



Gram-Prakash Securities

Scaling renewable mini-grids in rural India and providing stable electricity to millions of people

April 2017

Kellogg-Morgan Stanley
Sustainable Investing Challenge



400 MILLION

People live with little or no access to electricity in India

90%

Located in rural area





KEROSENE & DIESEL

Main energy source for rural communities
Expensive and unreliable

BIOMASS

Agricultural and animal waste - widely available
Yet mostly neglected



CHALLENGES FOR STATE-GRIDS



GEOGRAPHY



INFRASTRUCTURE



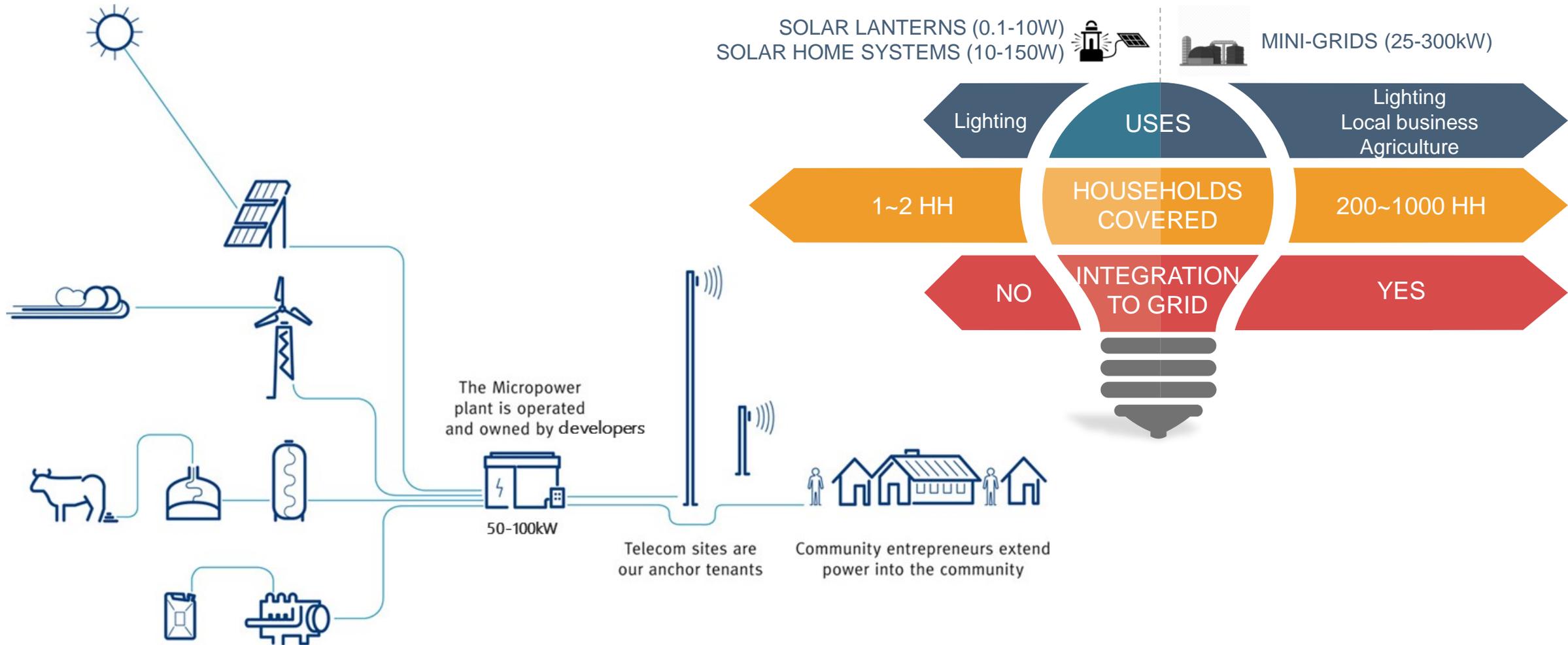
FOSSIL FUELS



LOW PRIORITY



A MINI-GRID IN A NUTSHELL



Source: OMC

GRAM-PRAKASH SOLUTION

GRAM-PRAKASH



DEBT



DEVELOPMENT



OPERATION



BIOMASS
MINI-GRIDS
(50-100kW)



LOCAL
DEVELOPERS



EQUITY

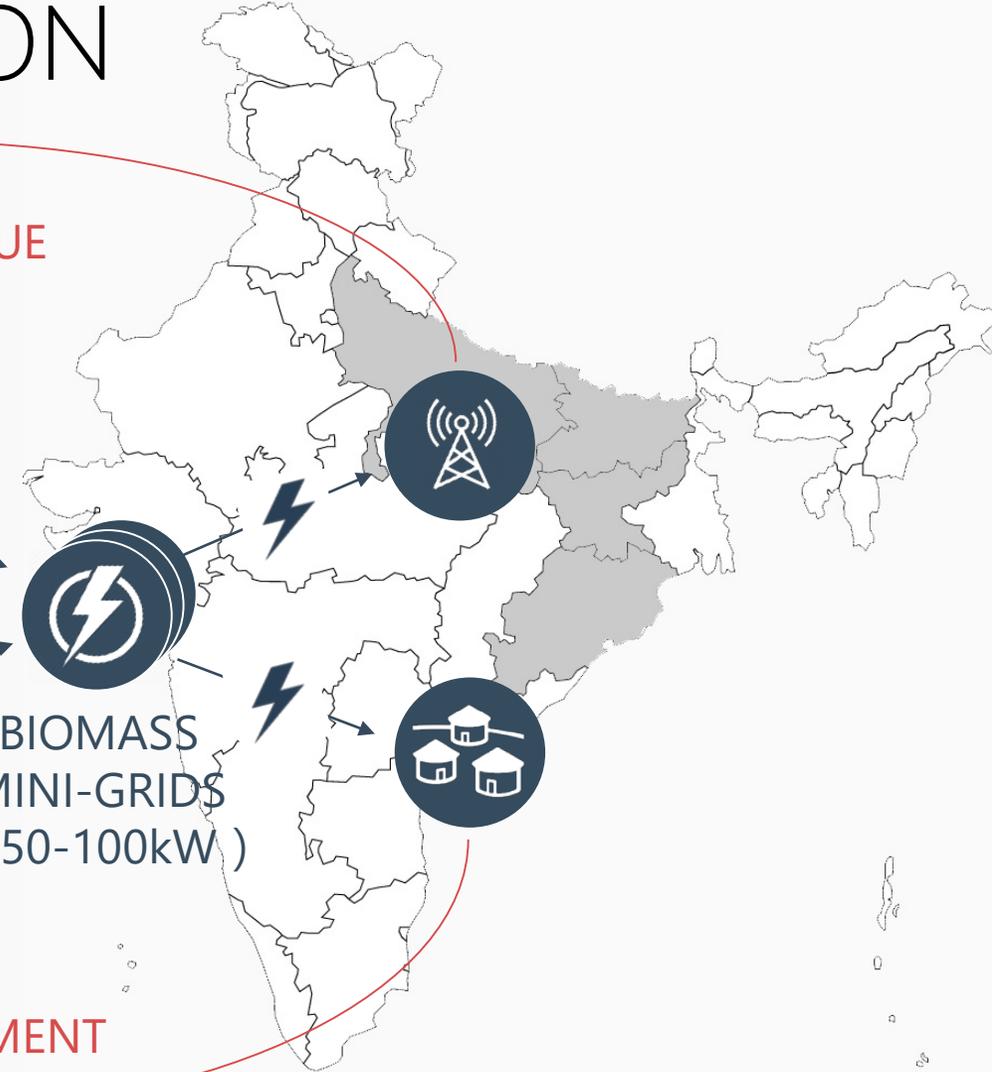


CONCESSIONAL
EQUITY

ANCHOR REVENUE

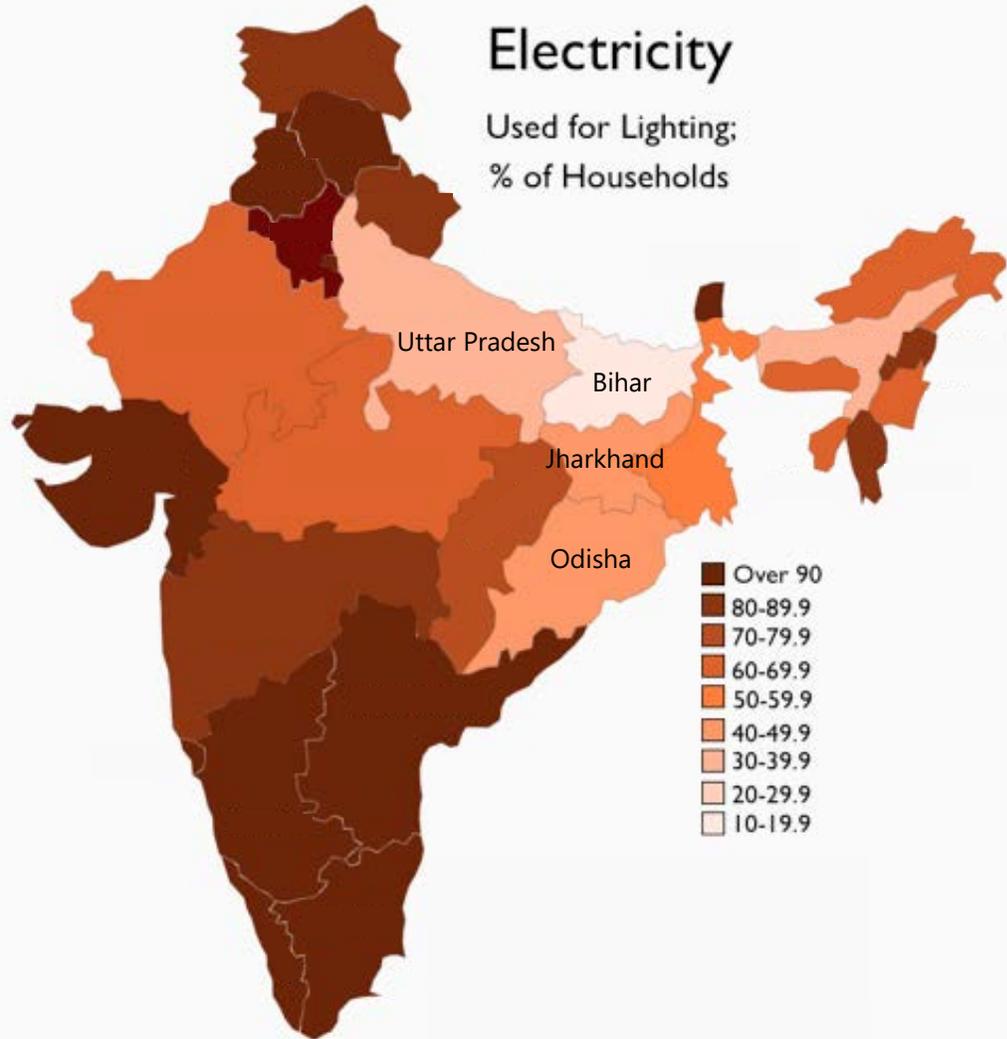


MONTHLY PREPAYMENT





VILLAGE DEVELOPMENT CRITERIA



INADEQUATE OR NO GRID



ABUNDANT FEEDSTOCK



HIGH WILLINGNESS TO PAY



POLICY CERTAINTY





...WITH SIGNIFICANT SOCIAL IMPACT



7 hours of electricity/day
1000 households
10 irrigation pumps; 5 shops



Average household
income increases by 30%



12,000 job in O&M
and supply chain



Reducing 600,000 tones
of CO2 emission/year



Additional study time 2 hours/day
15% reduction in medical expense



RISKS AND MITIGATION STRATEGIES



FEEDSTOCK

- Contract supply with multinational agri-business
- Community co-ownership
- In-kind trade



REVENUE

- 40% from anchor users
- Mobile prepayment for households



POLICY

- Only operate where clear mini-grid policy
- Partner with reputable local companies
- Political risk insurance



O&M

- Community co-ownership
- Contract with reputable c/p
- Proven low-cost technology and design



TECHNOLOGIES

- Open to integrate other technology when cost-effective
- Currently biomass most cost-effective (LCOE at 6c-8c/kWh)



FEEDSTOCK LESS A ISSUE FOR MINI-GRIDS



RISKS AND MITIGATION STRATEGIES



FEEDSTOCK

- Contract supply with multinational agri-business
- Community co-ownership
- In-kind trade



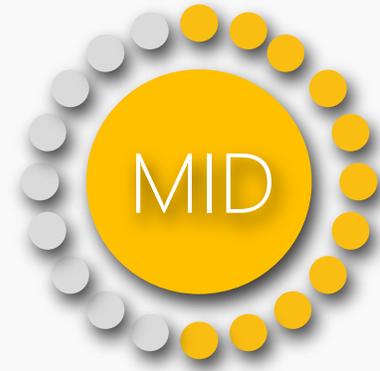
REVENUE

- 40% from anchor users
- Mobile prepayment for households



POLICY

- Only operate where clear mini-grid policy
- Partner with reputable local companies
- Political risk insurance



O&M

- Community co-ownership
- Contract with reputable c/p
- Proven low-cost technology and design

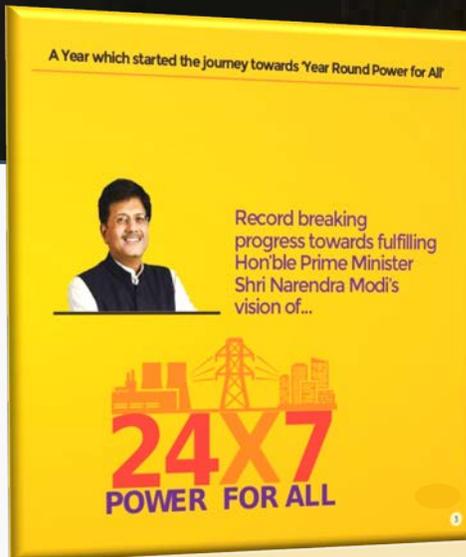


TECHNOLOGIES

- Open to integrate other technology when cost-effective
- Currently biomass most cost-effective (LCOE at 6c-8c/kWh)



POLICY CERTAINTY REQUIRED



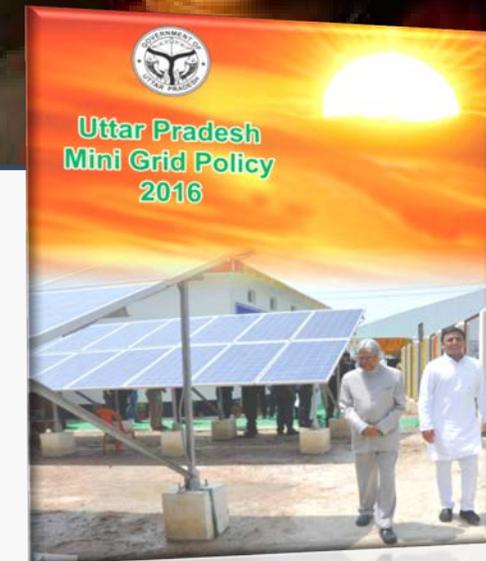
Ministry of Power

Joint initiative between federal and state governments to supply electricity to all commercial and retail consumers by 2019



MNRE

MNRE has set out an ambitious target to increase renewable energy generation 5X to 175GW by 2022



Uttar Pradesh

UP has become the first state to implement a mini-grid policy addressing private developer concerns



RISKS AND MITIGATION STRATEGIES



FEEDSTOCK

- Contract supply with multinational agri-business
- Community co-ownership
- In-kind trade



REVENUE

- 40% from anchor users
- Mobile prepayment for households



POLICY

- Only operate where clear mini-grid policy
- Partner with reputable local companies
- Political risk insurance



O&M

- Community co-ownership
- Contract with reputable c/p
- Proven low-cost technology and design



TECHNOLOGIES

- Open to integrate other technology when cost-effective
- Currently biomass most cost-effective (LCOE at 6c-8c/kWh)



GRAM-PRAKASH SPV CAPITAL STRUCTURE

CAPITAL	TARGET INVESTORS	SIZING	INDICATIVE PRE-CONVERSION EQUITY (%)	INDICATIVE POST-CONVERSION EQUITY (%)	BASE CASE IRR
Gram-Prakash Convertible Debt	Institutional investors	\$50M-\$100M	0% (option to convert at year 5)	50%	13%-15%
Operator Equity	Local developers	\$15M-\$30M	30%	20%	19%-25%
Concessional Equity	Foundations Impact Investors	\$35M-\$70M	70%	30%	15%-22%

PUSHING THE BOUNDARIES OF SUSTAINABLE INVESTING

Potential institutional investors



Local developers



Concessional equity providers



INVESTMENT THESIS



LOW-COST PROVEN TECHNOLOGY

Market driven model with proven operating models

Underserved market results in high-potential natural monopolies



DE-RISKED FUTURE CASHFLOWS

Investment vehicle contingent on long-term agreements with top-tier strategic partners

Economies of scale reduces logistical costs associated with feedstock and O&M



PORTFOLIO DIVERSIFICATION

Trade-off between lower liquidity yet low beta

Pushes the frontier for sustainable investing with clear reportable metrics



SUPPORTIVE POLICY FRAMEWORK

Enabling policy environment with National Indian Mini-Grid Policy to be approved in April 2017



OUR TEAM AND THANK YOU



HONGFEI
WANG

Canadian



LINA
GEDVILAITE

Lithuanian



APOORVE
KHANDELWAL

Indian



TIM
MAY

Australian



THANKS TO OUR CONSULTATION PARTNERS

MOODY'S

SmartPowerIndia
Powered by ROCKEFELLER FOUNDATION

CONERGY

GE Energy

InfraCo
Asia

MILINDA
PRODUCE WELL · CONSUME WISELY



vodafone

Bharat Petroleum
energising lives

IFC | International Finance Corporation
WORLD BANK GROUP

THE ROCKEFELLER FOUNDATION

HUSK POWER SYSTEMS
हस्क पावर सिस्टम्स
तमसो मा ज्योतिर्गमय

ENGIE

indus TOWERS

BCP
BAMBOO CAPITAL PARTNERS

ARMSTRONG ASSET MANAGEMENT

Olam



TOTAL

Christian Super
adding values to money

OBI PARTNERS

BERKELEY ENERGY

Cargill

argus



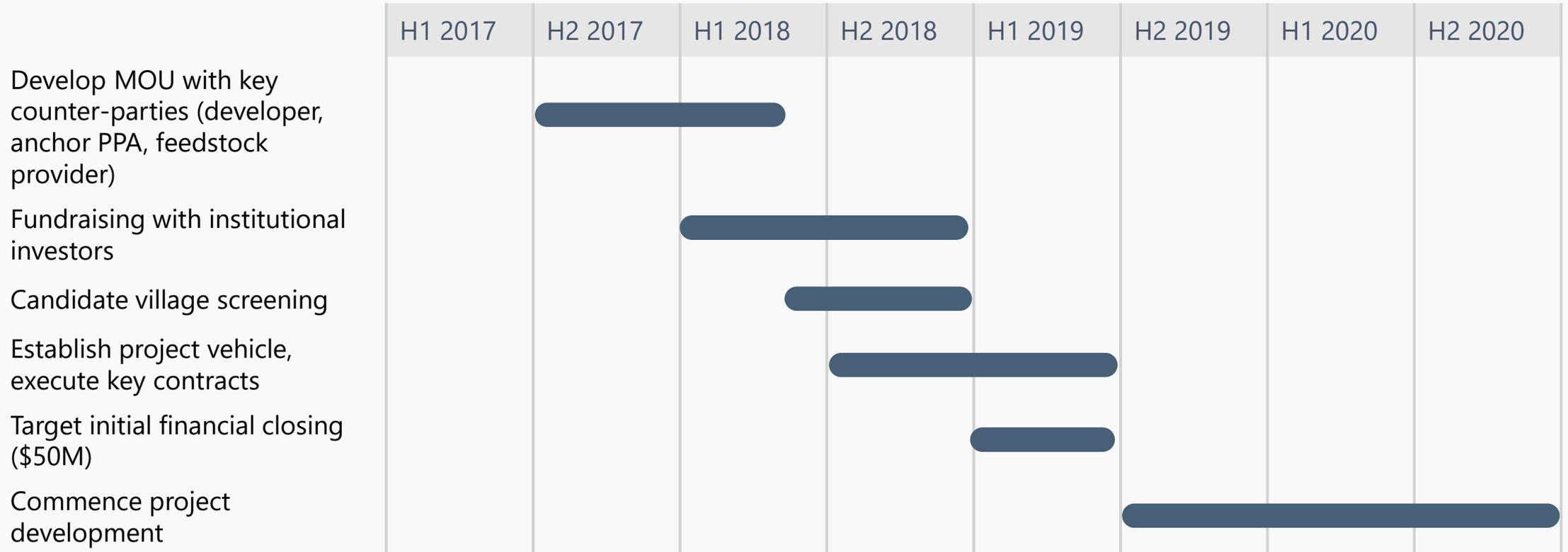
APPENDIX

Scaling renewable mini-grids in rural India and providing stable electricity to millions of people

April 2017

Kellogg-Morgan Stanley
Sustainable Investing Challenge

IMPLEMENTATION TIMELINE





KEY INVESTMENT CASE ASUMPTIONS

Capex cost	\$1890 / KW	Approx. household energy consumption	30 KWh / month
Indicative plant size	50-100 KW	Feedstock cost	\$41.28/T
Capacity factor	60%	Feedstock usage (p.a.)	259-518T
Anchor capacity utilisation	25%	Feedstock escalation	5.0% p.a.
Anchor tariff (PPA)	20c / KWh	Operations & maintenance expense	5% of revenues
Household access tariff	\$2.50-\$3.00 / month	Marketing & admin expense	5% of revenues

Note: USD figures used rather than INR for ease of comparability in prospectus



INDICATIVE SECURITY STRUCTURE

Asset Class	Indicative Baa/Ba grade convertible debt security (once operational)
Security Size	US\$100M, sufficient to catalyze 2,000 projects in villages at 50% leverage
Target return	12% -15% (local currency)
Management fees	1.0% + 20% return over 8% (where access impact targets are achieved)
Fund Maturity	20-25 years
Term	10 years, with option to convert to equity after 5 years. Subsidized equity capital willing to accept additional economic dilution in event of conversion (still likely to receive 15%+)
Interest rate	6.4% (10 year Indian govt bond rate)
Underlying asset	<ul style="list-style-type: none">• Income generating mini-grids are pooled to form SPV.• Primary revenue counterparty (25% capacity allocation) to be investment grade Telco firms• Strong partnership with preferred operators within target States with successful projects underway• Fund expected to invest in 5-10 separate SPVs (across various States and operating technologies)
Hedging	Product will remain unhedged

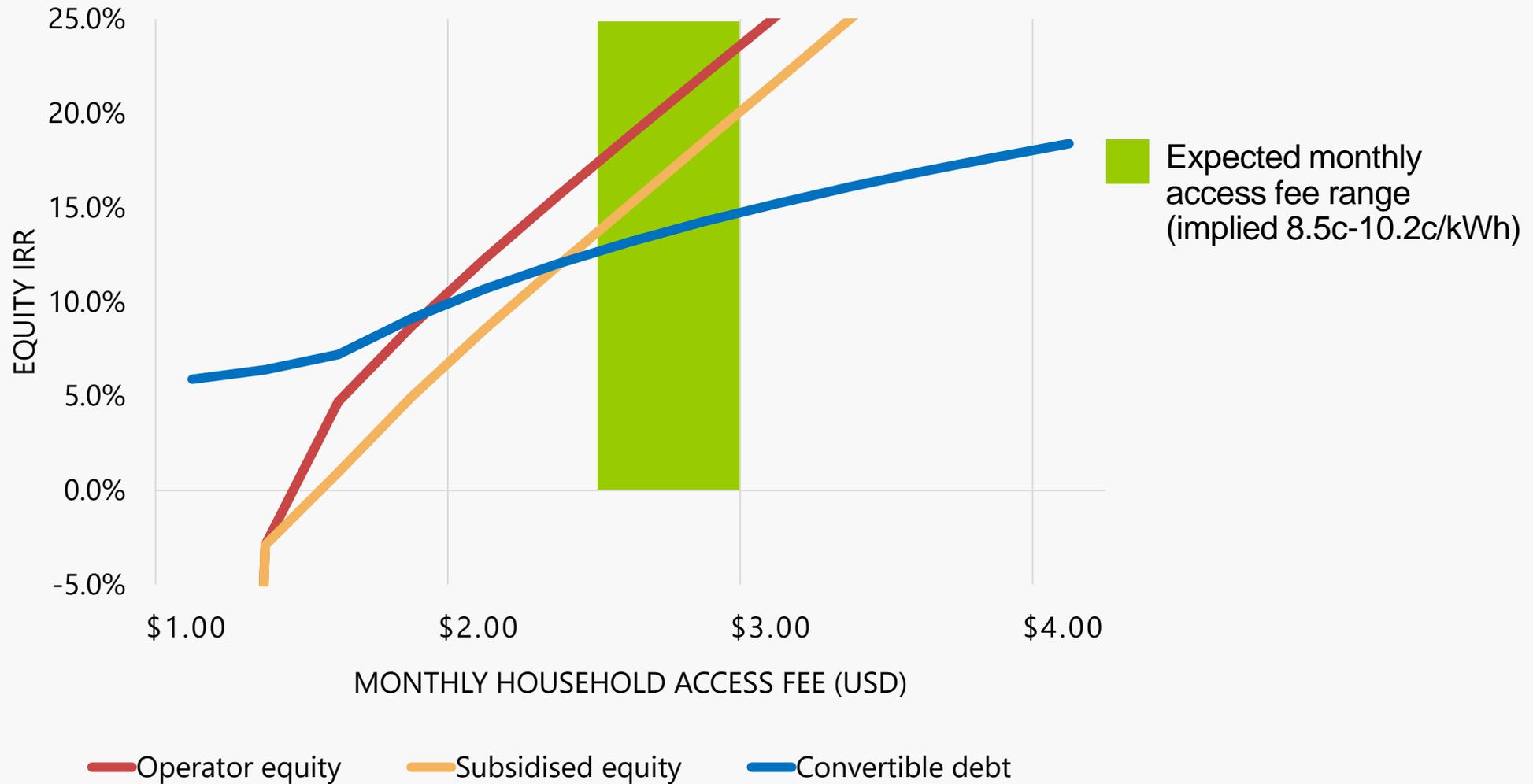


MATRIX FOR INDICATIVE CREDIT SCORE

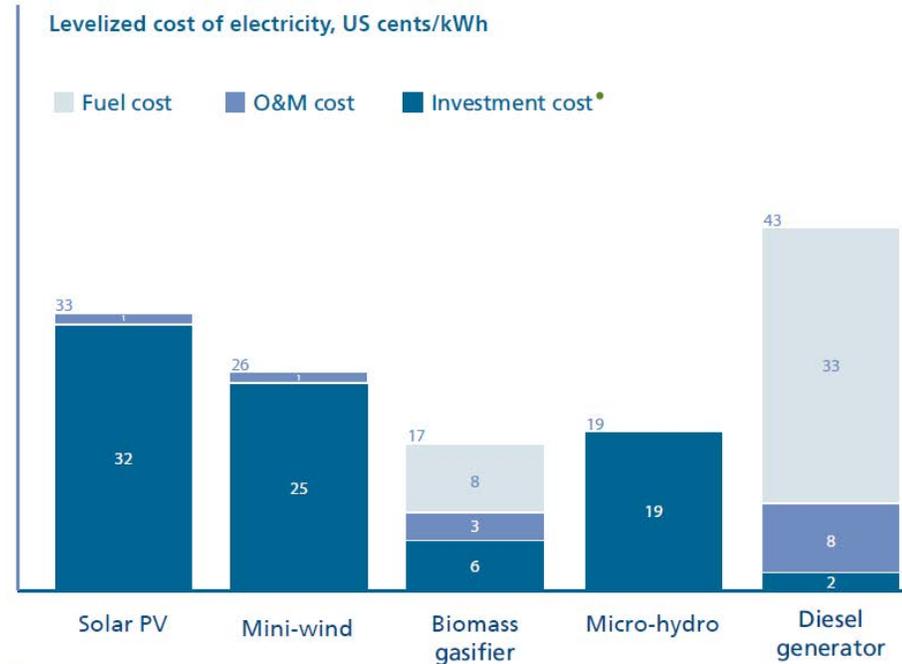
Factor category	Indicative assessment	Indicative credit score
Predictability of cashflows (30%)	About 40% of expected cash flow stream is based upon contracted or hedged cash flow. Some risk of fuel supply; fuel supplier is rated below investment grade.	Ba/B
Competitiveness/ Regulatory Support (15%)	Generally supportive regulatory framework for renewable generation from central government, regional jurisdiction or rate setting authority, but support could erode over time due to a change in law or supportive regulation.	Ba
Technical Risks / Vendor Profile (10%)	Recognized vendor has direct experience with this technology and has successful performance history. Warranties for bio-mass plants in place for [10] years.	Baa
Quality of O&M Contractual Framework (10%)	O&M contract with recognized operator, but limited support can be expected if performance problems persist.	Ba
Key financial metric (35%)	DSCR of 2.7x-2.9x over security life under Base Case	A
Overall assessment		Baa/Ba



HOUSEHOLD PAYMENT REMAINS UNCONTRACTED



Comparative technology economics



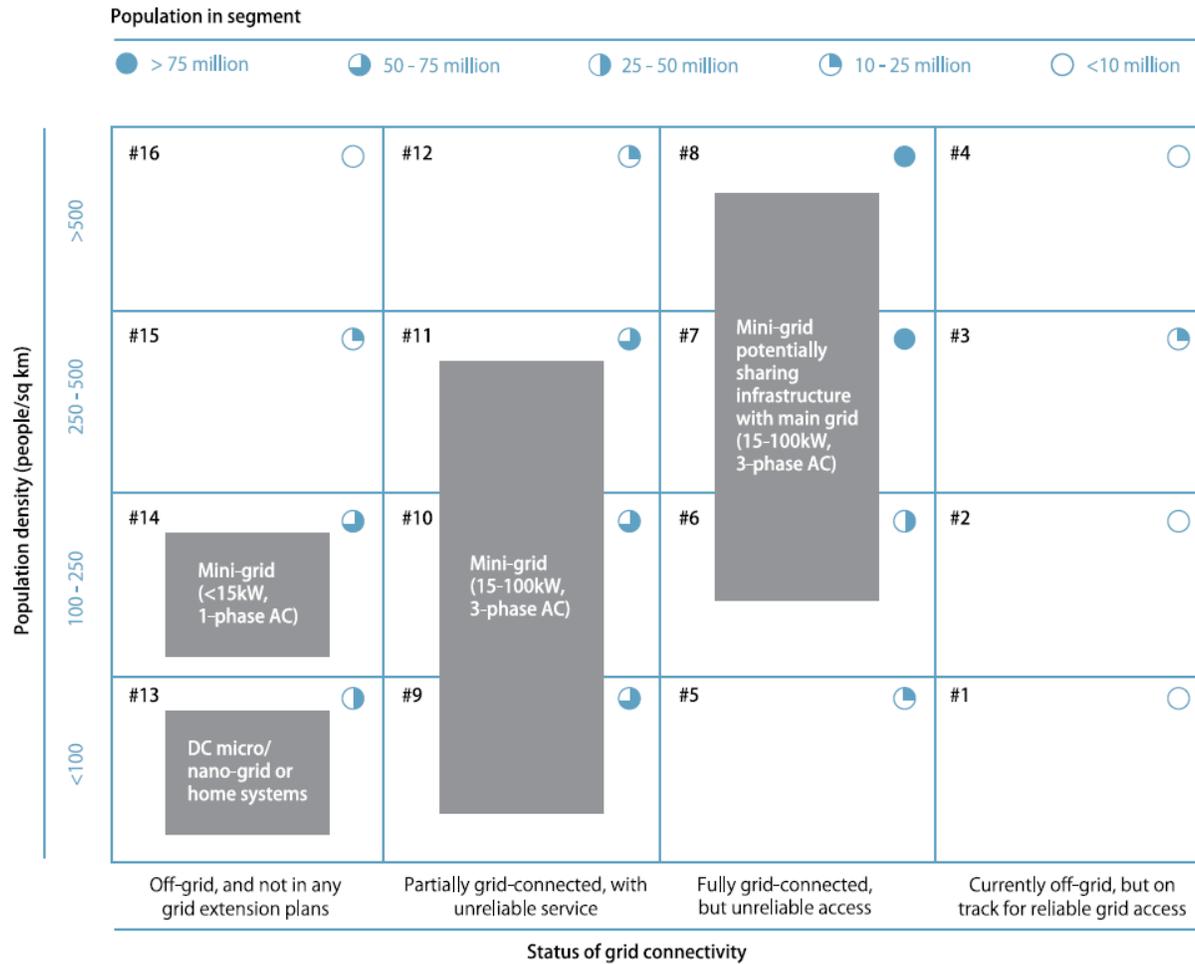
- Capacity Factors vary considerably among locations and have significant impact on plant economics, especially for solar PV or Micro-hydro
- Biomass power cost is mainly driven by fuel cost; small plants are fueled with local feedstock, usually at a cheaper price compared to market
- Difficult access to credit can increase the overall cost, particularly for capital-intensive ones, like Solar PV, Mini-wind, or Micro-hydro

Main Assumptions					
Capex \$/kW	4,800*	3,300	3,800	3,000	850
Useful life Years	20	20	20	25	15
Capacity factor %	20	18	80	20	80
Fuel costs \$/kW	n.a.	n.a.	32* \$/ton	n.a.	0.98 \$/l

- WACC at 10%
- 20% premium price over the residential PV prices in Europe
- Heat content at 2 MWh/ton (wood after felling at 55% moisture)

Source: IFC, ESMAP, World Bank, McKinsey analysis

Potential market sizing



Source: ITT