

**ICO PROJECT  
URGENT REVITALIZATION OF LAKE URMIA  
THROUGH WATER TRANSFER FROM LAKE VAN**

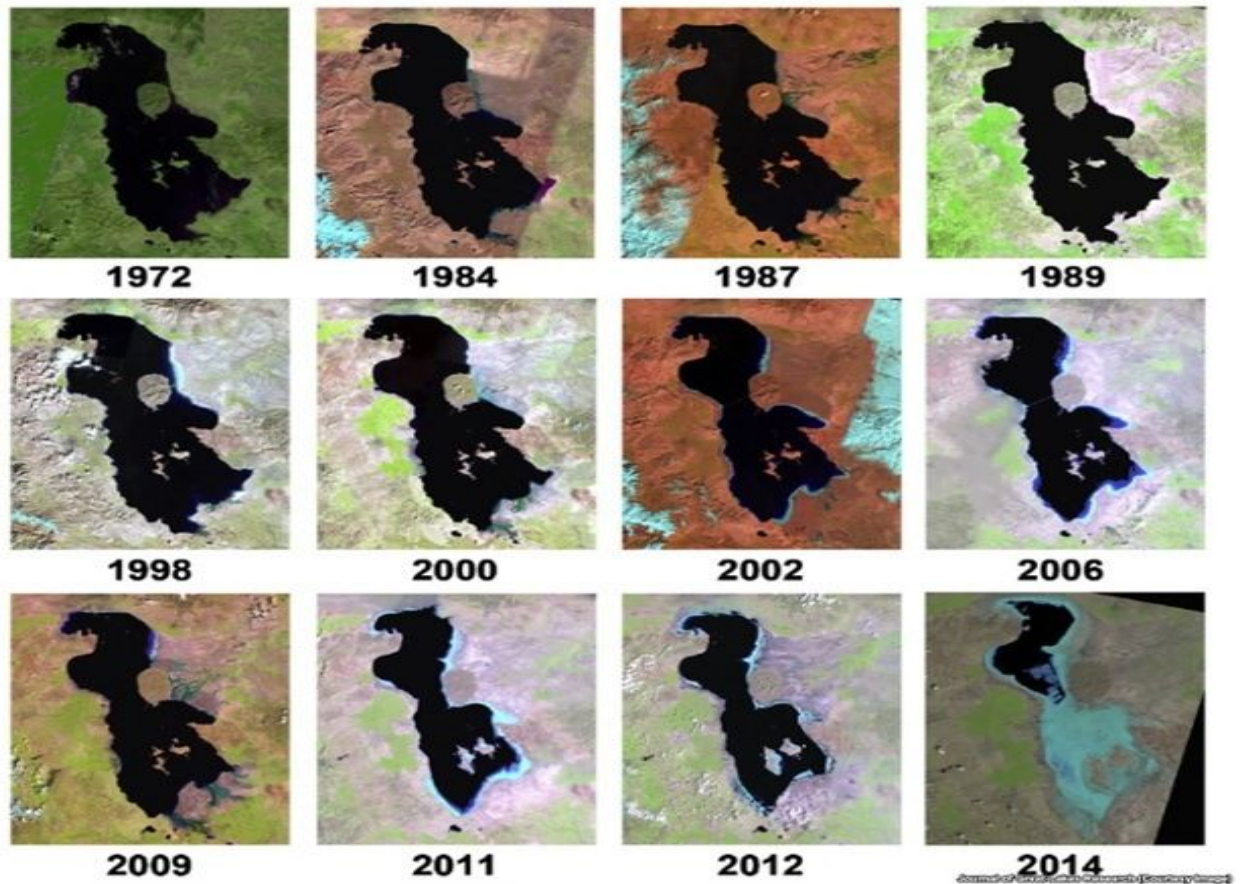
**EXECUTIVE SUMMARY**

**PROJECT IMPLEMENTATION  
LED BY THE KOCA GROUP**



## INTRODUCTION

Recently in September 2015, an international scientific conference was held by ICO for the **URGENT REHABILITATION OF LAKE URMIA**, a disaster area where the amount of water has dropped from its original level of over 30 billion cum to approximately 2 billion as shown below in the pictures.



During this trip to Iran, ICO tried to involve all the stakeholders in the project to discuss the necessity of an urgent solution. There has been a consensus at all levels for the proposal from the Koca Group proposing a transfer of water from lake Van to lake Urmia in line with the feasibility studies to be undertaken.

The highest political authorities in Iran are well aware of the importance and urgency of the matter and further to the conference, a preliminary project has been submitted by ICO regarding the above proposal.

This executive summary is prepared to highlight the urgency of the situation and the basic parameters for a conceptual approach in regards to the rehabilitation project.

## **BRIEF OVERVIEW OF THE ENVIRONMENTAL DISASTER**

As a result of the construction of dams on the rivers of the lake basin and diversion of surface water for agriculture through illegal water wells, along with reduced precipitation and warmer temperatures, annual water supply to the lake has dropped dramatically resulting in serious drought.

In addition, a causeway built during last decade divided Lake Urmia into two parts. This road crossing in the middle of the lake has prevented the circulation of water leading to the acceleration of the drying process. The northern part of the lake has some water but the southern part, which is larger and wider, is very dry and with little water left only in small parts. The lake has been transformed to a salt desert and the major threat is due to the dust storms spreading across the region.

**The crossroad is interrupting the water circulation between the south and the north of lake Urmia**



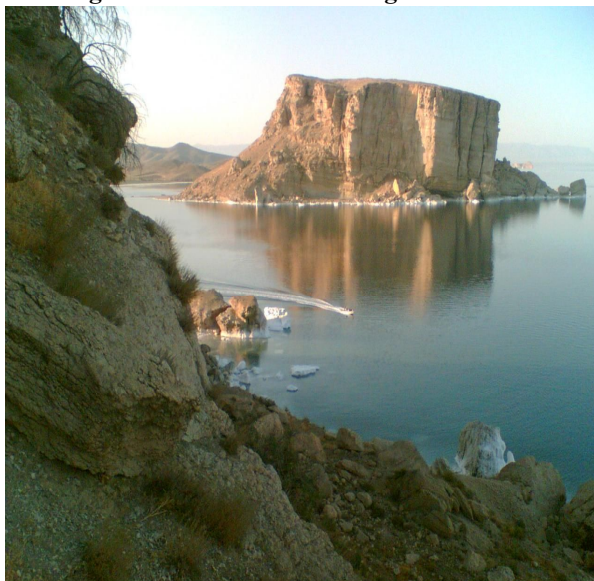
**Rebuilding the causaway to a bridge for the passage of cars, trains and ships and guarantee free water circulation in the lake**



### **The transformation of Lake Urmia in to a Salt Desert**

The salt dust storms are mainly stemming from the southern part of the lake and endangering the whole region.

**Creating a salt dessert and causing salt storms**



The new salt desert of Lake Urmia



## Salt Storm



### As a result:

1. The wind effect and the salt dust over the dried lake basin is leading to a huge environmental disaster affecting a wide ranging area, which may even extend to eastern Turkey, Iraq, Armenia and Azerbaijan.
2. The diverse bird and animal population for which the lake was providing an important habitat is close to extinction.





3. The surrounding agricultural lands and diverse plant population is steadily drying up under current conditions.
4. The dust storms and the increase in ultra-violet radiation are causing very serious health hazards for the population.

Lake Urmia's water crisis is causing a very serious environmental disaster and if urgent measures are not immediately adopted, it will lead to mass migration of several million people from the region.

### **PROPOSAL FOR REVITALIZATION OF LAKE URMIA**

Although it will be unlikely to bring the lake back to its original conditions of the last decade, it is technically feasible to refill the lake rapidly through water transfer. This can be done by supplying up to 2 billion cum of water annually through the construction of pipelines from Lake Van to Lake Urmia and immediately initiate the rehabilitation of the lake. The project's scope

also includes the construction of pump stations, service roads and subsidiary construction works according to geographic conditions of the chosen supply route.

This project consists in the supply of water from Lake Van and further specific measures:

1. Considering the higher elevation difference of Lake Van to Urmia (approx. 400m) it would be conceivable to build a hydroelectric power plant on the Iranian side.
2. Installing floating solar power panels on the surface of Lake Urmia to prevent evaporation as well as providing an environmentally friendly energy source for the region.



3. Releasing plastic balls on the surface of newly constructed dam reservoirs in the mountains to prevent evaporation and to conduct the water saved to the lake.
4. Construction of deep geothermal wells for energy production and returning cooled water to the lake in the vicinity of the lakebed.



5. Further environmental and agricultural measures necessary to sustain water flow to the lake through the reduction in wasted agricultural water via drip irrigation.



## IMPLEMENTATION OF WATER SUPPLY FROM LAKE VAN

The pipeline from Lake Van to Lake Urmia would be approximately 190 km long compared to a pipeline from the Persian Gulf or the Caspian Sea, which are around 1000 km and 320 km long respectively. Furthermore, Lake Van is 400 m higher than Lake Urmia whereas the other sources mentioned are 1300m lower than Urmia.



**Therefore, a pipeline from Lake Van would be the most effective solution with regards to cost, energy consumption, and construction time considering the urgency of the situation.**

Whereas water supply from the above mentioned seas would incur significant cost and time, water from Lake Van can be discharged directly due to its similar characteristics with Lake Urmia's water.

The quantity of water that can be transferred through pipelines may amount to 2 billion cum annually. The actual construction works for the pipeline will be completed in one year and immediately afterwards, the refilling process will begin. This will instantly dampen the salt desert and prevent salt storms. In 3 years 6 billion cum of water can be transferred to cover major parts of the lake initiating the revitalization of the eco-system.

Preventing salt dust winds from the south is the most critical step for the rehabilitation of the lake. Therefore, providing water to the south is the first priority. Distribution of water to the lake basin from the main pipeline via several branches is necessary at the lake basin. Furthermore, the construction of several strong pressure fountains for the dispersal and the mixing with the existing water will regenerate the water quality of the lake.

### Power Fountains



The existing road crossing the lake should also be reconstructed as a causeway to allow the circulation of water and the middle section to be uplifted through a bridge to permit the passage of boats.

An enhanced water management system in the province should be implemented in coordination with water cooperatives in the villages. As such, an urban development plan to monitor and control all related parameters of water supply, the mixing with existing water, the level of water, water wastage, irrigation, water wells and environmental requirements must be considered.

## **THE EXPECTED BENEFITS OF THIS PROJECT**

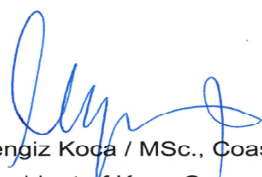
1. Revitalization of Lake Urmia and preventing its disastrous impacts on the environment covering a very large region including Turkey, Iran, Iraq and other neighboring countries.
2. Enhancing strong political and economic ties between Turkey and Iran and rebalancing the trade balance between the two countries.
3. Creating significant employment in both countries by initiating such a large-scale project.
4. Building environmentally friendly efficient and sustainable energy sources such as hydroelectricity, floating solar panels and geothermal plants. These sources will not only reduce the investment costs for the revitalization of the lake but will also generate income for development projects in favor of the population of the region.

## **CONCLUSION**

Since high-level authorities in Iran have expressed their urgent intention to address this issue and revitalize the lake, this project could prevent an ecological disaster and lead to regional cooperation and stability.

It is important to mention that this is a multi-dimensional problem and requires solutions with the contribution of multi-disciplinary studies such as engineering, environmental, agricultural, and political support through a cross-border solution.

In this respect, an international consortium of specialized companies from Turkey and Europe will undertake all required studies for the project and realize its implementation and handover to the Iranian authorities on a turnkey basis with a 15-year guarantee under international inspections and surveillance.



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