Morgan Stanley Sustainable Investing Challenge 2014

HELIOS

Financing solar irrigation in India

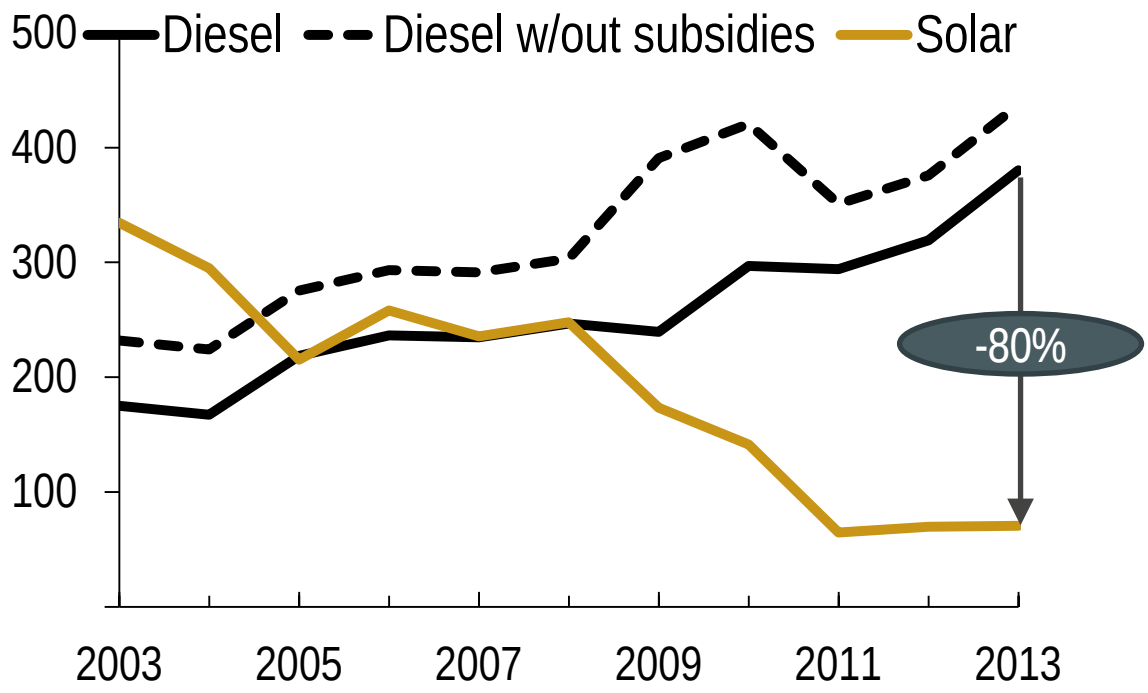
CHALLENGE: 70 million farmers in India power their irrigation systems with diesel generators

- High fuel costs
- Exposure to fuel price volatility
- Wasteful fuel subsidies
- CO_2 emissions

OPPORTUNITY: Solar-powered irrigation systems alleviate all these issues, are now economical

Total cost of ownership of irrigation systems[1]

'000 INR



- Proven technology
- No fuel or subsidy costs
- Lower maintenance costs
- No CO_2 emissions

1 Based on HWWI and HELIOS research, current fuel prices based on EIU research, lifetime 20 years, discount rate 10%

BARRIERS: Adoption of solar-powered irrigation hinges on available financing and improvements in distribution

1

Financing: The underserved "middle market segment"

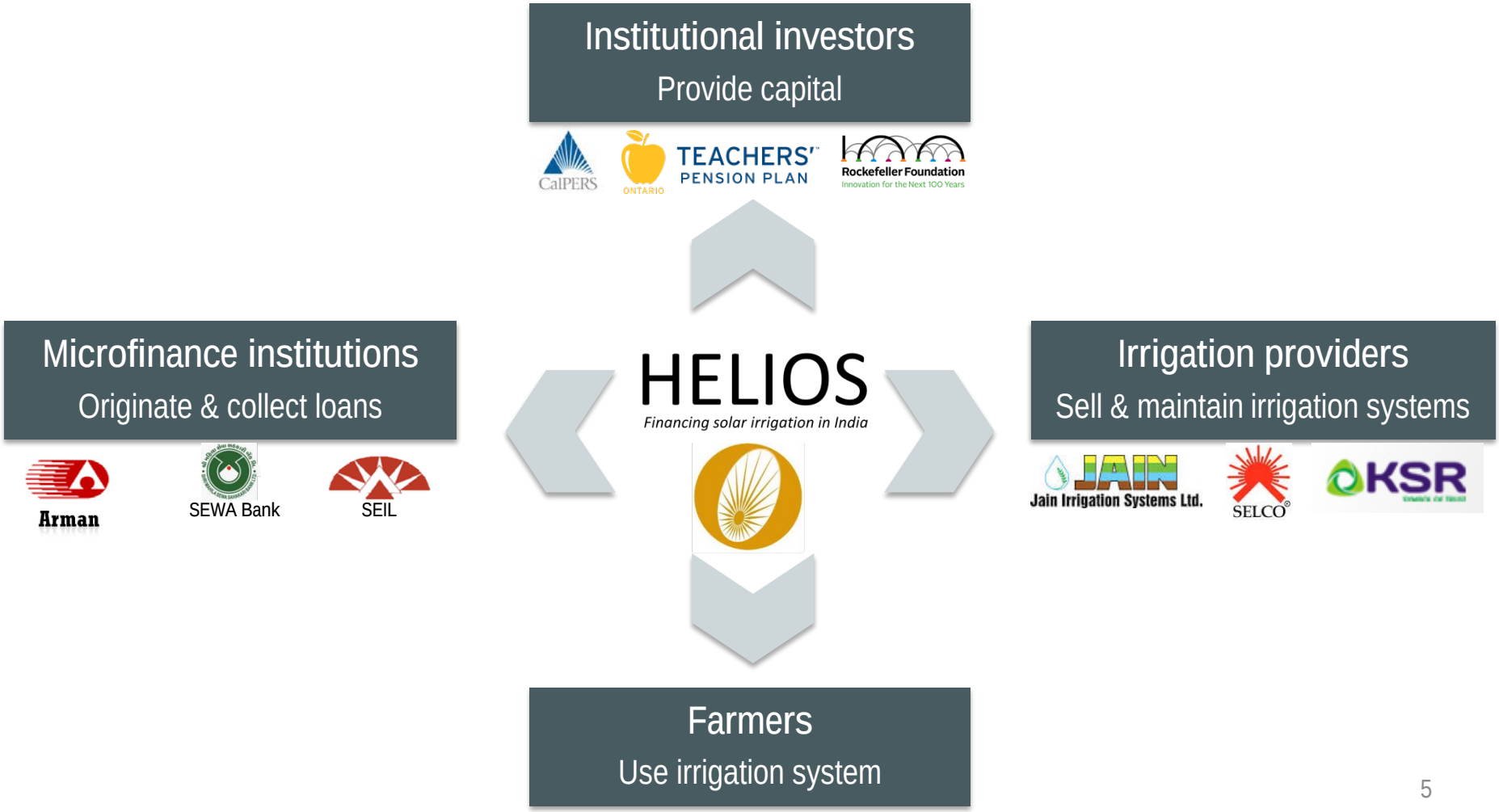
- Typical loan for solar-powered system ~3400 USD, 5-6 years
  - Too large, tenure too long for typical micro financing
  - Too small, with little-understood collateral for commercial banks
- Total capital need enormous: Replacing all pumps would require > USD 100bn

2

Distribution: Little coordination along supply chain

- Distributors sell only small volumes, have no access to volume rebates
- Lack of standardization means higher maintenance costs, weak secondary markets

HELIOS solves this challenge by bringing institutional investors, system providers and farmers together



HELIOS reduces annual costs for farmers and eliminates risks of fuel price and subsidies

	Diesel system	Solar with HELIOS
Structure	Either already owned (convert) or newly acquired	Loan over 3400 USD, 5 years repayment, 16% real interest
Up-front costs	~ 550 USD	1000 USD (down payment)
Annual costs	~1000 USD	First 5 years: ~720 USD Then: ~20 USD
Maintenance	Often required, accounts for up to 5% of annual costs	Provided by HELIOS, then ~20 USD/year
Price risks	Fuel price (last 5yrs: +50%) Reductions in fuel subsidies	-

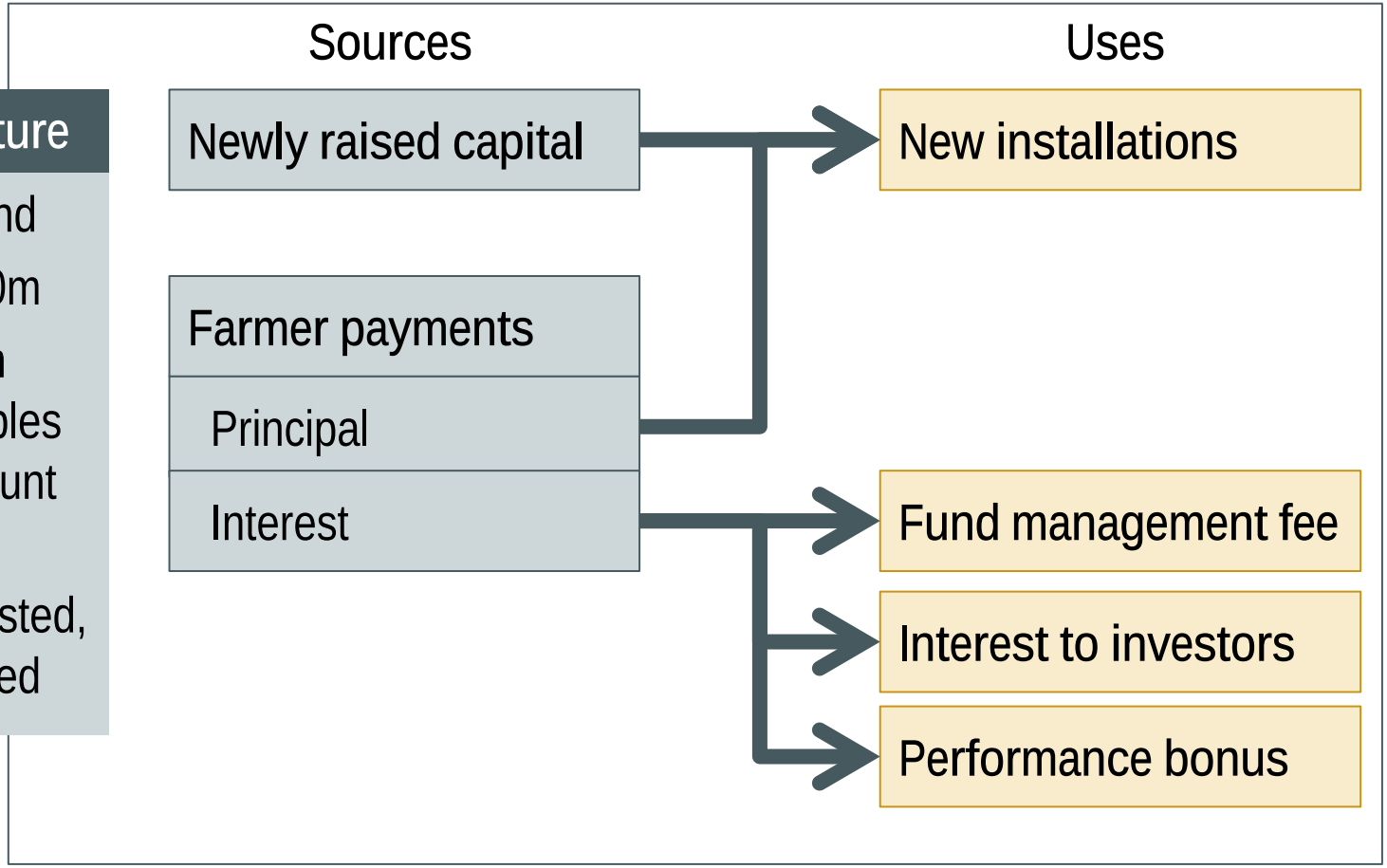
Conversion from diesel[1]: NPV USD 2670, IRR 45%

1 Lifetime of 10 years, discount rate 10%
SOURCE: HELIOS, Microfinance Information Exchange, Price quotes from diesel and solar producers

HELIOS is an open-ended structured fund that will reinvest principal repayments and disburse interest

Financing Structure

- Open-ended fund
- Target size: $10m
- Capital called in tranches (multiples of $1m) to account for scaling
- Principal reinvested, interest disbursed



HELIOS will return 7% annual interest + 80% of the upside to investors and allow for an exit after 10 years

Profit-sharing arrangement

- 2% management fee
- 7% hurdle rate
- Returns above 7% will be split 80:20 in favor of investors

Exit option

- When investor wants to exit, principal will be repaid over following 5 years

Sample calculations for annual profit sharing[1]

	Low case	Base case	High case
Achieved return[2]	7.0%	12.3%	15.0%
Retained by HELIOS	0.0%	1.1%	1.6%
Returned to investors	7.0%	11.2%	13.4%

1 Assuming gradual scale-up, exit of investors in years 11-15
2 After 2% management fee

HELIOS will create a 12-15% IRR for investors under 9 key risk scenarios

Risk mgmt of default rates:

- Alignment of incentives with MFIs
- Resale/reuse strategy for collateral (solar panels)
- Potential insurance against extreme weather events

Sensitivity calculations: IRR

Deployment speed \ Default rate	Low	Base	High
Fast	15.4%	15.1%	14.6%
Base	14.2%	13.8%	13.3%
Slow	13.0%	12.6%	12.3%

Risk mgmt of delays in deployment:

- Tranching of capital injections
- Strategic partnerships with experienced distributors
- Alignment of incentives (signup bonus)

HELIOS will deliver significant social impact for the farmers and society at large

For the farmer

- Lower fuel costs of USD 800 / year
- No exposure to oil price volatility
- No dependency on fuel subsidies

For society at large[1]

- No local air pollution
- Fuel subsidies saved: USD 18.6 million
- Lower CO_2 emissions: 350,000 t CO_2

1 Based on full deployment with USD 10m assuming a ten year project lifetime

HELIOS has sparked interest with investors and partners, is entering a pilot phase this summer

	Idea phase Jul 2014	Pilot phase Aug 2014 – Aug 2015	Scaling phase Sept 2015

Key activities	• Test and **refine idea** with experts
	• Elicit **interest** with and select **partners** for pilot phase:
	  • Local distributor
	  • Fin. service provider
	• Define **pilot team**
	• Raise **funding** for pilot phase
		• Define **specific pilot region** (most likely in South Gujarat)
		• Assess and select **equipment**
		• **Install** at least 50 systems
		• Refine **processes**
		• Raise **funding** for scaling phase
			• **Extend** partnerships
			• **Call** first tranche
			• **Scale up** loan disbursement

Funding	• Equity contribution (in-kind) • Startup competitions	• Foundations • Potentially angel investors • Potentially impact investors	• Institutional investors • Impact investors

HELIOS has identified Gujarat as ideal state to start a pilot, with lots of potential to scale across India

Why start in Gujarat ?

Favorable business climate

- No domestic content requirements
- 34 international companies are developing Gujarat's large-scale solar

Strong agricultural and solar sector

- 34% growth in cropped agricultural land in last 10 yrs
- 320,000 hectares of land covered by micro irrigation
- Diversified crop & cropping patterns
- Rapid growth of economy and population (60m)

State support for solar

- National Solar Mission support for off-grid systems
- More than 1 GW of solar PPA's closed
- More than 823 MW built by 2013

HELIOS has tested and refined its model thanks to the input of numerous partners and mentors

Mentors and advice

Atish Babu
Venture Capital, focused on agriculture and food tech startups in India; MBA HBS, MIT SB

David Lingelbach, PhD
20+ years experience in banking, hedge fund mgmt in emerging economies

Tanvi Nagpal
15 yrs experience in development program management in the water sector, Gates Foundation, WB

Roger Leeds, PhD
Leading expert for emerging markets (WB, IFC) and VC fund manager

Kurt Lambert, PhD
Serial entrepreneur, developer of first hedge fund credit risk methodology

Salman Zaheer
Former Energy Sector Manager, South Asia, The World Bank

Mark Peterman, PhD
CEO, OndaVia

Anita Campion
President AZMJ
20+ years experience in ag finance

Biplab Paul
Social Entrepreneur, Irrigation in Gujarat, Awarded by Ashoka, US Dept of State, WB, Aga Khan

Potential partners

Mr. Jain
CEO Jain Solar

JAIN Jain Irrigation Systems Ltd.

Mr. Girish NR
SELCOLABS

SELCO®

Picture credits: International Water Management Institute

Appendix

The HELIOS team has strong experience in finance, consulting, international development and resources

- Mallory Baxter
- 3 years experience in public financial management (Gov't of Canada)
- Project mgmt. experience in social impact assessment
- MA in Int. Economics, Int. Development[1]

- Markus Wilthaner
- 5 years work experience in strategy (McKinsey) and IT consulting
- MA in Int. Economics, Energy & Resources[1]
- MSc Business Informatics, TU Vienna / NU Singapore

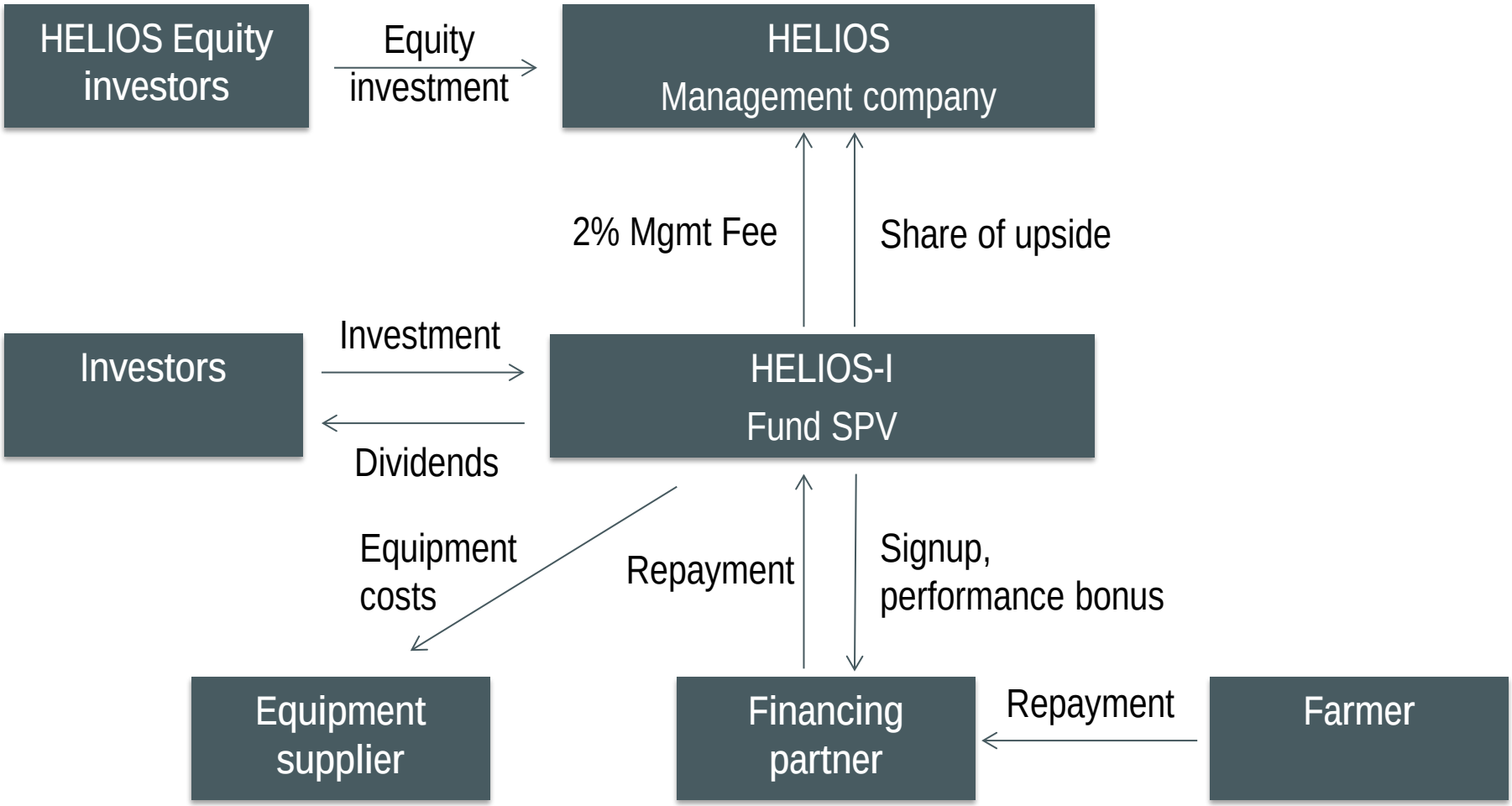
- Nick Luter
- 7 years work experience conducting hedge fund risk analysis and research
- Experience working on Int'l Development Consulting projects and with OPIC.
- MA in Int. Relations and Economics[1]

Michael Eschmann

- 3 years work experience in renewable energy consulting - expert for sustainability impact measurement
- MA in Int. Economics, Energy & Resources[1]
- B.A. Business Administration and Finance, Zurich University

1 Expected May 2014

HELIOS structure and cash flows



HELIOS is able to manage risks better due to scale

Key risk	Impact	Probability	Mitigation strategy
Increase in fuel subsidies	Medium	Low	• Slow down deployment and capital calls
Increase in solar panel prices	Medium	Low	• Manage volume contracts with suppliers, slow down deployment and capital calls
Higher default rates due to extreme weather event, adverse food prices…	High	Medium	• Improved monetization of collateral due to scale and arrangements with producers • Aligning interests of distributors and finance providers through bonus payments • Insurance against adverse weather events or food prices
Depreciation of rupee against USD	Medium	Medium	• Tranching allows for some flexibility in disbursement • Potentially financial hedging (dependent on investor preferences)

Key assumptions in financial model

Assumption		Value	Source
Loan to Farmer	Interest Rate (Real)	16 %	MFI interviews
	Loan Size	$ 2363	Calculated
	Default Rate	8%	Assumption – 2% in Y1-3, 1% in Y4-5
	Down Payment	30%	Industry standard
	Repayment Period	5 years	MFI interviews
Solar System	Capex	1588 $/KW	Research with equipment suppliers
	Volume rebates	15%	Research with equipment suppliers
	Average fuel costs (for diesel equivalent)	1.32 $/l	0.8 $/l (Delhi price) + 65% (GSMA)
Financing	Administrative fee	$ 5/loan and year	MFI interviews
Distributor	Signup bonus	$ 50	MFI interviews

Examples of solar-powered water pumps

- **Producer:** Eco Systems International
- 2.5 hp (~1.9 kW)

- **Producer:** CLARO
- 7.5 hp (~5.6 kW)