

## Environmental and Social Data Sheet

### Overview

Project Name: PETKIM Ethylene Plant  
 Project Number: 20120012  
 Country: Turkey  
 Project Description: The project concerns the capacity optimization comprising a moderate expansion of the promoter's ethylene plant within a petrochemical complex in Aliaga, near Izmir in western Turkey. The intermediary ethylene produced provides feedstock for the production at site of various derivative chemicals, such as e.g. high and low density poly-ethylene (LDPE / HDPE).

EIA required: YES

Project included in Carbon Footprint Exercise<sup>1</sup>: NO

(Details are provided in section: "Carbon Footprint")

### Summary of Environmental and Social Assessment, including key issues and overall conclusion and recommendation

The project consists of a number of plant modifications, capacity adjustments and installation additions to optimize the existing ethylene plant thus eliminating operational bottlenecks. The project will increase plant efficiency and reduce operating cost. It will be implemented within existing facilities and will not increase the plant's footprint. The plant additions comply with best available technology (BAT) standard. Additional environmental load is limited and partly reversed to a net gain, such as for NO<sub>x</sub> due to the partial burner replacement with low NO<sub>x</sub> burners. The project is considered acceptable for Bank financing.

If the project would be located within the EU, it would fall under Annex II of the Directive 2011/92/EU requiring the competent authority to decide on the need for an EIA. An EIA has been requested by the competent authorities and has been established by the promoter. This integrated EIA also covers the extensions and new installations of downstream processing plants. The project has been approved by the competent authority.

### Environmental and Social Assessment

#### Environmental Assessment

The project complies with national and EU legislation. It meets BAT standards, as follows:

- **Design:** Stone & Webster BAT design includes: thermally efficient furnace, utilising extensive heat recovery systems; all equipment and piping systems designed to ensure high level of containment and to minimise fugitive emissions; absence of hydrocarbons vents to atmosphere for normal operation; hydrocarbon flare collection systems for the safe disposal of off-specification and purge streams; highly integrated energy recovery systems; extended period of continuous operation between planned overhauls (5 years); safe plant shutdown systems; waste minimization, including

<sup>1</sup> Only projects that meet the scope of the Pilot Exercise, as defined in the EIB draft Carbon Footprint Methodologies, are included, provided estimated emissions exceed the methodology thresholds: above 100 000 tons CO<sub>2</sub>e/year absolute (gross) or 20 000 tons CO<sub>2</sub>e/year relative (net) – both increases and savings.

provision of dilution steam generation systems to minimise aqueous effluent volumes; effluent collection systems allowing the effective treatment of process effluent water, including specific treatment facilities for the processing of the spent caustic stream, resulting from acid gas removal from cracked gas;

- **Process Control and Operation:** Provision of effective process control systems, including implementation of multi-variable control techniques, such as DCS (Distributed Control System) and APC (Automatic Process Control);
- **Emissions:** Only a limited number of process steps that are used in steam cracking installations give rise to emissions since the very nature of the operation, involving hazardous, flammable and sometimes toxic volatile hydrocarbons at high pressures, requires containment per default. The plant design ensures control of emissions to air, water and soil. The new cracking furnace (as is its existing twin of 2005) is equipped with low-NO<sub>x</sub> floor burners. That should ensure maximum emission levels of 100-130 mg/Nm<sup>3</sup>, depending on hydrogen levels in the fuel (however contrary to CO<sub>2</sub> emissions) which may add up to 25% to the NO<sub>x</sub> emissions. This is considered a significant improvement compared to the old furnaces equipped with conventional wall burners, showing NO<sub>x</sub> emissions of 195 mg/Nm<sup>3</sup> average, varying between 170-250 mg/Nm<sup>3</sup>.

Emission modelling for NO<sub>2</sub>, VOC and SO<sub>2</sub> has shown that legislative threshold values are not exceeded. The additional road traffic indirectly created by the project is in line with the production increase of some 13%. Biodiversity issues are not touched upon as the project is located within existing facilities. Energy efficiency savings, leading also to specific CO<sub>2</sub> emission reductions can be expected from the project.

The promoter's production site is certified for ISO 14000 (environment) and 18000 (Occupational health and safety) families.

### **EIB Carbon Footprint Exercise**

Using conservative assumptions, the absolute emissions of the project amount to 91 kt/a CO<sub>2</sub>. This figure covers the fuel feedstock mix, the required steam supply of various pressure and the electricity consumption both from internal and external sources. This estimate does, however, not comprise upstream CO<sub>2</sub> emissions from naphtha feedstock preparation nor downstream production of marketable petrochemicals like e.g. LDPE, HDPE or PP. A comparison with any baseline remains rather theoretical due to the size of the project and plant configuration (not a complete plant, but a location specific extension) and due to the differing feedstock (naphtha vs. ethane). However, all new capacity wherever built can be assumed to be BAT compliant. Therefore a theoretical identical case has been chosen as a baseline which, as a consequence, leads to zero relative emissions. Equivalent plant capacity based upon gas feedstock (as used in the Middle East) has not been considered, as the respective baseline would vary too widely according to the assumptions taken regards recycling of fuel grade products. It can, however, be said with certainty that equivalent capacity would be put in place elsewhere, should the promoter not go ahead with its expansion.

### **Social Assessment, where applicable**

Core Labour Standards are respected by the company. Occupational and Community Health and Safety issues are catered for by a dedicated company service.

### **Public Consultation and Stakeholder Engagement, where required**

A public participation meeting with an extensive presentation of the project to the interested public was held already early in the EIA process on 18 November 2011 in Aliaga. Respective

questions and answers have been taken into due planning consideration, also by the Ministry of Environment present.

### **Other Environmental and Social Aspects**

**Publications:** The preliminary non-technical summary (NTS) of the promoter's EIA is to be found on the website of the Bank. This NTS, however, will still be amended. Additional info about the promoter's environmental and safety & health policy can be found on its website under:

<http://www.petkim.com.tr/Sayfa/2/550/CORPORATE-SUSTAINABILITY-ENVIRONMENT.aspx> and

<http://www.petkim.com.tr/Sayfa/2/551/CORPORATE-SUSTAINABILITY-SAFETY-AND-HEALTH.aspx>