

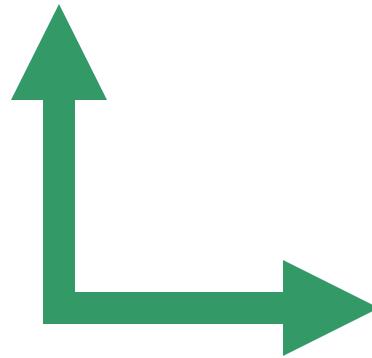


mabagas®



Biomethanation projects
in India

*Sharing experience in
policy and finance issues*



IOT Infrastructure & Energy Services Limited

Glocally Entrepreneurial

Daniel Weisser, IOT mabagas



- ➔ Company Overview
- ➔ Policy challenges
- ➔ Challenges in project finance
- ➔ Project related risks
- ➔ Sensitivity analysis





The JV Partners

- ➔ **mabagas** is German biogas company and 100% subsidiary of the Marquard and Bahls Group of Germany. Over the past 60 years the M&B Group has built leading positions in middle distillates trading and oil/chemical storage terminalling, as well as operating in the biomass energy and carbon trade markets.
- ➔ **IOT** Infrastructure & Energy Services Ltd. is a leading Engineering Company having interests in terminalling, EPC and upstream drilling services. IOT's core competence lies in design, engineering and construction of oil & gas projects with extensive operation & maintenance experience.



The Joint Venture (IOTM)

- ➔ IOT and mabagas International have formed a 50:50 JV company – IOT Mabagas Limited (IOTM) to build, own and operate biomass to energy projects
- ➔ Initial focus on tapping organic and agricultural waste streams in India to become the market leader in designing, constructing and operating commercial scale Biogas plants
- ➔ Mabagas provides process know how & technology expertise
- ➔ IOT provides significant expertise and capabilities in EPC/DE and domestic markets know-how across India



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Policy Challenges (examples)

- ➔ Feed-in Tariff Policy / REC System (domestic)
 - ➔ opex not adequately accounted in variable element of tariff setting
 - ➔ tariff-system based on low capex requirement
- ➔ Carbon Market Policy (international/domestic)
 - ➔ Sharing requirement of CERs with SEB
 - ➔ Risk of discontinuation of CDM in India



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Barriers to (project) finance

- ➔ length of loan-period
- ➔ DSCR (covenant)
- ➔ Grace period
- ➔ access to affordable debt
- ➔ little market experience by financial institutions



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Project related risks (examples)

- ➔ increasing gap between inflationary tendencies in revenues (low) and cost (high)
- ➔ short-term feed-stock supply contracts pose a potentially serious investment risk
- ➔ nascent organic fertilizer markets currently limit the strength of biogas projects to be adequately utilized



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An example of the economic viability of Bio-methanation plants

Project Case	:	2 MW Biogas to Power plant
Total Investment	:	Rs.260 Million (Rs.130 Million/MW)
Capital subsidy (CFA)	:	Rs.15 Million/MW (for mixed waste)
Plant Load Factor	:	80% - 82%
Present power tariff band	:	Rs. 4.24 – 4.7/kWhr
Approx feedstock Reqmt	:	11 Mt/MWhr @ 45% DS Content
Average Min Feedstock price	:	Rs.600/MT (landed at Site)
Price for Organic Compost	:	Rs.600/MT (current market prices)
Carbon Credits Revenues	:	10000 – 20000 Credits/Annum



Overview of financial viability with CER Revenue

Financial Indicators	Unit	Tariff at Rs.4.5/kWhr	Tariff at Rs.5.75/kWhr
Equity	%	30%	30%
Debt	%	70%	70%
Cost of Debt (min)	%	11%	11%
Equity IRR (pre tax)	%	9.0%	19.5%
Project IRR	%	10.7%	18.0%
Payback time	Years	9.2	5.45

Other Assumptions:

CFA : Rs.15 Million / MW
 Sale price of Compost : Rs.1200/MT
 CER Revenue : € 10 /CER

CERC Tariff determination provides for 19% pre tax RoE for first 10 years & 24% thereafter



Overview of financial viability without CER Revenue

Financial Indicators	Unit	Tariff at Rs.4.5/kWhr	Tariff at Rs.5.75/kWhr
Equity	%	30%	30%
Debt	%	70%	70%
Cost of Debt (min)	%	11%	11%
Equity IRR (pre tax)	%	3.5%	14.2%
Project IRR	%	5.7%	14.3%
Payback time	Years	12.3	6.8

Other Assumptions:

CFA : Rs.15 Million / MW

Sale price of Compost : Rs.1200/MT

CER Revenue : NIL

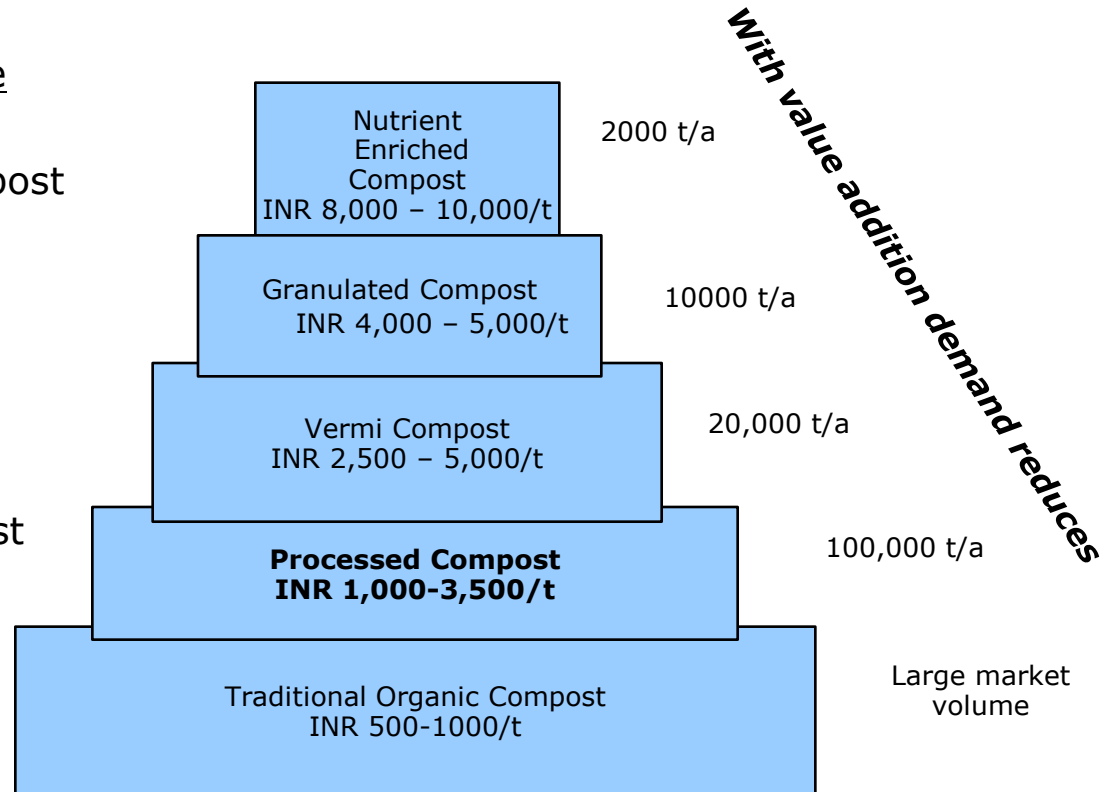
CERC Tariff determination provides for 19% pre tax RoE for first 10 years & 24% thereafter



Present Market of Organic Compost

Products currently being traded in the Market:

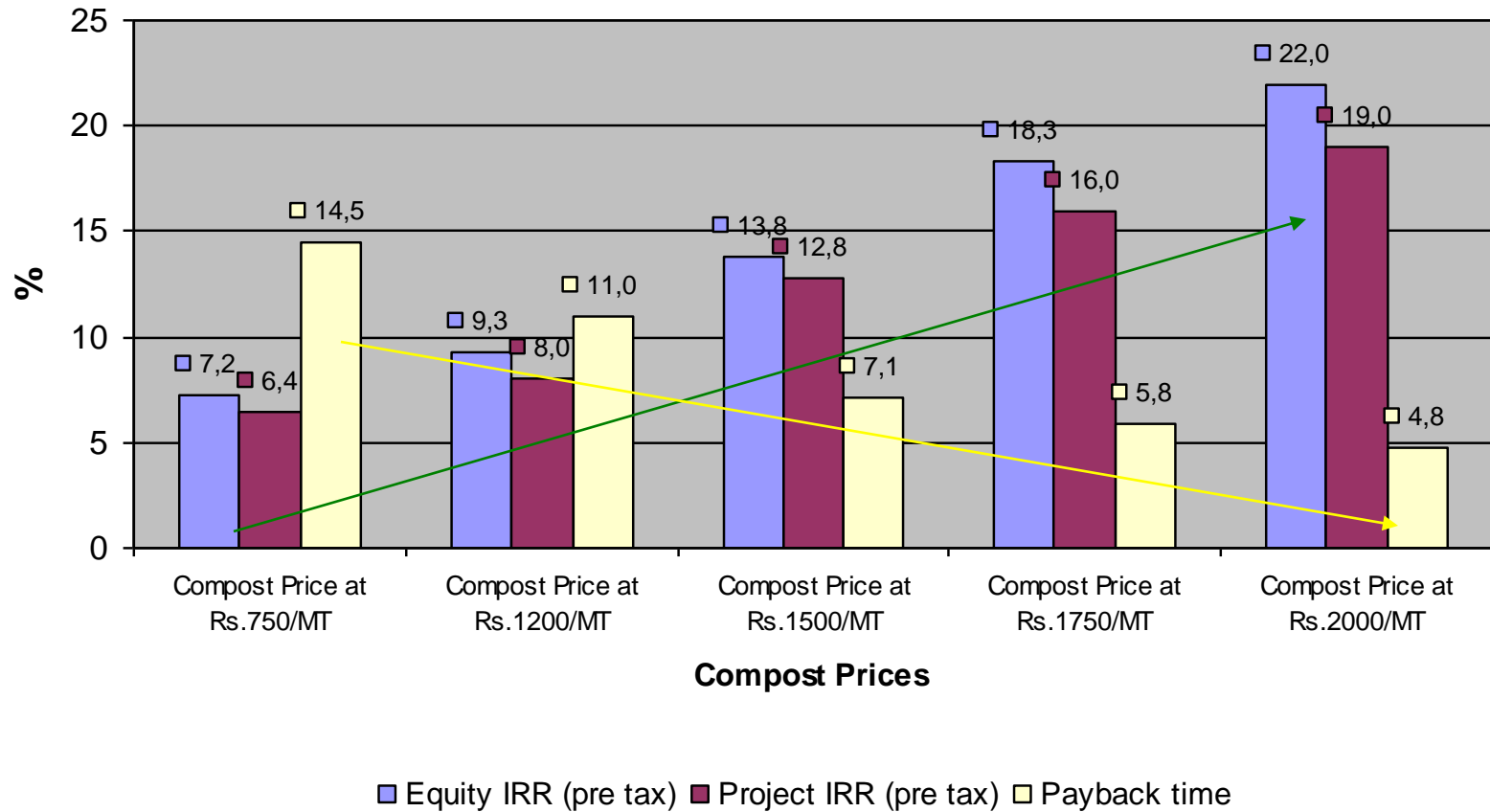
- Animal Manure as Mulch & Compost (Poultry litter, Cow dung waste composts)
- Crop Residues as mulch
- Municipal Waste as Compost
- Agro Industrial waste as Compost (Press mud, dairy waste)



Organic fertilizer from bio-methanation plants would fit into the processed compost space



Sensitivity of returns linked to value realizable from Organic Compost (CER revenue included)





Thank you

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