



# Course Report

## Capacity Building and Training Workshop Abu Dhabi

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## Introduction

From 2014 to 2017 the UAE Pacific Partnership Fund were very active promoting and installing renewable energy technologies in the Pacific Island nations. Masdar were the implementation agency for 11 large infrastructure projects, which delivered over 6.4 MW of renewable energy projects to 11 Pacific small island countries. During the week from 8<sup>th</sup> January the UAE hosted a 1-day renewable energy (RE) integration training programme to assist the 11 countries and their utilities to cement the gains made. In partnership with the IRENA general assembly, the event was organised by Masdar (Abu Dhabi Future Energy Company), the UAE Ministry of Foreign Affairs and International Cooperation (MoFAIC) and the Abu Dhabi Fund for Development (ADFD).

The course was aimed at senior government personnel and ministers who were also attending the IRENA general assembly.

The training programme drew upon the knowledge of industry experts to provide a comprehensive understanding of RE technologies and their integration into utility grids. The course also integrated technical case studies from the implementation of the UAE-Pacific Partnership Fund projects, which had often introduced utility-scale renewable energy for the first time to local grids, and achieved penetration of up to 70% in some cases.

The training team and course organiser created and agreed on content suitability for the course.

The following topics were covered:

- RE Technologies including Solar PV, Wind Energy, Energy Storage Technologies, Inverter Types, Controllers, Networks, and Hybrid Mini-grid selection
- Network Integration including Issues Matrix, Solar Variation, Frequency and Governors, Load Sharing and Droop, Rotational Inertia. Voltage Regulation, Faults, Unbalance and LVRT, Generator Dispatch, Diesel Minimum Load, Grid Analysis, Energy Contribution, Fault Clearing and Dynamic Behaviour
- Project Economics including Types of Budget Estimate, Estimating costs for grid upgrades, Economic Parameters, Levelised Cost of Electricity, Financial Modelling for RE Projects, Documentation and Quality Control, Independent Power Producers, Application of Battery Storage
- Project Planning, Project Management, Environmental and Social Impacts, Risk Assessment and Health and Safety
- Case studies of UAE PPF projects

## The Presenters

The course was presented by two employees of Elemental Power and Renewables (EPR) New Zealand and one employee of IT Power Australia (ITP) as follows:

### **Andrew Revfeim – Elemental Power and Renewables**

Andrew has over 26 years of broad energy sector experience in Australasia, Middle East, Europe and North America. He is an expert in commercial structuring, project economics, contract negotiation and management, project financing and risk management. He holds a Bachelors of Engineering (Chem. and Process) and an MBA (London Business School).

### **Kate Bromfield – Elemental Environment**

Kate is an expert in environmental risk and risk communication, and is experienced at facilitating clear communication across multiple disciplines. She has over 10 years' experience in geology and environmental management in the Asia Pacific region. She holds a Bachelor of Science with 1<sup>st</sup> class honours in palaeontology, and a Doctorate Degree in marine palaeoecology.

### **Simon Franklin – IT Power**

Simon has over 10 years' experience in the Australian energy sector. Simon is an experienced project manager and has a strong background in renewable energy, with a Bachelor of Engineering (1st class honours) and Bachelor of Information Technology. Simon has also worked with the Cooperative Research Centre for Greenhouse Gas Technologies, investigating the feasibility of carbon capture and storage technologies.

## The time schedule

The training course was opened by H.E. Rashed Mohamed Awadh Al Hemeiri, Director of Technical Cooperation Department and attended by 19 delegates from Pacific Islands and the funding partners Masdar, MOFAIC and ADFD.

Following introductions, Simon Franklin began with an overview of RE technology and Andrew Revfeim provided a supporting case study from the LaKaRo project (Fiji), which allowed delegates to discuss the pros and cons of RE options in their individual countries.

After morning tea, Simon gave a detailed account of the integration of RE technology into power grids and Andrew again followed up with a supporting case study, this time from Palau.

Andrew then presented a session of RE financing and IPPs that was well received and elicited extensive discussion.

The workshop ended with Kate Bromfield facilitating a discussion on project decision making pathways, including planning and logistics.

A detailed agenda was as follows:

Table 1 Schedule for Training Course

Thursday, 11 <sup>th</sup> January 2018	Topic	Presenter
9.00 – 9.30 am	Course Introduction	H.E. Rashed Mohamed Awadh Al Hemeiri
9.30 – 9.45 am	Welcome and Introduction to course	Andrew Revfeim and Kate Bromfield
9.45 – 10.15 am	Renewable Energy Technologies, Characteristics and Cost trends	Simon Franklin
10.15 – 10.30 am	Technology Selection Case Study	Andrew Revfeim
10.45 – 11.00 am	Network Integration and Design for High Renewable Penetration	Simon Franklin
11.00 – 11.15 am	Network Integration Case Study	Andrew Revfeim
11.15 – 11.30 am	Economics of RE Integration with Existing Power Generation	Andrew Revfeim
11.30 – 11.45 am	Independent Power Producers	Andrew Revfeim
11.45 – 12.15 am	Decision making pathway and Discussion	Kate Bromfield
12.15 am	Close out and lunch	
2.00 – 4.00 pm	Tour of Masdar City	All

## Participants

The course was held for participants who were attending the IRENA general assembly, and included Ministers and at least one other delegate for each country. The workshop was attended by 19 participants (**Error! Reference source not found.**), including three delegates each from MOFAIC and Masdar, and two from ADFD. Although EPR received registrations from all 11 countries except the Solomon Islands, only six countries were finally represented at the training course, following travel and logistics challenges.

## Appendix 1 – Photos



1 Participants



2 Presenters



3 Venue