

SUSTAINABLE ENERGY INDUSTRY DEVELOPMENT PROJECT: RESOURCE MAPPING

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RESOURCE MAPPING - PHASED APPROACH

Phase 1: Preliminary resource mapping output based on satellite and global atmospheric and meteorological data

- Initial resource estimate at the country level based on a mesoscale model using satellite and re-analysis data; preliminary validation using existing ground-based data.
- ESMAP-led, solar maps published completed for PICs June 2017, wind maps to be completed by November 2017

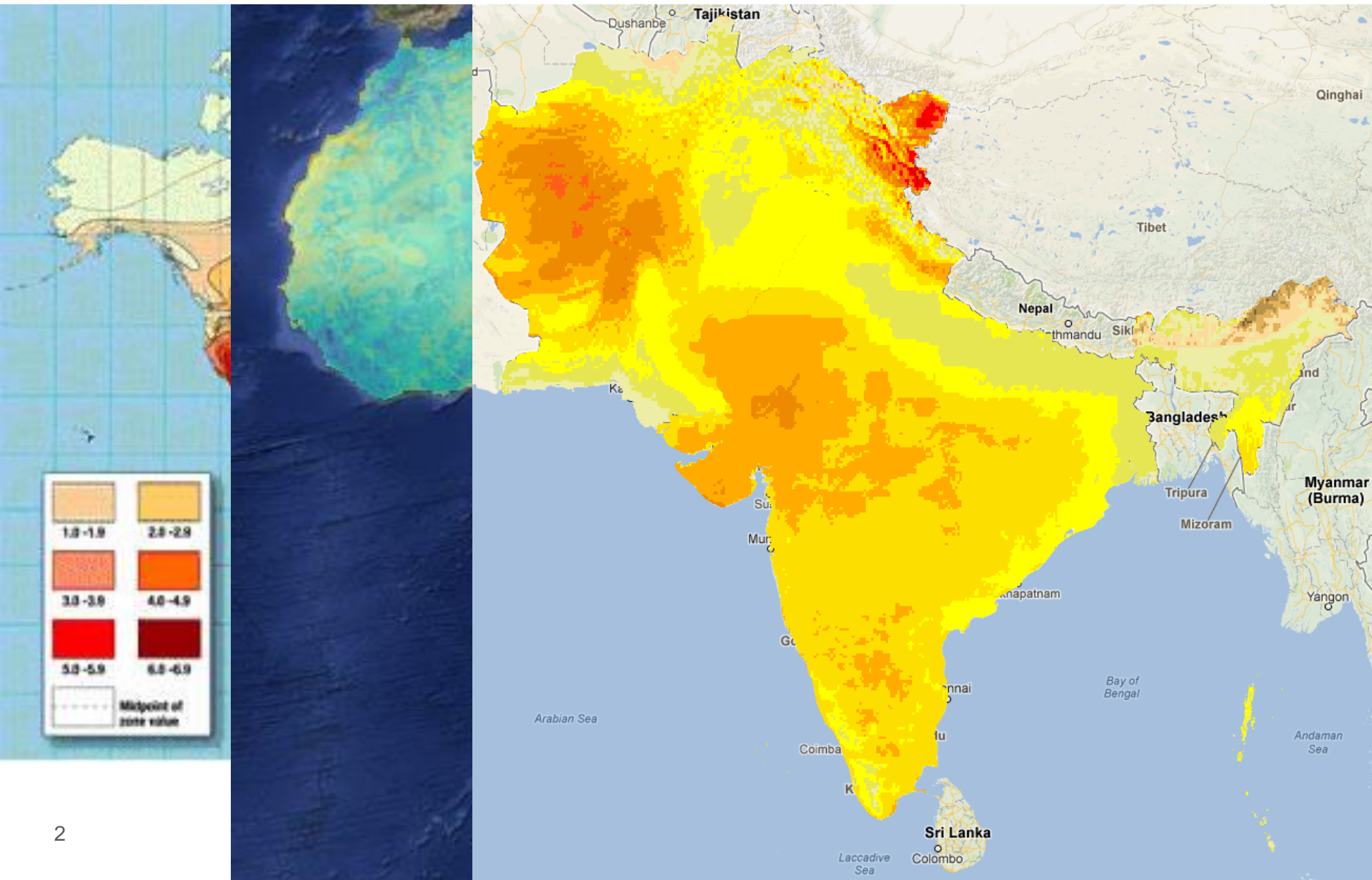
Phase 2: Ground-based data collection

- Ground-based measurement campaign using high-quality measurement devices, with real-time data transmission and reporting, for the purpose of validating and improving the mesoscale model and generating reliable benchmarking data.
- PPA-led, RFP expected to be published in August 2017

Phase 3: Production of validated resource atlas based on satellite and ground-based data

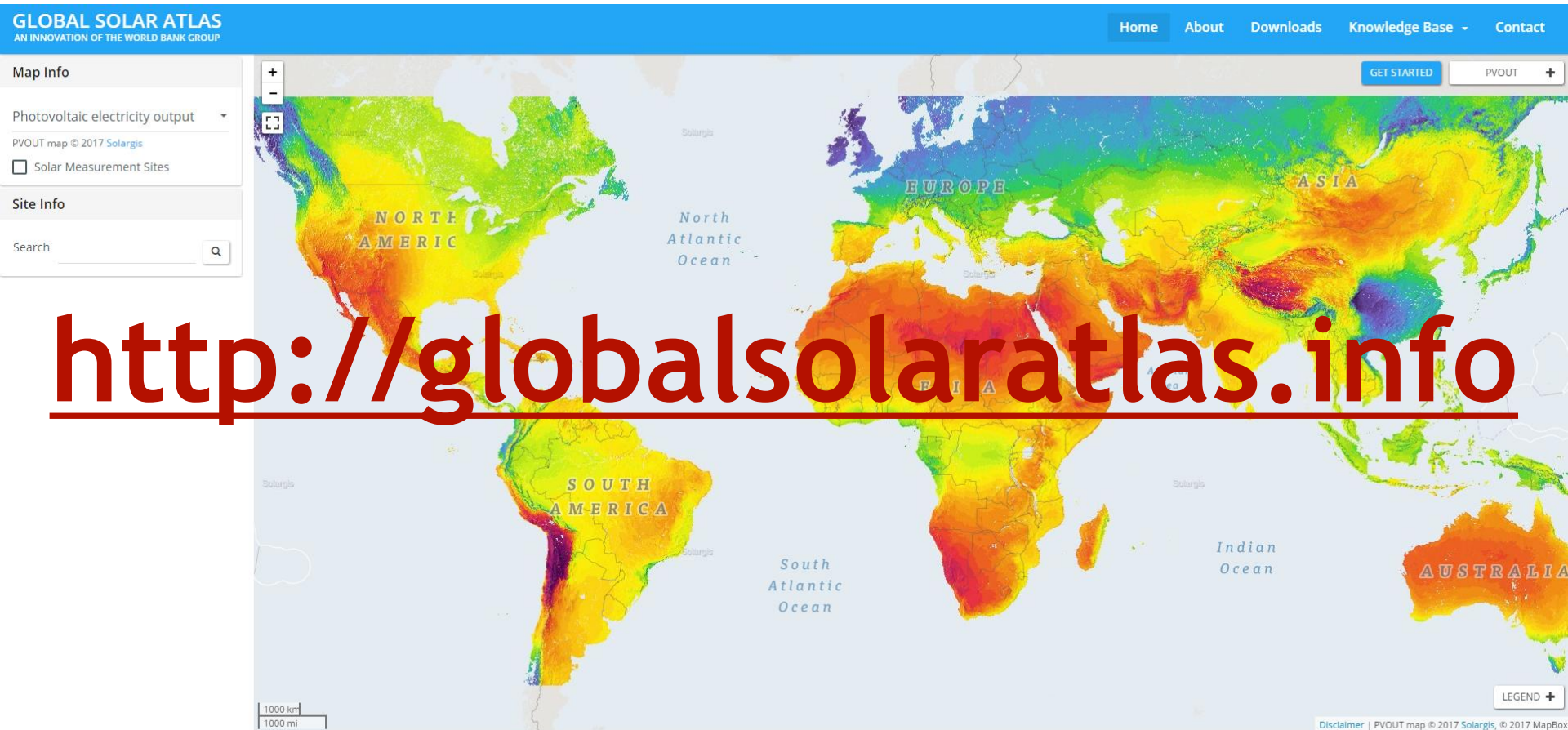
- Preparation of validated resource maps and atlas reports that describe the final outputs, methodology and process, and include provision of the final geographic information system (GIS) data.

EXISTING MAPS - PROLIFERATION AND CONFUSION



GLOBAL SOLAR ATLAS

- Launched in January 2017, maps for PICs available since end June 2017
- Based on high quality modeled solar data from Solargis
- Around 65,000 visitors since launch
- Poster maps and GIS layers for all developing countries



<http://globalsolaratlas.info>

MAPPING COMPLETED!

SOLAR RESOURCES

PHOTOVOLTAIC POWER POTENTIAL



DESCRIPTION
This solar resource map provides a summary of estimated solar photovoltaic (PV) power generation potential. It represents the average daily/yearly sum of electricity production from a 1 MW peak-gld connected solar PV system configuration consisting of ground-based, free-standing array with crystalline silicon PV modules mounted at a fixed position, with optimum tilt to maximize yearly energy yield. The optimum tilt ranges from 0° to 12° towards the equator. Use of high efficiency inverters is assumed. The solar resource data is based on high-resolution solar resource data and PV modeling outputs provided by Solargis. The calculation takes into account solar irradiation, air temperature, and losses to obtain the energy conversion and losses in the PV modules and other components of a PV power plant. The cumulative effect availability is considered to be 100%.

ABOUT
The World Bank and the International Finance Corporation (IFC) jointly published this solar resource map alongside a Global Solar Atlas containing global, regional and country maps to support the scale-up of solar power in our client countries. This work is funded by the Energy Sector Management Assistance Program (ESMAP), a multi-donor trust fund administered by 13 official bilateral donors. It is part of a Resource Mapping that covers biomass, on-land selected Solargis as its global provider. This map has been prepared by Solargis, an resource database that they own and maintain.

TO obtain additional maps and information, please visit:
<http://globalsolaratlas.info>

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SOLAR RESOURCE MAP

PHOTOVOLTAIC POWER POTENTIAL

SOLOMON ISLANDS



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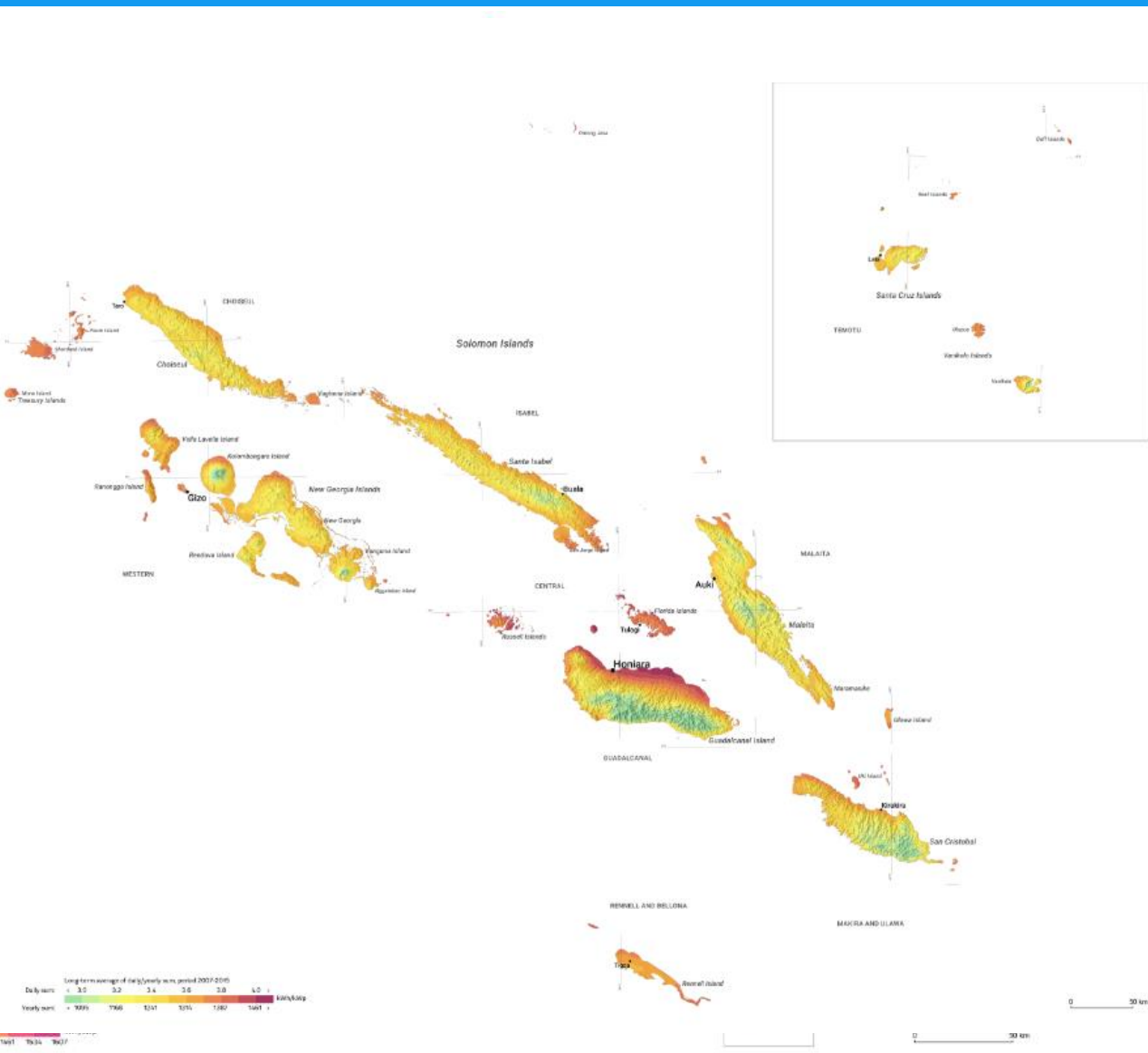
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EASY TO USE DOWNLOADS

- Go to: <http://globalsolaratlas.info/downloads>
- Poster maps and GIS layers easy to download
- User guide: <http://globalsolaratlas.info/knowledge-base/user-guide>
- FAQ: <http://globalsolaratlas.info/knowledge-base/faq>
- Has anyone used the site already? Feedback?

Download maps for your country or region

Solar resource and PV power potential maps and GIS data can be downloaded from this section. Maps and data are available for 145 non-OECD countries and selected regions . Please use the tabs below to select a region or a country. The maps and data have been prepared by Solargis for The World Bank Group.

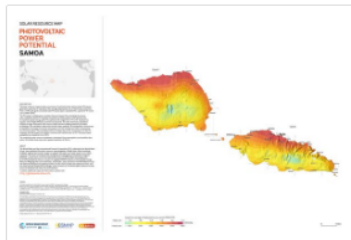
SELECT REGION ▼

or

SAMOA ▼

Poster maps for Samoa

Maps provided below are high resolution, **ready-to-print** image files, which you can print in poster-size formats. We recommend high quality fineart printing on semi-glossy paper. Alternatively, consult your local printing company for other printing options and materials (foam boards, solid boards, stickers, etc.). The files are provided in the loss-less TIF format with the approximate size of 100 MPix.

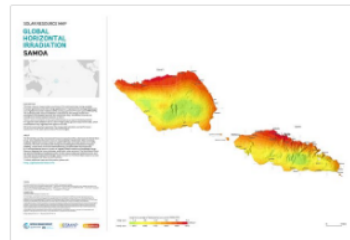


Photovoltaic electricity output

Optimal press size: 900 x 600 mm

DOWNLOAD

TIF, 6.7 MB

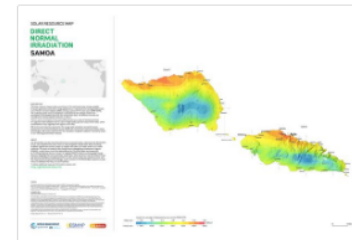


Global horizontal irradiation

Optimal press size: 900 x 600 mm

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TIF, 6.6 MB



Direct normal irradiation

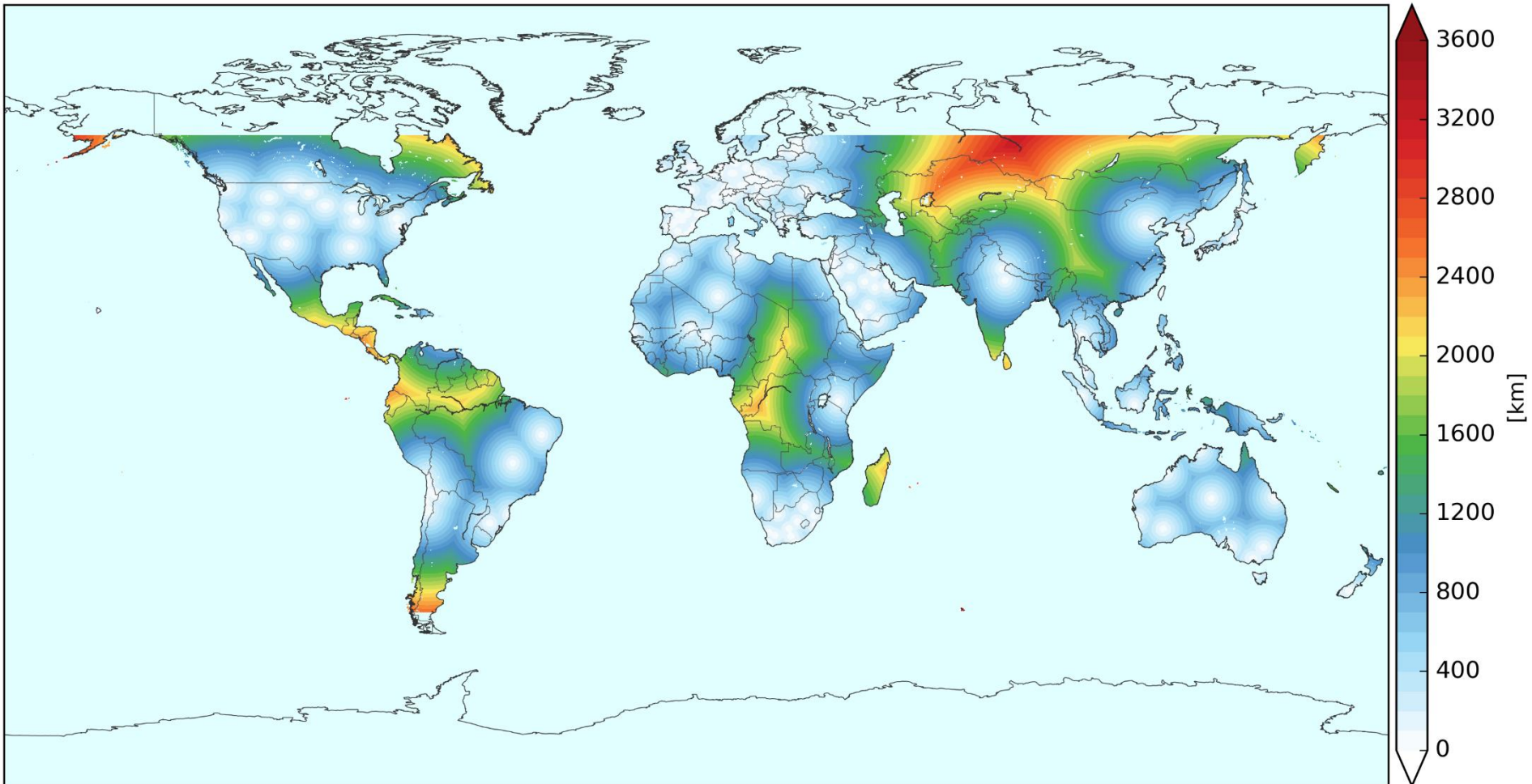
Optimal press size: 900 x 600 mm

DOWNLOAD

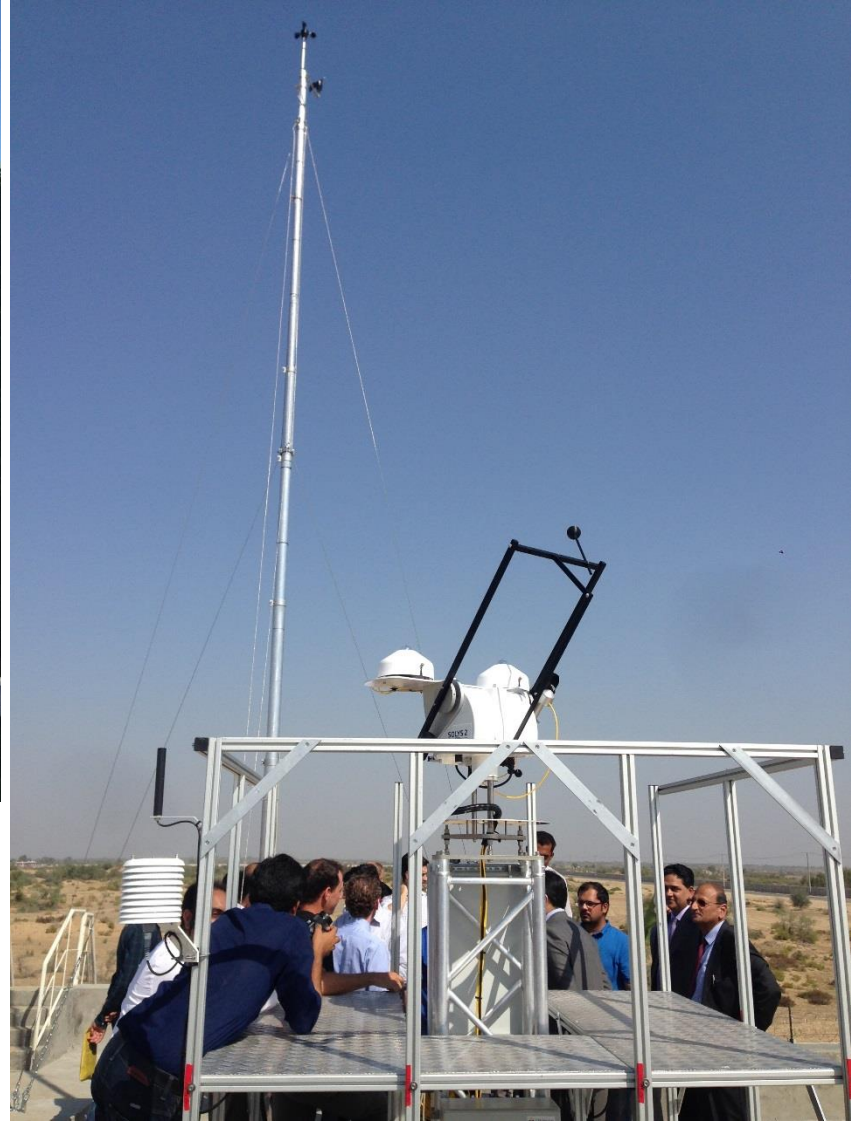
TIF, 6.8 MB

BUT UNCERTAINTIES REMAIN

Distance to validation sites



NEED TO INVEST IN HIGH QUALITY MEASUREMENT DATA



COUNTRY PROJECT PIPELINE

Country	Funding	Source	Biomass	Small Hydro	Solar	Wind
Bangladesh	\$500,000	ESMAP / ASTAE			✓	✓
Burundi*	-	ESMAP			✓	
Ethiopia*	\$1,600,000	ESMAP			✓	✓
Indonesia	\$750,000	ESMAP		✓		
Kenya*	-	ESMAP			✓	
Madagascar	\$1,350,000	ESMAP		✓		
Malawi	\$710,000	ESMAP			✓	
Maldives	\$2,415,000	ESMAP / ASTAE			✓	✓
Nepal	\$1,800,000	ESMAP			✓	✓
Pacific Islands (10 countries)	\$2,200,000	SIDS-DOCK			✓	✓
Pakistan	\$4,350,000	ESMAP / ASTAE	✓		✓	✓
Papua New Guinea	\$1,900,000	ESMAP / ASTAE			✓	✓
Rwanda*	-	ESMAP			✓	
Somalia	\$1,000,000	In-country trust fund			✓	✓
Sudan*	-	ESMAP			✓	
Tanzania*	\$2,350,000	ESMAP		✓	✓	✓
Uganda*	-	ESMAP			✓	
Vietnam	\$1,765,000	ESMAP	✓	✓	✓	✓
Zambia	\$3,600,000	ESMAP			✓	✓

PUBLISHING THE DATA IS ESSENTIAL

ENERGYDATA.INFO BETA
AN INNOVATION OF THE WORLD BANK GROUP

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Add Dataset

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21 datasets found

Order by: Relevance



Topic: **Resource assessments** ✕

Zambia - Wind Measurement Data (2016-2017)

Data repository for measurements from 8 wind masts in Zambia. Data will be uploaded in batches, on a monthly basis, and will transmit daily reports for wind speed, wind...

CSV **XLSX** **ZIP**

Madagascar - Small Hydro GIS Atlas (2017)

The GIS HydroAtlas of Madagascar is the final output from the small hydro resource mapping component of the activity "Renewable Energy Resource Mapping and Geospatial Planning..."

ZIP **GeoJSON**

Pakistan - Wind Measurement Data (2016-2018)

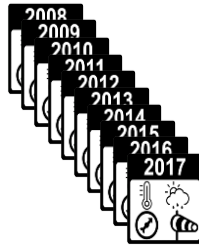
Data repository for measurements from 12 wind masts in Pakistan. Data will be uploaded in batches, on a...

<https://energydata.info>

RESEARCHING THE COST-BENEFIT OF MEASUREMENTS



x 10 = US \$1m



x 1GW = ? potential economic benefit

LOWER UNCERTAINTIES LEAD TO LOWER COST

Lower Uncertainty

- **Site adaptation** can reduce GHI uncertainty from **8% to 3.5%**
- **Regional Adaptation** can reduce the uncertainty from **8% to 5%**

Lower Tariff

- **Increases the P90 output** of the PV plant
- For the same IRR, **tariff can be reduced by 6%**

Economic Benefits

- For a total of **1 GW** installation, reduced cost of electricity can lead to **economic benefits of US\$89m**

CONSOLIDATION IS NOW NEEDED

Requirements for the industry

- Use, disseminate and improve the Global Solar Atlas
- Invest in public measurement campaigns
- Publish data to help improve the models

Things to avoid

- Further solar mapping
- Use of old resource data and maps
- Cut corners when investing in measurements

Future Plans

- Enhancements of the Global Solar Atlas
- Relaunch improved Global Wind Atlas by end of 2017
- Publish guidance on measurement campaigns

Contact Details

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