

## A case study for environmental impact assessment of oil refinery in Iran with emphasis of Environmental and Social Action Plan (ESAP)

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**Abstract**—Oil giant projects in the industrial and economic growth and welfare of human communities have been designed and implemented are in no doubt about the negative environmental effects such as water pollution, soil, air, loss of plant species and animal and at the end of the imbalances ecosystems, which in some cases, these damages are irrecoverable. If the projects are integrated through the social impact assessment not only succeeded in reducing or eliminating adverse effects are, but also increased the positive effects and display it will in enhanced sustainable development. Tehran oil refinery chooses as a case study with consideration of the social aspect of the socio - environmental effects of the project. Using a new matrix of fine activity stages and scored and with regard to the physical environment, natural and socio-economic and cultural effects of its implementation and lack of performance in the short and long term.

**Keywords**—component; oil, human communities, ecosystems, social impact assessment, Tehran oil refinery

### I. INTRODUCTION

The concept of social learning described and effort to show how communities of people with both diverse and common interests can reach agreement on collective action to solve a shared problem [17]. The reality is that with the increasing need for oil exploration and industrial world to its position the largest and most important source of energy resources and raw polymers and plastics, social and economic direction in many countries and Iran, the general changed [1]. Social impact assessment is defined as the process of identifying the future consequences of a current or proposed action which are related to individuals, organizations and social macro systems (Becker, 2001). New oil to world markets, face, structure and function of all institutions of political, social, economic and even cultural country greatly affect. Samples of this nature and identity of its affiliated institutions have oil and if not, all relations and equations of political, economic and social changes in countries were emerged like Iran's good and important developments (Behzadie, 2003). The many categories, dimensions and interactions of risks have led to concerns for multiple and cumulative risks [2]. Function of the oil change history of Iran and the country's economic direction in recent centuries, including strategic issues in economic and social analysis of counts [3]. By identifying potential impacts in

advance of large project, agencies and individuals, can make better decisions about which interventions should be undertaken, and how [8]. The reality is that with the growing need for oil exploration and industrial world to its position the largest and most important source of energy resources and raw polymers and plastics, social and economic direction in many countries and Iran, completely changed. Potentially, guidelines and principles can be directed to many different groups, each of whom has different interests [5]. All relations and equations of political, economic, social and countries like Iran has undergone major changes and developments were emerged [4]. A group of oil experts believe that the main cause of lack of development in various dimensions, and all our psychological problems due to connection to the source of enormous wealth is God-given [6]. So, if Iran's oil situation had not improved and perhaps better than their current situation. Although the situation in Iran without oil and certainly can not stop drawing and be files, but not from the negative effects of oil were neglected in various social fields [7]. The following major functions of oil will be in various institutions of the social groups of country. The largest negative effect of oil refinery in Iran's social groups, covering social and cultural weaknesses and inertia came to Iran [9]. Although the foundations in terms of production technology and business environment is not among the rich and developed countries, but the oil fortune without trouble and tribulation has been given community, country has row in developing countries with relatively high per capita income [10]. Brush oil and poor social groups of patients from the comments kept secret because of their financial obligations easily with oil supply has never felt the need and have no shortage of brains and hands - and their efforts to rush formation in the economy forced [11]. Although Iran is rich in terms of per capita consumption but produced a decisive great (especially for luxury goods) can be considered. Oil revenues from the anti-productivity culture in the dominant institutions and organizations promoting the country have replaced the traditional culture and religious work in the community are satisfied; samples already in many developed countries, consumption patterns more balanced pattern of consumption in our country's agenda have. The major disadvantages of deep social and economic culture, somehow clear the injection of oil revenues in the system forthright national economy goes, and unfortunately lose color elements such as punctuality,

activist, working order and have led to the conscience [14]. Fundamental elements would be impossible which are definitely and certainly without any kind of development. High government subsidies in the energy sector through the financing of oil are high and fuel consumption in the country, the main reason for the growing energy and environmental crisis in Iran are considered. In the country of 70 million more than the countries with population above 300 million people will use gas or gasoline and the destruction process and renewal of natural resources, erosion, loss of forests and rangelands, drought, reduced rainfall. The country has faced serious crises. Iran enjoys enormous resources due to oil, fuels and energy carrier's never reasonable price and have not and this has caused to other natural resources as national wealth and sustainable development and balancing factor in the long term is not significant [16]. This problem, energy and environmental crisis in Iran have created unfortunately, due to open despite oil revenues, not such a critical sense. Though it seems negative functions mismanagement of oil revenues in Iran has expanded its interests, but this should not hide the interests and benefits of oil and keep covered [15]. Oil, among the main three components of power in international relations and equations are considered [19]. Considering the critical dependence on the public, especially the industrial countries and countries in the world and powerful, energy resources, and all governments combined with behavioral compliance with caution and are oil-rich countries and this particular weight in the political negotiations and discussions to give them. Oil the other hand, an important factor of national solidarity and integration can be considered [18]. Because all the benefits of oil sales of government is therefore to strengthen the base of central government in Iran has been led [13]. It should be noted, Iran's extensive national and religious and ethnic variety and enjoyment of a strong central government if national unity is strength. Oil revenue, strong and important factor has in strengthening the central government and key functional preservation of territorial integrity [12].

## II. MATERIAL AND METHODS

For this project the data obtained by mixing the LEOPLD matrix and environmental risk assessment by using the special software under SQL server system. The assessment model for oil refinery social impact assessment and analysis of the results were established based on the interactions matrixes in which the interactions of two stages of oil refinery construction and operating activities on all environmental and social parameters were studied under the three general categories of social management, land usage and future development plans and its socio-economic effects and social and cultural aspects integrating all involved agents. All construction and operating stages' elements and sociological parameters were determined given the operational need. In order to evaluate the interactions between social parameters and both construction and exploitation operations, special tables designed for evaluation of interactions for taking conclusion and final summing up. For evaluating the environmental and social some special items has been selected that including: severity

impact (negligible, moderate, critical, catastrophic), probability impact (rare, seldom, occasional, likely, continuous), importance impact (short term, long term, reversible, irreversible, indirect, direct, cumulative), impact type (positive, negative, no impact), significant impact.

### 5. Significant impact

0-3, Green, no impact-low, 4-6, Yellow, minor impact-moderate, 7-10, Orange, major impact, 10>, Red, critical major impact. Special software under SQL server program designed getting accurate results of social and environmental impact assessment of Tehran oil refinery as selected for case study. After calculations results were provide as a graph. The graph shows the final evaluation for this case study.

## III. TEHRAN OIL REFINERY

As mentioned earlier the oil refinery and environment interactions were studied given the size of the job and environmental features in the framework of different units of oil refinery (executive, constructional, operational and processing) and different environmental (physical, biological, socio-economical and cultural) parameters. The major environmental impacts and consequences of oil refineries include gas emissions, effluents, solid wastes, noise, odor and visual and aesthetic impacts [8]. Tehran Oil refining Company discussion is: Date of establishment: 1965-1968, Date of operating: 1969 (South refinery)-1973 (North refinery), Nominal capacity: 220,000 barrels per day, Operational capacity: 240,000 barrels per day, Feed: Light crude oil of Ahvaz –Asmari oil field, crude oil of Maroon/Shadgan, Middle Asia, Production units: crude oil distillation, viscosity, liquid gas recovery, gasoline hydrogenated refining and gasoline conversion, hydrocracker, Hydrogen, Nitrogen, Sulfur recovery, Amine gas treatment [25].

All researches and studies about this issue entail three kinds of operations:

- 1- Detailed investigations and studies about environment.
- 2- Investigations and studies about oil refinery.

3- Investigations and studies about oil refinery environmental impact assessment

Regarding the first item, studies about environment, the studies were conducted given the refinery neighboring lands suitability and surrounding environment and necessity to consider the soil and environment protection by the vegetation. Regarding the second item, studies about crude oil refinery, the studies were carried out given the main agents in production and interference in area oil industry and as the major agent of oil pollution in the area. In this respect, oil refinery different units were focused. Regarding the third item, studies about oil refinery environmental impact assessment, given the diversity in crude oil and creation of severe environmental pollution by all oil refineries upon refinery technical default (in all stages including design, execution and operating).

### A. Air pollution

Air pollution due to the refineries' operation mainly derives in operating stage according to the facilities' age and employing processes by firing, steam boilers, furnaces,

pumps, compressors, reserve tanks and distillation towers. The most important air pollutants are sulfur oxides, nitrogen oxides, carbon monoxide, aldehydes, ammonia, particles and hydrocarbons [24]. The emitted hydrocarbons from the refinery are the most important source of pollution. Emitted hydrocarbons from the exhausting pipes and reserve tanks are the major air pollutants deriving from a refinery operation. Part of hydrocarbons is produced via evaporation [29]. During combustion process, nitrogen oxides are formed particularly in facilities such as boilers, compressors, catalytic reducers and introduced into the environment. The particles are produced by turbines and boilers directly related to consuming fuel.

#### B. *Water pollution*

Discharging effluents into the environment can contaminate surface waters, soil and underground water due to leak or oozing of raw materials or products [20]. Such a condition could be occurred due to tanks' or pipelines' leak [22].

#### C. *Solid wastes*

Refineries produce noticeable amounts of solid wastes [3]. The largest amount of solid wastes originate from cracking, coke production, sludge production and treatment (sludge deriving from cleaning tanks), water and oil separators and effluent treatment system.

#### D. *Ecosystem demolition*

In recent years, oil and gas prospecting and extraction operations imposed some damages to the marine and land environments in the areas that are under oil industries operations due to lack of a definite description for studying and investigating environmental impact assessment services [12].

### IV. RESULT AND DISCUSSION

As the Fig 1 shows on the base of the information gathered in the field of social and environmental features within the project, review and understanding of the environmental, economic, social and cultural features of the project area affected, prevention of negative social and environmental destruction through the possible effects of control project. Construction of oil refinery in Tehran province makes jobs in the way of direct and indirect. The opinions of local people and authorities of all the statistics authorities and regional authorities, before entering the industry rates of social pathologies, including drug, theft and prostitution was low, at least in social insecurity may have been, an appropriate level of social contact between people was established and goods price inflation in the main requirement is an acceptable level. By using this software and evaluating the results the special graph will give in Fig 1. :

### V. CONCLUSION

Refinery construction occurs in areas of the province that are deprived of land without cultivation or development of argument that supporters of this plan. Sponsors building

more oil installations in Tehran, in rail transport facilities and road facilities suitable for the oil industry are considered in Tehran. Some opponents also suggest construction of oil facilities in Tehran should be responding to future generations.

#### ACKNOWLEDGEMENT

Any decision about the establishment of oil in Tehran, should consider other measures of social impacts of development occur in this province. Tehran Refinery project development is one of the measures that can be caused by cumulative effects of the interaction effects of construction and setting up oil installations, damaging effects on this province instead of leaves. Should be tried instead of merely providing information that opponents or people familiar with the consequences of actions make a positive comprehensive information available to people. Public broadcasters should serve the target and allowed the people to decide, even if facilities are constructed, consciously and are familiar with such complications.

#### REFERENCES

- [1] Ahmadi B., Social impact assessment in Iran, Tehran, azad publisher, 2008.
- [2] A. H. Becker, "Social impact assessment", European Journal of Operational Research, 128, 2001, pp. 311-321.
- [3] Behzadie H., Socio-environmental impact assessment for oil refinery, Tehran, nioc publisher, 2003.
- [4] Ch. Benighaus, M. Hildé., and T. Assmuth, "Integrated risk assessment and risk governance as socio-political phenomena: A synthetic view of the challenges, Journal of Science of the Total Environment", STOTEN-11680, 2009, pp10-11.
- [5] Davarie I., Socio-environmental impacts for oil industry, Tehran, nioc publisher, 2002.
- [6] Ehsanie J., Social impact assessment, Tehran, edalat publisher, 2001.
- [7] F. Vanclay, "Principles for social impact assessment: A critical comparison between the international and US documents", Journal of Environmental Impact Assessment Review, 26, 2006. pp. 3 – 14.
- [8] Farhadie R., Social impacts of oil refinery, Tehran, dana publisher, 2004.
- [9] Ghasemie M., Social impacts of oil industry, Tehran, saman publisher, 2001.
- [10] D. He, Y. Braun, and B. Tilt, "Social impacts of large dam projects: A comparison of international case studies and implications for best practice", Journal of Environmental Management, 90, 2009, pp. 249–257.
- [11] Javaherie M., Social impacts of oil industry, Tehran, sahand publisher, 2002.
- [12] Kamali S., Social impact assessment for oil industry project, Tehran,, nioc publisher, 2007.
- [13] Lavasanie H., Social impacts of large project, Tehran, tavana publisher, 1999.
- [14] Mohamadian T., Social impact assessment, Tehran, tahourie publisher 2005.
- [15] Naserzadeh T., Sociology for oil industry, Tehran, rahnama publisher, 2001.
- [16] Paravar E., Sociology for projects in Iran, Tehran, kamal publisher, 2006.
- [17] Ramazanie S., Sociology for better future, Tehran, kohansal publisher, 2003.
- [18] Savadkouhie M., Sociology for projects, Tehran, kamyab publisher, 2002.

[17] T. Webler, H. Kastenholz, and H. Renn., "Public participation in impact assessment: A social learning spaces", *Journal of Environ impact assess rev*, 15, 1995, pp. 443-463.

[18] Tavakolie N., *Sociology for projects in future*, Tehran, aram publisher, 2007.

[19] Zoljalalian N., *Sociology in oil industry in Iran: Using methods*, Tehran, andisheh publisher, 2001.

