

SOUTH ASIAN ASSOCIATION FOR REGIONAL COOPERATION (SAARC)



SAARC ENERGY CENTRE
ISLAMABAD

THE REPORT

Programme Activity: PRG-81/2015/PROMO



May 2016

SAARC Energy Centre
697, Street 43, Sector E-11/4, NPF,
Islamabad, Pakistan
www.saarcenergy.org



SAARC Energy Centre

SEC Programme Activity (PRG-81/2015/PROMO)

Workshop on Application of on-grid Biogas Technologies

16-17 May, 2016

Intercontinental Hotel Kabul, Afghanistan



**In Collaboration with
Ministry of Energy & Water, Kabul
Government of Afghanistan**

The Report

Introduction

SAARC Energy Centre, Islamabad under its approved programme activity for FY 2016 organized a two day **Workshop on Application of on-grid Biogas Technologies** in Kabul, Afghanistan on 16-17 May 2016. The event was arranged in Intercontinental Hotel Kabul in collaboration with the Ministry of Energy & Water, Kabul, Government of Afghanistan. Copy of the Workshop Agenda is available at **Annexure I**.

2. SEC especially envisaged this workshop under its thematic programme area of “Minimize Oil Imports through Improvements in Energy Efficiency and Fuel Substitution (PROMO)” aiming to create awareness as well as understanding and to sensitize the professionals and decision makers to prioritize development of Biogas projects within the SAARC Region.

3. The objective of the workshop was to disseminate information about commercial and structural deployment of on-grid Biogas power plants in SAARC Member States. The detailed objectives of the workshop are given below:

- a) Share and discuss the Biogas potential in South Asia;
- b) Create awareness on existing on-grid biogas power generation projects in South Asia;
- c) Discuss relevant Policy and Regulations available in the SAARC Member States;
- d) Learn about prevailing Tariff structure for Biogas generation power plants;
- e) Facilitate Biogas power generation related technology transfer and sharing of regional and international best practices; and
- f) Facilitate capacity development in Biogas power generation in SAARC Member States

4. In view of the proactive participation by the resource persons and delegates, the workshop successfully managed to establish communication, facilitate professional exchange and initiate cooperation between policy makers, experts, project developers and other stakeholders from public and private sectors.

Participation

5. A total of 58 participants including the delegates from Member States Afghanistan, Bangladesh, Bhutan, Nepal, India and Pakistan; Resource Persons from Afghanistan, India, Pakistan and Sri Lanka; and staff from SEC participated in the workshop. The list of the participants is available at **Annexure II**. The workshop attracted an overwhelming participation from the host Member State Afghanistan dominated by SEC’s collaborating organization for this Workshop i.e. Ministry of Energy & Water, Kabul. The resource persons delivered presentations on different issues relevant to Biogas sector and existing

commercial projects in Member States. The participants had a very open and interactive discussion over the existing potential, the available opportunities in the Biogas sector and other relevant aspects.

Workshop Agenda

6. The Workshop programme comprised of six technical sessions comprising of 17 presentations delivered by the delegates from the Member States, Resource Persons and energy professionals from the SAARC Member States. The workshop agenda was divided into the following eight major sessions:

- i. Inaugural Session
- ii. Country Presentations
- iii. Biogas Potential and Resources in SAARC Region
- iv. Biogas Production and Feedstock
- v. Economic and Financial aspects of on-grid Biogas Projects
- vi. Regulatory Framework for on-grid Biogas Projects
- vii. Market Challenges, Best Practices and Successful Projects
- viii. Valedictory Session

Inaugural Session

7. The workshop was inaugurated by **H.E Amanullah Ghalib, Deputy Minister, Ministry of Water & Energy, Afghanistan**. The session was graced by the presence of Dr. Arif Wardak, Senior Advisor, Ministry of Energy and Water, Afghanistan, and Dr. Muhammad Akhtar Nawaz, Programme Leader (TT), SAARC Energy Centre.

8. The workshop was commenced with a Welcome Speech by Dr. Muhammad Akhtar Nawaz, Programme Leader (TT), SAARC Energy Centre. Dr. Nawaz welcomed the resource persons and all the delegates from SAARC Member States for attending the workshop. He especially thanked Chief Guest, H.E Amanullah Ghalib, Deputy Minister, Ministry of Water & Energy, Afghanistan for his gracious presence at the workshop and for encouraging the SAARC Energy Centre's endeavors in Energy Sector.

9. Dr. Nawaz stated that the significant technological innovation and cost reductions of renewable energy technologies, along with improved business and financing models, are increasingly creating clean and affordable renewable energy solutions for individuals and communities in developing countries. The optimal utilization of indigenous resources of the South Asian Region needs to be prioritized, since it would ensure and endure energy security and maximize, the socio-economic benefits, for the people of this region. Furthermore, Biogas technologies in developing countries have the potential for a wide range of additional social, economic and environmental benefits, most importantly helping to

extend affordable, reliable and clean energy access to the 1.75 billion people in this region.

10. He again acknowledged the great cooperation extended and kind hospitality provided by the Ministry of Water & Energy, Afghanistan and especially to H.E Mr. Amanullah Ghalib sahib as focal person in facilitating to organize this workshop and also helping the SEC in organizing the workshop. He expressed his satisfaction, as the real stakeholders had joined hands for common goal. He also thanked the high level officials of the Government of Afghanistan and the delegates and participants for their presence and for their interest and commitment to the cause of energy and power.

11. **H.E Amanullah Ghalib, Deputy Minister, Ministry of Water & Energy, Afghanistan** in his inaugural address as Chief Guest appreciated the initiatives taken by SAARC Energy Centre in facilitating and coordinating programmes to enhance energy security, to remove barriers and to build confidence and consensus for sustainable energy use across the SAARC region. He stated that currently about 40% of the Afghan households are connected to power supply systems and the strategic goal of the Afghanistan power sector is to provide power supply to the population in whole Afghanistan.

12. He further emphasized that Biogas energy is capable of providing enormous supplies of electricity for Afghanistan and the Investments need to be made into the development of Renewable Energy technologies such as biogas and a variety of ingenious new ways to improve our efficiency and conserve presently wasted energy. In his remarks, he stated that the goal towards sustainable development must be based on developing Renewable Energy resources within coming years. This requires all Member States to overcome many obstacles, adopt new technologies and promote development of biogas technologies all over the SAARC region.

13. He, in his final remarks, wished for active participation of all delegates from SAARC member countries and resource persons of the workshop for sharing information and learning from each other's experiences in the areas of Renewable energy and specifically Biogas technology. He wished all the participants of the workshop a very pleasant stay in Kabul.

14. Dr. Arif Wardak, Senior Advisor, Ministry of Energy and Water, Afghanistan in his keynote address state that currently, Afghanistan import about 80% of its overall electrical energy demand from Iran, Tajikistan, Uzbekistan and Turkmenistan. Thus, Power generation in Afghanistan is mainly hydro based and this slightly increased in the past and includes Solar energy too whereas thermal generation has reduced in the last three years.

15. He further stated that Afghanistan has a lot of potential to generate energy using its own indigenous resources for fulfilling the energy needs of its people. The country has very good resources of different types of renewable energy which is not expensive in long run, doesn't cause pollution and is abundantly available. At the end of his address, he appreciated the role of SAARC Energy Centre in arranging workshop, and thanked all the participating delegates and resource persons.

Technical Proceedings

16. The Workshop proceedings were initiated with Technical sessions, designed on specific areas and started with country presentations by each of the participating Member States. The Workshop program comprised of six technical sessions comprising of 17 presentations by the delegates from the Member States, Resource Persons and energy professionals from the SAARC Member States. All the presentations made in the following technical sessions were distributed to all the participants through USB and are available at the SEC website (www.saarcenergy.org):

a) Country Presentations

This first technical session started with the introductory presentation by Mr. Ahsan Javed, Programme Coordinator, SEC. In his presentation, he shed light on the background, objectives and expectations of this two day workshop. He also informed the audience about the mandate, objective and efforts of SAARC Energy Centre in fostering energy cooperation within the SAARC region. In the end, he gave brief introduction of those programme activities undertaken by SAARC Energy Centre in the field of Renewable Energy.

This was then followed by the country presentations by the delegates from the member states. The countries Afghanistan, Bangladesh, Bhutan, Nepal and Pakistan presented the situation of electricity sector, progress of existing and planned on-grid Biogas projects in their respective country.

b) Biogas Potential and Resources in SAARC Region

i. Role of biogas in the current energy mix and future energy plans of Sri Lanka

Mr. Namiz Musafer, Director, Janathakshan, Colombo, Sri Lanka

Mr. Namiz Musafer started his presentation by sharing the data of Base Load Demand and Generation Forecast of Sri Lanka with the participants. He informed that the peak forecast of electricity for Sri Lanka may rise above 7000 MW by the year 2039. The Government is planning to reach a minimum level of 10% of electrical energy supplied to the grid from Non-Conventional Renewable Energy by 2015. He also shared difference tariffs of electricity available in the country. Up till now, Biogas is not contributing electricity in the national grid. However, the Government has announced feed-in-tariffs for different type of Biomass.

c) Biogas Production and Feedstock

i. Value Chain of Biogas (production, gas upgrading, grid injection and utilization)

Mr. Ramana Reddy, Renewable Energy Expert (Finance), India

Mr. Ramana Reddy gave an overview of input sources of Biogas in fixed and floated dome digesters. He informed about the mechanism and the factors affecting Biomethane production. He also emphasized the importance of mixing of contents in the digester, and gave comparison between the conventional and latest high rate digesters. He also gave pictorial views of high rate digester installation in India using cattle dung, vegetable waste and sugar cane as input source.

ii. Programmes and Policies of India for promotion of Biomethanation Technology for Energy Recovery

Mr. V. K. Jain, Scientist, Support Programme Group, UNDP Projects (Biomass + ACE), MNRE, New Delhi, India

Mr. V. K. Jain gave detailed overview of programmes being implemented by Ministry of New and Renewable Energy in India. He also listed several specific technical institutes responsible for capacity building and training in field of all renewable energy technologies. He informed the participants that Government of India has initiated several policy initiatives with significant progress in extending the national grid and Off-grid/ Decentralized distributed generation models. The key objectives of the National Biogas and Manure Management Programme of India are to provide clean gaseous fuel mainly for cooking and lighting purposes and to provide organic bio-manure to reduce use of chemical fertilizers.

d) Economic and Financial aspects of on-grid Biogas Projects

i. Financing Biogas Projects in SAARC Countries: Challenges and Opportunities

Mr. Ramana Reddy, Renewable Energy Expert (Finance), India

Mr. Ramana Reddy started the presentation by listing key factors (availability of raw material/ water, demand for biogas and bio-manure, technology available for biogas generation) which affect the viability of a commercial Biogas project. He informed the participants that IREDA provides maximum loan up to 70% to projects based on minimum equity of 30%, interest rate (10.5 – 12 %) and IRR of 12% per annum. He also shared details of commercial Biogas projects which received financial assistance from Government of India. Lastly, he listed challenges for promotion of commercial Biogas power projects which are non-availability of input at one point, high project cost per MW, not much lucrative tariff offered from Distribution Companies and lack of local suppliers for Biogas technologies.

ii. Future Challenges for Biogas Systems – Technical, Financial and Marketing Aspects

Mr. Namiz Musafer, Director, Janathakshan, Colombo, Sri Lanka

Mr. Namiz stated that there are a total of 7,800 domestic Biogas systems based on Fixed, Floating, Compact and Balloon type technologies in Sri Lanka. He informed that social challenges associated with Biogas technology are poor waste management habits, non-sorting of waste at source, appearance and aesthetics. The financial challenges facing Biogas technology are lesser cash inflows, poor reputation of biogas plant, reliability of

digesters, subsidy driven sector and lack of interest by Donor agencies. Other issues attached with Biogas technology are its site specific in nature, non-branding and after sales services.

iii. Case study of 35 MW Waste to Energy Plant at Lahore, Pakistan

Mr. Hassan Jafar Zaidi, CEO, Power Planners International, Pakistan

Mr. Zaidi presented a case study of an under implementation 35 MW Waste to Energy Plant for Lahore Waste Management Company. The plant is the first waste-to-energy grid connected power plant in Lahore, Pakistan and will use controlled combustion in a circulated fluidized bed. The project will be completed with a total cost of US\$ 140 Million on a land area of 25 acres with daily Municipal Solid Waste processing capacity of 2,000 tons and power generating capacity of 35 MW. He informed the participants about the pre-requisite (Load flow study, Short circuit study, Transient Stability study, for conducting Interconnection Study of any Biogas power plant connected to the electrical grid. At the end, he briefly gave an overview of similar kind of SWM plant being planned at city of Mardan, Pakistan with 12 MW installed capacity.

e) Regulatory Framework for on-grid Biogas Projects

i. Energy Recovery from Wastes – Policy & Regulatory Frameworks and Successful Examples in India

Mr. V. K. Jain, Scientist, Support Programme Group, UNDP Projects (Biomass + ACE), MNRE, New Delhi, India

Mr. Jain started his presentation by stating the institutional arrangement responsible for Biogas sector at the central level in India. Ministry of New and Renewable Energy is responsible for promoting recovery of energy from wastes/effluents in the country. There are various incentives and support measures in form of financial assistance, concessional duties, and preferential tariff offered by the Government of India for all types of biogas projects consuming urban, industrial and agriculture wastes/residues. Mr. Jain also shared Indian standards on Biogas/bio-methane and successful projects installed in the country.

ii. Grid Interconnection Studies of Bagasse Based Co-generation Power Plants in Pakistan

Mr. Hassan Jafar Zaidi, CEO, Power Planners International, Pakistan

Mr. Zaidi gave an overview of the requisite Grid Interconnection Studies conducted for 18 Bagasse based co-generation power plants in Pakistan by M/s Power Planners International. The projects had been connected to national grid mostly through 132 kV transmission line. He also shared detailed technical specifications of electrical generator connected with the national grid including rotor angles, power swings, acceptable voltage level and protection from over-frequency event.

f) Market Challenges, Best Practices and Successful Projects

i. *Induction of Renewable Energy to redefine the Generation mix*

Mr. Mian Sultan Mahmood, CEO, Creative Group of Companies, Pakistan

Mr. Sultan informed the participants about two successful Biogas projects i.e., Biogas plant at M/s Creative Engineering (Pvt.) Ltd and M/s Skypower (Pvt.) Ltd implemented by private sector for self-consumption of Biogas in their own manufacturing facilities. He also shared details of an on-going Biogas project at Halloki using Flexible Line Reactor technology with gas production capability of 750 m³. He also shared the composition of Biogas, process flows and details of parts in Biogas digesters with the participants of the workshop.

ii. *Capacity Development of Local Craftsmen and Institutions on Biogas in Afghanistan*

Mr. Farid Safi, Biogas Portfolio Manager, BORDA, Kabul

Mr. Farid gave an overview on the development of biogas sector in Afghanistan. He also informed the participants that with the cold climatic region of Afghanistan and lack of technical expertise, public awareness and skilled craftsmen have been core challenges facing Biogas development. However, opportunities exists such as employment potential, health benefits, meeting daily energy requirements and availability of bio slurry for fertilizer. He informed the participants that BORDA is working on capacity building programs such as training local people and conducting awareness raising workshops. There are biogas projects which were installed with data loggers for research purpose and insulated local materials such as mud and straws for reducing heat loss to the surrounding soil.

iii. *Case study of a 200 m³ biogas plant constructed (through Skype)*

Mr. Qamaruddin, Country Representative, Winrock International, Pakistan

Mr. Qamaruddin delivered his presentation to the participants of the workshop through skype from Pakistan. He shared the details of a Biogas project at Nestle Training Farm at Sukheri, Pakistan with input as cow manure and a 150 PSI gas storage capacity. He stated the technical statistics associated with the Biogas plant including initial cost and Operation cost of the project. In the cost benefit analysis, it shows that the payback period of the project is just 1.88 years. He also informed the participants the M/s WinRock International have facilitated installation of 300 medium size Biogas plants, provided technical advisory to the dairy farmers and developed capacity of biogas plant construction companies.

Dinner Reception

17. SAARC Energy Centre hosted dinner on Tuesday, 17th May 2016 for the workshop delegates providing an informal opportunity for close interaction and networking. A number of dignitaries from Government of Afghanistan along with personals from private sector also joined on this occasion.

Valedictory Session

18. Dr. Muhammad Akhtar Nawaz shared the report of the Workshop with the participants. While thanking Ministry of Energy & Water for their contribution in successful culmination of the workshop, he read out the following recommendations emerging from the deliberations of the workshop:

- a) SAARC Energy Centre may identify and implement pilot Biogas projects in Member States with mutual collaboration
- b) SAARC Energy Centre may organize Biogas practical hands-on training workshops in Member States with expertise and experience
- c) SAARC Energy Centre may assist Member States in developing suitable policies for attracting investments in commercial Biogas projects
- d) Capacity building study visits of successful Biogas projects in SAARC Member States may be arranged by SAARC Energy Centre
- e) A platform may be created for interaction on issues of Renewable energy among the Member States
- f) Potential Resource Assessment (Quantity and composition of wastes) may be carried out for selected cities of SAARC Region

19. Dr. Muhammad Akhtar Nawaz thanked the Chief Guest, H.E Amanullah Ghalib, Deputy Minister, Ministry of Water & Energy, Afghanistan for joining this invaluable event. He informed the participants that it is increasingly important for key stakeholders to examine existing regional dynamics and develop synergies for enhancing knowledge sharing and technology transfer in Biogas sector. He stated that the workshop has helped to establish communication, facilitate professional exchange and initiate cooperation between policy makers, experts, project developers and other stakeholders from public and private sectors. Dr. Nawaz concluded by extending his special appreciation to all the delegates, resource persons who had travelled to Kabul and to the local delegates for participation in the workshop.

20. The Chief Guest, **H.E Amanullah Ghalib, Deputy Minister, Ministry of Water & Energy, Afghanistan** chaired the valedictory session. Through his address to the workshop delegates, he congratulated SAARC Energy Centre for organizing this workshop which provided an invaluable opportunity for achieving and maximizing the knowledge sharing

among the participants. He commented that SAARC Energy Centre is playing a vital role to enhance cooperation to address regional energy issues, to promote technology transfer and knowledge sharing among the Member States and to enhance SAARC knowledge base in energy development and management. At last, he congratulated the entire SEC team for successfully completing the workshop.

21. Mr. Sheikh Faezul Amin, Member, Sustainable & Renewable Energy Development Authority (SREDA), Dhaka from Member State Bangladesh offered vote of thanks on behalf of all the delegates to the Chief Guest, Resource Persons, Ministry of Energy & Water, Kabul and hotel staff for successful organizing of the workshop and managing high enthusiasm and involvement on the part of delegates throughout the process. He also greatly appreciated the efforts taken by SAARC Energy Centre in conducting the workshop.

Annexure I



SAARC Energy Centre
Islamabad

Workshop Agenda

SAARC Workshop on Application of on-grid Biogas Technologies
16-17 May, 2016
Intercontinental Hotel Kabul, Afghanistan

Sunday, 15 May 2016	
Arrival of Guests	
Day 1 - Monday, 16 May 2016	
0830 – 0900	Registration
Inaugural Session	
Chair: <i>Eng. Habib Rahman Rahmat, Energy Specialist, Inter-ministerial Commission for Energy (ICE), Ministry of Economy, Afghanistan</i>	
0900	Recitation of the Holy Quran
0900 – 0915	Welcome Address: <i>Dr. Muhammad Akhtar Nawaz, Programme Leader (TT), SAARC Energy Centre on behalf of Director, SEC</i>
0915 – 0930	Inaugural Address by the Chief Guest: <i>H.E Amanullah Ghalib, Deputy Minister, Ministry of Water & Energy, Afghanistan</i>
0930 – 0945	Keynote Address: <i>Dr. Arif Wardak, Senior Advisor, Ministry of Energy and Water, Afghanistan</i>
0945 – 1000	Remarks by the Chair: <i>Eng. Habib Rahman Rahmat, Energy Specialist, Inter-ministerial Commission for Energy (ICE), Ministry of Economy, Afghanistan</i>
1000 – 1015	Distribution of shields by <i>Dr. Muhammad Akhtar Nawaz, PL(TT), SEC</i>
1015 – 1045	Coffee/Networking break and Group photograph
Session 1	
Country Presentations	
1045 – 1245	• Presentation on SAARC Energy Centre <i>Mr. Ahsan Javed, Research Fellow (Renewable Energy), SEC</i> • Afghanistan <i>Mr. Abdul Jamil Musleh, Acting Director, Renewable Energy Department, Ministry of Energy and Water, Kabul</i> • Bangladesh <i>Mr. Sheikh Faezul Amin, Member, Sustainable & Renewable Energy</i>

	<i>Development Authority (SREDA), Dhaka</i> - Bhutan <i>Mr. Dawa Penjor, Engineer, Dept. of Renewable Energy, Ministry of Economic Affairs, Thimphu</i> - India - Nepal <i>Mr. Tirtha Raj Aryal, Deputy Chief of Mission, Embassy of Nepal, Islamabad</i> - Pakistan <i>Mr. Irfan Ahmed Sheikh, Assistant Director (Standards), National Electric Power Regulatory Authority, Islamabad</i>
Session 2 Biogas potential and resources in SAARC Region	
1245 – 1330	Role of biogas in the current energy mix and future energy plans of Sri Lanka <i>Mr. Namiz Musafer, Director, Janathakshan, Colombo, Sri Lanka</i> Q & A
1330 – 1430	Luncheon
Session 3 Biogas production and Feedstock	
1430 – 1630	- Value Chain of Biogas (production, gas upgrading, grid injection and utilization) <i>Mr. Ramana Reddy, Renewable Energy Expert (Finance), India</i> - Programmes and Policies of India for promotion of Biomethanation Technology for Energy Recovery <i>Mr. V. K. Jain, Scientist, Support Programme Group, UNDP Projects (Biomass + ACE), MNRE, New Delhi, India</i> Q & A
1630 – 1700	Coffee/ Networking break
2000	Welcome Dinner hosted by Ministry of Energy & Water for the delegates and Dignitaries
Day 2 - Tuesday, 17 May 2016	
Session 4 Economic and Financial aspects of on-grid Biogas projects	
0900 - 1100	- Financing Biogas Projects in SAARC Countries: Challenges and Opportunities <i>Mr. Ramana Reddy, Renewable Energy Expert (Finance), India</i> - Future Challenges for Biogas Systems – Technical, Financial and Marketing Aspects <i>Mr. Namiz Musafer, Director, Janathakshan, Colombo, Sri Lanka</i> - Case study of 35 MW Waste to Energy Plant at Lahore, Pakistan <i>Mr. Hassan Jafar Zaidi, CEO, Power Planners International, Pakistan</i> Q & A
1100 - 1130	Coffee/ Networking break
Session 5 Regulatory framework for on-grid Biogas projects	
1130 - 1300	- Energy Recovery from Wastes – Policy & Regulatory Frameworks and Successful Examples in India <i>Mr. V. K. Jain, Scientist, Support Programme Group, UNDP Projects (Biomass + ACE), MNRE, New Delhi, India</i> - Grid Interconnection Studies of Bagasse Based Co-generation Power Plants in Pakistan

	<i>Mr. Hassan Jafar Zaidi, CEO, Power Planners International, Pakistan</i> Q & A
1300 - 1400	Luncheon
Session 6 Market Challenges, Best practices and Successful Projects	
1400 - 1545	• Induction of Renewable Energy to redefine the Generation mix <i>Mr. Mian Sultan Mahmood, CEO, Creative Group of Companies, Pakistan</i> • Capacity Development of Local Craftsmen and Institutions on Biogas in Afghanistan <i>Mr. Farid Safi, Biogas Portfolio Manager, BORDA, Kabul</i> • Case study of a 200 m³ biogas plant constructed (through Skype) <i>Mr. Qamaruddin, Country Representative, Winrock International, Pakistan</i> Q & A
Session 7 Valedictory Session	
1545 - 1645	Report of the Workshop <i>Dr. Muhammad Akhtar Nawaz, PL(TT), SEC</i> Distribution of Certificates Valedictory Address <i>H.E Amanullah Ghalib, Deputy Minister, Ministry of Water & Energy, Afghanistan</i> Vote of Thanks <i>Mr. Sheikh Faezul Amin, Member, Sustainable & Renewable Energy Development Authority (SREDA), Dhaka</i>
1645 - 1700	Coffee/ Networking break
1900 - 2100	Dinner hosted by SAARC Energy Centre for the delegates
Wednesday, 18 May 2016	
Delegates Depart	

Annexure II

SAARC Workshop on Application of On-grid Biogas Technologies

16-17 May 2016, Intercontinental Hotel, Kabul, Afghanistan

List of Participants

#	Name	Designation	Department	Country	Contact	Email
Delegates						
1.	Mr. Abdullah Nasrati	Director, Hydro-energy programs	Ministry of Energy and Water	Afghanistan	0093 774 224 201	a.abdullah10@yahoo.co.uk
2.	Mr. Sayed Farsheed Hashimi	Biomass Specialist	Ministry of Energy and Water	Afghanistan	0093 787 834 525	red.hashimi@gmail.com
3.	Mr. Sheikh Faezul Amin	Member	Sustainable & Renewable Energy Development Authority (SREDA)	Bangladesh	0088 029 513 510 0088 017 155 659 621	faez_1965@hotmail.com
4.	Mr. Q. A. Sharhan Sadique	Deputy Director	Sustainable Energy, Power Cell	Bangladesh	0088 029 551 261 0088 017 168 981 06	dd.sus@powercell.gov.bd
5.	Mr. Dawa Penjor	Engineer	Dept. of Renewable Energy, Ministry of Economic Affairs	Bhutan	00975 232 270 9 00975 174 298 08	dpenjor@moea.gov.bt
6.	Ms. Dawa Zam	Engineer	Dept. of Renewable Energy, Ministry of Economic Affairs	Bhutan	00975 023 290 64 00975 176 382 18	dzam@moea.gov.bt
7.	Mr. Anil Kumar	Counsellor (Commerce & Public Affairs)	Embassy of India, Kabul	India	0093 705 127 863	com.kabul@mea.gov.in

#	Name	Designation	Department	Country	Contact	Email
8.	Mr. Tirtha Raj Aryal	Deputy Chief of Mission	Embassy of Nepal, Islamabad	Nepal	0092 512 610 317-19 0092 333 505 380 1	taryal@gmail.com
9.	Mr. Irfan Ahmed Sheikh	Assistant Director (Standards)	National Electric Power Regulatory Authority (NEPRA)	Pakistan	0092 512 013 200 0092 300 066 401 0	hafiz.irfans@hotmail.com h.irfan@nepra.org.pk
Resource persons						
10.	Mr. Farid Safi	Portfolio Manager	Bremen Overseas Research and Development Association (BORDA)	Afghanistan	0093 079 941 352 4	safi@borda-afg.org
11.	Mr. Ramana Reddy Polamreddy	Renewable Energy Expert (Technical / Policy / Finance)	Consultant	India	0091 981 070 918 8	prreddy100@gmail.com
12.	Mr. V K Jain	Director	Ministry of New and Renewable Energy	India	0091 112 436 978 8 0091 991 123 806 1	jainvk@nic.in
13.	Mr. Hassan Jafar Zaidi	CEO	Power Planners International	Pakistan	0092 301 414 526 4	hassan@powerplannersint.com
14.	Mr. Mian Sultan Mahmood	CEO	Creative Group of Companies	Pakistan	0092 333 434 466 4 0092 320 880 017 2	sultan1256@hotmail.com
15.	Mr. Qamaruddin	Country Representative	Winrock International	Pakistan	0092 300 855 118 2	Qamar.Uddin@winrock.org
16.	Mr. Namiz Musafer	Director	Janathakshan	Sri Lanka	0094 112 829 412 0094 773 662 723	namizm@gmail.com

#	Name	Designation	Department	Country	Contact	Email
Host country (Afghanistan)						
17.	<i>H.E Amanullah Ghalib</i>	Deputy Minister of Energy	Ministry of Energy and Water	Afghanistan	0093 794 444 443	amanghalib@hotmail.com aman.ghalib@mew.gov.af
18.	<i>Dr. Arif Wardak</i>	<i>Senior Advisor</i>	<i>Ministry of Energy and Water</i>	Afghanistan		
19.	Eng. Habib Rahman Rahmat	Energy Specialist	Ministry of Economy	Afghanistan		
20.	Ms. Safia Azizi	Biogas Engineer	Ministry of Energy and Water	Afghanistan	0093 079 419 506 3	safiaazizi@gmail.com
21.	Mr. Abdul Jamil Musleh	Director of RED	Ministry of Energy and Water	Afghanistan		
22.	Ms. Seema Abedi	Director of WAPECA	Ministry of Energy and Water	Afghanistan		
23.	Mr. Ahmad Javid Ghanizada	Director of VTC	Ministry of Energy and Water	Afghanistan		
24.	Mr. Ahmad Maiwand Sultani	Director of Energy Project Supervision Department	Ministry of Energy and Water	Afghanistan		
25.	Ms. Malalai Barikzai	Director of Energy Policy Department	Ministry of Energy and Water	Afghanistan		

#	Name	Designation	Department	Country	Contact	Email
26.	Mr. M. Ismail Nawabi		Ministry of Energy and Water	Afghanistan		
27.	Mr. Hamayoun Kohistani	Director of Energy Planning	Ministry of Energy and Water	Afghanistan		
28.	Ms. Tajnisa Besmel	Advisor to VTC	Ministry of Energy and Water	Afghanistan		
29.	Mr. Said Padasha Sadat	Head of MHP Unite	Ministry of Energy and Water	Afghanistan		
30.	Mr. M. Ismail Nawabi	Head of Biomass Unit	Ministry of Energy and Water	Afghanistan		
31.	Mr. Farhad Mahmoody	Head of Kabul Energy Zone	Ministry of Energy and Water	Afghanistan		
32.	Mr. Rohullah Faqiri	Coordination Manager of RED	Ministry of Energy and Water	Afghanistan		
33.	Mr. Fazlullah Fazli	Deputy Team Leader	ADB-TA	Afghanistan	0700603491	Fazli28@gmail.com
34.	Hadi Adeli	Environmental Project Assistant	BORDA	Afghanistan	786086782	adeli@borda-afg.org
35.	Sima Soja	Biogas Assistant Coordinator	HELP			
36.	Mohabattullah Ateash	Biogas Engineer	ACT			

#	Name	Designation	Department	Country	Contact	Email
37.	Mr. Wali Mohammad Faiz		Ministry of Energy and Water	Afghanistan		
38.	Mr. Obaidullah Sharzad Hakimi		Ministry of Energy and Water	Afghanistan		
39.	Eng. Hashim Alemi		Ministry of Energy and Water	Afghanistan		
40.	Mr. Emad Haroon		Ministry of Energy and Water	Afghanistan		
41.	Mr. Basir Amin		Ministry of Energy and Water	Afghanistan		
42.	Mr. Sayed Yahya Zewary		Ministry of Energy and Water	Afghanistan		
43.	Mr. Sultan Ali Javid		Ministry of Energy and Water	Afghanistan		
44.	Mr. M. Haroon Hairan		Ministry of Energy and Water	Afghanistan		
45.	Mr. Ashiqullah Keebla		Ministry of Energy and Water	Afghanistan		
46.	Mr. Ahmad Farzand Affifi		Ministry of Energy and Water	Afghanistan		
47.	Eng. Shahnaz Hakim Kohistani		Ministry of Energy and Water	Afghanistan		

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Brief Pictorial View of the Workshop









