

Draft Approach and Methodology for the RIA

1. RIA in Turkey

In 2006 a By-Law on “Principles and Procedures of Drafting Legislation” was issued as a Council of Ministers’ Decree on February 17, 2006, replacing the previous 1992 Principles. This By-Law defines procedures and processes in drafting legislations i.e. laws, decree-laws, by-laws and regulations and also includes provisions on application of Regulatory Impact Assessment (RIA). In particular, an appendix is attached to the By-Law clarifying the criteria relevant to performing an RIA. Accordingly the RIA should include:

- Justification for drafting legislation and type;
- Cost - Benefit analysis, cost-effectiveness analysis (impact on budget);
- Assessment of necessity for creating a new agency and cadres – if applicable;
- Analysis of impact on economy, business, social life, environment, red-tape and administrative procedures;
- Participation and consultation;
- Feasibility of the proposed legislation, etc.

These RIA requirements are based on the EU Impact Assessment Guidelines SEC (2005)791, which define the key analytical steps of an RIA:

- What is the problem?
- What are the objectives?
- What are the policy options?
- What are the likely economic, social and environmental impacts?
- How do the options compare?
- How do the consultation and participation take place?
- Implementation, monitoring and evaluation.

Note: The above EU guidelines have since been updated by the Impact Assessment Guidelines of January 2009 SEC (2009) 92¹.

The above guidance from Turkey and the EU will be used in the preparation of the RIA for the implementation of the Large Combustion Plant Directive.

2. IED-LCPs key issues

It is assumed as a starting point that the political decision to implement the Large Combustion Plant Directive of 2001/80/EC has already been taken and adopted as the ‘By-law on Large Combustion Plants’ of 2010; as such therefore this decision is no longer part of RIA, which instead will focus on the various options related to implementation.

However, the EU’s older Large Combustion Plant (LCP) legislation, namely Directive 2001/80/EC, has now been incorporated into the Directive on Industrial Emissions (IED) 2010/75/EC. There are some changes to the Emission Limit Values applicable to LCPs in the later 2010/75/EC Directive as opposed to the 2001/80/EC Directive. These changes have not been incorporated into the Turkish legal framework and it is unclear as to whether they will be. The implications of these more stringent IED requirements will be one of the options investigated as part of the RIA development.

However, even if the IED legislation was to be transposed during the course of the project, there is some inherent flexibility in the IED as Emission Limit Values are rigorously defined (Article 30) unless the LCP is part of:

- A Transitional National Plan (Article 32); or
- A Limited Life Derogation (Article 33); or
- A Small Isolated System (Article 34)²; or

¹ http://ec.europa.eu/smart-regulation/impact/commission_guidelines/docs/iag_2009_en.pdf

- Was put into operation no later than 27 November 2003, and does not operate more than 1,500 operating hours per year, as a rolling average over a period of 5 years.

The above flexibility mechanisms, which were also inherent in the previous 2001/80/EC LCP Directive will have to be investigated as part of the implementation scenarios assessed in the RIA.

3. Who is affected by implementation of LCP legislation?

Those who stand to be affected by the implementation of the LCP legislation, with its more stringent environmental standards, are;

- LCP operators in the electricity generating sector;
- LCP operators in industrial sectors, such as sugar, etc.;
- Industrial and commercial consumers of electricity;
- Domestic consumers of electricity;
- Public health authorities due to the impacts associated with respiratory illnesses, etc.;
- Concerned citizens in relation to environmental issues and associated NGOs.

4. Data Collection and analysis

It is assumed at this stage that there are 111 existing LCPs in Turkey. The LCP implementation project already has a detailed component on data collection – Activity 1 of the Terms of Reference (ToR). However, for the purpose of completing a cost assessment of the implementation of the Directive on the existing and proposed LCPs, it will be necessary to collect the following data, which would be somewhat additional to the data requirements for environmental compliance, in particular as it applies to LCPs not meeting the defined Emission Limit Values:

- Operating conditions, such as capacity, operating hours (load factor, i.e. base load, mid-merit, peaker), GWh, fuel type(s), emissions, cost per MWh, etc.;
- Engineering details, such as age, room for expansion to fit emissions controls, estimated costs to upgrade to LCP legislation Emission Limit Values, viability of site for long term power generation, operational problems (varying lignite quality, etc.), availability of limestone and disposal / recycling provisions for flue gas treatment residues, etc.

For new (under construction) and proposed LCPs it is assumed, based on a number of relevant project Environmental Impact Assessments viewed to date, that their emissions are compliant with the Turkish LCP legislation prescribed Emissions Limit Values (ELVs). However, this will have to be confirmed in each case as part of the data collection and analysis.

The main component of the data analysis relates to the financial costs and operational details associated with flue gas treatment options to meet the required LCP ELVs. The current EU's Best Available Reference Document (BREF) for Large Combustion Plant is based on data, which is now a decade old and therefore less than ideal. While the LCP BREF is currently being updated, the updated financial information is not available in the current draft, while it is also worth pointing out that in general financial information in the EU BREFs is at best limited.

Others though have also noticed this, including the United Nations Economic Commission for Europe (UNECE). Indeed, in 2001 the UNECE Convention on Long Range Transboundary Air Pollution approved the setting up of an Expert Group on Techno-Economic Issues (EGTEI) relating to the reduction of air pollutant emissions³. EGTEI aims at assessing costs of emission reduction techniques and providing input data to determine total costs for a given sector of activity, depending on various emission reduction scenarios based on technology different rates of penetration. The EGTEI approach offers several possibilities:

- To improve the representation of pollution abatement technology costs for a given sector;
- To reduce uncertainties by working together with the relevant industry stakeholders;

² 'small isolated system' means any system with consumption of less than 3,000 GWh in the year 1996, where less than 5 % of annual consumption is obtained through interconnection with other systems

³ http://www.citepa.org/old/forums/egtei/egtei_index.htm

- To check traceability of data used;
- To insure compatibility with the Regional Air Pollution Information and Simulation (RAINS) model.

As their June 2014 report⁴ highlights:

“Item 2.2.5 - Develop a techno-economic tool as an evolution of the methodologies for evaluating costs in the Large Combustion Plants Sector: At the plenary meeting of the EG, CITEPA has presented the latest development of the cost methodology, now applied to Plants > 50 Mw, along with examples of applications and illustrated the ad hoc Excel tool developed for calculations. The documentation and the tool have been circulated among the EGTEI members and Industrial Associations for comments and testing, and will be also delivered to the Institute for Prospective Technological Studies (IPTS) Seville for the purposes of the LCP BREF revision. A special testing is planned in cooperation with CEFIC on 50 -300 MWth range plant capacity. The updated version of the tool will be presented at the EGTEI plenary meeting, in October.”

It is anticipated that this will provide a useful source of financial data on abatement systems, when it becomes available in the near future. In addition, the European Power Plant Suppliers Association (EPPSA) may also be a potential source of financial data for abatement systems and these have been contacted, as to the potential for provision of the same. It is also recognised that the quality of Turkish lignite leads to somewhat unique combustion conditions and potentially different choices in pollution abatement. In this regard the power supply division of Foster Wheeler is involved in the supply of combustion equipment (circulating fluidised bed boilers) and associated abatement systems to three new lignite power stations in Turkey.

Note: Foster Wheeler Environmental Division is one of the partners on this project. As such therefore, Foster Wheeler Global Power Group (GPG) seems to be one of the leaders with regard to practical experience with the combustion of Turkish lignite and they have been contacted as to the sharing of some of their experience.

5. Policy Options - Possible Scenarios to be considered

The main policy options which are evident at this time for inclusion in the RIA are:

- Apply flexibility mechanisms utilising the Transitional National Plan / Limited Life Derogation;
- Identify older (and smaller?) LCPs which might fall under such arrangements;
- Consider significant and effective upgrades at larger more modern plants and benefits to be carried over by means of the Transitional National Plan arrangement to the smaller and older plants;
- Consider if exemption on ELVs for older plants operating less than 1,500 hours per year is applicable / could be applied to older plants;
- Consider implementation solely to comply with requirements specified directly in the Turkish LCP legislation (as related to the LCP Directive 2001/80/EC) or include the additional expenditure in order to comply with Emission Limit Values in the IED and the forthcoming BAT conclusions for the LCP sector;
- Possibilities for fuel switching – such as greater use of low sulphur natural gas;
- Possibilities for increased use, where viable, of low emissions sources, such as nuclear, hydro, etc⁵.

6. Assessment of Benefits

The implementation of the LCP legislation will result in a significant reduction in air pollution. This in turn leads to a reduction in associated external costs, where external costs are defined as those which do not appear in the immediate financial bill for the supply of the product, but are what society has to bear in relation to impacts on the environment; human health, vegetation growth, building damage, etc. Therefore the RIA will need to include an assessment of external costs which are associated with the:

⁴http://www.unece.org/fileadmin/DAM/env/documents/2014/AIR/WGSR/EGTEI_report_to_WGS_R_52.pdf

⁵ Note: Highly intermittent and diffuse sources of renewables, such wind and solar, cannot replace the reliable dispatchable electricity generation from an LCP.

- Existing situation;
- The 'Do-Nothing' scenario with increased levels of power generation in addition to the existing situation; and
- The LCP ELV implementation scenario with the associated reduction in discharges of pollutants.

The assessment of external impacts of air pollutants has already been addressed by the EU in their 'Thematic Strategy on Air'⁶ and in particular the scientific assessment which underpinned the Thematic Strategy under the Clean Air for Europe (CAFE) programme⁷. The EU's ExternE⁸ programme on the 'external impacts of energy' also supplemented this work. Consideration and localisation of the above can be completed to provide an indicative cost range of the external impacts associated with the above scenarios.

Note: This relatively recent EU work was Member State specific, in that it addressed the relevant financial considerations which applied to each Member State and the extent of the pollution load.

The outcome of this would be an indicative external cost, i.e. financial sum, for the scenarios above.

Note: Some similar analysis of this nature has been completed as part of the RIA for the implementation of the National Emission Ceilings and Integrated Pollution Prevention and Control legislation in Turkey and will be built upon.

On 18 December 2013 the European Commission adopted a 'Clean Air Policy Package'. As a follow-up of the existing efforts to improve European air quality the package involves the following components:

- **New Clean Air Programme for Europe**⁹ with new air quality objectives until 2030;
- A **revised National Emission Ceilings Directive**¹⁰ with more rigorous national emission ceilings for the 6 main polluting substances;
- A **new Directive on the Limitation of Emissions of Certain Pollutants into the Air from Medium Combustion Plants**¹¹;

For areas recognised as pollution 'black spots', it would also be possible to run an air dispersion model with 'as before' and 'after' LCP ELV implementation to predict the local ground level concentrations which would apply. This could possibly supplement the generic analysis above.

Finally, the EU guidance on RIA previously mentioned recognises that Health Impact Assessment can be an essential part of an RIA and have produced a guidance document on this subject¹². Similarly, the World Health Organisation has produced a guidance document on Health Impact Assessment of Development Projects for their Eastern Mediterranean Region¹³. Some good relevant Health Impact Assessments have been produced elsewhere, such as for a controversial waste to energy project in Northern Ireland¹⁴, which can also be used for guidance, although the assistance of the relevant Turkish public health officials is required in order to prepare such a report.

7. Assessments of costs

⁶ <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52005DC0446&from=EN>

⁷ <http://ec.europa.eu/environment/archives/cafe/general/keydocs.htm>

⁸ http://www.externe.info/externe_d7/

⁹ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions - A Clean Air Programme for Europe, COM(2013) 918 final - <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52013DC0918>

¹⁰ Proposal for a Directive of the European Parliament and of the Council on the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC, COM(2013) 920 final- <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013PC0920&from=EN>

¹¹ Proposal for a Directive of the European Parliament and of the Council on the Limitation of Emissions of Certain Pollutants into the Air from Medium Combustion Plants- <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013PC0919&from=EN>

¹² http://ec.europa.eu/health/ph_projects/2001/monitoring/fp_monitoring_2001_a6_frep_11_en.pdf

¹³ http://www.who.int/water_sanitation_health/resources/emroehiabook/en/

¹⁴ <http://www.apho.org.uk/resource/item.aspx?rid=115982>

The direct financial costs which will need to be assessed with relevance to the individual LCPs comprise:

- Capital Expenditure (CAPEX) associated with the installation of emissions control measures or other related Best Available Techniques (BAT) requirements;
Note: This will apply to some but not all facilities, depending on the outcome of a needs assessment relevant to the requirements of the LCP legislation and BAT conclusions.
- Operational Expenditure (OPEX) associated with the above;
- Environmental impact associated with increased use of lime and disposal of gypsum (an 'external cost');
- Financial and environmental costs associated with some loss of LCP efficiency; i.e. reduced power station output.

On a sectorial basis following the completion of the above, the following assessment will be required.

- Social cost of increased electricity charges to pay for the above CAPEX and OPEX;
- An assessment of the impact on administrative structures, which is associated with Activity 3.1 of the Terms of Reference.
Note: The emphasis of the IED legislation is based on self-regulation and reporting by industrial facilities, with more limited intervention by the authorities once the permitting process is completed.

To clarify, the scenario development will have to address the individual upgrade / replacement / extended lifespan options applicable for each existing and proposed LCP in Turkey. Approximate cost ranges will then have to be applied utilising established generic available CAPEX and OPEX for such as desulphurisation, particulate control and DeNOx systems. These will need to be adjusted in each case for Turkish conditions, local site conditions and fuel types, with particular emphasis on combustion conditions for Turkish lignite. While options in terms of abatement systems may exist in relation to compliance of an individual LCP with the prescribed ELVs, options which will form part of the CAPEX and OPEX assessment, the final choice of technique applied to meet the required performance standard will rest with the individual operator.

An estimation of price rise per kWh for electricity supplied to the Turkish market will then have to be prepared and used for the qualitative assessment of the social impact. For example, impacts on industrial competitiveness and resulting employment, impacts on domestic fuel bills with potential fuel poverty impacts, etc. In this regard, input will be required from the consultation phase with the stakeholders.

8. Option analysis

For each policy scenario identified, given the completion of the costs benefit study above, the results will have to be analysed and the various options ranked in terms of advantages and disadvantages. The main parameters to be considered in this ranking would comprise, but not be limited to:

- Feasibility / Practicality – can the necessary technology be delivered in the timeframes required;
- Environmental benefit – reduction in external costs;
- Financial cost – CAPEX, OPEX and timeframe over which costs ensue;
- Social cost – resulting impacts from rise in price of electricity.

Ideally a matrix type approach should be used and some form of weighting applied to each element with regard to the overall conclusion. This will help define the preferred option(s).

9. Public Participation

The public participation will need to include the following steps:

- Identification of the stakeholders;
- Preparation of the necessary information for the dissemination phase;
- Dissemination of the information to the stakeholders;

- Stakeholder review and submission of analysis / comments;
- Taking due account of the public participation; a summary of the comments received, a description of where and why they have been incorporate or as the case may be those which have not and why not.

Given the importance of the above, a short initial public participation, focusing on identification of issues, such as costs and impacts, will have to be completed. Note: A workshop related to the same is identified by Activity 2.2 of the Terms of Reference (ToR). This would then be followed by a second more detailed public participation to follow when the RIA report is at a developed phase, as is also identified with the additional workshops in Activity 2.2 and Activity 3.3 of the ToR.

10. Final Report

According to Turkish requirements, RIA Reports should be written in simple and understandable language, and normally should not exceed 30 pages. Additionally, all information annexes of the report and supporting documentation should be provided.

Therefore a final report will be prepared with a summary of recommendations, while individual annexes will include the documentation related to the steps previously identified. The report will also address the implementation phase of the legislation which will follow and the measures relating to maintaining the RIA up-to-date to reflect the changing conditions, which will occur as plants are modified, etc.