

20-20" targets should be:

- on one hand – the needs and energy consumption but not only of the “big players” – Germany, France, UK, Italy...and of the all 28 members of EU and other European countries,
- on other hand - relevant are their share the GHGs production is needed to be reduced.

So, one of the most important challenges of the European Union now in the way to the sustainable development is the climate changes, and thence the goal is to find most rationale decision of the European "20-20-20" targets.

III. SOLUTION OF THE EXAMINED PROBLEM - MAIN ACTIONS FOR APPLICATION OF NEW SENSIBLE, FLEXIBLE AND RATIONAL APPROACH INVESTMENT PROPOSALS' REALIZATION

On the backdrop of the example for the European energy consumption reality, how could be achieved safe and environmental sound sustainable development of the investment process, especially when it comes to major projects at all in Europe and on the world?

The answer of the question “HOW” could be with applying of rational environmentally and safe approach, including in global aspect for GHG’ reduction and climate changes’ mitigation, consist in its envelope the follow main actions:

Action-1:

Application of procedures:

- Environmental Impact Assessment (EIA) and
- Integrated Pollution Prevention and Control (IPPC), with relevant zoning and emergency planning.

Action-2:

Application of SWOT analysis as technique of the strategic management, but not ordinary and Extended SWOT analysis for identification of the influences of every project.

Action-3:

Application of ALARA Principle (As Low as Reasonably Achievable) in accordance with the relevant legislation and standards for operational safety of the investment infrastructures and protection of the employees, public and environment from hazards and harmful effects.

Action-4:

As supplement to the all activities in accordance with the European "20-20-20" targets, to be achieved 20% of the new enterprise energy consumption to come from renewable sources, and 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency.

For application of the above actions, the developers and investors in European and other countries could rely for performance, research and technical support and/or consulting services of researchers and senior experts from Technical University of Sofia, in particular Safety and Environmental & Engineering Laboratory (SE & EL) at Electrical Power Department. Of course, in all cases closed collaboration with local research, design and engineering organisations and experts

is needed.

IV. RESULTS AND DISCUSSIONS

As example and demonstration of the proposed rational approach here could be presented some results of the steps – on the first place the implementation of Action 1, for instance in the case to consider the assessment and prevention of a power plant’ environmental impact and human health risk with the whole public care and responsibility now and for the next generations.

The purpose of the EIA study and report should be defined as follow:

- to study and analysis of possible reasons, sources and levels of impact and determination of potential risk for the environment and human health during construction, normal operation and possible design basis and beyond design basis accidents at the plant, and
- to define recommendations and measures to decrease the impact to the all components of the environment and to the population,
- including on this basis to be determine the risk/emergency zones and thence to be implemented the emergency planning.

The rationale for EIA is based on European and National Regulations of various countries, in particular here for Bulgaria.

So, for instance regarding a construction of a new power plant, or a new unit of existing power plant, in accordance with the European and Bulgarian legislation should be obligatory implemented EIA on the stage “Investment proposal for construction of the plant”. After series of implemented projects [2], [3], [4] in this direction from our side and on the basis of our expertise could be recommended the structure of EIA, as follow:

- Introduction
- Part 1. Annotation of the Investment proposal for new plant construction.
- Part 2. Alternatives for execution of the Investment proposal.
- Part 3. Description and analysis of the environment components and factors and their interaction.
- Part 4. Analysis and assessment of hypothetical impact on the population and the environment during construction, normal operation of the new plants and emergencies.
- Part 5. Information on the methods used to prognosticate and assess the impact on the environment.
- Part 6. Description of the measures intended to prevent, decrease or stop hazardous impact on the environment, as well as a plan for execution of these measures.
- Part 7. Standpoints and opinions of the public, competent bodies on EIA, and concerned countries in transboundary context resulting from the consultations held.
- Conclusions
- Appendixes

For instance, in Part 5 of EIA for the air pollution assessment applying the Tim’s Simple Plume Model by the standard deviations of the plume concentration in the Y and Z directions, the air pollution dispersion could be performed as is shown in the Fig 3.

Air Pollution Dispersion

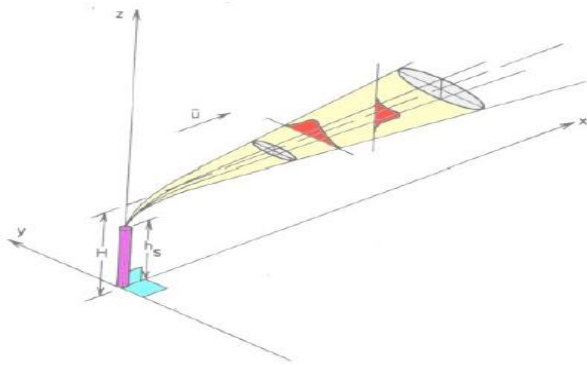


Fig 3. Spread of the plume by the air pollution dispersion [5]

As part of the Action 1, the determination of the risk/emergency zones and thence implementation of the emergency planning, in the general case for instance in the energy sector could be presented as Emergency&Risk zoning reflection in the EIA of the Investment proposal. So, this understanding should be developed in the relevant part of the EIA of each Investment Proposal in accordance with the Bulgarian and European Regulations – of course only for the cases of Investment Proposals where the EIA is obligatory. These under Article 92 of the Environmental Protection Act (EPA) from 2002 (last amendments in 2016), are e.g.: Crude-oil refineries, Thermal Power Plants (TPPs) and other combustion plants with a rated thermal input of 50 MW or more, Nuclear Power Plants (NPPs) and other nuclear reactors, enterprises for iron and steel, ferrous metal foundries with a production capacity over 20 tons/day, installations for the processing of ferrous and non-ferrous metals, enterprises for paper and cardboard, and glass with a capacity over 20 tons/day, etc.

On the one hand the Emergency Planning and Emergency Preparedness measures are stipulated in two Emergency Plans [6]:

- i. The External Emergency Plan (EEP) - Emergency Plan, which determines the emergency planning areas/zones and the actions of the competent authorities for the protection of the population, property and the environment in the event of accidents.
- ii. The Internal Emergency Plan (IEP) - Emergency Plan of the nuclear facility or the site with an ionizing radiation source which determines the actions of the licensee or the title holder for a solution for limitation of the accident and liquidation of the consequences from it in compliance with the EEP.

On other hand bearing in mind the stages of implementation of the investment project, it was necessary to provide the emergency planning in two respective parts, as follows:

- i. Emergency planning up to the start of the operation of the plant (construction stage)
- ii. Emergency planning in relation to the operation of the plant and as protective actions during eventual accident and an emergency.

The IPPC procedure in the Action 1 have to be implemented for the plants in operation in accordance with Directive

2010/75/EU of the European Parliament and the Council on industrial emissions (the Industrial Emissions Directive or IED) - the main EU instrument regulating pollutant emissions from industrial installations. The IED aims to achieve a high level of protection of human health and the environment taken as a whole by reducing harmful industrial emissions across the EU, in particular through better application of Best Available Techniques (BAT) in the mayor existing plants.

In the Action 2 the list of SWOT issues should be defined in screening, for instance with the matrix at Fig.4 and their exemplary descriptions below.

Extended SWOT analysis		Internal environment	
		Pluses (S)	Minuses (W)
Ex -environment	Opportunities (O)	S-O strategies: Opportunities for pluses realizations	W-O strategies: Weaknesses destruction for creating of new opportunities
	Dangers (T)	S-T strategies: Using of pluses for weaknesses elimination	W-T strategies: Creating of strategies which not allow activation of the weaknesses from the dangers

Fig.4. Matrix of SWOT issues

S - strengths (pluses): competent human resources, experience in common research, extensive range of expertise, fixed financing from the budget and additional funds from the projects, high qualified human for safety assessment, experience in EU project, expertise with EU projects in other fields of science, well fitted laboratories and software for performing of analysis and assessments;

W - weaknesses (minuses): not enough qualified human resources in the field, direct applicability of results, inadequate human resources management, research is concentrated in the fields, which are partly financed by national sources, Bulgaria can't afford to develop large research programs.

O - opportunities: Financing from national project to cover the studies on innovations, systems and materials, participation in technical meetings, participation at EU Funds, participation in EU calls and international projects, involvement of young researchers in the projects, where it is possible co-operation with neighboring countries.

T - threats (dangers): insufficient number of students of relevant engineering programs at the universities and learners/trainees in training centers, reduction of funding at the universities, research institutions and training centers, only applicative research, confined opportunities for young specialists in the field, no strategy on national level to define the priorities in development of innovations and research, lower interest for knowledge.

These SWOT issues are more appropriate for national level, but could be modified for the conditions of the relevant investment proposal also.

In the Action 3 applies ALARA Principle. This acronym is formed from the phrase "As Low as Reasonably Achievable." The phrase refers mainly to a principle of keeping radiation doses and releases of radioactive materials to the environment as low as can be achieved, based on technologic and economic

considerations.

Although that, the more than merely best practice, ALARA which is predicated on legal dose limits for regulatory compliance, this principle could and should be applied as a requirement for all safety programs.

The application of ALARA Principle have to be for operational safety of the investment infrastructures and protection of the employees, public and environment from hazards and harmful effects. In all of the cases ALARA have to be in accordance with the relevant legislation and standards. For instance for investments in the nuclear energy sector leading standards are the nuclear safety & security and safeguards standards of the International Atomic Energy Agency (IAEA), general presented in Fig. 5 in three series:

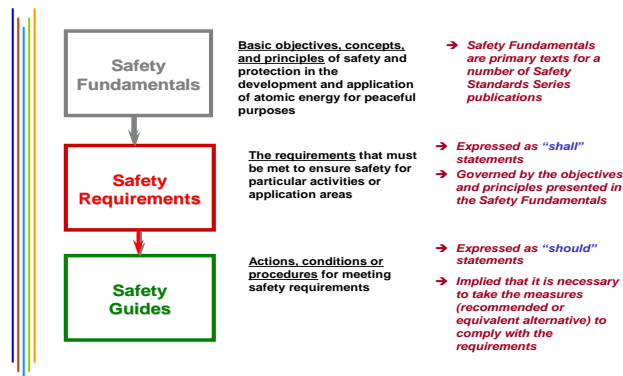


Fig. 5. Series of IAEA safety standards

The aim of the Action 4 is to be defined a model of the targets of the Investment in the new enterprise, in harmony and compliance with the European "20-20-20" targets to be met by 2020, namely:

- A reduction GHGs emissions of at least 20% below 1990 levels.
- 20% of EU energy consumption to come from renewable resources.
- A 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency.

The European "20-20-20" targets should be consider as good practice and to be applied in each Investment in a new enterprise in Bulgaria and everywhere in the world [7] [8], especially concerning the energy consumption to come from renewable sources, and appropriate measures for improving of the energy efficiency.

CONCLUSIONS

These actions presented above could be considered and accepted from investors and companies on one hand, and also from authorities and municipalities on other hand, in European and other countries, not only as reasonable recommendations. These should be taken together with relevant effective measures and activities for possible contribution for global warming' mitigation and achieve of safe and environmentally sound sustainable development of the investment process and the whole economics.

Abbreviations

GHG: Green House Gases
 EIA: Environmental Impact Assessment
 IPPC: Integrated Pollution Prevention and Control
 LCP: Large Combustion Plant
 ALARA: As Low As Reasonably Achievable
 EEP: External Emergency Plan
 IEP: Internal Emergency Plan
 BAT: Best Available Techniques

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