
World Bank's Engagement on Renewable Energy in Central Asia

A stylized graphic of a globe, composed of several overlapping, curved lines in shades of light blue and grey, positioned in the bottom-left corner of the slide.

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1. Overview of World Bank's Renewable Energy Portfolio

Renewable Energy-related Targets in Climate Change Action Plan

Targets	Progress	Next Steps
De-risk Renewable Energy (RE) investments, add 20 GW RE generation and enable 10 GW RE integrated into grids by 2020	<ul style="list-style-type: none"> In 2016-2017, approximately 10 GW of RE approved or under advanced stages of preparation (hydro, geothermal, with solar PV contributing the largest share) 	<ul style="list-style-type: none"> Scale up solar PV, wind and geothermal by crowding in the private sector through risk mitigation and buying down cost Expand into newer riskier markets (storage, floating solar PV, hybrid systems)
Mobilizing US\$25 billion commercial funds for clean energy over FY16-20	<ul style="list-style-type: none"> In 2016-2017, projects approved and under advanced stages of preparation expected to mobilize \$6.5 billion 	<ul style="list-style-type: none"> Expanded use of guarantees Scale up of climate funds necessary for continued mobilization (\$1 of climate funds have leveraged up to \$4 of private financing)

World Bank's Financial Instruments for Renewable Energy Development

Financing Modalities

Direct Loan

Lines of Credits

Dedicated Debt or
Equity/Quasi-Equity
Funds

Competitive Subsidies

Output Based Aid
(OBA)

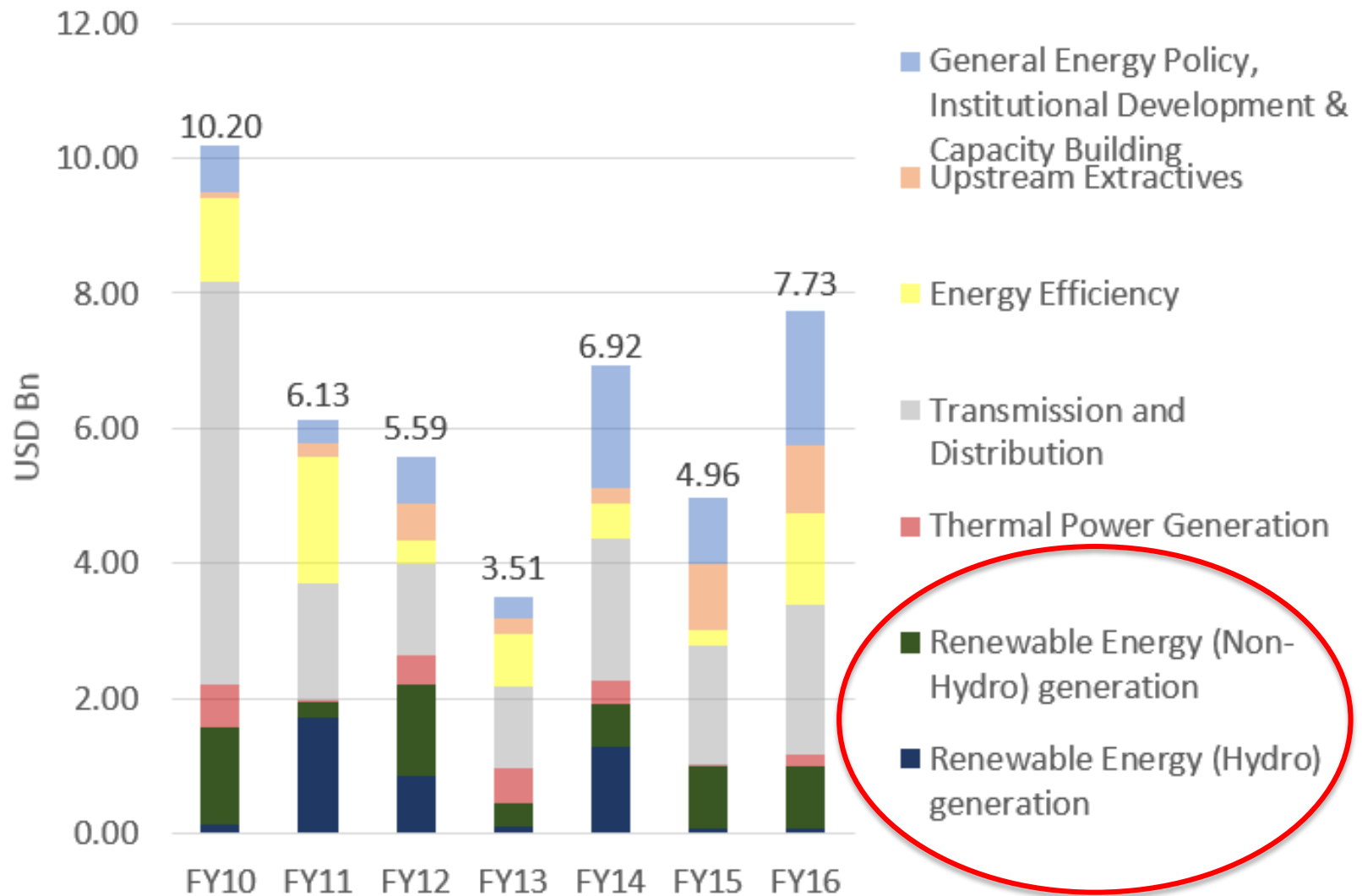
Matching Grants

First or Second Loss
Guarantees

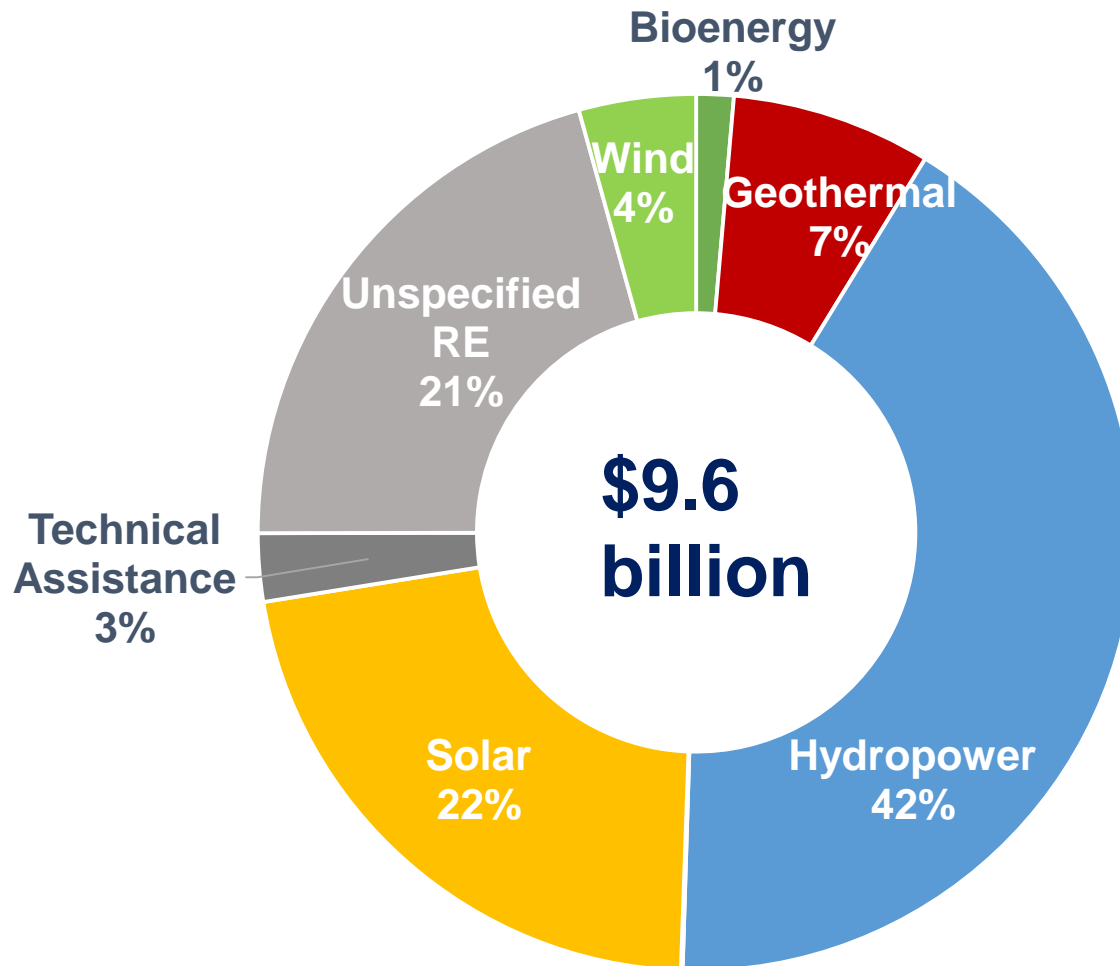
Risk Sharing Products

*...and many more
tailored ones*

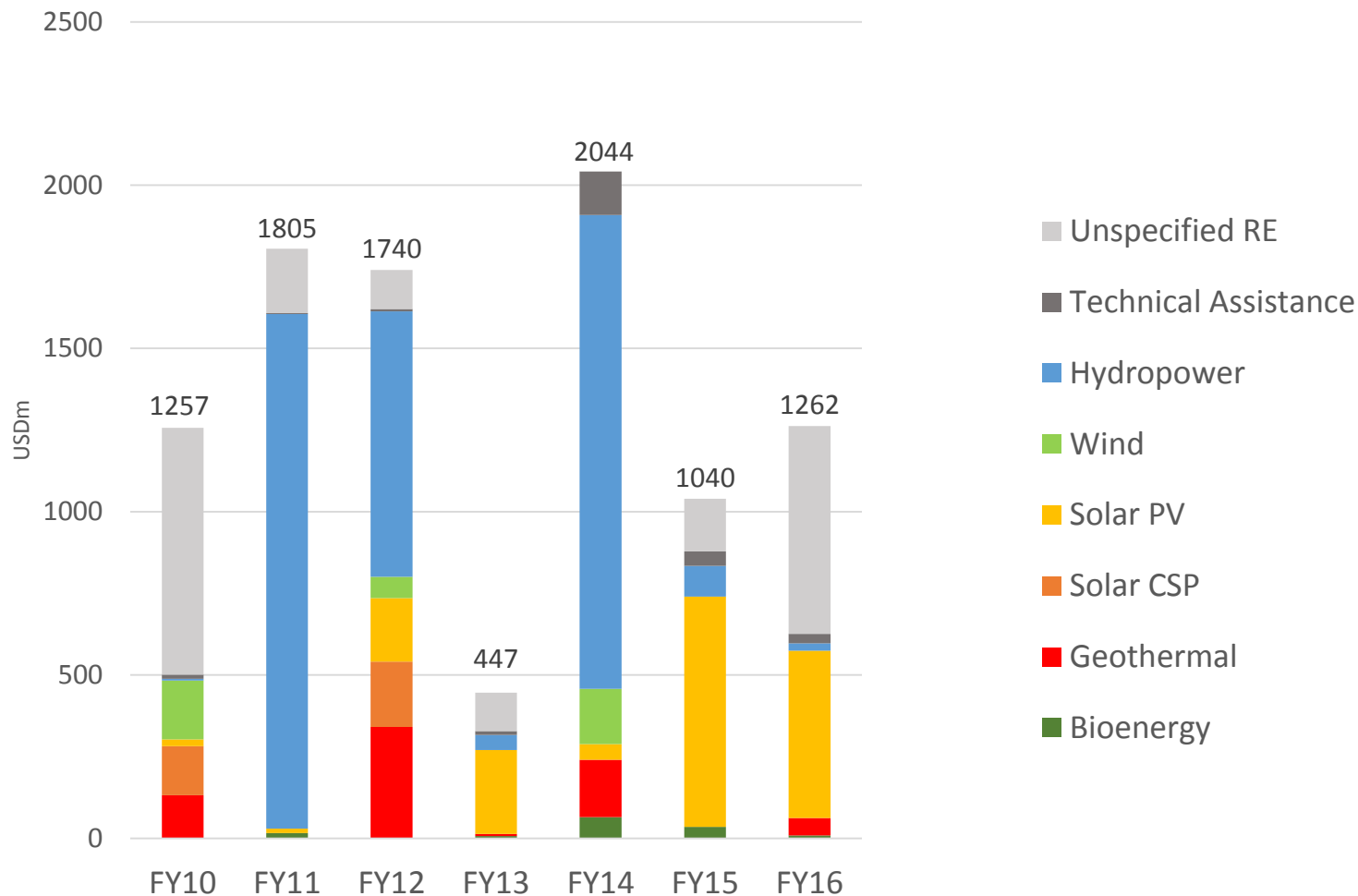
Share of Renewable Energy: \$9.6 billion out of \$45 billion (Energy and Extractives Lending FY10-16)



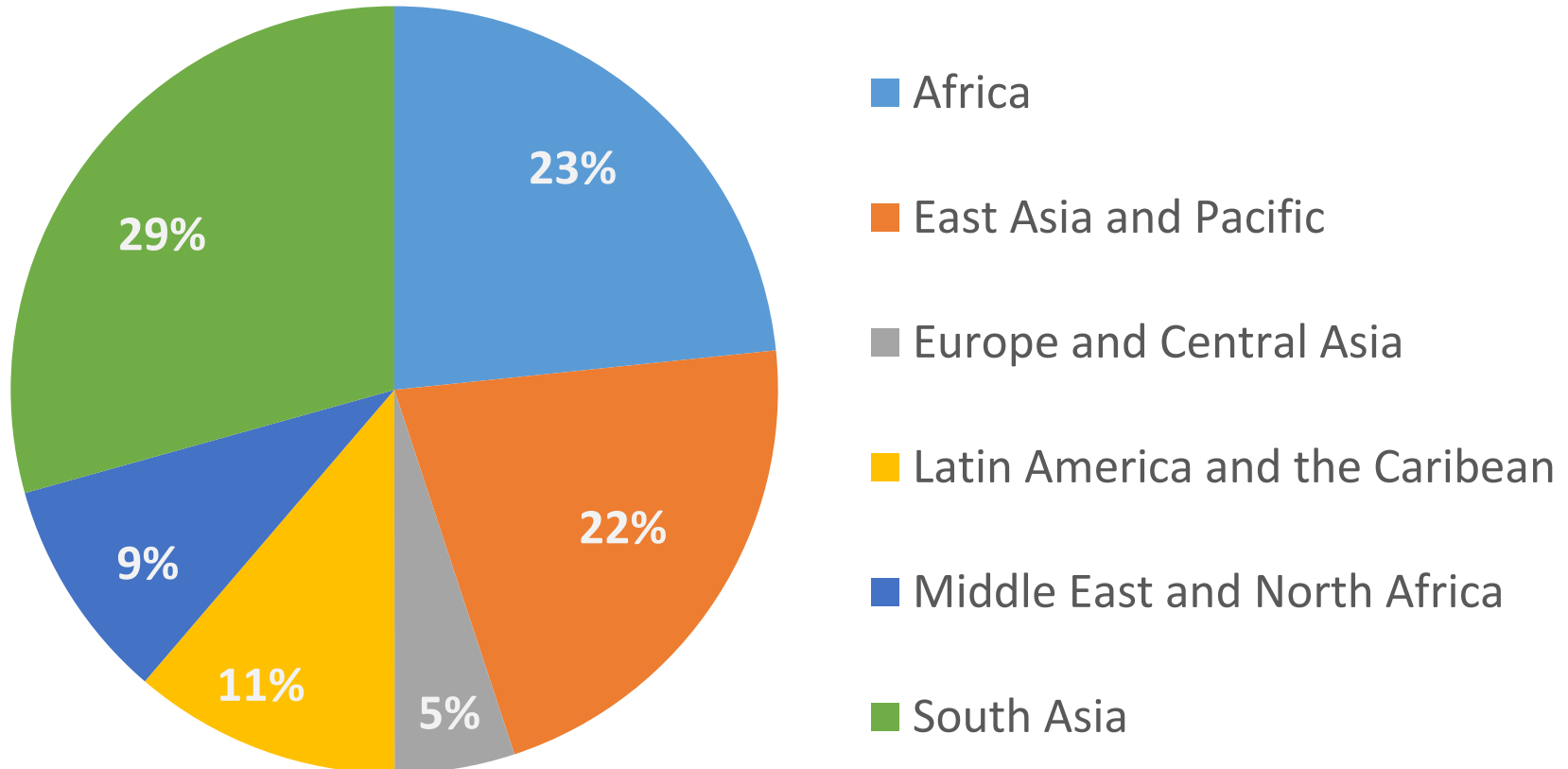
Hydro is the Dominant Sub-technology (Energy and Extractives FY10-16)



Share of Non-Hydro Renewable Energy is Increasing (Energy and Extractives Lending FY10-16)



Regional Shares of Non-Hydro Renewable Energy (Energy and Extractives FY10-16)



2. Regulatory Indicators for Sustainable Energy (RISE) – with Special Reference to Renewable Energy in Central Asia

Regulatory Indicators for Sustainable Energy (RISE)



<http://rise.esmap.org/>

- Pilot was conducted in 17 countries in 2014, first global edition was published early 2017.
- 27 indicators and 80 sub-indicators to capture the quality of policies and regulations for energy access, renewable energy and energy efficiency.
- Covers 111 countries across the developed and developing countries, accounting for more than 90 percent of global population and energy consumption.
- Will be published biennially (next report scheduled in 2018).

RISE Indicators

	Policies and Regulations			Administrative Procedures
Energy Access	<ul style="list-style-type: none"> Existence and monitoring of officially approved electrification plan Scope and officially approved electrification plan 	<ul style="list-style-type: none"> Framework for grid electrification Framework for mini-grids Framework for stand-alone systems 	<ul style="list-style-type: none"> Consumer affordability of electricity Utility transparency and monitoring Utility creditworthiness 	<ul style="list-style-type: none"> Establishing a new household grid connection Permitting a new mini-grid
Energy Efficiency	<ul style="list-style-type: none"> National energy efficiency planning Energy efficiency entities Information provided to electricity consumers Incentives from electricity rate structures 	<ul style="list-style-type: none"> Mandates & incentives: large consumers Mandates & incentives: public sector Mandates & incentives: utilities Financing mechanisms for energy efficiency 	<ul style="list-style-type: none"> Minimum energy performance standards Energy labeling systems Building energy codes Carbon pricing and monitoring 	<ul style="list-style-type: none"> Securing energy efficiency appliance standards certification
Renewable Energy	<ul style="list-style-type: none"> Legal framework for renewable energy Planning for renewable energy expansion 	<ul style="list-style-type: none"> Incentives & regulatory support for renewable energy Attributes of financial and regulatory incentives 	<ul style="list-style-type: none"> Network connection and access Counterparty risk Carbon pricing and monitoring 	<ul style="list-style-type: none"> Permitting a new renewable energy project

RISE Renewable Energy Indicators

Policies and Regulations

- **Legal framework for renewable energy**
 - Primary legislation
 - Legal private ownership of generation
- **Planning for renewable energy expansion**
 - Renewable energy targets and plans
 - Renewable energy in generation planning
 - Renewable energy in transmission planning
 - Resource data and siting
- **Incentives & regulatory support for renewable energy**
 - Financial and regulatory incentives
 - Grid access and dispatch
- **Attributes of financial and regulatory incentives**
 - Predictability and efficiency (policy-neutral)
 - Predictability and efficiency (policy-specific)
 - Long-term sustainability
- **Network connection and access**
 - Connection cost allocation
 - Network usage and pricing
 - Renewable grid integration
- **Counterparty Risk**
 - Payment risk reduction
 - Utility creditworthiness
 - Utility transparency and monitoring
- **Carbon pricing and monitoring**
 - Carbon pricing mechanism
 - Monitoring, reporting and verification (MRV) system

Administrative Procedures

- **Permitting a new renewable energy project**
 - Time and number of procedures

RISE score: 7 indicators and 18 sub-indicators

Not scored: 1 indicator and 1 sub-indicator

RISE Renewable Energy Indicators

Scoring Calculation Details

Legal framework for renewable energy

Questions	Scoring	Traffic light
I. Legal framework for renewable energy	<i>Sum and divide by 2</i>	
1. Primary legislation		
1.1 Does a legal framework for renewable energy development exist?	Yes – 100, No – 0	If the score X is: $x \geq 67$ ● $33 < x < 67$ ● $33 \leq x$ ●
2. Legal private ownership of generation		
2.1 Is the private sector ownership of renewable energy generation legally authorized?	Yes – 100, No – 0	

Planning for renewable energy expansion

Questions	Scoring	Traffic light
II. Planning for renewable energy expansion	<i>Sum and divide by 4</i>	
3. Renewable energy targets and plans		
3.1 Does an official renewable energy target exist?	Yes – 25, No – 0	
3.2 Does a renewable energy action plan or strategy to attain the target exist?	Yes – 25, No – 0	
3.3 Does the plan or strategy define the amount of investment necessary to meet the RE target?	Yes – 25, No – 0	
3.4 Is there an institution responsible for tracking progress in renewable energy development?	Yes – 25, No – 0	
4. Renewable energy in generation planning		
4.1 Does an electricity generation plan that includes renewable energy development exist?	Yes – 50, No – 0	If the score X is: $x \geq 67$ ● $33 < x < 67$ ● $33 \leq x$ ●
4.2 Is the generation plan based on a probabilistic approach?	Yes – 50, No – 0	
5. Renewable energy in transmission planning		
5.1 Does the current transmission planning consider renewable energy scale-up?	Yes – 50, No – 0	
5.2 Has the country conducted a variable renewable energy integration study?	Yes – 50, No – 0	

Planning for renewable energy expansion

Questions	Scoring	Traffic light
II. Planning for renewable energy expansion	<i>Cont...</i>	
<p>6. Resource data and siting</p> <p>For each relevant RE technology:*</p> <p>6.1 Does the government publish or endorse a resource atlas or other data on the abundance and quality of the resource?</p> <p>6.2 To what extent does the map follow best practices of data quality and availability?</p> <p>6.3 Has the country carried out strategic planning or produced zoning guidance to inform the commercial development of the resource?</p> <p>6.4. Has the planning or zoning guidance been carried out according to best practice by 1) being undertaken as part of a strategic environmental and social assessment or equivalent process; and 2) making the outputs publically available?</p> <p>* A relevant technology is one for which the country has a specific resource target or, if no resource targets exist, has high resource potential according to IRENA country profiles.</p>	<p>Yes – 25, No – 0</p> <p>0–25 – scale</p> <p>Yes – 25, No – 0</p> <p>0–25 – scale</p> <p>Sum and divide by number of relevant technologies</p>	<p>If the score X is:</p> <p>$x \geq 67$ ●</p> <p>$33 < x < 67$ ●</p> <p>$33 \leq x$ ●</p>

Incentives and regulatory support for renewable energy

Questions	Scoring	Traffic light
III. Incentives and regulatory support for renewable energy	<i>Sum and divide by 2</i>	
7. Financial and regulatory incentives for renewable energy		
7.1 Is there at least one scheme to support renewable energy per unit of electricity generated? (e.g. feed-in tariff, competitive bidding/auction, mandates, generation premiums, production tax credits)?	Yes – 50, No – 0	
7.2 Does the government offer other direct fiscal incentives for renewable energy (e.g. capital subsidies, grants or rebates, investment tax credits, tax reductions?)	Yes – 50, No – 0	
8. Grid access and dispatch		
8.1 Does the country provide guaranteed access to the grid for RE?	Yes – 25, No – 0	
8.2 Do RE projects receive priority in dispatch?	Yes – 25, No – 0	
8.3 Are there provisions to compensate seller if offtake infrastructure is not built in time?	Yes – 25, No – 0	
8.4 Are there mechanisms to compensate RE projects for lost generation due to certain curtailments after project commissioning?	Yes – 25, No – 0	<p>If the score X is:</p> <p>$x \geq 67$ ●</p> <p>$33 < x < 67$ ●</p> <p>$33 \leq x$ ●</p>

Attributes of financial and regulatory incentives

Questions	Scoring	Traffic light
IV. Attributes of financial and regulatory incentives	<i>Sum and divide by 3</i>	
9. Predictability and efficiency (policy- neutral) 9.1 Is the market entry mechanism for private RE projects defined? (e.g. 1st come 1st served, tenders) 9.2 Are projects subject to development timelines or milestones? 9.3 Are tariffs indexed (in part or in whole) to an international currency or to inflation?	Yes – 33.3, No – 0 Yes – 33.3, No – 0 Yes – 33.3, No – 0	
10. Predictability and efficiency (policy- specific) 10.1 If there is a guaranteed tariff, is there a mechanism to adjust the level of the tariff for new entrants (e.g. declination)? 10.2 If there is a guaranteed tariff, is there a mechanism to differentiate tariffs based on the size of the generation plant? 10.3 If there is competitive bidding/auctions, are there provisions to ensure full and timely project completion (e.g. bid-bonds, project milestones, eligibility requirements) 10.4 If there is a renewable energy mandate, can it be met with tradable certificates (e.g. RECs, ROCs, TECs)	Yes – 100, No – 0 Yes – 100, No – 0 Yes – 100, No – 0 Yes – 100, No – 0 Divide by the number of relevant incentives in place	If the score X is: $x \geq 67$ ● $33 < x < 67$ ● $33 \leq x$ ●
11. Long-term Sustainability 11.1 Is the price subsidy/benefit implied by a renewable energy incentive program passed through in full or in part to the final electricity consumer?	Yes – 100, No – 0	

Network connection and access

Questions	Scoring	Traffic light
V. Network connection and access	<i>Sum and divide by 3</i>	
12. Connection cost allocation 12.1 Are there rules defining the allocation of connection costs? 12.2 What is the type of the connection cost allocation policy (i.e. shallow/deep)?	Yes – 50, No – 0 Shallow – 50, Deep – 0	
13. Network usage and pricing 13.1 Are there rules that allow electricity customers to purchase power directly from a third party (i.e. an entity other than the designated utility in a service area)? 13.2 Do the rules define the size and allocation of costs for use of the transmission and distribution system (e.g. wheeling charges, locational pricing?)	Yes – 50, No – 0 Yes – 50, No – 0	
14. Renewable grid integration 14.1 Does the country have a grid code that includes measures or standards addressing variable renewable energy? 14.2 Are there rules for exchanging power between balancing areas that penalize variable renewable energy (e.g. through imbalance penalties)? <small>*</small> 14.3 Are there provisions in the power exchange rules that allow for plant forecasting?	Yes – 33.3, No – 0 Yes – 0, No – 33.3 Yes – 33.3, No – 0	If the score X is: $x \geq 67$ ● $33 < x < 67$ ● $33 \leq x$ ●

*Only scored in countries with multiple balancing areas.

Counterparty risk

Questions	Scoring	Traffic light
VI. Counterparty risk	<i>Sum and divide by 3</i>	
15. Payment risk mitigation		
15.1 Does the government offer or allow backing of utility power purchase payments (e.g. through a letter of credit, escrow account, payment guarantee, or other)?	Yes – 100, No – 0	
16. Utility Transparency and Monitoring		
16.1. Are the financial statements of the largest utility publicly available?		
a) generation	Yes – 25/8, No – 0	
b) transmission	Yes – 25/8, No – 0	
c) distribution	Yes – 25/8, No – 0	If the score
d) retail sales	Yes – 25/8, No – 0	X is:
If yes, are they audited by an independent auditor?		$x \geq 67$ ●
e) generation	Yes – 25/8, No – 0	$33 < x < 67$
f) transmission	Yes – 25/8, No – 0	●
g) distribution	Yes – 25/8, No – 0	$33 \leq x$ ●
h) retail sales	Yes – 25/8, No – 0	

Counterparty risk

Questions	Scoring	Traffic light
VI. Counterparty risk	<i>Cont...</i>	
16.2. Are the following metrics published in a primary official document (by the utility, regulator or ministry and/or government)?		
a) Transmission - Transmission loss rate	Yes – 25/4, No – 0	
b) Distribution - Distribution loss rate	Yes – 25/4, No – 0	
c) Retail sales – Bill collection rate	Yes – 25/4, No – 0	If the score X is: $x \geq 67$ ● $33 < x < 67$ ● $33 \leq x$ ●
d) Retail sales– Energy available to end users	Yes – 25/4, No – 0	
16.3. Is the utility operating an incidence/outage recording system (or SCADA/EMS with such functionality)?	Yes – 25, No – 0	
16.4. Is the utility measuring the SAIDI and SAIFI or any other measurements for service reliability?	Yes – 25/3, No – 0	
a) Are the measurements reported to the regulatory body?	Yes – 25/3, No – 0	
a) Are the measurements available to public?	Yes – 25/3, No – 0	

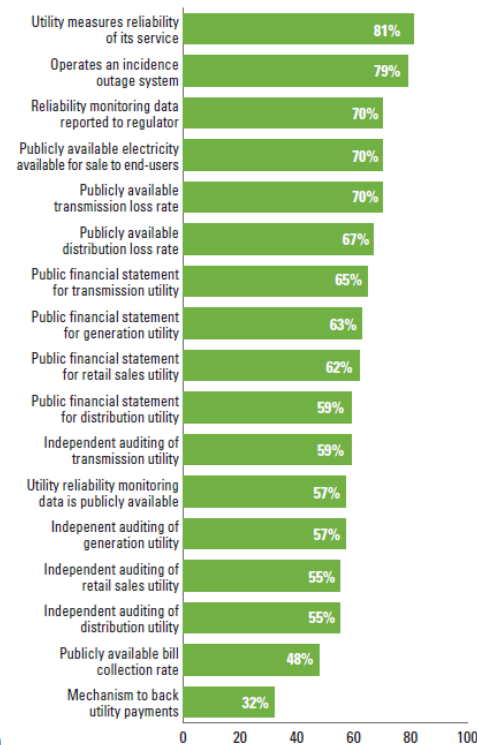
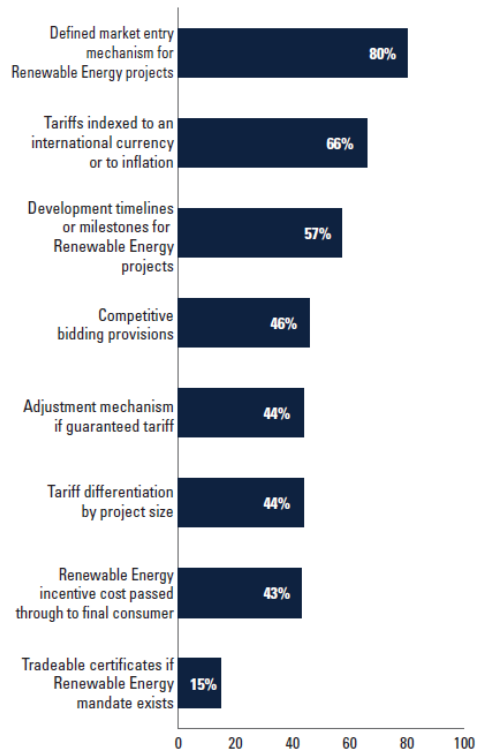
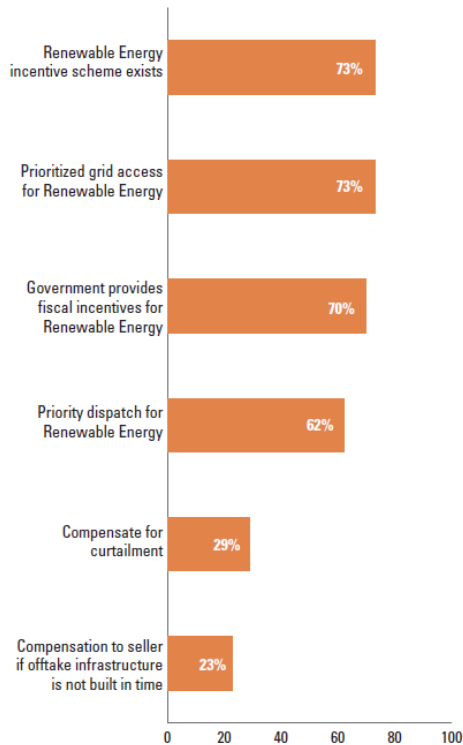
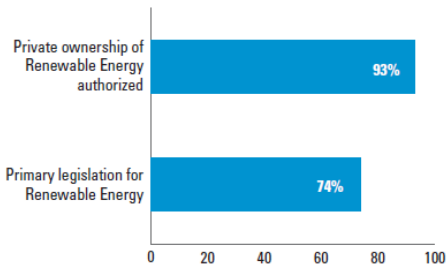
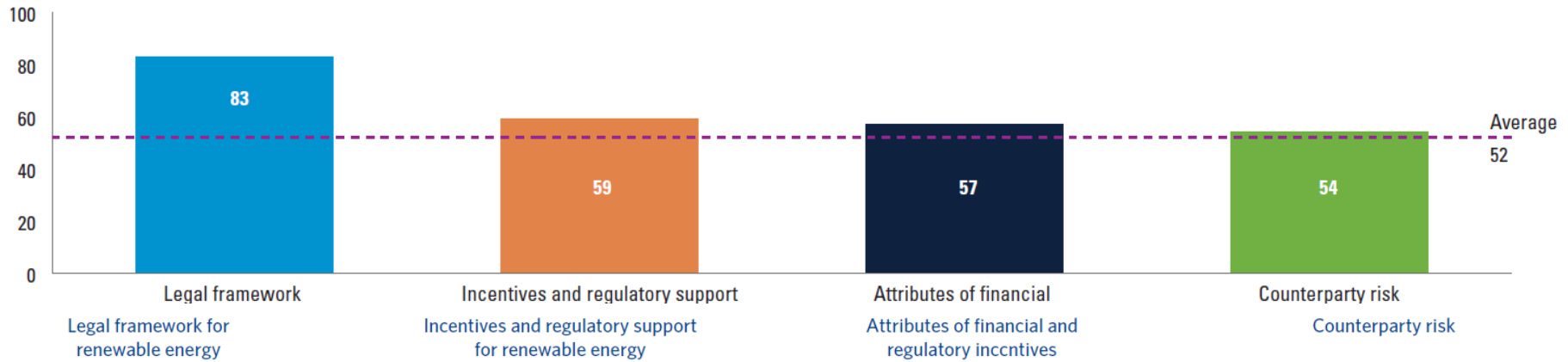
Counterparty risk (cont.)

Questions	Scoring	Traffic light
VI. Counterparty Risk	<i>Cont...</i>	
17. Utility Financial Viability	<i>Sum</i>	
17.1. Current ratio	<1 -- 0 in between -- scale ≥ 1.2 -- 25	
17.2. EBITDA margin	<0 -- 0 in between -- scale $\geq 15\%$ -- 25	If the score X is: $x \geq 67$ ● $33 < x < 67$ ● $33 \leq x$ ●
17.3. Debt service coverage ratio	<1 -- 0 in between -- scale ≥ 1.2 -- 25	
17.4. Days payable outstanding	>180 -- 0 in between -- scale ≤ 90 -- 25	

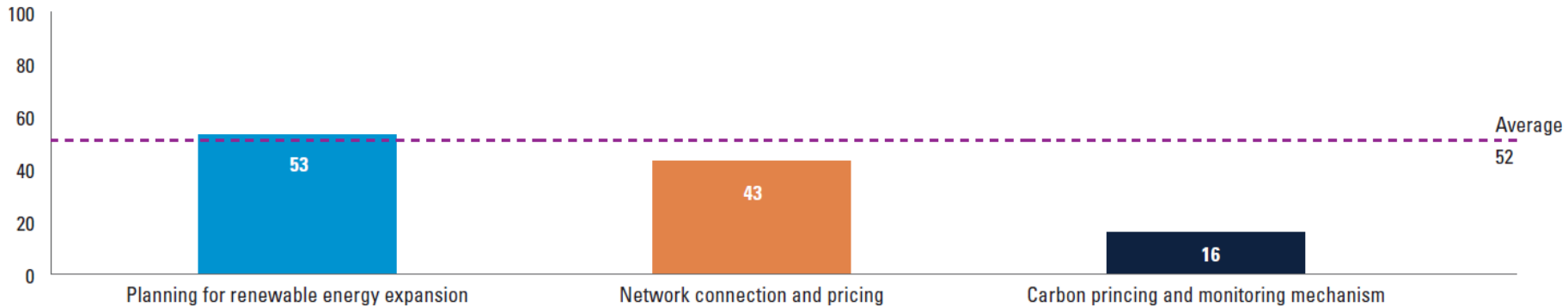
Carbon Pricing and Monitoring

Questions	Scoring	Traffic light
VII. Carbon pricing and monitoring	<i>Sum</i>	
18.1 GHG emissions coverage under any carbon pricing mechanism	100% coverage – 50, < 100% – scaled	If the score X is: $x \geq 67$ ●
18.2 Monitoring, reporting and verification system for greenhouse gas emissions in place	Yes – 50, No – 0	$33 < x < 67$ ● $33 \leq x$ ●

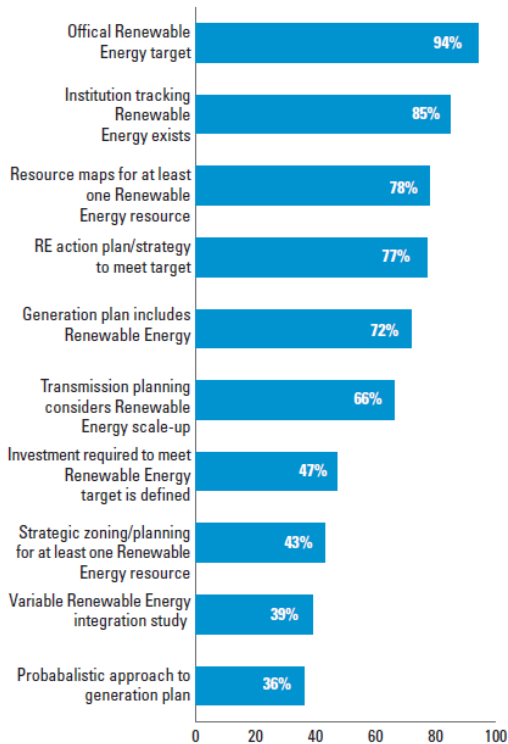
RISE Renewable Energy Score Distribution by Indicators – Global (1/2)



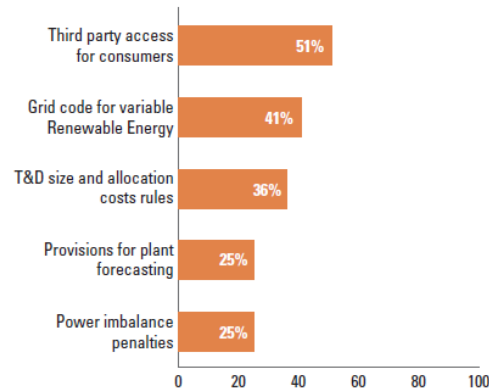
RISE Renewable Energy Score Distribution by Indicators – Global (2/2)



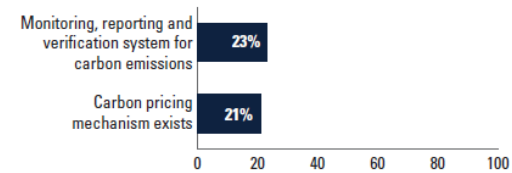
Planning for renewable energy expansion



Network connection and pricing



Carbon pricing and monitoring mechanism



RISE Renewable Energy Score Distribution by Indicators – Central Asia

Indicators	Kazakhstan	Kyrgyz Republic	Tajikistan	Uzbekistan	Global Average
1. Legal framework for renewable energy	100	100	100	100	83
2. Planning for renewable energy expansion	65	43	38	31	53
3. Incentives and regulatory support for renewable energy	75	75	38	38	59
4. Attributes of financial and regulatory incentives	83	33	67	33	57
5. Network connection and pricing	92	58	0	0	43
6. Counterparty risk	36	64	12	8	54
7. Carbon pricing and monitoring	78	0	0	0	16
Total	76	53	36	30	52

3. World Bank Energy Program in Central Asia

Examples of World Bank Energy Program in Central Asia

Diversification of Energy-mix

- Renewable energy development (Wind resource assessment and proposed development in UZB, IFC's proposed solar advisory in UZB)
- Regional cooperation (below)

Demand-side Energy Efficiency

- Energy efficiency for industrial enterprises (UZB)
- District heating and building energy efficiency (KAZ, KYR, TAJ, UZB)

Supply Adequacy and Efficiency

- Renewable energy generation (SHPP TA in KYR, HPP in TAJ)
- Modernization of key transmission and distribution networks (KYR, UZB)

Institutional Development

- Power system planning (KAZ, UZB) and dispatch efficiency assessment (UZB)
- Tariff and subsidies studies (KYR, TAJ, UZB)
- Support to regulator (KYR)
- Advanced metering (KYR, UZB)
- Support to utility corporate governance (KYR, UZB)

Regional Cooperation

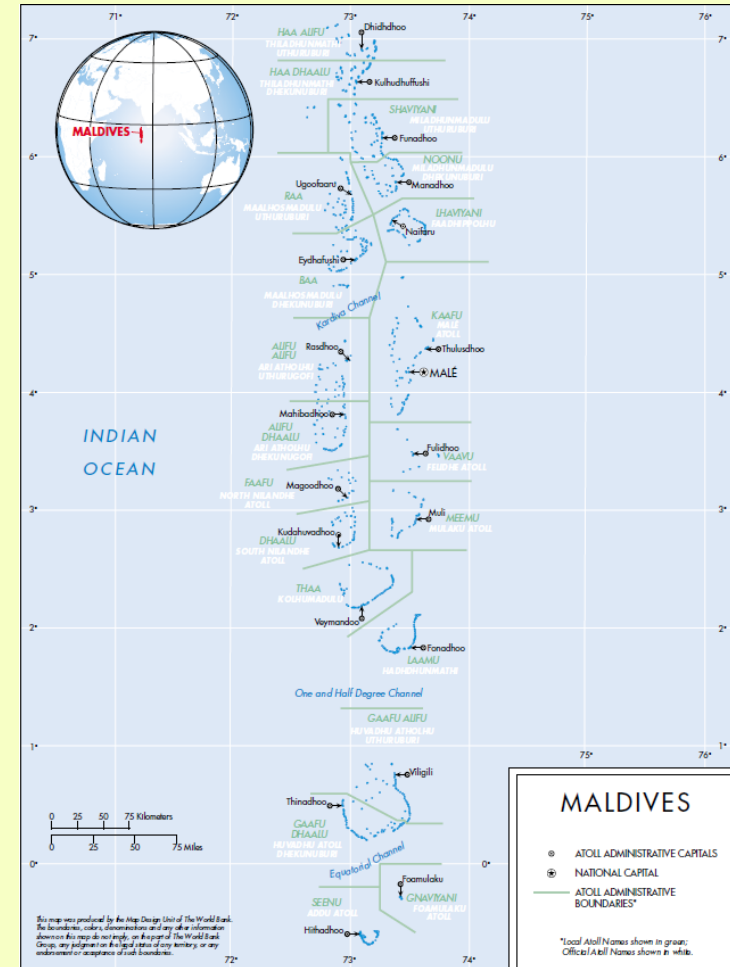
- Central Asia Regional Economic Cooperation Program (CAREC)
- Central Asia Energy and Water Development Program (CAEWDP)
- Regional interconnection (CASA-1000)

4. Cases from Other Regions

De-risking: Maldives Accelerating Sustainable Private Investment in RE (ASPIRE)



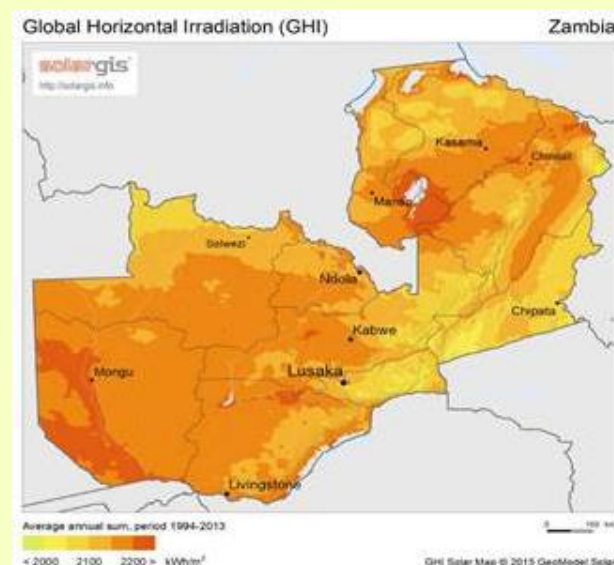
- Up to 35-50MW of PV
- WB provides off-take and liquidity guarantee
- Potential subsidy for smaller islands and batteries



De-risking: Scaling Solar (Zambia Case)

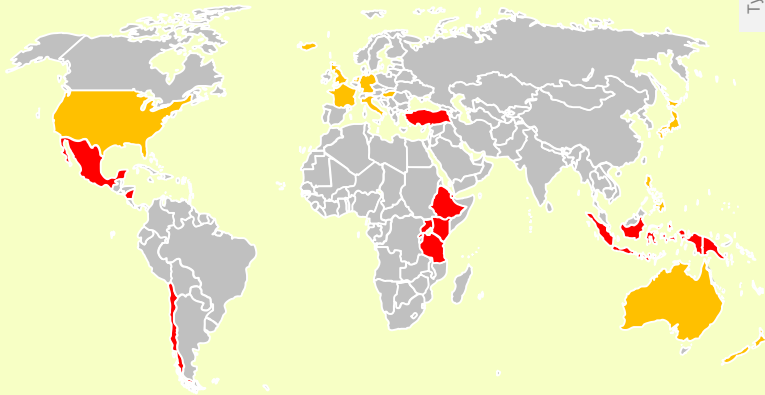
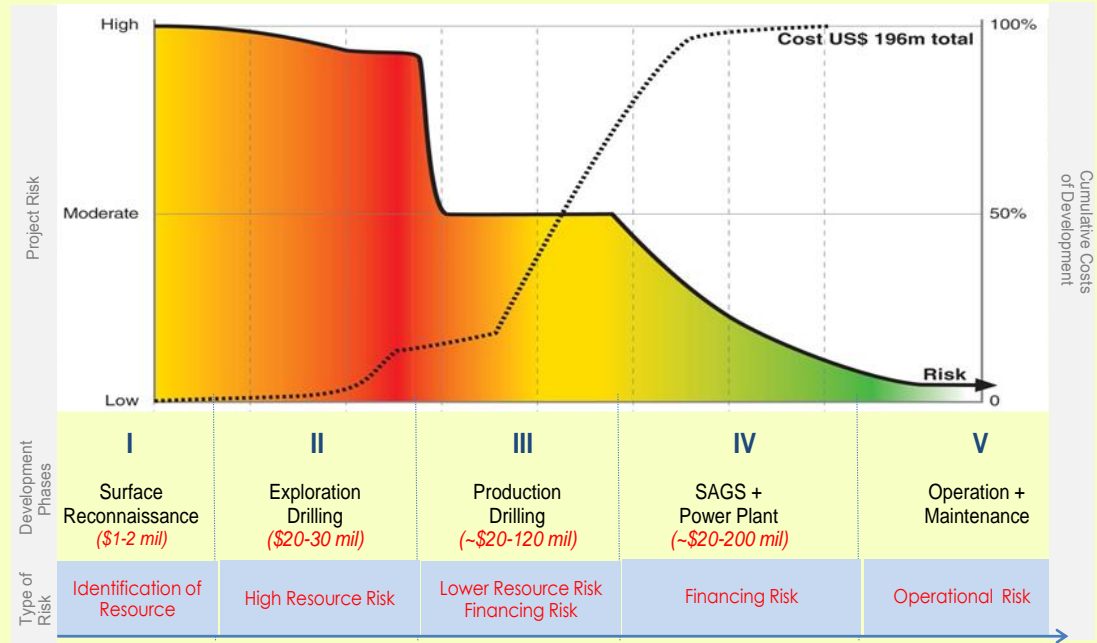
- Projects were developed and tender was prepared and executed to conclusion in 9 months; round 2 for 200MW already announced
- USc 6/kWh non-indexed is equivalent to an average in current dollars over contract lifetime of USc 4.7/kWh

Sites:	West Lunga	Mosi-oa Tunya
Neoen/ First Solar	Usc 6.02/kWh	
ENEL Green Power		USc 7.84/kWh



- All bidders who submitted an offer requested the IDA payment guarantee; no IDA loan guarantee was needed

De-risking: Geothermal Resource Risk



March 2015

Global Geothermal Development Plan

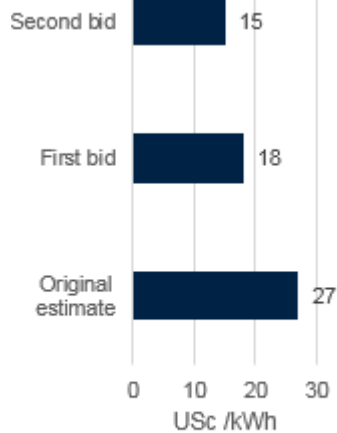
About \$1 billion



5-8 times leverage

Reducing Financing Cost: Morocco Noor CSP Complex

- 2,000 MW target
- 500 MW plus storage under development
- WB financing only \$400 million
- About \$3 billion financing
- Tariff evolution:



Source: CNN

Reducing Financing Cost: Solar Rooftops in India

- \$500 million World Bank (IBRD)
- \$125 million Clean Technology Fund
- \$25 million Global Environmental Fund
- 1,000MW (Government target is 40,000GW)
- State Bank of India is the borrower and implementing agency
- Multiple delivery models



Picture credit: Renewable Energy Magazine

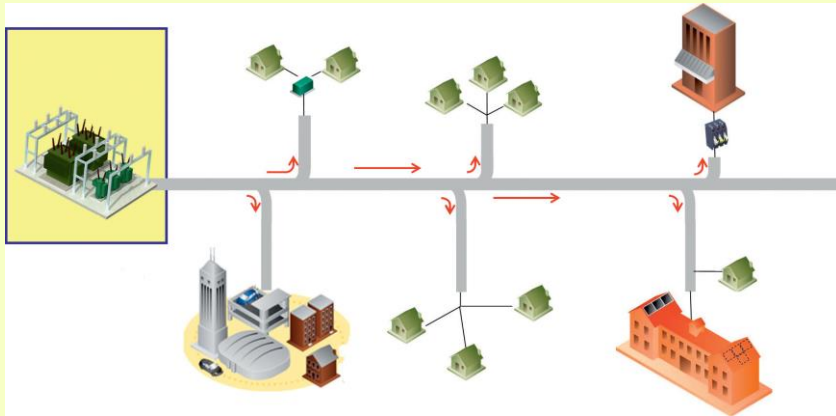
Greening Grid: Solar Parks in India

- **World Bank to support over 3,000MW of utility scale solar power**
- **Provision of critical infrastructure**



Charanka solar park (224MW) for comparison

Greening Grid: Smart grids in Ukraine, Vietnam and Turkey



Traditional Distribution System



Distribution System of the Future

THANK YOU!

