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**4<sup>th</sup> International Conference on  
Energy, Environment and  
Sustainable Development**

November 01-03. 2016  
Mehran University of Engineering and  
Technology, Jamshoro, Pakistan

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**EESD 2016**

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Mehran University of Engineering and Technology, Jamshoro, Pakistan

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# PREFACE

We are delighted to present to you the 4<sup>th</sup> International Conference on Energy, Environment and Sustainable Development (EESD-2016) conference proceedings. EESD-2016 was successfully held from Nov. 01 – 03, 2016 at Mehran University of Engineering and Technology (MUET), Jamshoro, Pakistan.

EESD conferences are organised by the Energy and Environmental Engineering Research Group (EERG) with local and international collaborators every two years since 2009. These conferences are multi-disciplinary, peer reviewed international events which provide opportunity for interaction to all the stakeholders from academia, industry, policy makers, public and private organizations to address the various technological and social challenges of the energy and environment field sustainably.

This 4<sup>th</sup> edition of International Conference on “Energy, Environment and Sustainable Development (EESD-2016) attracted original research papers of very high quality. EESD-2016 received 337 abstracts and 190 full papers out which 157 papers have been published in the conference proceedings. The proceedings have been divided into eight sections. Each section comprises of the papers of each of eight themes of the conference.

Overall 500 delegates including 20 international attended the EESD-2016. The keynote talks by eminent foreign and national speakers enriched all the attendees with thought provoking ideas and knowledge.

Editorial team thanks the organising committees, technical committee for valuable review of the submitted manuscripts, event sponsors, MUET, Jamshoro and all faculty members, staff and students who gave their time and energy to make EESD-2016 a very successful event.

*Editorial Board*

# ACKNOWLEDGMENT

The organizing Committee of EESD-2016 acknowledges the cooperation and support from Higher Education Commission (HEC), Pakistan, Pakistan Science Foundation, Islamabad, M/s. Pakistan Petroleum Limited, Sindh Engro Coal Mining Company, RASTEK, PAKTECH, PCM for their financial support towards organizing the event successful. This support was particularly important as this enabled organizing committee for inviting the international and national delegates. The support extended by other organization and sponsors for holding EESD-2016 is also acknowledged.

The technical committee members who took all pain for reviewing the abstract/full manuscripts, the unbroken efforts of Energy and Environmental Engineering Research Group of MUET, Jamshoro is worth to mention and highly acknowledged.

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