



Wind Project Financing

**Targets, Barriers & Challenges, Elements of Financing,
Recommendations for Financing**

Coverage

- Background
- Debt Financing – Elements & Barriers
- Equity Financing – Elements & Barriers
- Risks & Approach



Background

- ✓ Objective
- ✓ Potential
- ✓ Proposed Targets
- ✓ Financing Requirement

Wind Potential Assessment

- As part of our vision document, we have analysed potential assessment studies undertaken by CWET and LBNL

Study	Onshore Potential (GW)
CWET	103 at 80 m
LBNL	2006 at 80 m
	2605 at 100 m
	3121 at 120 m
Xi Lu et al	1324
Jami Hossain et al	2076 at 80 m

Total on-shore wind potential as per recent assessment is around 2006 GW (at 80 m) to 3121 GW (at 120 m).

- The study undertaken by LBNL estimates total off-shore developable potential in India of about 238 GW, at 100 m hub-height.
- **Hence wind potential is not a constraint in scaling up wind**

Summary of proposed targets 200 GW by 2032

	12 th FYP (FY 2016-17)	13 th FYP (FY 2021-22)	14 th FYP (FY 2026-27)	15 th FYP (FY 2031-32)
Onshore capacity (GW)	38.84	73.93	113.42	163.45
Repowering (GW)	0.78	3.49	8.62	19.37
Small wind (GW)				0.10
Offshore wind (GW)		2.00	6.32	19.97
Total in GW (Cumulative)	39.62	79.42	128.36	202.89

The CAGR for increase in capacity addition from 21.13 GW in FY 2013-14 to 202.89 GW in FY 2031-32, works out to 13.39%

Inherent benefits from proposed wind targets

Emission reduction potential

- Considering last 5 year average emission factor (0.79 tCO₂/MWh) specified by CEA
- The GHG emission reduction potential over the useful life works out to **6158 Million metric ton of CO₂ e (Carbon Dioxide equivalent) by FY 2031-32**

Job creation potential

- Estimated based on average job creation of 4 person/MW as per MNRE HRD report.
- The total job creation potential is estimated at nearly **8.7 lakh till FY 2031-32. This translates to annual job creation potential of 48260.**

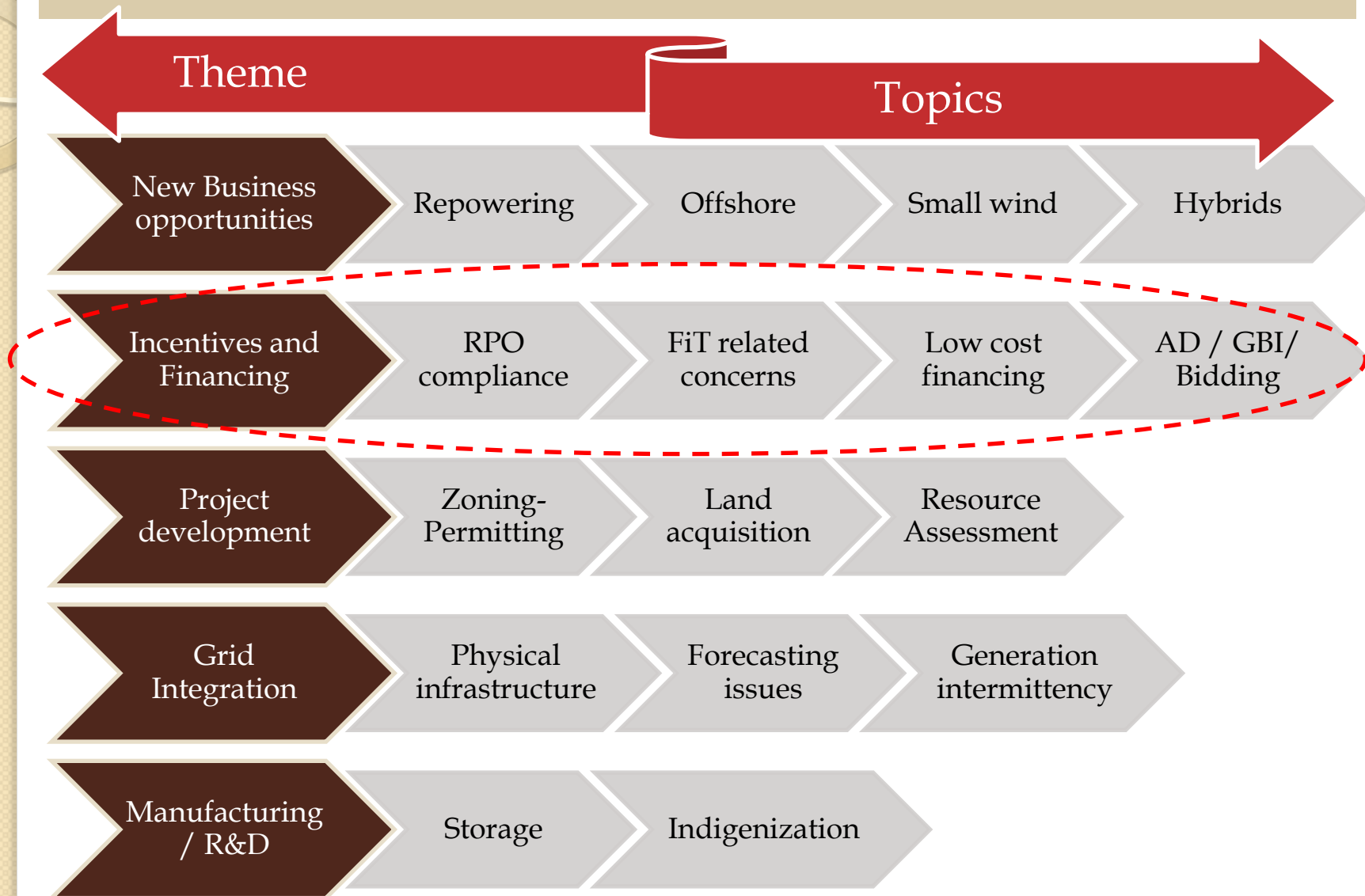
Import bill reduction potential

- Landed cost of imported cost -Rs 6000/ton with GCV of 5500kCal/kg and Heat rate of 2172 kcal/kWh as per CERC
- The cumulative import bill reduction potential over the useful life of wind projects is estimated at around **Rs 18.4 lakh crore, considering the reduction in imports from coal (Or 116 million ton of oil equivalent)**

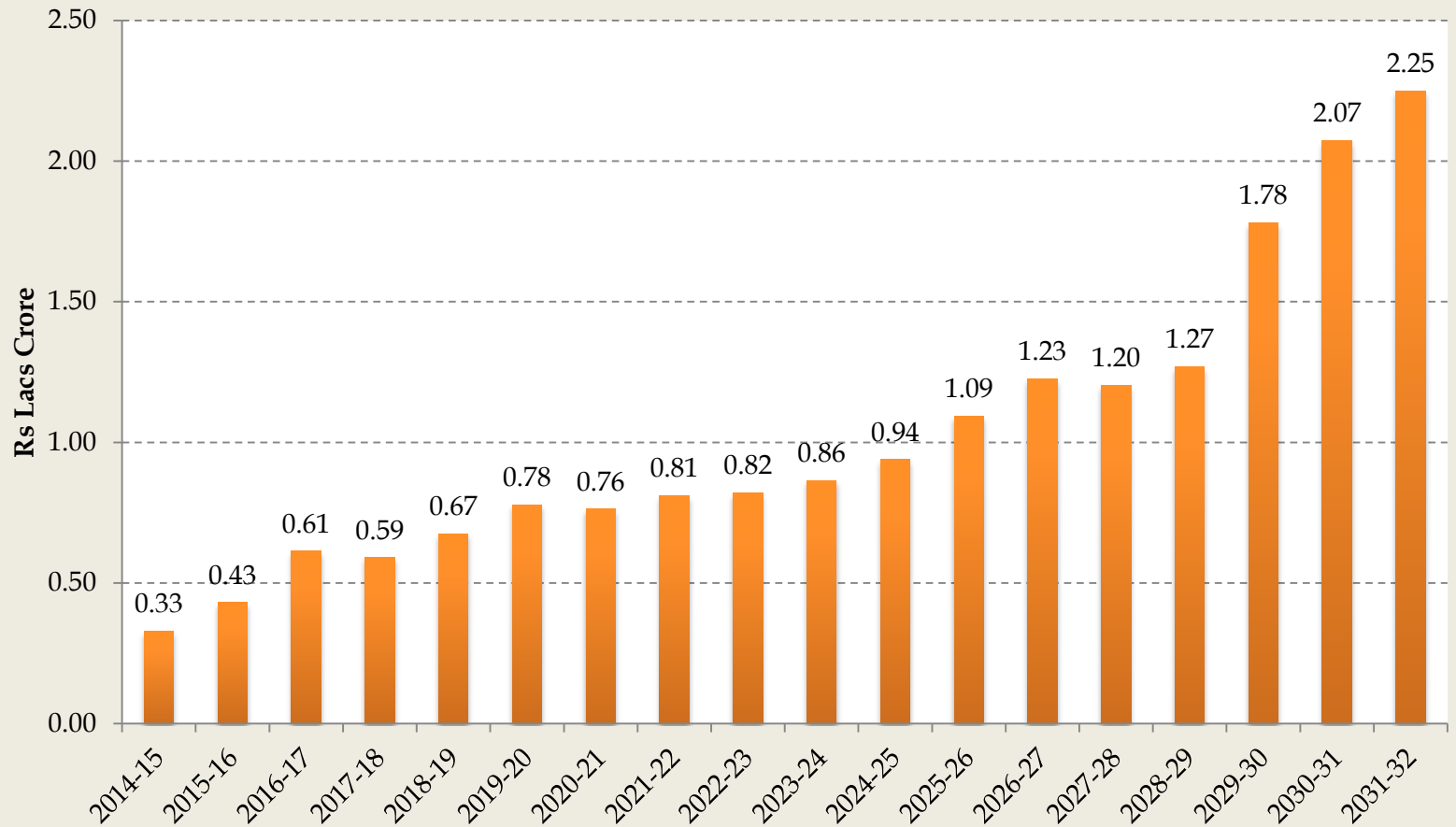
Objective is to build consensus

- The objective is to evolve consensus around such aspects covered under various themes
- At each wind discussion forum, we will discuss strengths, opportunities, challenges and approaches/solutions to accelerated development, and build consensus around the identified themes
- Based on the discussions, we intent to present the final vision of Wind Vision document to MNRE.

Themes for Discussion



Financing Requirement by 2032



It is estimated that to achieve the target of 200 GW by 2032, an investment of **Rs 18.51 lakhs crore** will be required

Financing Requirement by 2032

- The financing requirement is worked out considering
 - ✓ Onshore wind capital cost of Rs 6.5 crore/MW (with 1.5% annual escalation)
 - ✓ Offshore wind capital cost (incl. transmission cost) of Rs 20 crore/MW (considering average cost in Indian market -(expected to reach Rs 12-13 crore by FY 2022-23)
- Quantum of debt and equity required will be around Rs 12.95 lacs crore and Rs 5.55 lacs crore respectively
- Discussion is going on ambitious targets of 200 GW for wind and 100 GW for solar, which is expected to increase the financing demand
- Investment required to achieve the target of Rs 18.51 crore by 2032 only for wind, translates to Rs 1.1 lacs crore per year
- Rs 36000 crore investments in year 2011 is considered as the best case in India
- Gap of around 74000 crore per year raise doubt on financing ability of Indian market



Debt Financing

- ✓ Sources of Financing
- ✓ Barriers of Debt Market
- ✓ Outlook

Debt – Sources of Financing

Particulars	Commercial Banks	IFCs	Institutional Investors	Multilateral Agencies
Source	Public and Private Banks	IREDA, REC, IDFC, PFC, L&T Finance, Tata Capital	Pension Funds, Insurance Companies, Charitable Trust based Funds etc.	World Bank, ADB, KfW, EBRD & IDB
Loan Tenure	10 to 12 years	10 to 15 years	Up to 15 years	20 to 30 years
Interest Rate	12.0% to 13.5%	12.0% to 14.0%	Fixed Coupon Rates	Libor+Administrative+Sovereign guarantee+Hedging cost
Lead Time	3 to 4 months	6 to 8 months	3 to 4 months	6 to 12 months
Commitment Charges	2 %to 3%	2 %to 3%	0.5% to 1%	0.5% to 1%
Remarks/ Recommendations	<ul style="list-style-type: none"> ➤ Develop new schemes to provide long term loans ➤ Cut short lead time ➤ Increase exposure limit 	<ul style="list-style-type: none"> ➤ Low cost credit lines should be pass on to the developers ➤ Cut short lead time ➤ Provide fixed interest rates 	Fixed rates can be secured from the institutional investors	Multilateral agencies have lower interest rate therefore low cost loans can be secured for wind projects

Debt – Sources of Financing

Particulars	Bonds	ECB	ECA	Subordinate Debt
Source	Government Securities, Financial Institutions, Private Companies	IFCs, Multilateral Agencies, Institutional Investors	Export Credit Agencies and Investment Insurance Agencies	Convertible debt, Senior subordinated debt or Private securities
Loan Tenure	Up to 20 years	Up to 20 years	Up to 10 years	
Interest Rate	Fixed Coupon Rates	Libor+Administrative+ Sovereign guarantee +Hedging cost	Libor+ Hedging cost+ Premium	Fixed Coupon Rates
Lead Time	3 to 4 months	Depends upon the type of projects		
Commitment Charges	0.5% to 1%	Charges vary with the type of ECB source	Higher than domestic debt	Depends upon the type of security
Remarks/Recommendations	<ul style="list-style-type: none"> ➤ Corporate Bonds are good source of long term loans with lower borrowing cost ➤ Low risk of interest fluctuation ➤ Create awareness among retail investors 	<ul style="list-style-type: none"> ➤ Process need to be simplified for ECB financing ➤ Microfinance need to be promoted in the sector ➤ ECB has lower interest rate 	<ul style="list-style-type: none"> ➤ Lower interest rates offered by ECAs 	<ul style="list-style-type: none"> ➤ It is used when company is generating adequate cash flows ➤ It is less risky than equity for investors

Debt - Barriers

Challenges

Limited Long Term Debt Market

- Under-developed bond Market
- Asset Liability Mismatch
- Limited Takeout Financing Options

High Financial Cost

- High inflation rates
- Competition among multiple sectors
- Uncertainty about country's future borrowing needs

Volatile Market

- Fluctuation in inflation rates
- Interest rate fluctuation
- Uncertain policy environment

Lack of Fixed Interest Rate Loans

- Unavailability of long term hedging instruments
- Uncertainty in financial markets

Availability of funds

- Variability of wind power and skewed regulations
- Capping on ECB
- Under-developed bond market

Limited non-recourse financing

- Relationship with the lenders make it easy to secure fund
- Variability in wind generation

Challenges

Debt - Barriers

Challenges

Capital Limit on ECB

- Automatic route - USD 500 millions/year
- Government approval - USD 250 millions/year
- ECB limit will be the key to achieve the target

Interest rate ceilings on ECB

- Higher risk perception with wind makes it unattractive
- High hedging cost restrict to provide funds

Lack of Forwards Market in Foreign Exchange

- Nascent forward market
- High cost of hedging in India

Skewed Norms for NPA

- Banks have NPA limit of 90 days and NBFCs have limit of 6 months
- Shorter overdue period of banks makes it reluctant to provide funds

Distribution Utility Poor Financial Health

- Most of the WPPs executed PPA with Discoms
- Discoms poor condition and delayed payments increase uncertainty

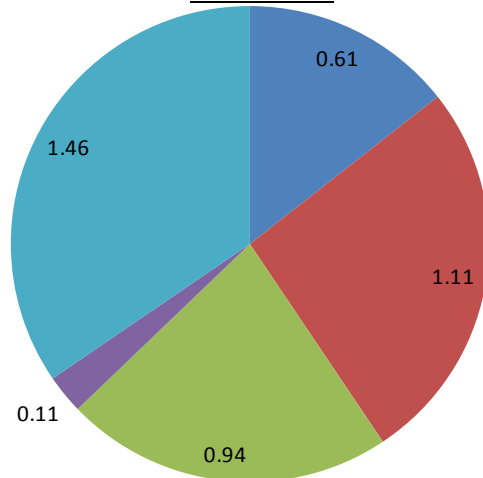
Lack of Refinancing Options

- Cashflow reduction in initial years, reduce chances for refinancing

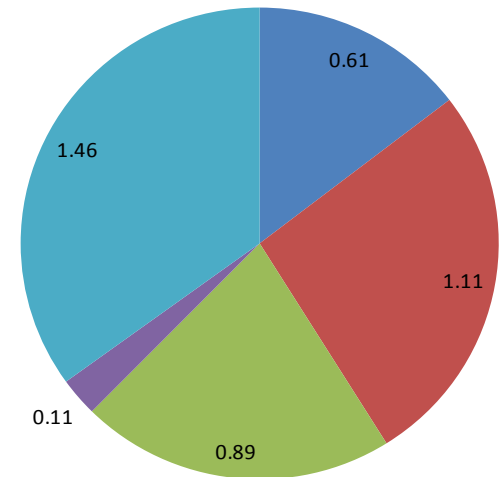
Challenges

Impact of Interest Rates(IR) on COG

CERC Approved COG of Rs 4.23/unit at 12.70% IR



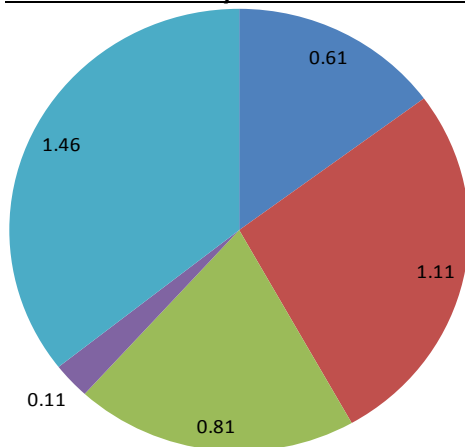
COG of Rs 4.18/unit at 12.00% IR



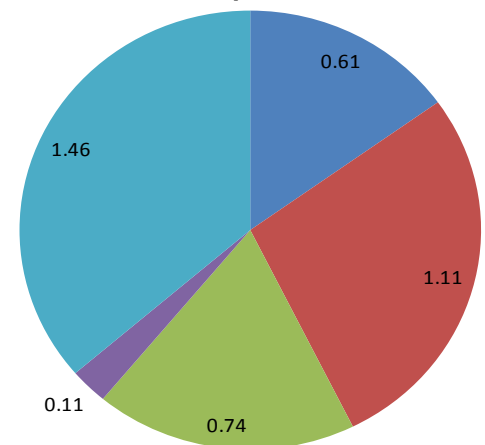
Components of COG

- O&M expn
- Depreciation
- Int. on term loan
- Int. on working capital
- RoE

COG of Rs 4.10/unit at 11.00% IR



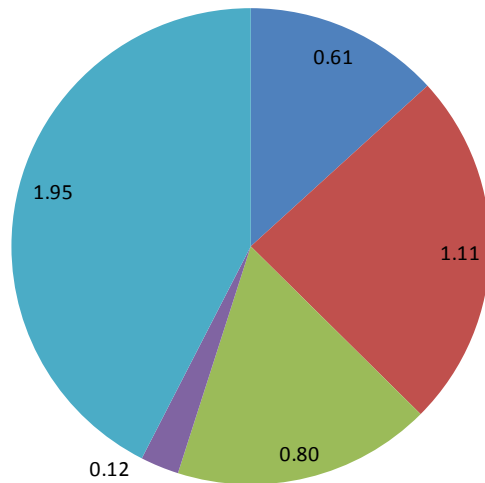
COG of Rs 4.03/unit at 10.00% IR



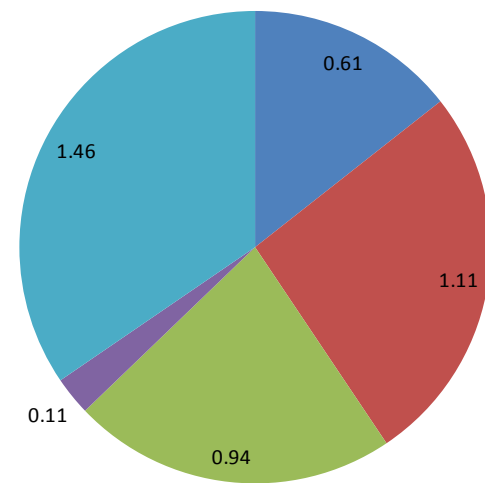
Decrease in cost of debt shall bring the early grid parity and relieve government to provide any further capital subsidy & incentives for wind (Analysed for Wind Zone 4)

Impact of Debt-Equity Ratio on COG

Rs 4.59/unit at 60% Debt



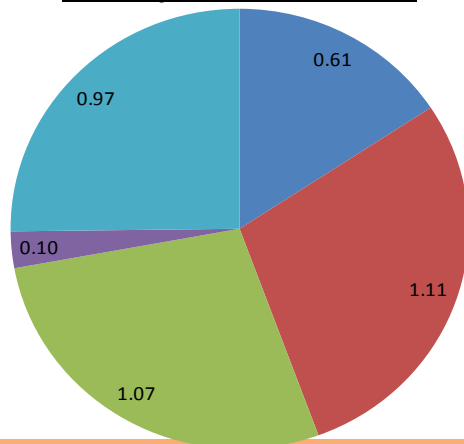
Rs 4.23/unit at 70% Debt (Normative)



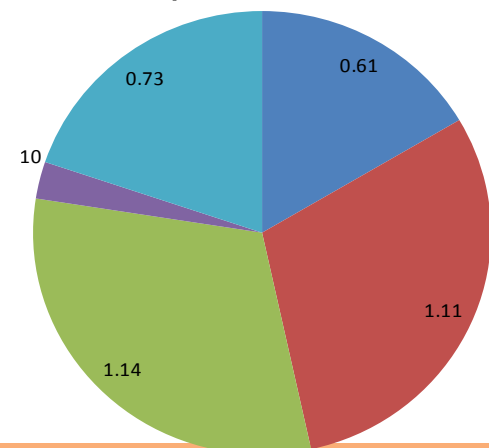
Components of COG

- O&M expn
- Depreciation
- Int. on term loan
- Int. on working capital
- RoE

Rs 3.87/unit at 80% Debt



Rs 3.69/unit at 85% Debt



Increase in quantum of debt decreases COG and increase availability of equity for other projects (Analysed for Wind Zone 4)

Recommendations

- **Increase limit of ECB** for wind projects
- **Low cost credit lines secured by IFCs** should be passed on to developers
- Provide sovereign **guarantee at lower fee to wind projects**
- Promote fixed interest rate financing for wind projects
- Provide **security to lenders** against the **increase in exposure limits and fund allocation** to wind
- Government should empanel set of agencies to appraise wind projects, which shall provide additional comfort to the lenders
- Promote corporate bond market in India **to increase availability of funds**

Recommendations

- Banks needs to **increase lending appetite** by adopting various ALM technique i.e. takeout financing etc.
- Reforms required in establishing well **developed swap and hedge markets** in India
- Ease processes of availing funds, reduce lead time for project appraisal, lower the complexity in documentation process
- National Clean Energy Fund exposure should be fixed for each technology
- Promote crowd funding and micro finance for small scale wind
- Make interest income non-taxable for lenders to enable lowering of interest rate
- Promote subordinate debt market for wind



Equity

- ✓ Sources of Equity Investment
- ✓ Barriers of Equity Market
- ✓ Outlook

Equity – Sources of Investment

	Private Equity	Developers Equity	Capital Market
Features	<ul style="list-style-type: none"> ➤ Direct investments in private companies ➤ Closed-end investment structures ➤ Tenure between 10 to 12 years ➤ Include leveraged buyouts (LBO), venture capital, distressed, growth, mezzanine finance and angel investor 	<ul style="list-style-type: none"> ➤ Comes from reserves and surplus of sponsor's existing businesses ➤ Investors are technically equipped and financially sound companies with committed management 	<ul style="list-style-type: none"> ➤ Established players raise equity investment ➤ Tapping capital markets is feasible only for those companies which have achieved significant scale and have profitable operations
	Most equity investments in Indian wind companies have been made at the parent company level, and not at the project level	Large business houses having surplus cash would play an important role	Established players in the capital market may access funds from public

Equity – Barriers

Returns on Equity vis-a-vis Interest Rate

- RoE is capped for wind
- Increase in cost of debt is decreasing the spread between equity and debt

Availability of Equity

- Lack of availability of debt restrict the equity to invest in new projects
- High interest rate restrict recycling of equity

Recommendations

- Re-look regulatory and policy framework to **suitably compensate equity investors**
- **Provide benefits to retail investors for investment in wind** to increase participation in capital market
- Increase availability of debt to motivate investors to recycle its equity
- **Encourage** small scale private players for the **development of wind**



Risks

- ✓ Project Risks
- ✓ Project Risks Mitigations
- ✓ Risks Matrix
- ✓ Approach

Project Risks

	Risk Source	Description
Project Risks	Wind Supply Risk	Inaccurate site wind measurements
	Performance Risk	Internal and external factors that causes power production to stop or slow
	Cost Risk	Cost overruns and inflation
	Political Risk	Risks arising from political interference
	Approval Risk	Delayed or denied approvals
	Counterparty Risk	Credit risk
	Completion Risk	Risks arising from delays and project abandonment
	Force Majeure	Natural disasters

Project Risks Mitigation

	Risk Source	Means of Mitigation
Project Risks	Wind Supply Risk	➤ Engage qualified wind experts and consultants
	Performance Risk	<ul style="list-style-type: none"> ➤ Insurance for Minimum Generation ➤ Conduct due diligence, stick to industry standards ➤ Use of performance based contracts ➤ Performance guarantee
	Cost Risk	<ul style="list-style-type: none"> ➤ Use fixed price construction contracts ➤ Full maintenance contracts ➤ Insurance coverage
	Political Risk	<ul style="list-style-type: none"> ➤ Government Partial Risk Guarantee ➤ ECA insurance
	Approval Risk	➤ Engage qualified project development partners
	Counterparty Risk	<ul style="list-style-type: none"> ➤ Execute PPA ➤ Use of security in the form of guarantees ➤ Use of fall-back mechanisms i.e. ESCROW and Letter of Credit
	Completion Risk	<ul style="list-style-type: none"> ➤ Use fixed price date certain turnkey EPC contract ➤ Take completion guarantees
	Force Majeure	➤ Take Insurance for natural disasters

Risks Matrix

Degree		
Barriers	High Interest Rate	Extreme
	Volatile Market	
	Returns on Equity vis-a-vis Interest Rate	
	Lack of Long Term Debt	High
	Lack of Fixed Interest Rate Loan	
	Limited Lending to Renewable Energy	
	ECB is Capped	
	Relatively High Performance Risk	
	NPA Issue	
	Wind Supply Risk	
	Cost Risks	
	Political Risk	

Risks Matrix

Degree		
Barriers	Non-Recourse Financing is Limited	Moderate
	Availability of Debt	
	Lack of deep forwards market in foreign exchange	
	Front loaded Cost Structure	
	Policy Distortions	
	Approval Risks	
	Counterparty Risk	
	Completion Risk	
	Force Majeure	Low
	Availability of Equity	
	Transaction costs	
	Uncertainty about the Potential of Recovering Capital Costs from Customers	

Approach

De-Risk: Remove Gaps in Policy and Regulatory Framework to Promote Investment Environment

Increase confidence and provide certainty to lenders and investors



Reduce Demand-Supply Gap: Tap Various Sources of Financing to Increase the Supply of Fund

Commercial
Banks

IFCs and
Institutional
Investors

ECBs

Multilateral
Agencies

Subordinate
Debt



Decrease Cost: Promote Low Cost Financing

Relax norms of financing for bond market, asset classification, guarantee fee and ECB.

Promote NCEF financing, foreign exchange forward market, capacity building, hedging market, non-taxable interest income, micro finance and crowd funding

Results GRID PARITY & REDUCED INCENTIVES



THANK YOU



For more information, please contact :
Wind Discussion Forum Secretariat
C/O IDAM Infrastructure Advisory Services Pvt. Ltd.
801, Crystal Plaza, 158, CST Road, Kalina, Santacruz(EAST), Mumbai - 400 098 India.
Telephone : + 91 22 4057 0201 Website : www.idaminfra.com