cultural and financial center of the country. With the realization of the project the travel time between these two cities will be decreased, thus making the train trip faster, comfortable and safer. With the new alignment of the AIHSTP the distance between Ankara and Istanbul will be lessened to 533 kms. The new railway will be suitable for 250 km/hr speed, equipped with double line, signal and electrification. The usual seven-hour trip using the currently existing regular train between Ankara and Istanbul will be reduced to three (3) hours once the AISTP becomes operational.

The project is being funded by the European Investment Bank, the China Eximbank and the Government of Turkey. As part of the requirements of the European Investment Bank, a Project Coordination and Implementation Unit (PCIU) was formed for the project in order to oversee that the Ankara-Istanbul High Speed Train Project is implemented in a professional and efficient manner and in accordance with the approved time and financial framework of the European Investment Bank. The Joint Venture Euroestudios-Tumas-Kocks was contracted

by General Directorate of State Railways (TCDD) to provide the PCIU Consultancy work. The main components of the AIHST Project consist of Tunneling works, Infrastructure, Superstructure & Electrification, Underpass, and Major Station Construction works. The track alignment is shown in the map below.

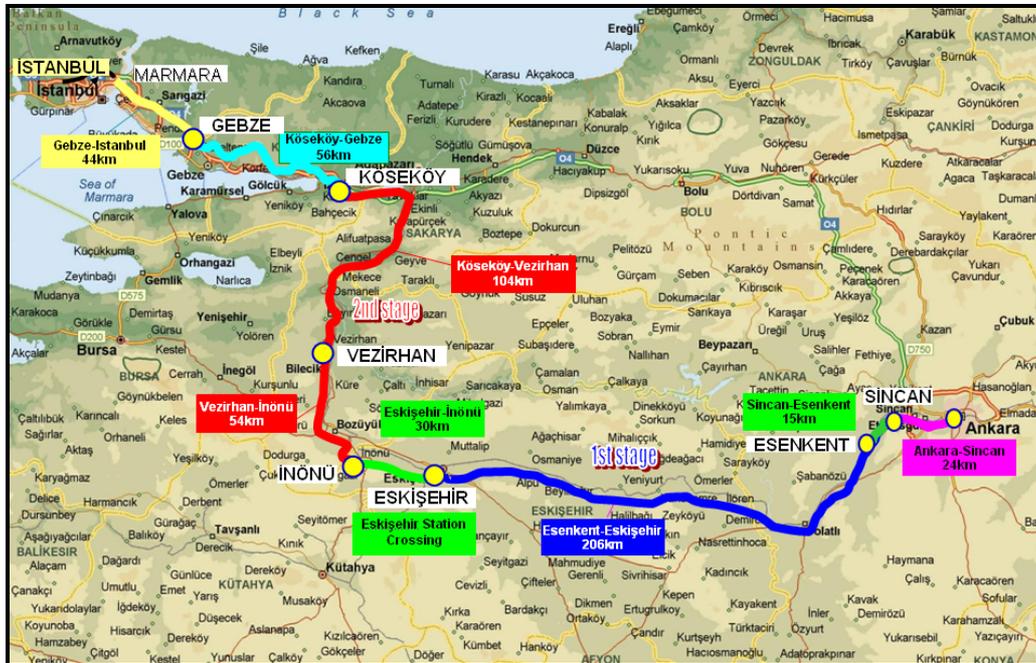


Figure 1: Alignment Layout of the AIHSTP

3.1 Environmental Monitoring Scope

For the environmental aspect of the Project, the PCIU will assist TCDD to monitor and analyse the contractor's Environmental and Safety Management Systems to ensure that there will be no adverse impacts to the surrounding environment during the implementation phase. Every six months an environmental recapitulation is done as part of the Bi-annual Progress Report. It consists of a description of any major issues encountered, which have impacts to the environment. At the end of the project, a summary of the environmental aspects shall be included as part of the Project Completion Report.

The environmental monitoring scope includes the pre-construction and construction stages. The Pre-Construction Stage involves the collection, review and assessment of all design and tender documents for each section of the Project with regard to the environmental tasks; checking the availability and content of the Environmental Management Plans (EMPs) of all sections of the project; inform the TCDD to prepare EMP in case it has not been done; collect all relevant environmental regulations, standards and guidelines; conduct site visits, especially along sensitive areas; review, assess, and comment on environmental impact abatements measures of each section of the Project; and prepare a quality control program in cooperation with the overall Quality Control Program of the PCIU.

The Construction Stage involves environmental monitoring for each section of the Project; monitoring of all Contractor's activities with regard to environmental issues; following-up of environmental mitigation measures; conducting site visits in regular intervals not exceeding three month; participation in regular meetings with the Contractors, the Client and authorities

involved; preparation of 6-Months' Progress Reports to be included in the overall Progress Report for presentation to the Client and the Bank.

The fundamental basis of the monitoring activities to be done by the PCIU emanated from the Environmental Impact Assessment (EIA) Report, The EIA Report contained analysis of the entire railway alignment (Ankara-Istanbul line) with a framework for Environmental Management and Monitoring. The environmental monitoring activities focused on the following major aspects:

- Protection of Surface and Ground Waters
- Sediment and Erosion Control Measures
- Wastewater Control
- Construction Site Management
- Storage of Materials
- Domestic Wastewater
- Removal and Disposal of Solid Wastes
- Waste Storage and Clean Up
- Restoration of Site
- Residual Contamination
- Handling and Disposal of Hazardous Materials and Wastes
- Emission and Dust Control
- Noise Control
- Providing Public Safety

This environmental monitoring is rather intensive and more detailed to comply with EIB's environmental procedures and requirements. In the process, the contractors are compelled to comply with the requirements of the EIA to avoid being issued a non-conformance citations. The result is better environmental management, avoidance of environmental problems and minimized impact to the environment. Compliance in some of the major aspects such as restoration of sites, emission control, erosion control, etc. contributes directly or indirectly to minimization of greenhouse gas emissions that accelerate climate change.

4. ENVIRONMENTAL IMPACTS AND CLIMATE CHANGE ISSUES

The connection between environmental impacts and climate change is not easily recognizable for it to be considered in the implementation of transport infrastructure project. In EIAs the direct and indirect impacts of the project over localized areas or the vicinities of the route alignment are given due consideration. Hence introducing climate change in the list of impacts to be mitigated faces a challenge, with a number of major issues that need to be threshed out. Nevertheless, due to the growing concern over climate change, it is important that the following issues be addressed urgently:

1. Most of the measures that address climate change are still on the policy level and have not translated into procedural aspects of the program and project levels of transport infrastructure project. Although the funding institutions such as the ADB and EIB have started including provisions in their respective environmental guidelines, these measures has not yet been made mandatory in implementation phases of the project EIS. As a result the EIS documents produced do not contain mitigating measures that

directly addresses climate change. The mitigating measures address certain local or areal concerns with no relevance to climate change requirements. As an example, in tree replacement of affected trees - certain ratio is presented for tree replacement such as 1:2, to better compensate for the direct loss. The ratio can be increased further for the purpose of addressing climate change, since the operations of the road will result in increased emission levels.

2. The project cycle, which includes conceptualization, feasibility study, detailed engineering, and construction, has not started considering climate change as among the parameters for options generation. The imperatives of climate change have not permeated into the environmental considerations aspects which form part of the economic viability of project options.
3. National and local governments have very vague understanding of climate change and its imperatives such that there are no clear regulatory or procedural requirements formed for programs and project implementations.
4. Although the EIA system has been in place in certain countries, the capacity to implement the requirements and monitor results is still low. This was encountered in the Azerbaijan project, which greatly justifies the necessity of the institutional strengthening. With such low capacity, it is expected that the imperatives of climate change will hardly be considered, let alone be put into action.
5. Although emission levels are among the parameters considered in the monitoring, a number of other items with relevance to climate changes, such as trees preserved or planted, revegetation of material sites, etc. escape unnoticed. The lack of accepted standards for such items makes it difficult to consider them relevant in arresting climate change. As seen in the Turkey's AIHSTP project, the environmental monitoring activities had been regularly done, accompanied with the corresponding report; however the aspects of climate change has not been incorporated due to absence of measurable parameters similar to that expressed in emission levels. Hence, certain gains in having good environmental management are discounted.

5. CONCLUSIONS AND RECOMMENDATIONS

In these two case studies, it can be said that there is a link between mitigation of environmental impacts and addressing climate change. The good practices of implementing environmental mitigation measures, especially those that contribute to faunal growth consist of good ways of addressing climate change. Side by side with the growing concern over climate change, environmental management systems evolve to incorporate them. From policy level it is hoped that the climate change imperatives be incorporated in the project cycle for transportation infrastructure. Also, the capacity for implementing and monitoring climate change is still rudimentary and needs proper support for development.

In view of these, the following recommendations can be offered to address the issues besetting climate change:

1. There should be concerted efforts between policy makers, the scientific community and practitioners to bring down to the program and project levels in an implementable way the imperatives of climate change. Clear, observable and measurable parameters can be established for the purpose of climate change mitigation. This can be over and beyond the requirements of local ecological and social aspects of environmental management.
2. Climate change concepts should become part of the considerations in project cycle.

The project stages should clearly indicate the implications of project options to climate change. In the final analysis one key question would be “will the project contribute or reverse climate change?”.

3. Capacity building and institutional strengthening have important roles to play to improve knowledge, heighten awareness and deepen understanding among national and local governments on the topic of climate change. This will be important for appropriate policies and regulations to be formulated to address climate change.
4. Continuous training of project implementors and project monitors has to be done in order to improve the level of implementation of measures described in the EIS system. Effective and efficient monitoring is the key to successful implementation of mitigation measures addressing identified environmental impacts and climate change requirements.
5. Parameters and standards relevant to climate change should be developed to assist practitioners for the effective environmental monitoring of projects. Along with the requirements of the local environment, global concerns should also be addressed. The parameters and standards will assist the project monitors in ensuring that they be fulfilled within the construction or implementation period of the transport infrastructure project.

As the evidence and indications of climate change mount and intensify, the decision to act becomes more urgent. As said in a water crisis “Every Drop Counts”, so it can hold true in climate change crisis – “Every Carbon Unit Sequestered Counts”.

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