Title of case study	**Adapting road infrastructure to climate change**
Name of organization(s)	**Egis**
Business sector	Construction & Engineering
Region(s) relevant to case study	☒ All regions ☐ Africa and the Arab States ☐ Asia and the Pacific ☐ Caribbean and Central America ☒ Europe ☐ Least Developed Countries ☐ North America ☐ Polar regions ☐ Small Island Developing States ☐ South America
Country(s) relevant to case study	France (Egis headquarters)
Adaptation sector(s) relevant to case study	☐ Business ☐ Education and training ☐ Food security, agriculture, forestry and fisheries ☐ Human health ☐ Oceans and coastal areas ☐ Science, assessment, monitoring and early warning ☐ Terrestrial ecosystems ☐ Tourism ☒ Transport, infrastructure and human settlements ☐ Water resources ☐ Other (please specify):
Adaptation activity	Egis is a recognized expert in the field of road engineering, and manages multi-disciplinary projects at all stages of their development, including urban road projects, interurban links, French and worldwide motorway network, and roads projects financed by international funders. Extreme climate events have major direct impacts on all road infrastructures. The consequences are mainly economic, but also concern safety. Climate change considerably modifies infrastructure's vulnerability to these impacts. Usually, infrastructure is designed on the

	basis of regulations and calculation codes which supply typical intensity values for climatic phenomena associated with a return frequency (e.g. a 10 year rainfall or a 100 year flood). While this reference event concept, based on return frequency, has been extremely useful in the past, it is becoming dangerous insofar as the underlying assumption that the climate of tomorrow will be similar to that of yesterday is no longer correct. According to the National Observatory of the Effects of Global Warming (ONERC), extreme meteorological phenomena will increase in number and degree in the years to come in France. Egis' report "Adapting Road Infrastructure to Climate Change: Innovative Approaches and Tools" presents several examples of concrete and effective solutions available to road owners and operators, from upstream institutional approaches to real-time risk management, stemming from national and international research undertaken in recent years, local implementations with infrastructure owners, and international networking.
Cost-benefit	There is a need for a systematic method that can help to identify the risks and evaluate the cost-benefit outcome of different actions. This was the aim of the RIMAROCC project, launched in 2008. RIMAROCC (Risk Management for Roads in a Changing Climate) is a common European methodological approach, funded by 11 National Road Administrations, through the ERA-NET Road research programme. The RIMAROCC method is designed to be general and to meet the common needs of road owners and road administrators in Europe. The method seeks to present a framework and an overall approach to adaptation to climate change. The method is based on existing risk analysis and risk management tools for roads within the ERA-NET Road member states and others, and is designed to be compatible and function in parallel with existing methods. Egis' incorporation of adaptation principles into its road design and construction projects enhances their long-term cost effectiveness and adds value for its clients. The cost of "inaction" demonstrates the essential need to act now and in a relevant manner.
Case study source(s)	Ennesser, Y and M. Ray. "Adapting Road Infrastructure to Climate Change: Innovative Approaches and Tools" Egis report.

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