

# Dr. Ashraf Ramadan

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## Speaker Biography:

Dr. Ashraf obtained his Bachelor of Engineering Degree in mechanical engineering from the University of Liverpool-UK. Having obtained a first-class honours degree with distinction, he was allowed to pursue his studies directly at the Ph.D. level. Working on an initially Defence Research Agency (DRA-UK) funded project, he was able to develop an empirical equation that characterises the relaminarisation of 3-D turbulent flows on 60 degree-skewed aircraft wing, which lead to him obtaining his PhD from the University of Liverpool-UK in experimental fluid mechanics. Ashraf was awarded many prestigious prizes and awards including the Institute of Mechanical Engineers (IMechE) Best Student Prize and Ford Mechanical Engineering Prize. Also, he was on KISR's top twenty list for three years in a row. Ashraf is a Chartered Engineer (IMechE-UK), a registered European Engineer, and a Project Management Professional (PMI-USA). Ashraf has numerous publications in peer-reviewed journals and books. His expertise is frequently called upon in many committees including Kuwait National Ambient Air Quality Standards Committee, Kuwait Emission Standards Committee, KISR's Project Evaluation Committee, and Kuwait Foundation for the Advancement of Sciences (KFAS) Technical Review Committee.

## Presentation Title:

### Developing Kuwait's Comprehensive Emission Inventory: Challenges, Opportunities, and Future Directions for Air Quality Management

## Abstract:

Since its foundation, Kuwait has undergone rapid modernization driven primarily by its oil industry, resulting in numerous major emission sources that, along with trans-boundary emissions, significantly impact air quality. Systematically analyzing the complex interactions between these man-made and natural factors on air quality requires effective monitoring, assessment, and prediction. Successfully accomplishing this task is crucial for developing air quality control measures to address some of Kuwait's most challenging problems, ultimately improving residents' quality of life and supporting the country's economic development.

The first step in this extensive task is to develop a comprehensive emission inventory (EI) for criteria air pollutants (CAPs). Once developed, the EI can be extended to cover important greenhouse gases (GHGs), PM<sub>2.5</sub>, and hazardous air pollutants (HAPs). Additionally, it can be expanded to include an air quality index, air dispersion modeling, and forecasting features, resulting in a comprehensive air quality management information system (AQMIS).

The EI will assist industries in complying with emission regulations and serve as a baseline for policy planning. For regulators, such as the Kuwait Environment Public Authority (KEPA), it will enable tracking progress towards National Ambient Air Quality Standards (NAAQS) attainment, developing control strategies and new regulations, conducting health risk assessments, preparing permits, locating monitoring stations, and performing air quality modeling. The EI will also support the Kuwaiti government in meeting national and international environmental obligations and reporting requirements.

In 2021, the Kuwait Institute for Scientific Research developed Kuwait's first comprehensive national emission inventory using a bottom-up approach based on 2016 emission conditions. However, this effort faced significant challenges, including lack of data sharing agreements, insufficient stakeholder coordination, and weak enforcement of environmental laws. Addressing these challenges is essential for regularly updating the EI.