

# SOLAR RESOURCE ASSESSMENT TO PROJECT DEVELOPMENT: MAPS, MODELS AND MEASUREMENTS

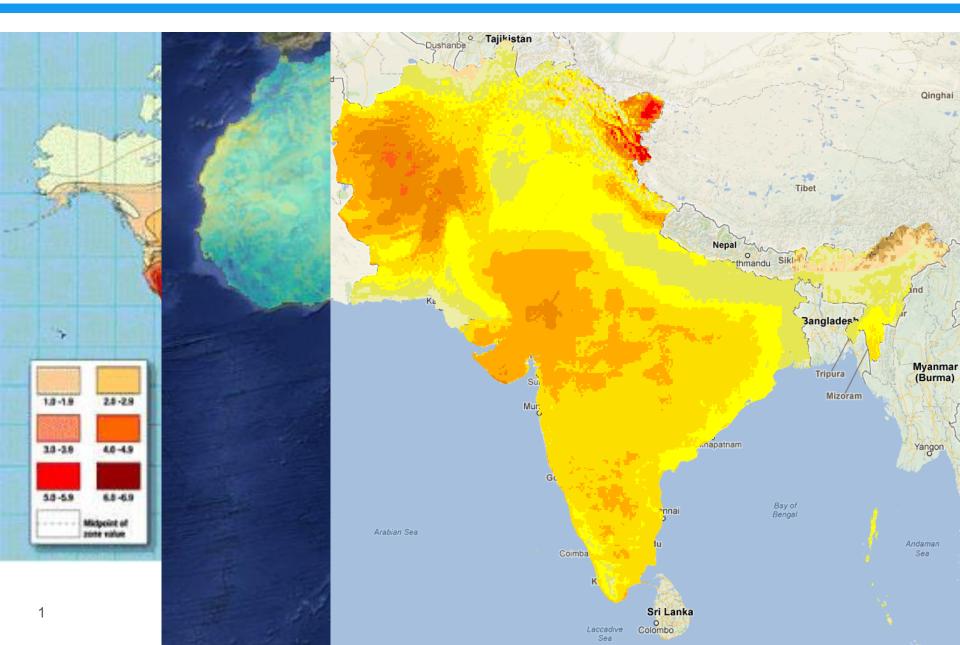
Asia Clean Energy Forum June 6, 2017

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## **PROLIFERATION AND CONFUSION**



# **GLOBAL SOLAR ATLAS**

Launched in January 2017

THE WORLD BANK

- Based on high quality modeled solar data from Solargis
- Around 50,000 visitors since launch
- Poster maps and GIS layers for all developing countries





# **MAPPING COMPLETED!**

### SOLAR RESOURCE MAP

### PHOTOVOLTAIC PHOTOVOLTAIC POWER POWER POTENTIAL POTENTIAL **KENYA**

### BANGLADESH



### DESCRIPTION

DESCRIPTION This solar resource map provides a summary of estimate obler photoexitais (PV) power generation potential. It represents the average daily/yearly sum of electricity production from a 1 kW-peak grin connected solar PV pr plant, colculated for a period of 17 recent years (1999-20 pinct, citositeted for a period of 10 recent years (1999-52, the Teventy years (1999-52, the Teventy years compared to compare the quark-based, it adapting instantian with any statistical attacking the second period of the pe

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http://globalsolaratlas.info

### SOLAR RESOURCE MAP

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plant, calculated for a priod of 22 recent years (1994-2015 The PV yestem configuration consists of ground-based, free standing structures with crystalline-silicon PV modules mounted at a field position, with optimum tit to maximize yearly energy yield. The optimum tit tranges from To to 22 assumed. The siliciticity calculation is based on high-resolution solar resource data and PV modeling of tware provided by Solizing. The calculation takes in the account solar radiation, alt temperature, and terrain, to simulate the energ conversion and discuss in the PV modeling and plant.

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WORLD BANK GROUP

SOLARGIS

THE WORLD BANK

ESMAP

DESCRIPTION

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SOLAR RESOURCE MAP

### PHOTOVOLTAIC POWER HORIZONTAL POTENTIAL IRRADIATION

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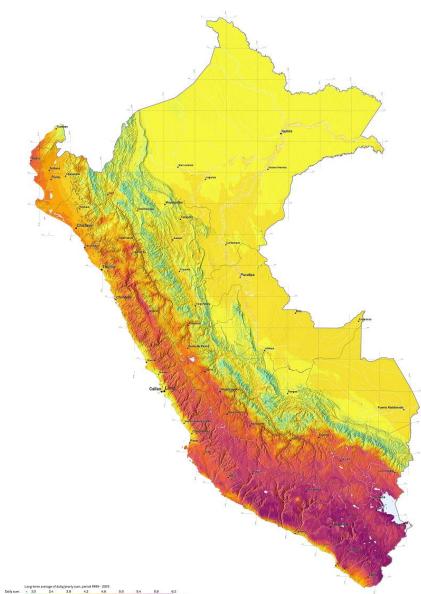


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donors. It is part of a global ESMAP initiative on Renewable Energy Resource Mapping that covers biomass, small hydro, solar and wind. The World Bank Group has selected Solargis its global provider of solar resource data and related service and this map has been prepared by Solargis, under contract to The World Bank, based on a solar resource database that they own and maintain To obtain additional maps and information, please visit: To obtain additional maps and information, please visit: http://globalsolaratlas.info

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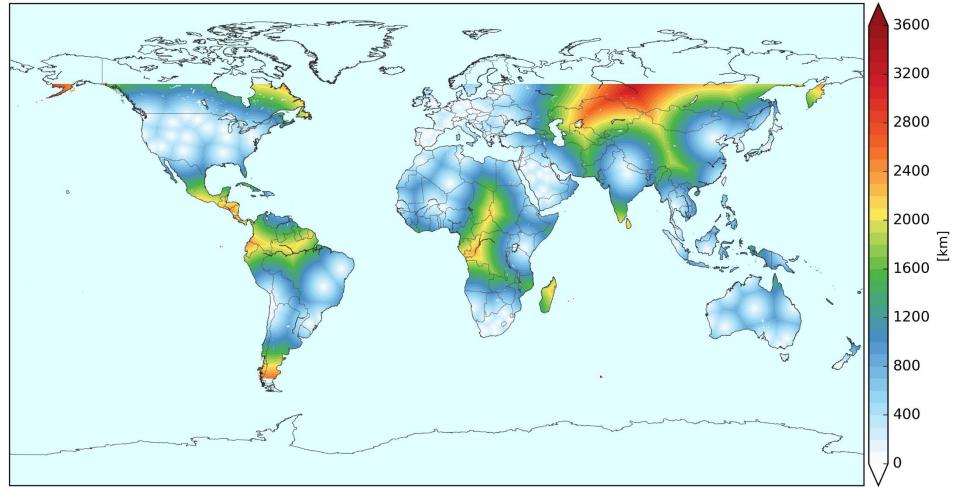
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## **BUT UNCERTAINTIES REMAIN**

Distance to validation sites



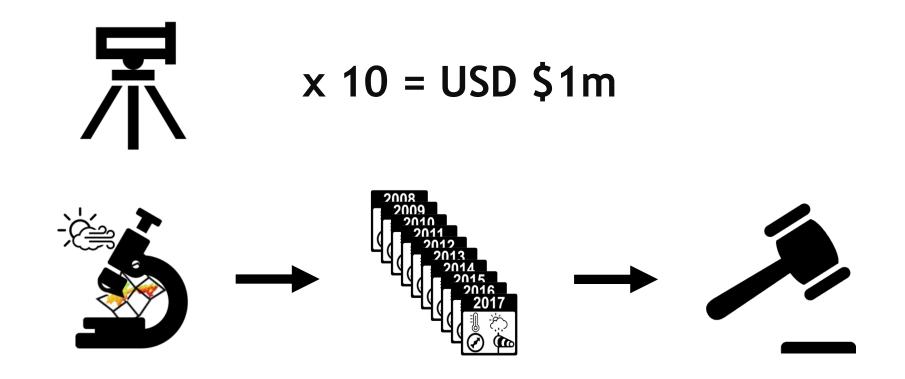
## **NEED TO INVEST IN HIGH QUALITY MEASUREMENT DATA**



## **BUT PUBLISHING IT IS ESSENTIAL**

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## LOWER UNCERTAINTIES LEAD TO LOWER COSTS





x 1GW = USD \$71m potential economic benefit

- ✓ Use, disseminate and improve the Global Solar Atlas
- ✓ Invest in public measurement campaigns
- $\checkmark$  Publish data to help improve the models
- × No need to carry out solar mapping
- × Stop using old resource data and maps
- Don't cut corners when investing in measurements

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



ESMAP website: <a href="https://www.esmap.org/re\_mapping">www.esmap.org/re\_mapping</a> Oliver Knight: <a href="https://www.esmap.org/re\_mapping">oknight@worldbank.org</a>

# **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			$\checkmark$	
Maldives	\$2,415,000	ESMAP / ASTAE			$\checkmark$	$\checkmark$
Nepal	\$1,800,000	ESMAP			✓	✓
Pacific Islands (10 countries)	\$2,200,000	SIDS-DOCK			✓	✓
Pakistan	\$4,350,000	ESMAP / ASTAE	✓		$\checkmark$	✓
Papua New Guinea	\$1,900,000	ESMAP / ASTAE			✓	$\checkmark$
Rwanda*	-	ESMAP			✓	
Somalia	\$1,000,000	In-country trust fund			✓	✓
Sudan*	-	ESMAP			✓	
Tanzania*	\$2,350,000	ESMAP		✓	$\checkmark$	≁
Uganda*	-	ESMAP			✓	
Vietnam	\$1,765,000	ESMAP	✓	✓	✓	✓
Zambia	\$3,600,000	ESMAP			$\checkmark$	$\checkmark$