



Environmental Impact Assessment Of Development Engineering Projects: A Case Study Of Riyadh City

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Abstract

This report delves into an exhaustive evaluation of Riyadh's environmental performance, precisely scrutinizing its policies, practices, and outcomes against the gold standard of international benchmarks. From policy frameworks to emissions control, water conservation, and public participation, this comprehensive assessment unravels Riyadh's journey towards sustainable development. These results not only highlight the current state of the city, but also chart a path for Riyadh to become a beacon of environmental excellence on the global stage in fulfillment of the Saudi Vision 2030 for Riyadh to become among the top 10 sustainable cities in the world. Our analysis transcends the surface, diving deep into the formulation, implementation, and adaptability of Riyadh's environmental policies. This scrutiny aims to precisely gauge their alignment with the most stringent international standards, identifying areas of excellence and recommending strategic adjustments where necessary and we measured the satisfaction of the residents of the city of Riyadh by conducting some surveys related about two basic topics: solid wastes recycling and gray water reuse. In conclusion, we navigate the intricate landscape of Riyadh's environmental commitment, paving the way for a future that seamlessly integrates the city into the vanguard of sustainable urban development.

Problem Statement

Urbanization can have negative effects on the natural environment, such as increased energy consumption, waste generation, greenhouse gas emissions, and climate change. Pollution and contamination of air, water, and soil, as well as biodiversity loss and habitat destruction are also potential issues; for Riyadh, the city faces a number of environmental challenges, the most significant of which are: contaminated well water, cement plant waste, increased sulfur dioxide and nitrogen oxide emission, land degradation and desertification, and others that may result in increased pollution and environmental risks.



Figure 1.1: Sustainable development goals

Methodology

The methods that's we use are:-
 1- Visual Inspection
 2- reports or forms
 3-Survey
 Research in the official ministries in Saudi Arabia about air quality, the amount of solid waste, emissions from air and energy, the amount of pollution and water consumption in Riyadh and compare them with international standards and also compare them with international cities.
 The form that we take it into account it consists of 6 parts each part has very important impact in our assessment.
 The first part talks about General information for example, the name of the project and type and the name of the owner
 Second part talks about project data which contains-
 1-Area total of the project
 2-Basic and the second product
 3-The location of the project
 Third part talks about project description consist of date of operation, water sources (groundwater-surface water-water network), the consumption rate, the type of waste (solid , liquid , gas) and how to dispose of.
 Fourth, part is applicable laws and legislation.
 Fifth, environmental impact assessment.
 Sixth, environmental management plan to mitigate environmental impacts:
 The summary and the mitigation for each impact

Figure 1.2.a

Figure 1.2.b

Figure 1.2: Samples of the form

The city of Riyadh was chosen to collect the information to represent the Kingdom of Saudi Arabia. More than 700 data were collected for each survey. One type of question was planned, which is multiple choice questions. Any outputs that appear logically inconsistent with answers are arranged, and each person can use the questionnaire's expressions once. The survey was filled out by publishing it on social networking sites. The collected data was analysed and presented in various formats showing important results.

Results and Discussion

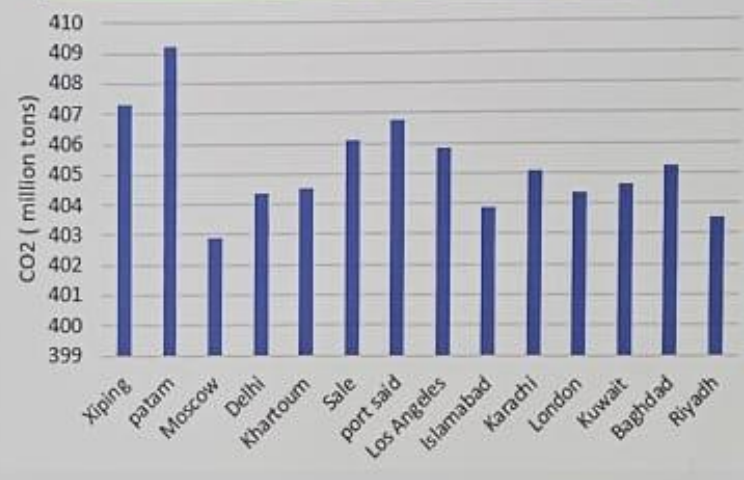


Figure 1.3: CO2 Emissions In different Cities Around The World

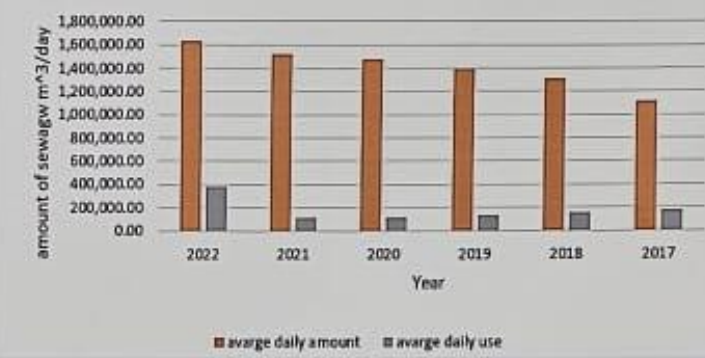


Figure 1.4: amount of wastewater in Riyadh

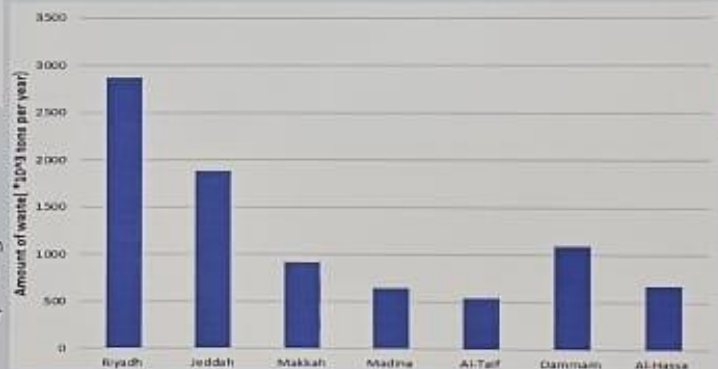


Figure 1.5: Solid Wastes Production In Saudi Arabia's Cities

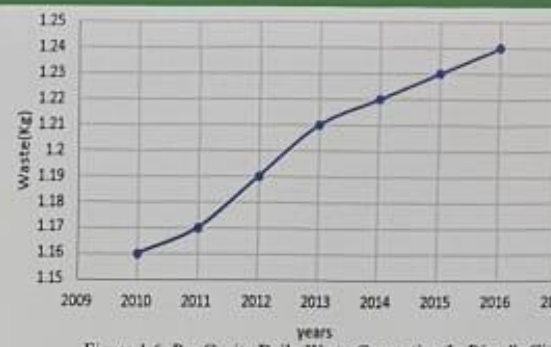


Figure 1.6: Per Capita Daily Waste Generation In Riyadh City

As we see from Figure 1.3 Note that CO2 is different in cities around the world and Riyadh has almost 403.5 million tons of CO2.
 As shown in figure 1.4 that wastewater is increase in the year 2022 in Riyadh due to development, projects, and residential density.
 We Concluded that Riyadh has the highest value in producing solid waste, you can see in Figure 1.5 due to residential density and it is the capital of the Kingdom of Saudi Arabia.
 Highest value in daily waste generation in Riyadh city was in year 2016.

Conclusion

We concluded from in-depth research into the history of Riyadh that after industrial renaissance that occurred due to Vision 2030, harmful emissions such as CO2 and energy consumption have also increased, especially in the central region of Saudi Arabia. Solid waste, water consumption and gray water are considered very high and every year they increase more due to the increasing population. Therefore, we conducted a questionnaire and concluded from the awareness of the residents of the city of Riyadh regarding solid waste, considered higher than their awareness regarding gray water, and that the majority of the residents of Riyadh have high awareness and accept the use of recycled solid waste and accept the use of recycled gray water, but for special uses because the majority of the population refuses to use it for drinking.

Recommendations

After the conclusions we reached and noticing the high emissions and pollution in Riyadh, we recommend paying attention to the environment and using environmentally friendly energies such as consuming solar energy and planting many trees to reduce harmful emissions and recycling waste to build an environmentally friendly city. It is important to divide waste to facilitate solid waste recycling and increase population awareness. To reduce water consumption, accept the use of recycled solid waste, and also use recycled wastewater, and spread special awareness in the environment to increase awareness and preserve the environment as much as possible.