



THE CENTER FOR
CLIMATE STRATEGIES



Steps and Methodologies for Renewable Energy Implementation Projects

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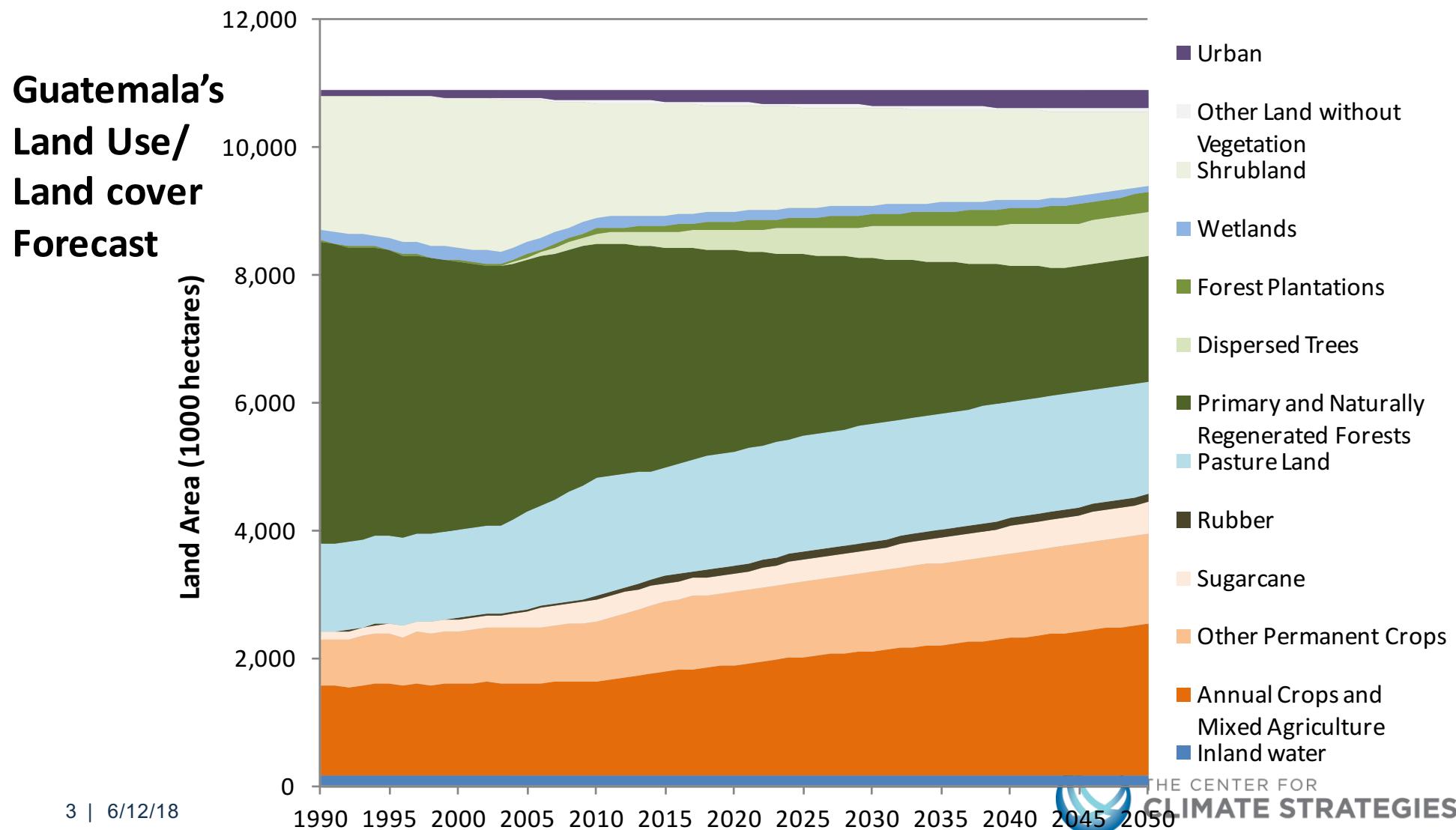
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LCD/LEDS/NDC Toolkit versus REI Toolkit

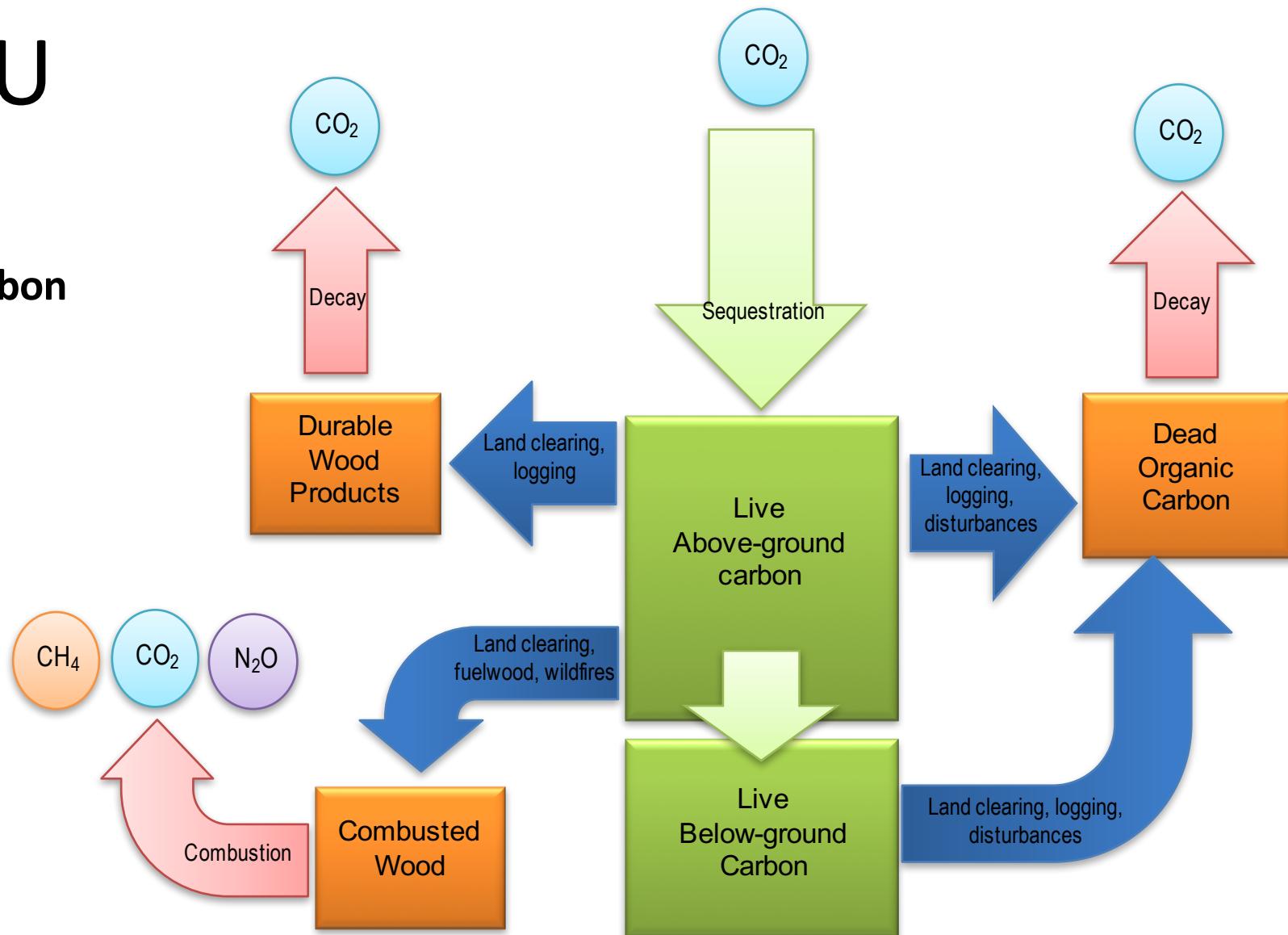
- LCD/LEDS/NDC Toolkit – designed to support *policy* design and analysis
 - Direct impacts and costs: energy/resources impacts, emissions, direct societal costs
 - Indirect impacts: jobs, gross domestic product
- REI Toolkit – designed to support *program or project* design and analysis (and subsequent scale-up)
 - Direct impacts: power generation, emissions
 - Financing requirements and risk, including program/project level return on investment, internal rate of return, etc.

LCD/LEDS/NDC Toolkit Examples: Agriculture, Forestry & Other Land Use (FOLU)

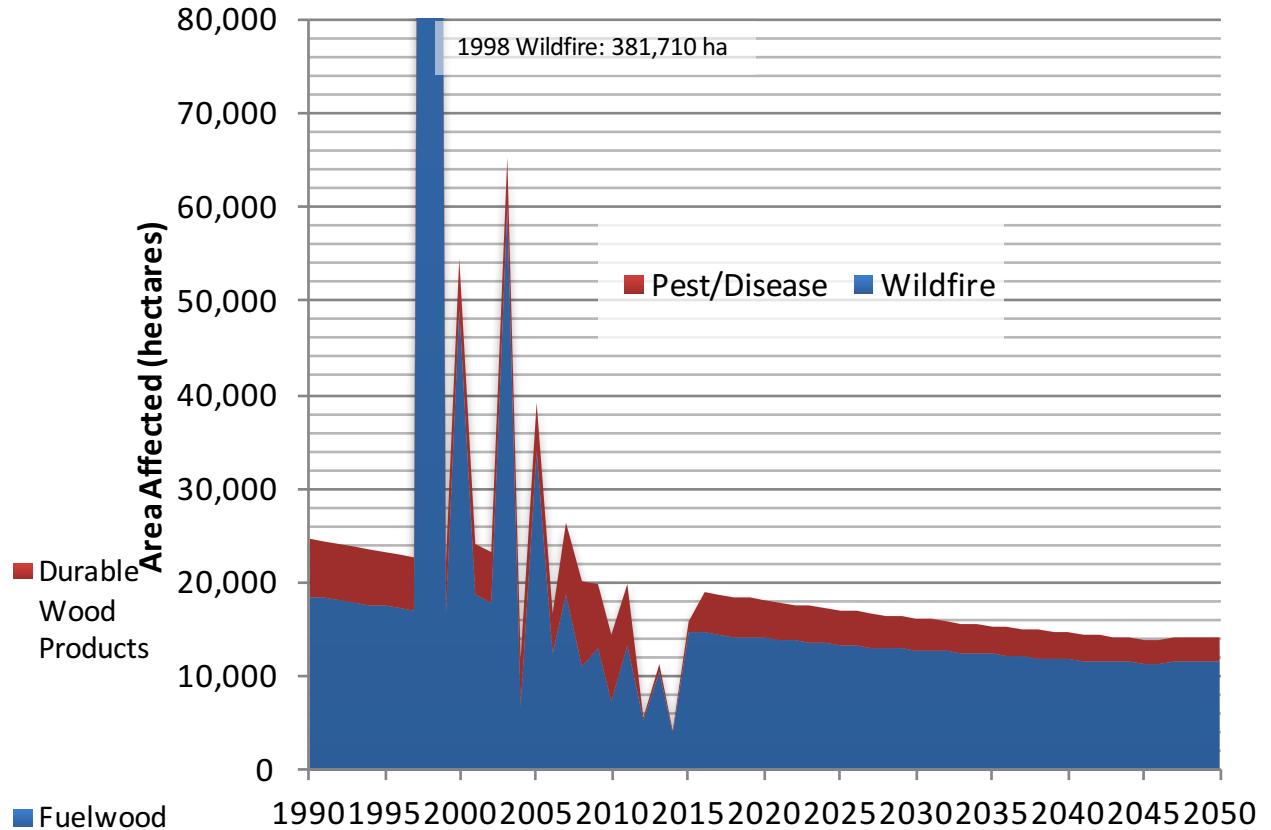
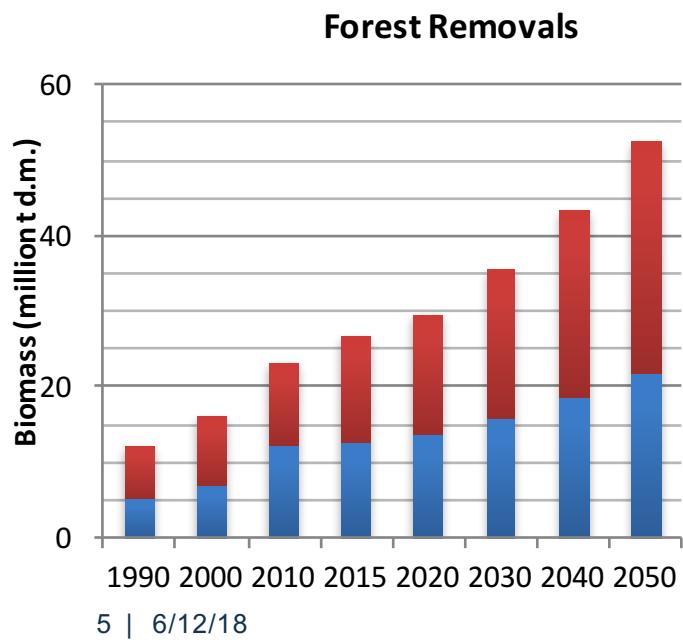


LCD/LEDS/NDC Toolkit Examples: FOLU

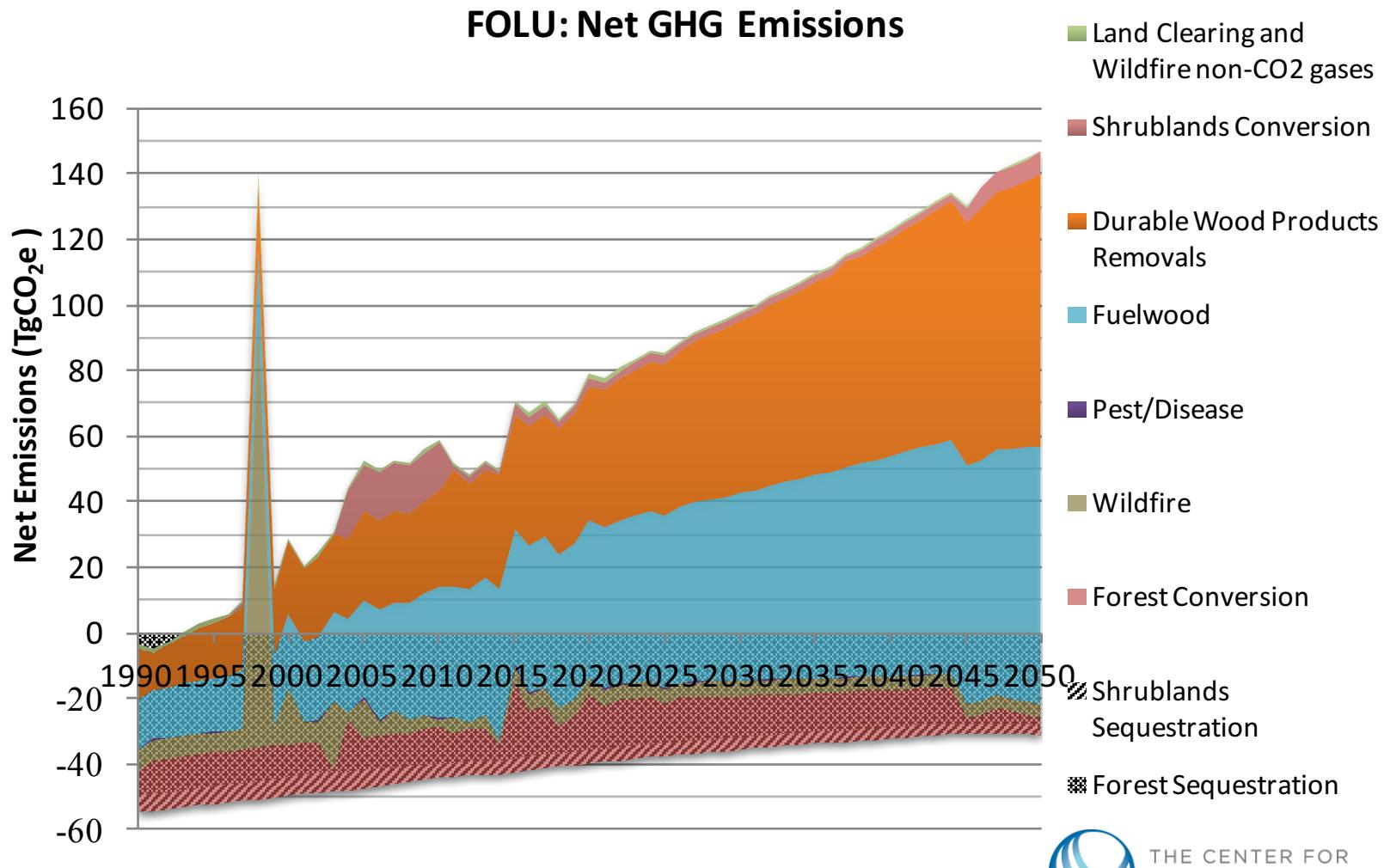
Forest Carbon Modeling



LCD/LEDS/NDC Toolkit Examples: Forest Carbon Inputs



LCD/LEDS/NDC Toolkit Examples: Forest Carbon Results - Guatemala



LCD/LEDS/NDC Toolkit Examples:

Guatemala's Crop and Livestock Sector

Número de política	Título de la política	Análisis independiente						Costos directos (año base 2018Q)
		Impacto de GEI en el país		Impactos totales de GEI		VPN	Efectividad de los costos	
		Impactos anuales del CO ₂ e	2050	2050	Acumulativo			
		2030 Tg	2050 Tg	TgCO ₂ e	TgCO ₂ e	QMillion	Q/tCO ₂ e	
AG-1.	Manejo sostenible de suelos	(1.7)	(2.6)	(54)	(54)	-Q2,841	-Q52	
AG-2.	Establecimiento y mejoramiento de sistemas agroforestal	(0.27)	(0.075)	(5.0)	(5.1)	Q125	Q24	
AG-3.	Establecimiento de plantaciones con potencial frutícola	(4.1)	(21)	(284)	(287)	Q1,513	Q5.3	
AG-4.	Uso eficiente de fertilizantes nitrogenados	(0.48)	(1.3)	(21)	(26)	Q148,178	Q5,677	
GAN-1.	Promover el establecimiento de pasturas mejoradas	(1.5)	(3.9)	(65)	(65)	-Q15,589	-Q241	
GAN-2.	Promover el establecimiento de sistemas silvopastoriles	(7.2)	(8.4)	(268)	(268)	-Q20,611	-Q77	
GAN-3.	Fomentar la gestión integral del estiércol en sistemas intensivos de producción animal	(0.87)	(1.7)	(32)	(51)	Q3,261	Q63	
	Total	(16)	(39)	(728)	(756)	Q114,036	Q151	

LCD/LEDS/NDC Toolkit Examples:

Guatemala's Crop and Livestock Sector

Cambio en energía, recursos y emisiones

Año	Cambio en el uso de fertilizantes nitrogenados	Cambio en el uso de combustible	1. Aumento en el secuestro de carbono	2. Cambio directo en las emisiones del combustible	3. Cambio indirecto en las emisiones de combustible
	tN	TJ	tCO ₂	tCO ₂ e	tCO ₂ e
2019	(622)	(110)	(333,295)	(8,174)	(2,235)
2020	(1,244)	(220)	(666,590)	(16,348)	(4,491)
2025	(4,354)	(770)	(2,333,066)	(57,219)	(15,831)
2030	(7,465)	(1,319)	(3,999,542)	(98,089)	(27,337)
2035	(14,930)	(2,639)	(7,999,102)	(196,179)	(55,071)
2040	(22,395)	(3,958)	(11,998,663)	(294,268)	(83,208)
2045	(29,859)	(5,277)	(15,998,223)	(392,358)	(111,750)
2050	(37,324)	(6,597)	(19,997,783)	(490,447)	(140,704)
Sum	(511,343)	(90,373)	(273,969,394)	(6,719,124)	(1,903,021)

Cambio en energía, recursos y emisiones

4. Cambio directo en las emisiones de fertilizantes	5. Cambio indirecto en las emisiones de fertilizantes	Impactos netos de GEI en la jurisdicción	Impactos netos de GEI fuera de la jurisdicción	Impactos Totales
tCO ₂ e	tCO ₂ e	TgCO ₂ e	TgCO ₂ e	TgCO ₂ e
(4,015)	(1,064)	(0.35)	(0.0033)	(0.35)
(8,030)	(2,127)	(0.69)	(0.0066)	(0.70)
(28,107)	(7,446)	(2.4)	(0.023)	(2.4)
(48,183)	(12,765)	(4.1)	(0.040)	(4.2)
(96,366)	(25,530)	(8.3)	(0.081)	(8.4)
(144,549)	(38,295)	(12)	(0.12)	(13)
(192,732)	(51,060)	(17)	(0.16)	(17)
(240,915)	(63,825)	(21)	(0.20)	(21)
(3,300,534)	(874,396)	(284)	(2.8)	(287)

LCD/LEDS/NDC Toolkit Examples:

Guatemala's Crop and Livestock Sector

Costos del escenario normal de negocios

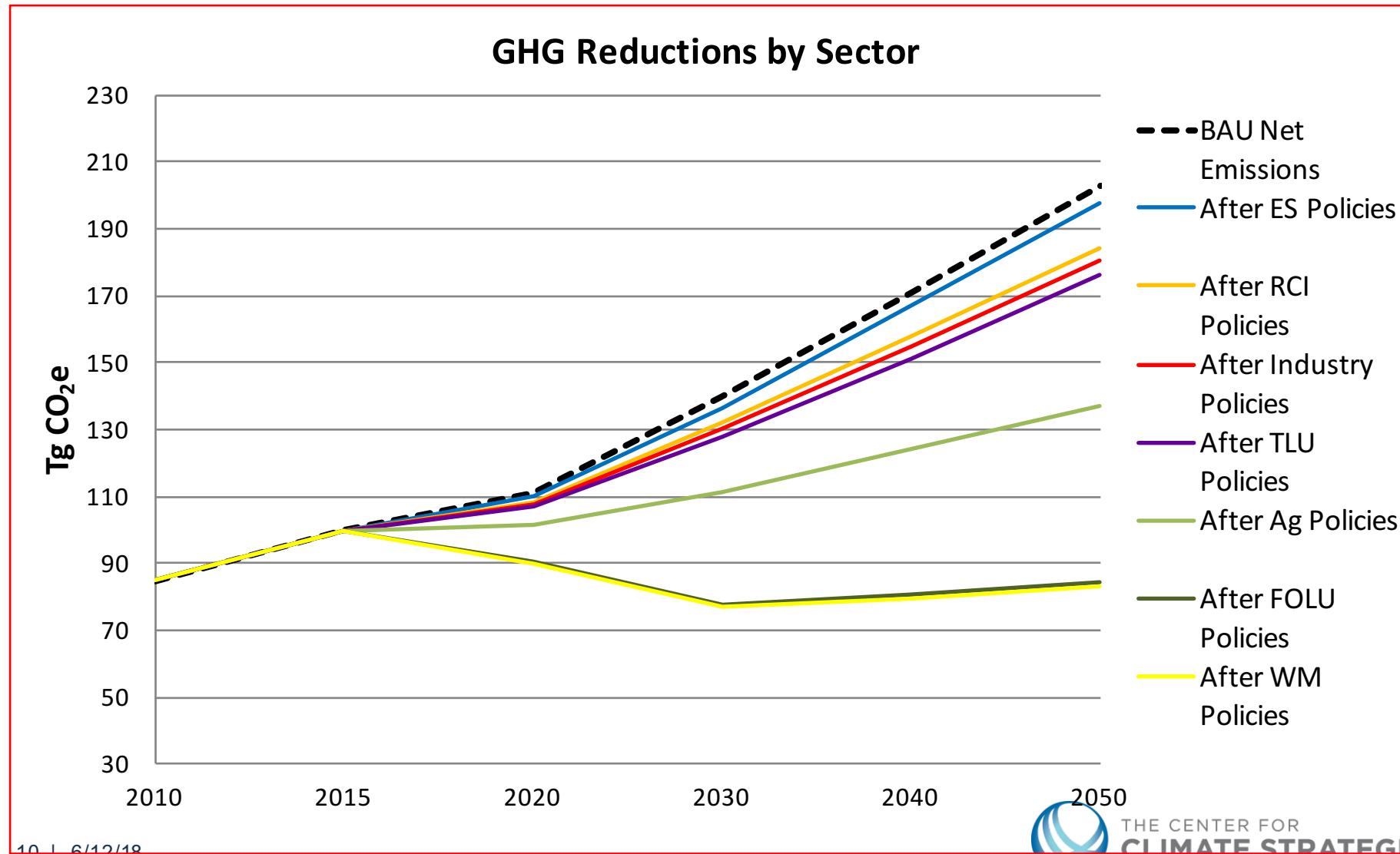
Año	Mano de obra y otros costos de producción				Total de los costos	Total de costos descontados	Efectividad de los costos
	Costos de combustible MMQ	Costos de fertilizantes MMQ	MMQ	Valor de los cultivos MMQ			
2019	Q0.016	Q29	Q4.8	-Q0.12	Q18	Q16.03	
2020	Q0.033	Q60	Q10	-Q0.25	Q34	Q28.5	
2025	Q0.147	Q272	Q45	-Q1.1	Q142	Q75	
2030	Q0.29	Q597	Q100	-Q2.5	Q303	Q101	
2035	Q0.67	Q1,533	Q256	-Q6.4	Q780	Q166	
2040	Q1.1	Q2,952	Q494	-Q12	Q1,479	Q200	
2045	Q1.7	Q5,050	Q845	-Q21	Q2,512	Q215	
2050	Q2.4	Q8,102	Q1,355	-Q34	Q4,012	Q218	
Sum	Q4.2	Q8,901	Q1,488	-Q37	Sum	Q4,564	Q1,513
							Q5.3

Costos netos

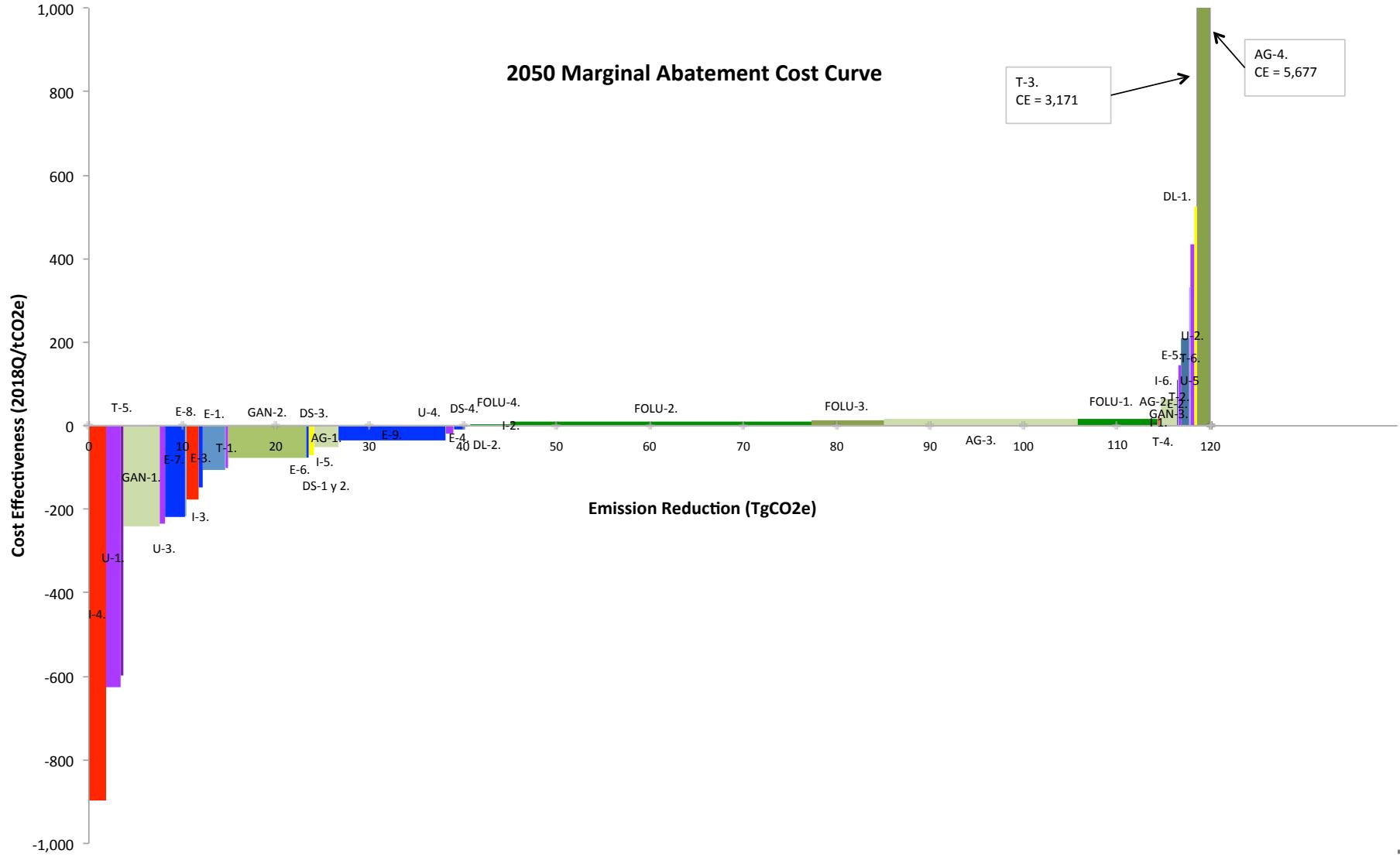
Costos del escenario de la política

Año	Total de inversiones iniciales	1. Costo del gobierno compartido	2. Costos de inversión anualizados: propietario de la tierra	3a. Costos de combustible	3b. Costos de fertilizantes	3c. Mano de obra y otros costos de producción	4. Valor de los cultivos	5. Costos administrativos del gobierno
	MMQ	MMQ	MMQ	MMQ	MMQ	MMQ	MMQ	MMQ
2019	Q4.2	Q1.5	Q0.99	Q0.0016	Q21	Q27	-Q0.4	Q1.1
2020	Q4.4	Q1.6	Q2.0	Q0.0033	Q44	Q57	-Q0.9	Q1.1
2025	Q5.6	Q2.1	Q6.1	Q0.014	Q198	Q254	-Q4.1	Q1.4
2030	Q7.2	Q2.7	Q7.8	Q0.029	Q435	Q559	-Q9.0	Q1.8
2035	Q22	Q8.2	Q24	Q0.067	Q1,116	Q1,436	-Q23	Q2.3
2040	Q29	Q11	Q31	Q0.11	Q2,149	Q2,764	-Q44	Q3.0
2045	Q37	Q14	Q40	Q0.17	Q3,677	Q4,730	-Q76	Q3.8
2050	Q47	Q17	Q51	Q0.24	Q5,898	Q7,587	-Q122	Q4.9
Sum	Q168	Q62	Q149	Q0.42	Q6,480	Q8,335	-Q134	Q27

LCD/LEDS/NDC Toolkit Examples: Guatemala's GHG Reductions



LCD/LEDS/NDC Toolkit Examples: Guatemala's LEDS Plan MAC Curve



REI Toolkit for REI Projects

GIS Supply/Demand Targeting

Technology Application Scoping

Technology Application MCA Screening

Low Carbon Development Baselines

Financial Mapping, Risk, Return, Impacts

Assessment of Renewable Energy Zones

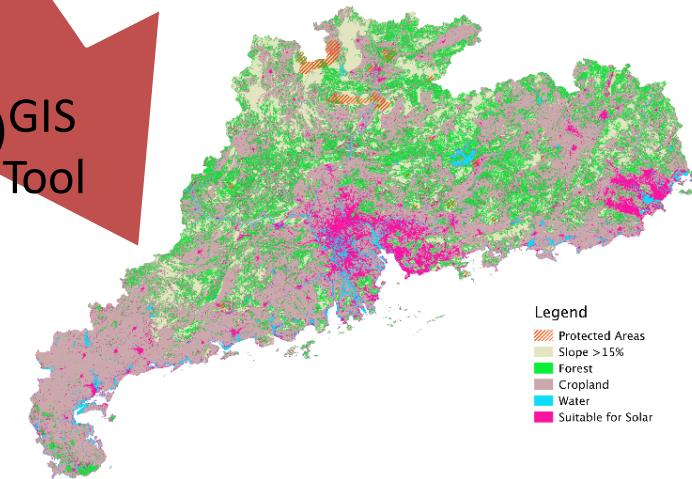
Land Use/Land Cover

Digital Elevation
Models (DEM)

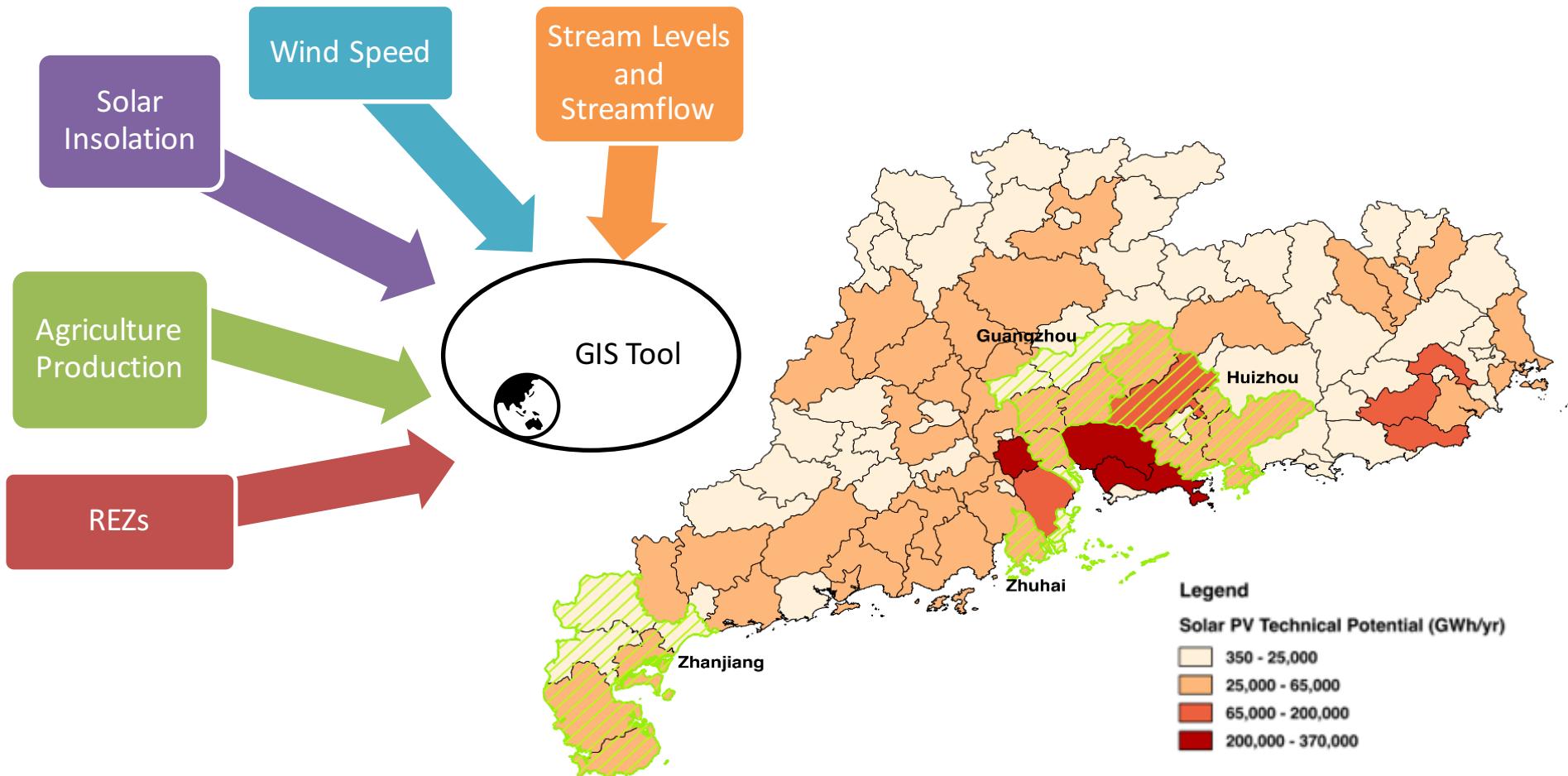
Infrastructure

Protected and Sensitive Areas

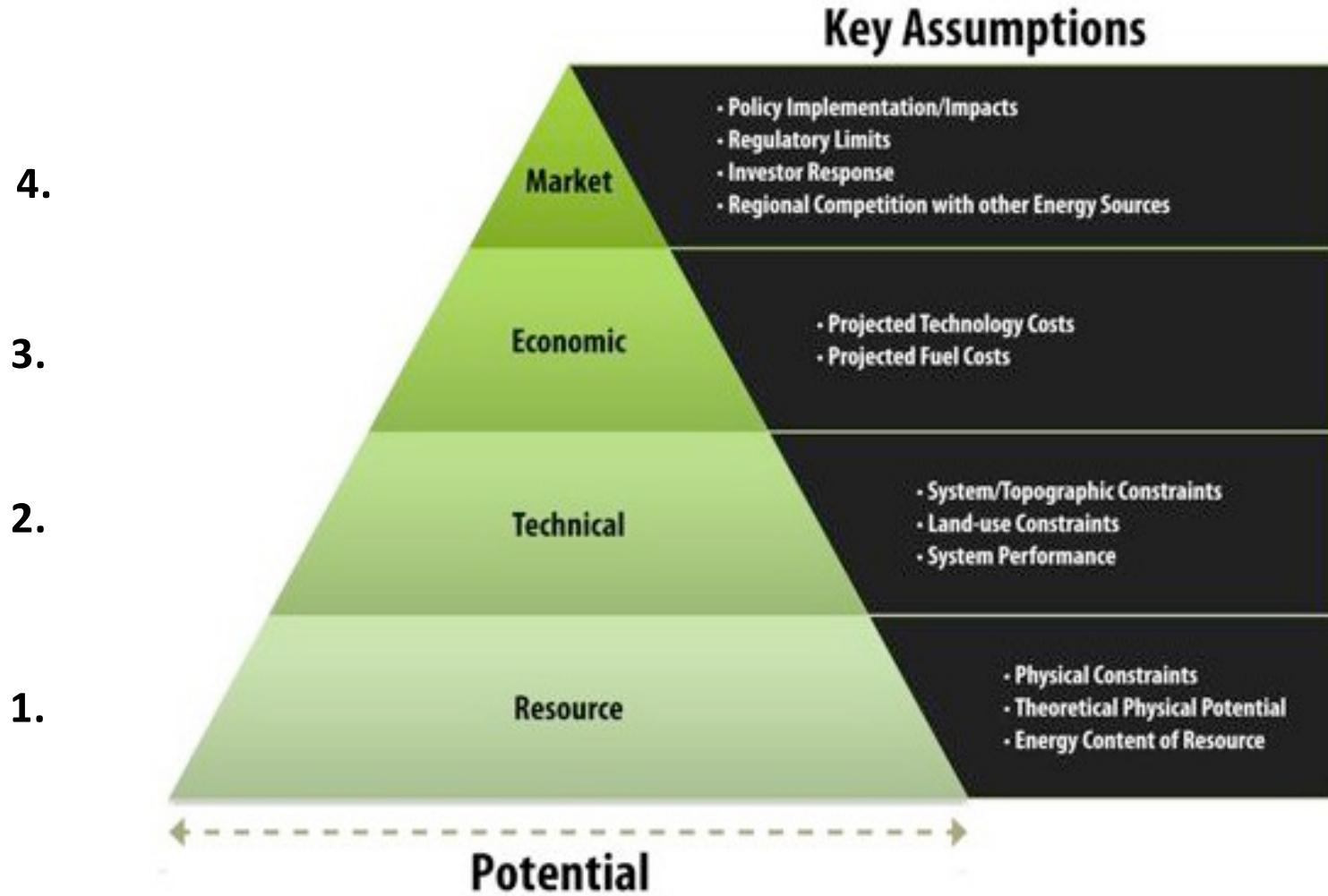
Population Density



RE Target Zones



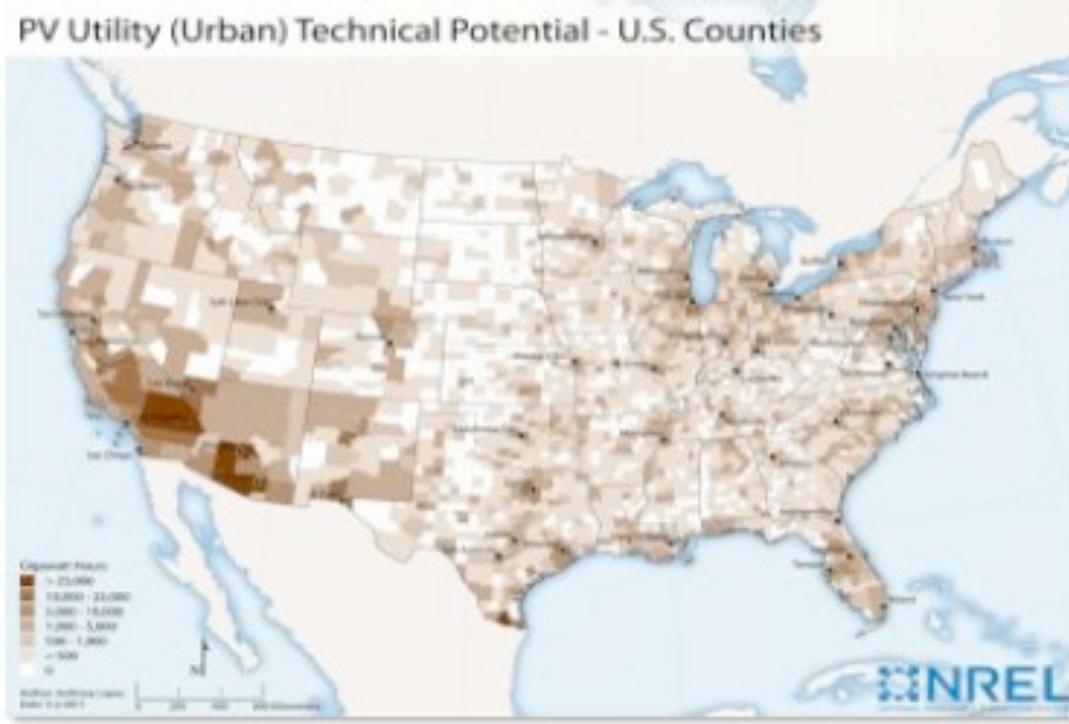
RE Resource Capacity Additions



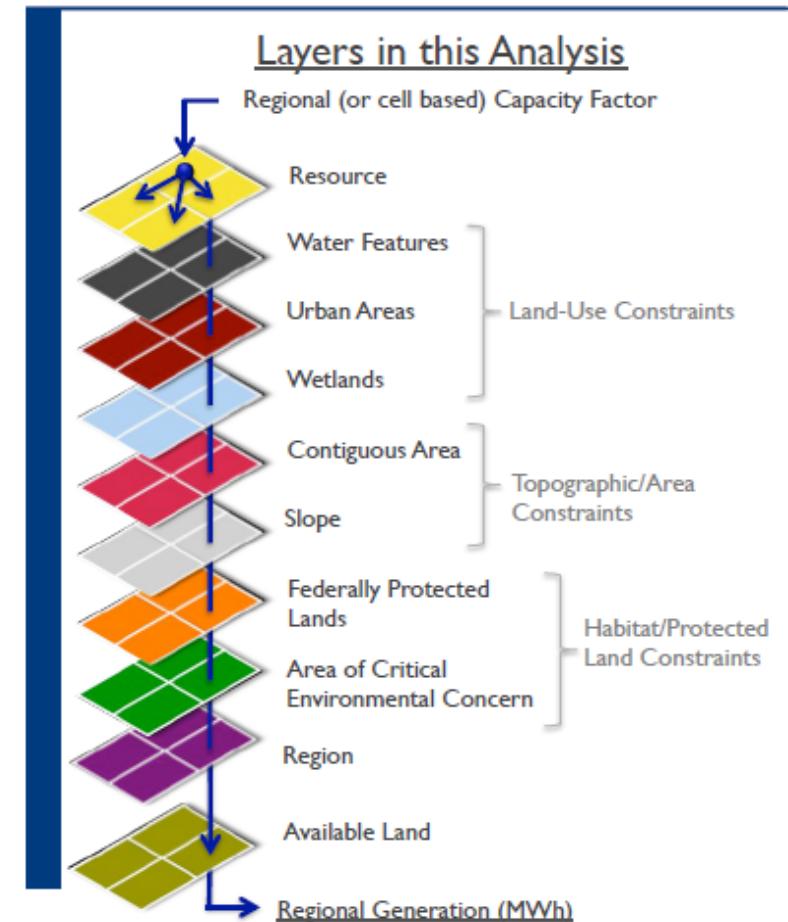
Example: Solar PV Implementation

1. Resource
 - Solar insolation (watt-hr/m²)
2. Technical
 - Removal of unavailable land and areas with high slope (watt-hr/m²)
3. Economic
 - Comparison of leveled cost of electricity (LCOE) to conventional sources
4. Market
 - Annualized installation + operations/ maintenance costs compared to cost of grid electricity

RE Resource Capacity Additions



GIS is a key technical tool for RE resource assessment.



RE Resource Capacity Additions

- Similar RE resource assessments needed for each resource:
 - Other forms of solar PV or concentrated solar power: residential rooftop, commercial/ industrial rooftop, etc.
 - Biomass: locations of feedstocks in relation to power or heat end users
 - Wind: location of areas with reliable resources
 - Micro-hydro: co-location of stream flow and elevation change

Geographic Information System (GIS)

- QGIS – Free open-source Geographic Information System (GIS)
- Can be used to create, edit, visualize, and analyze geospatial information
- Geospatial analysis, including sampling data, finding distances between data layer objects, and finding area of polygons



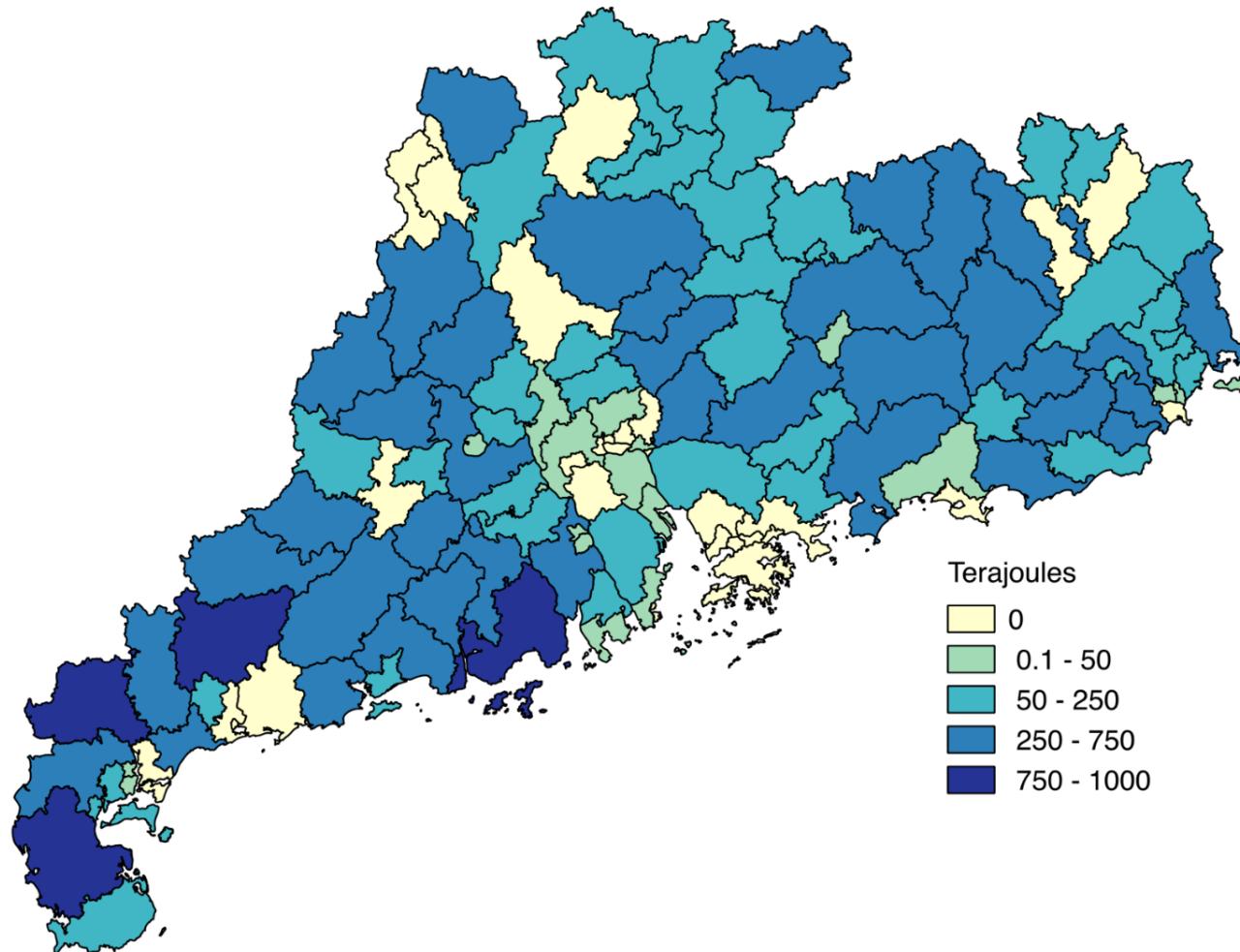
Geospatial Data

- Land Use / Land Cover
 - Urban area, crop land
- Rivers
 - Spatial data
 - Flow data
- Elevation and Slope
- Existing and planned electricity infrastructure
 - Generation facilities
 - Transmission and distribution lines and substations
- Population, Energy Consumption
- Solar irradiation

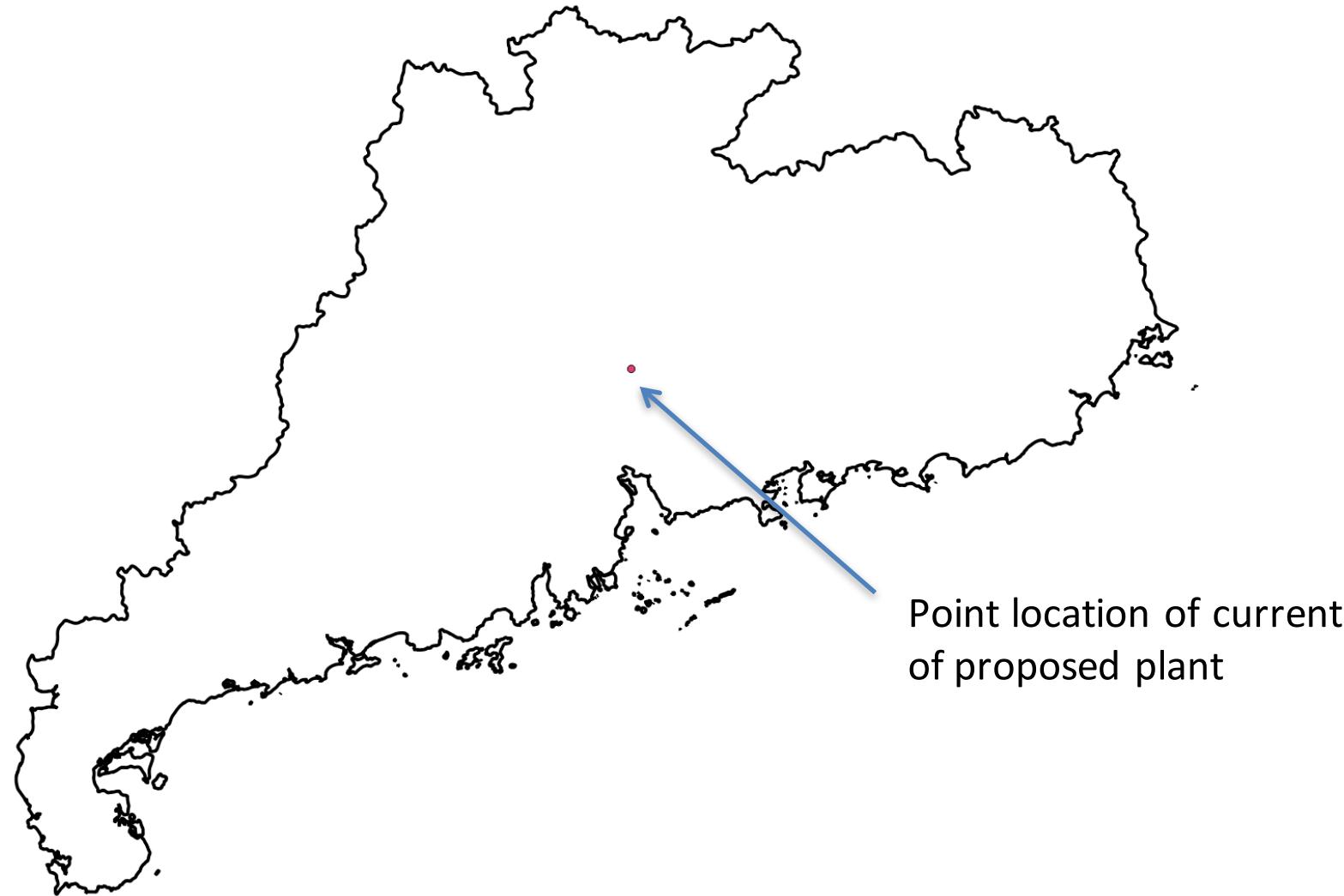
Ongoing Work with GIEC and GEI in Guangdong Province – Biomass Resources

- Agriculture – Crop Residues
 - Rice
 - Rice husk
 - Rice straw
 - Sugar cane
 - Bagasse
 - Crop straw
 - Others
- Forestry
 - Urban Forest Biomass
 - Forest Biomass (sustainable supplies)
- Waste Management
 - Solid Waste
 - Wastewater treatment

Example 1. Top-Down Rice Husk Resource Stationary Fuel Technical Potential Guangdong Province



Example 1: Bottom-Up Assessment of Biomass Power Plant Feasibility



Example 1: Biomass Power Plant



Specify radius around point

Example 1: Biomass Power Plant



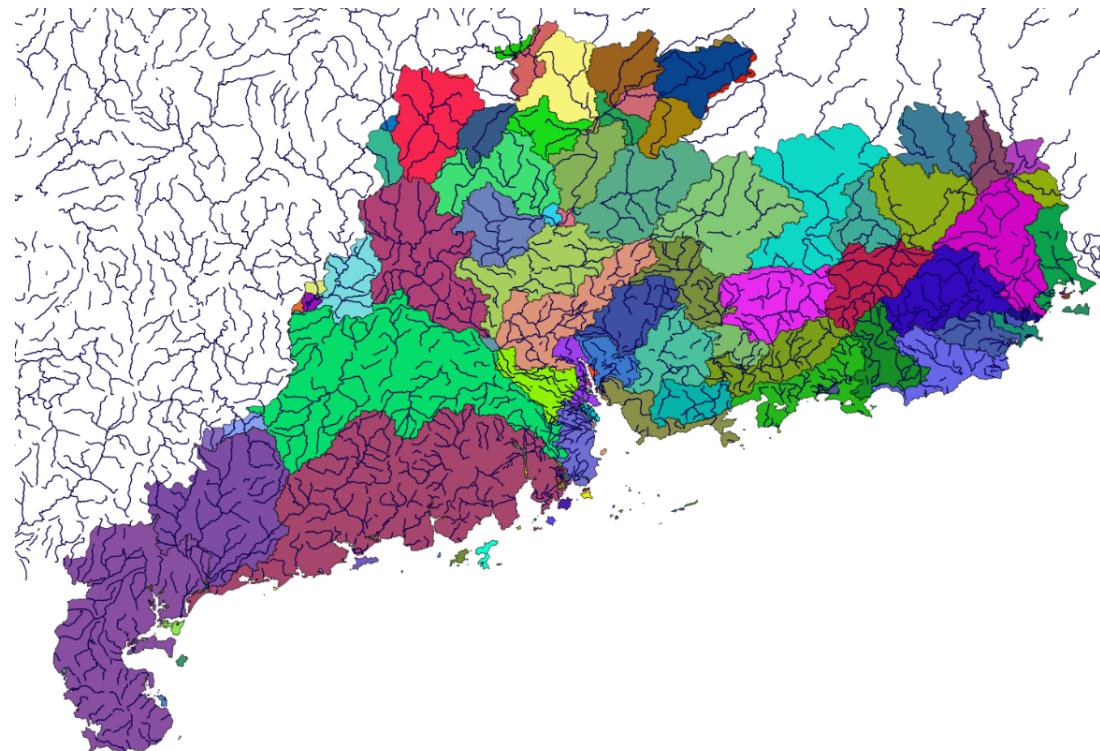
- Add Land Use / Land Cover data layer
- Use analysis tools to find area of cropland within radius

Example 1: Biomass Power Plant

- Can also use geospatial analysis tools to determine distance between proposed power plant site and
 - Electrical substations
 - Transmission lines
- Combine feedstock cost, transport cost and transmission feed-in cost to annualized technology capital costs and O&M costs for total annualized costs
- Calculate LCOE and compare to conventional sources

Example 2: Top-Down Micro-Hydro Distributed Power Technical Potential

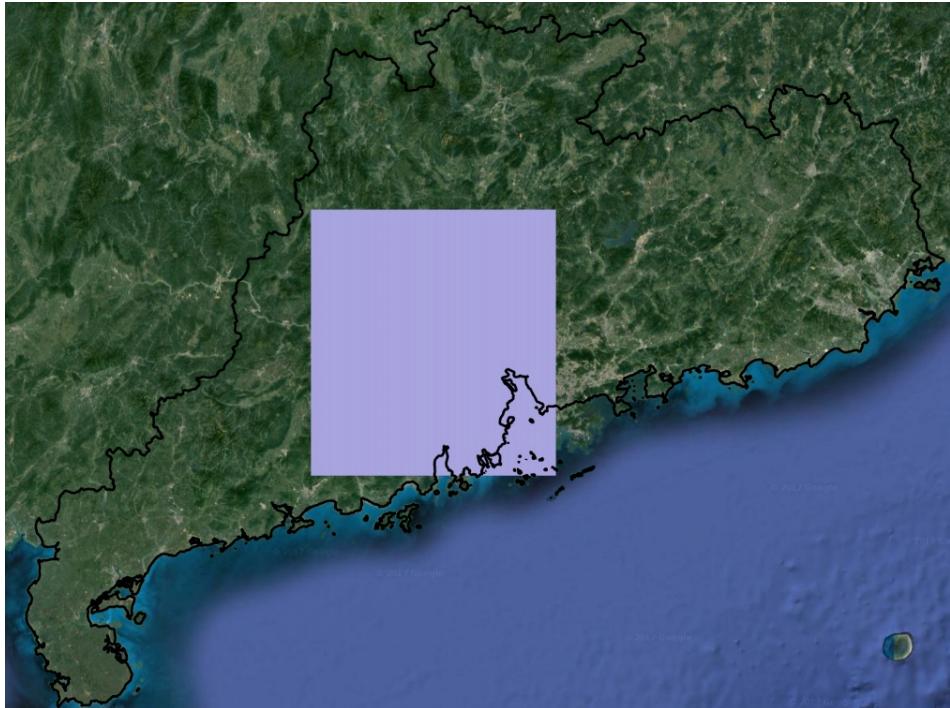
- Rivers within specific administrative boundaries
- Use elevation and slope data layers to find sections of rivers with sufficient head



Example 2: Micro Hydro Distributed Power

- Add locations of current micro-hydro plants and population and/or energy consumption data layer.
- Within river sections with sufficient head, filter out areas:
 - with existing micro-hydro
 - not near sufficient population
- Estimate potential power generation for selected areas based on head and water flow

Example 3: Solar PV Distributed Power



Create Sample Grid

Example 3: Solar PV Distributed Power



Use random sampling tool to sample grid within certain geographic area

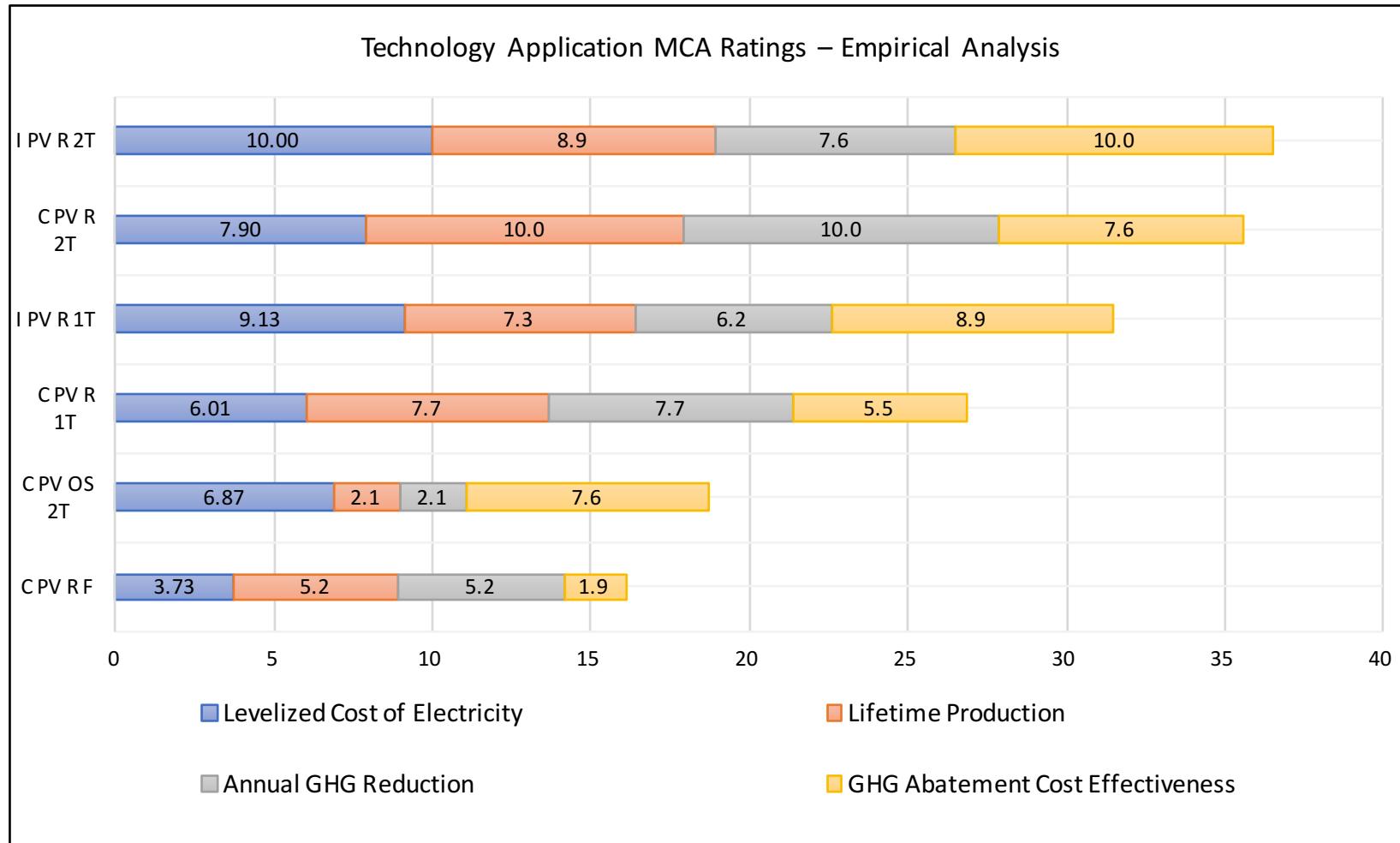
Example 3: Solar PV Distributed Power



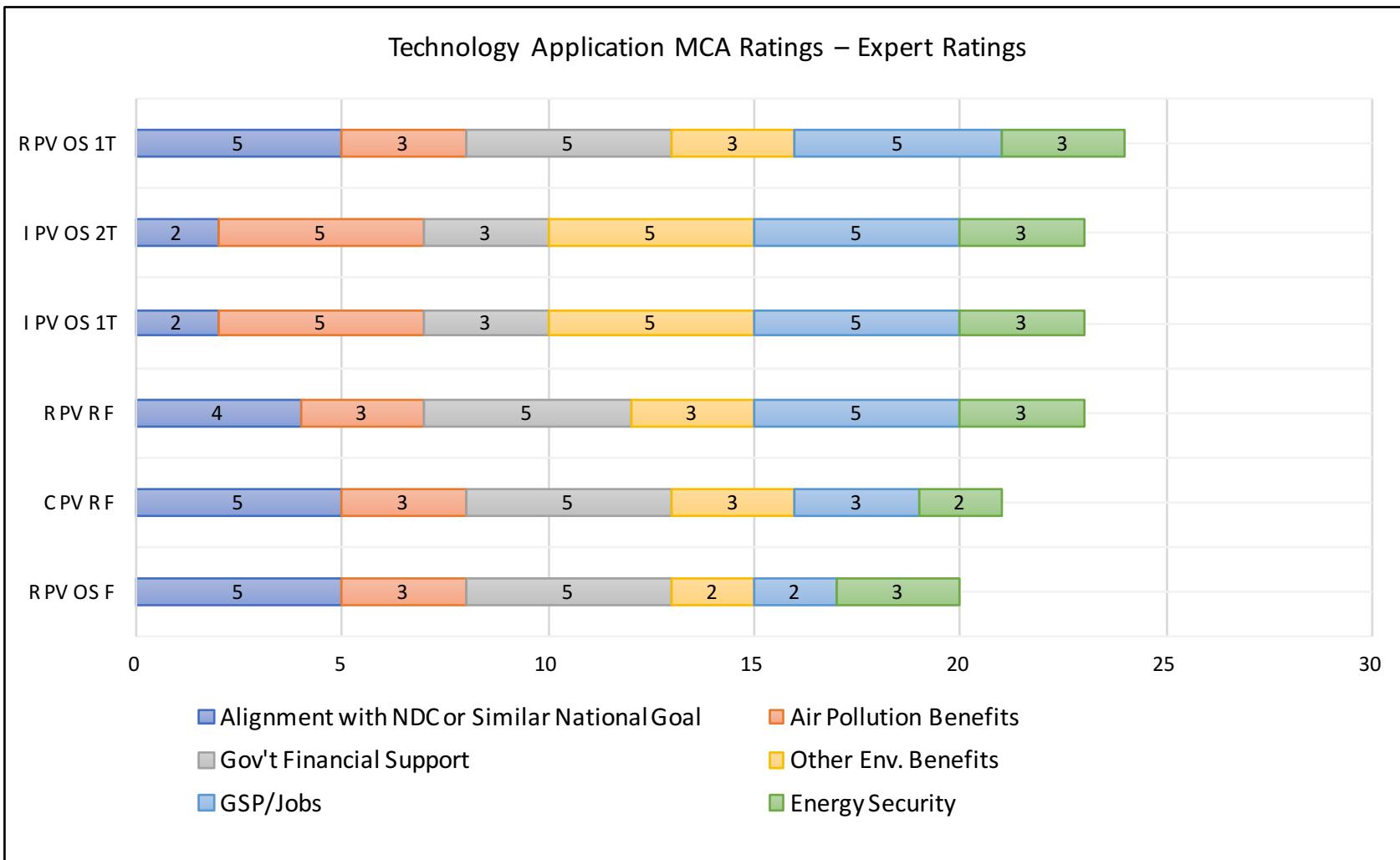
- Draw polygons on roof area within grid square
- Use analysis tools to calculate roof area
- Combine with solar irradiation data to estimate solar potential

Example 4: MCA Scoping Tool

Example 4: MCA Scoping Tool Results



Example 4: MCA Scoping Tool Results



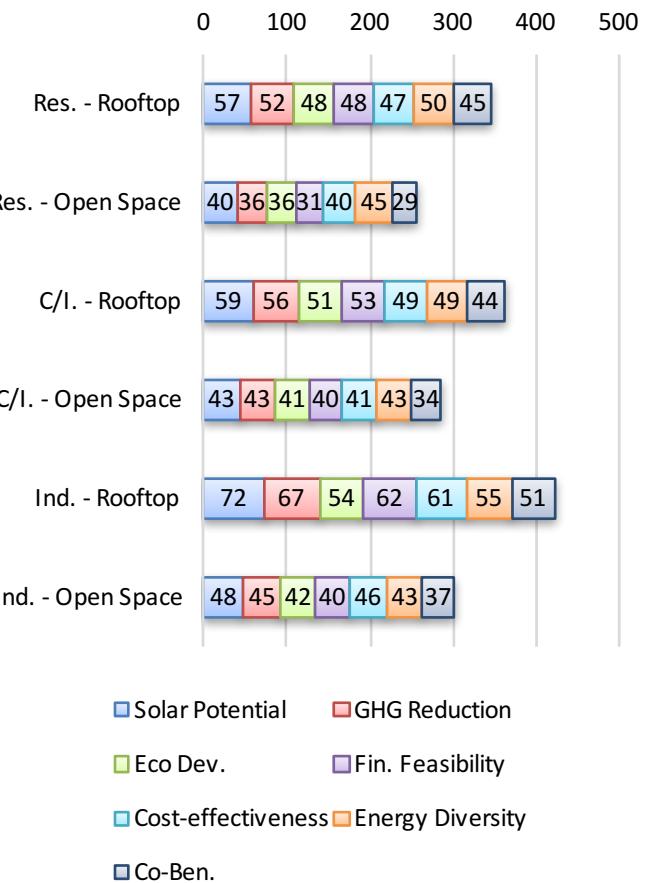
Example 4: MCA Screening Survey Tool

MCA Rating for Solar Technology Application

3. Please rate the status/impact/importance of each listed criteria for every solar technology application in the research region.

	Market Penetration Potential	Greenhouse Gas Reduction Potential	Economic Development (GDP impacts, jobs, or sector-specific goals)	Financing potential and feasibility
Residential -PV-Rooftop -Fixed	High	Medium	Low	Uncertain
Residential -PV-Open Space-Fixed	-- Please Select --	-- Please Select --	-- Please Select --	-- Please Select --
Residential -PV-Open Space-One-axis Tracking	-- Please Select --	-- Please Select --	-- Please Select --	-- Please Select --
Residential -PV-Open Space-Dual-axis Tracking	-- Please Select --	-- Please Select --	-- Please Select --	-- Please Select --
Commercial/Institutional-PV-Rooftop-Fixed	-- Please Select --	-- Please Select --	-- Please Select --	-- Please Select --
Commercial/Institutional-PV-Open Space-Fixed	-- Please Select --	-- Please Select --	-- Please Select --	-- Please Select --
Commercial/Institutional-PV-Rooftop-One-axis Tracking	-- Please Select --	-- Please Select --	-- Please Select --	-- Please Select --
Commercial/Institutional-PV-Rooftop-Dual-axis Tracking	-- Please Select --	-- Please Select --	-- Please Select --	-- Please Select --
Commercial/Institutional-PV-Open Space-One-axis Tracking	-- Please Select --	-- Please Select --	-- Please Select --	-- Please Select --
Commercial/Institutional-PV-Open Space-Dual-axis Tracking	-- Please Select --	-- Please Select --	-- Please Select --	-- Please Select --

MCA Screening Survey Results



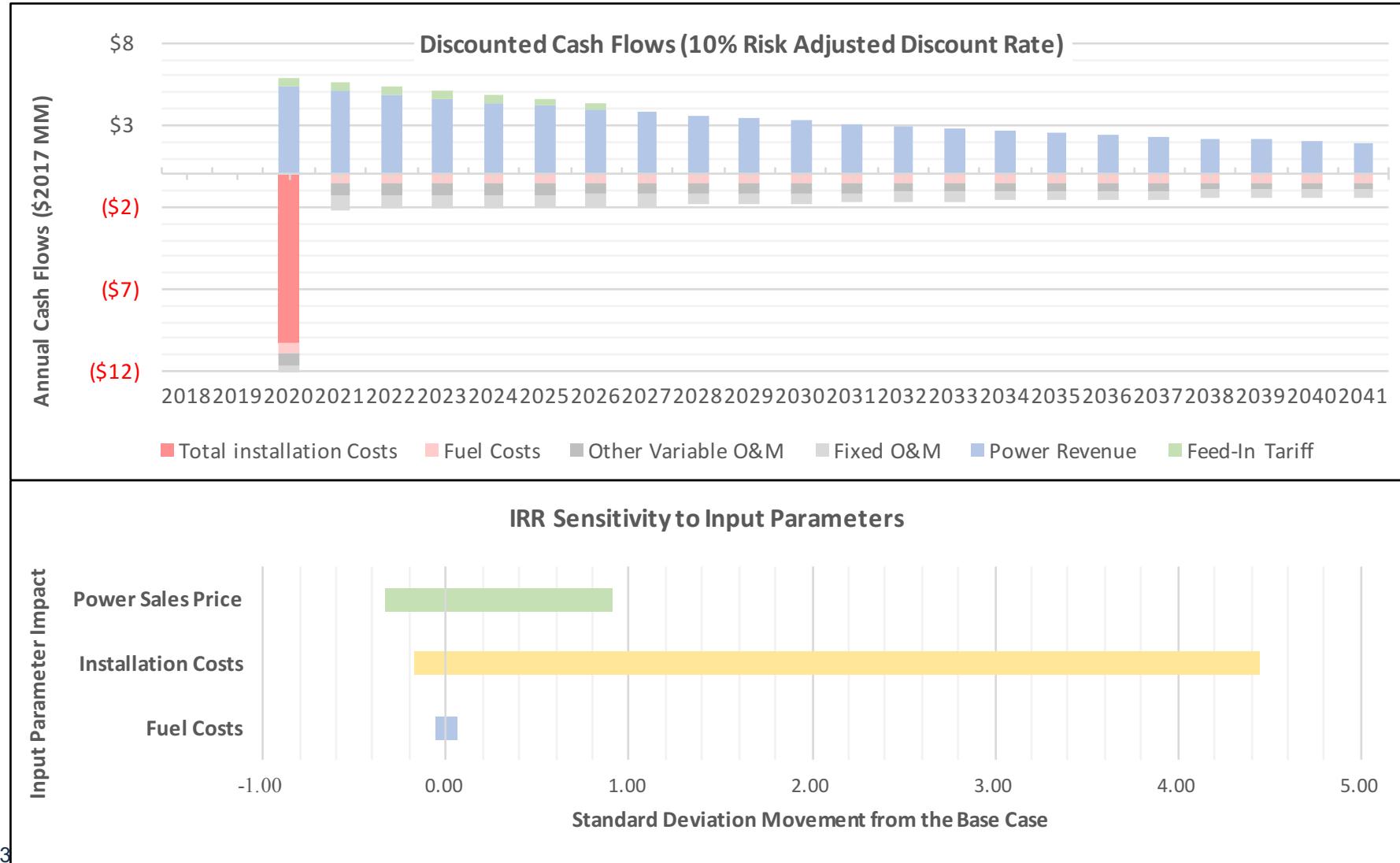
Example 5: Financial Analysis Tool for Program/Project-Level Assessment

Financial Analysis - 50 Watt Solar Home System											
Implementation Phase	Period	Year	Total Installation Costs (\$)	Equity (\$)	Debt Service (\$)	Fuel Costs (\$)	Other Variable O&M (\$)	Fixed O&M (\$)	Taxes (\$)	Renewable Energy Credits Revenue (\$)	Net Generation (Wh)
Installation and First Year of Operation	1	2017	(\$420)	(\$63)	(\$111.87)	\$0	\$0	(\$1.00)	\$0	\$0	70,000
	2	2018	\$0	\$0	(\$111.87)	\$0	\$0	(\$1.02)	\$0	\$0	70,000
	3	2019	\$0	\$0	(\$111.87)	\$0	\$0	(\$1.04)	\$0	\$0	70,000
	4	2020	\$0	\$0	\$0	\$0	\$0	(\$1.06)	\$0	\$0	70,000
	5	2021	\$0	\$0	\$0	\$0	\$0	(\$1.08)	\$0	\$0	70,000
	6	2022	\$0	\$0	\$0	\$0	\$0	(\$1.10)	\$0	\$0	70,000
	7	2023	\$0	\$0	\$0	\$0	\$0	(\$1.13)	\$0	\$0	70,000
	8	2024	\$0	\$0	\$0	\$0	\$0	(\$1.15)	\$0	\$0	70,000
	9	2025	\$0	\$0	\$0	\$0	\$0	(\$1.17)	\$0	\$0	70,000
Continued Operation	10	2026	\$0	\$0	\$0	\$0	\$0	(\$1.20)	\$0	\$0	70,000
	11	2027	\$0	\$0	\$0	\$0	\$0	(\$1.22)	\$0	\$0	70,000
	12	2028	\$0	\$0	\$0	\$0	\$0	(\$1.24)	\$0	\$0	70,000
	13	2029	\$0	\$0	\$0	\$0	\$0	(\$1.27)	\$0	\$0	70,000
	14	2030	\$0	\$0	\$0	\$0	\$0	(\$1.29)	\$0	\$0	70,000
	15	2031	\$0	\$0	\$0	\$0	\$0	(\$1.32)	\$0	\$0	70,000
	16	2032	\$0	\$0	\$0	\$0	\$0	(\$1.35)	\$0	\$0	70,000
	17	2033	\$0	\$0	\$0	\$0	\$0	(\$1.37)	\$0	\$0	70,000
	18	2034	\$0	\$0	\$0	\$0	\$0	(\$1.40)	\$0	\$0	70,000
	19	2035	\$0	\$0	\$0	\$0	\$0	(\$1.43)	\$0	\$0	70,000
	20	2036	\$0	\$0	\$0	\$0	\$0	(\$1.46)	\$0	\$0	70,000

Example 5: Financial Analysis Tool for Program/Project-Level Assessment

Financial Analysis - 50 Watt Solar Home System														
Implementation Phase	Period	Year	Net Generation (Wh)	Power Revenue (\$)	Feed-In Tariff (\$)	Other Revenue (\$)	Developer's Net Cash Flow (\$)	Developer's Discounted NCF (\$2017)	Project Discounted NCF (\$2017)	Depreciated Value of Plant (\$)	Discounted Costs (\$2017)	Discounted Benefits (\$2017)	Cumulative Cash Flows	Net Cash Flows
Installation and First Year of Operation	1	2017	70,000	\$0	\$0	\$172	(\$3)	(\$3)	(\$249)	\$420	(\$176)	\$172	(\$421)	(\$249)
	2	2018	70,000	\$0	\$0	\$179	\$66	\$60	\$162	\$399	(\$103)	\$163	(\$1)	\$178
	3	2019	70,000	\$0	\$0	\$186	\$74	\$61	\$153	\$378	(\$93)	\$154	\$185	\$185
	4	2020	70,000	\$0	\$0	\$194	\$193	\$145	\$145	\$357	(\$1)	\$146	\$378	\$193
	5	2021	70,000	\$0	\$0	\$202	\$201	\$137	\$137	\$336	(\$1)	\$138	\$579	\$201
	6	2022	70,000	\$0	\$0	\$210	\$209	\$130	\$130	\$315	(\$1)	\$130	\$788	\$209
	7	2023	70,000	\$0	\$0	\$218	\$217	\$122	\$122	\$294	(\$1)	\$123	\$1,005	\$217
	8	2024	70,000	\$0	\$0	\$227	\$226	\$116	\$116	\$273	(\$1)	\$116	\$1,230	\$226
	9	2025	70,000	\$0	\$0	\$236	\$235	\$110	\$110	\$252	(\$1)	\$110	\$1,465	\$235
Continued Operation	10	2026	70,000	\$0	\$0	\$245	\$244	\$104	\$104	\$231	(\$1)	\$104	\$1,709	\$244
	11	2027	70,000	\$0	\$0	\$255	\$254	\$98	\$98	\$210	(\$0)	\$98	\$1,963	\$254
	12	2028	70,000	\$0	\$0	\$265	\$264	\$93	\$93	\$189	(\$0)	\$93	\$2,227	\$264
	13	2029	70,000	\$0	\$0	\$276	\$275	\$88	\$88	\$168	(\$0)	\$88	\$2,502	\$275
	14	2030	70,000	\$0	\$0	\$287	\$286	\$83	\$83	\$147	(\$0)	\$83	\$2,788	\$286
	15	2031	70,000	\$0	\$0	\$299	\$297	\$78	\$78	\$126	(\$0)	\$79	\$3,085	\$297
	16	2032	70,000	\$0	\$0	\$310	\$309	\$74	\$74	\$105	(\$0)	\$74	\$3,394	\$309
	17	2033	70,000	\$0	\$0	\$323	\$322	\$70	\$70	\$84	(\$0)	\$70	\$3,716	\$322
	18	2034	70,000	\$0	\$0	\$336	\$334	\$66	\$66	\$63	(\$0)	\$66	\$4,050	\$334
	19	2035	70,000	\$0	\$0	\$349	\$348	\$63	\$63	\$42	(\$0)	\$63	\$4,398	\$348
	20	2036	70,000	\$0	\$0	\$363	\$362	\$59	\$59	\$21	(\$0)	\$59	\$4,760	\$362

Example 5: Financial Analysis Tool for Program/Project-Level Assessment



Technology Implementation Document (TID)

Technology/Policy Description

Implementation Design

- Goals, Location, Timing

Business Implementation Model

- Implementation Stages
- Parties Involved
- Agreements Needed
- Mechanisms Needed
- Risk, Return, Impact Requirements

Baseline Conditions

- Emissions
- Energy and Resources
- Economic Metrics

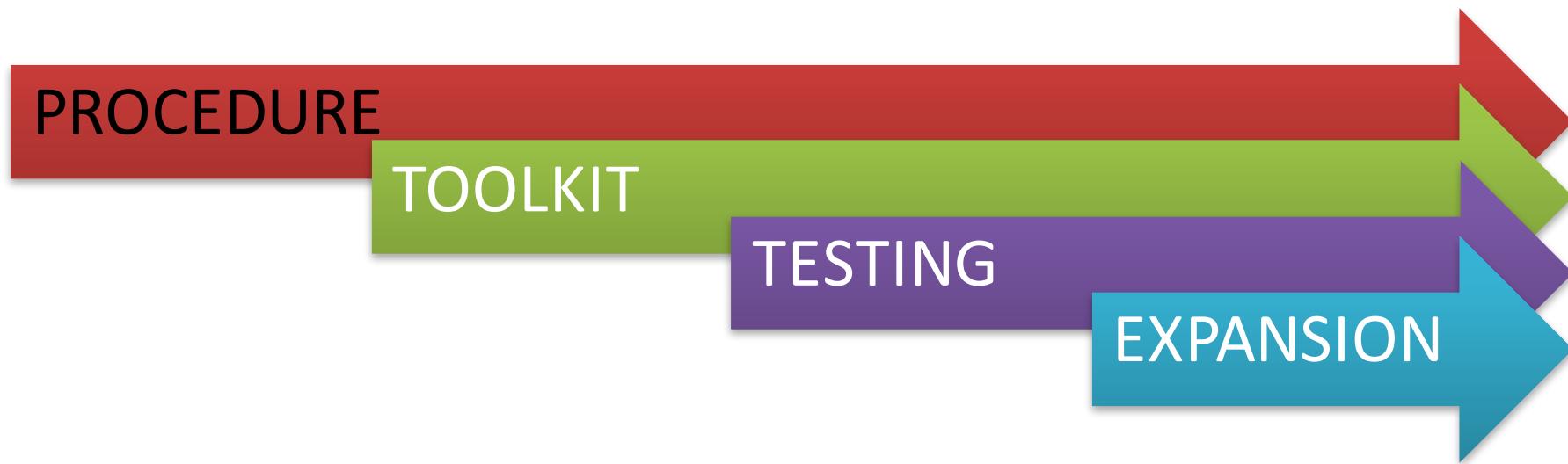
Performance Results

Thanks!

- Stephen Roe, Center for Climate Strategies,
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- Thomas Peterson, Center for Climate
Strategies, tpeterson@climatestrategies.us



South China RE Implementation



LCD Challenges

Goals

Paris goals reach only 2.8-3.1 degree stabilization

Gaps

Existing goals need better capacity, willpower

Shortfalls

\$27 trillion energy

\$100 trillion infrastructure

RE Challenges

Reliable Expansion

Reliable siting decisions

Correct technology, product, location, time

Product Success

Specific technology application

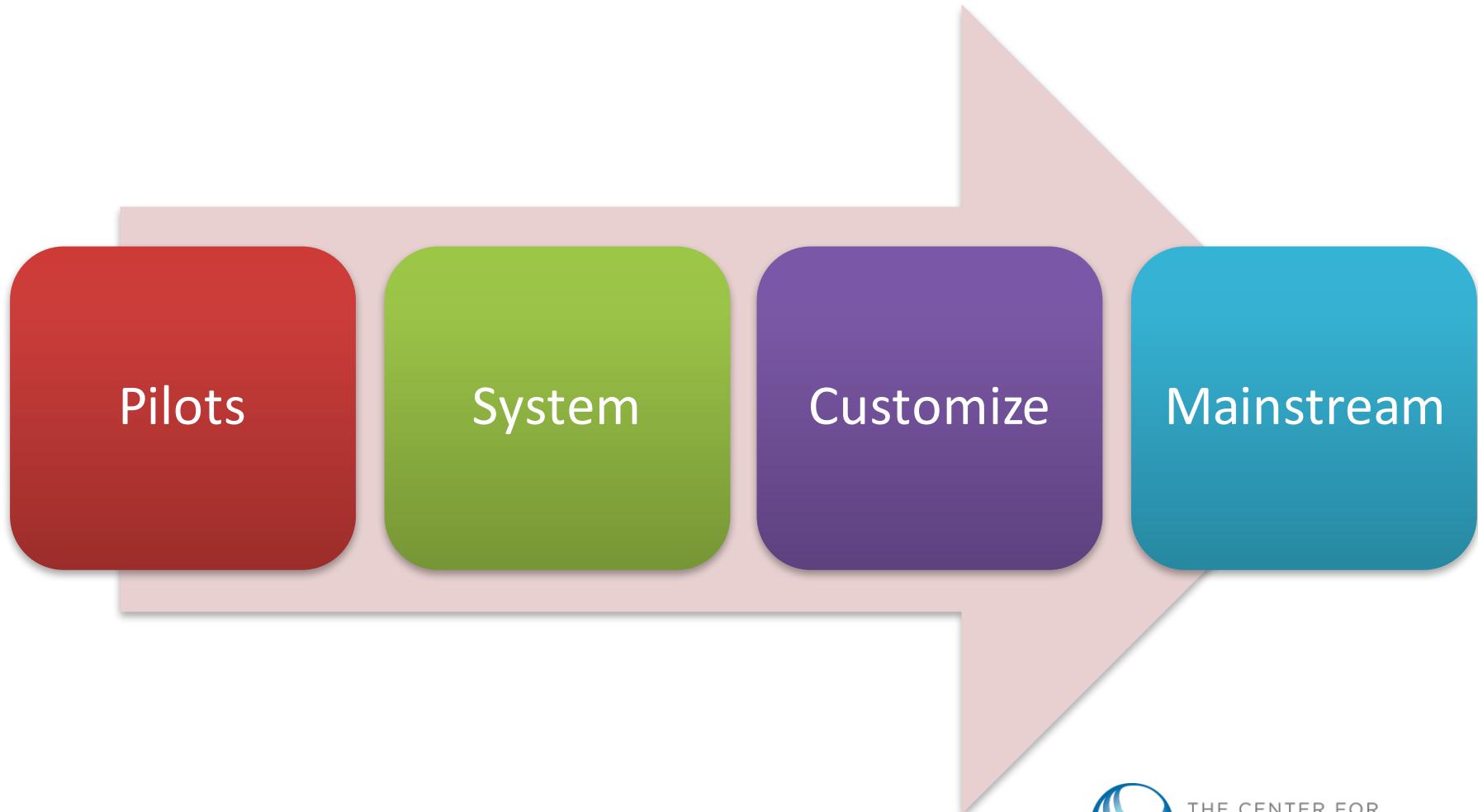
Investible product design

Regional Scale Up

Market penetration targets, approaches

Mainstreaming capacities

Project Approach



Key Issues

Supply/Demand Evaluation

- Assess resources, local supply/demand balance

Shared Decisions

- Public private partner collaboration

Business Implementation Model

- Steps, actions, agreements, requirements

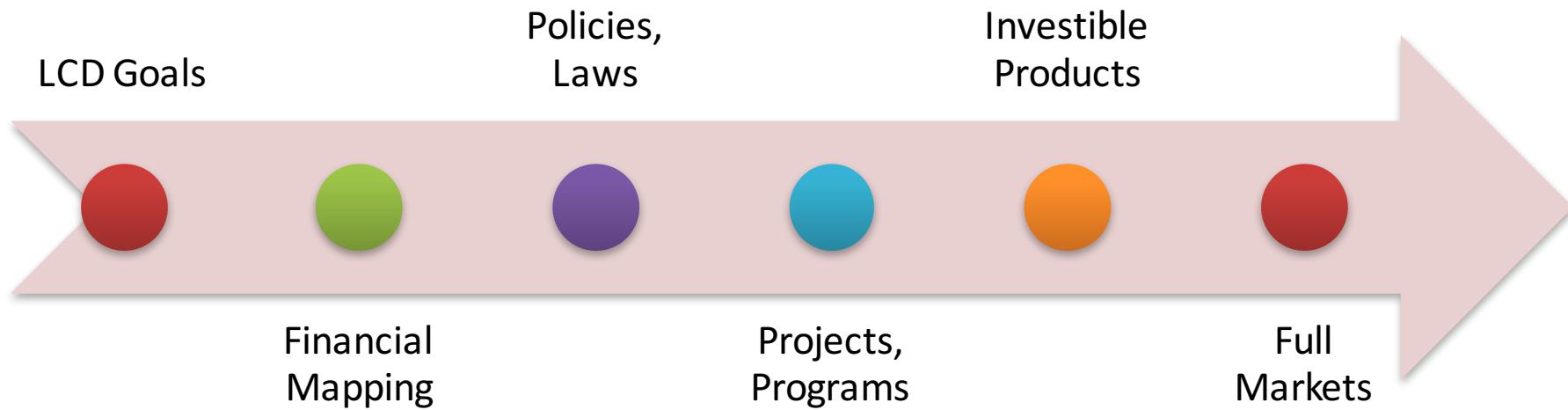
Investment Mobilization

- Financial mapping, risks, returns, impacts

Mainstreaming

- From projects to investable products

Policy and Market Transition



Unique RE Needs

Central → Mini Grid → Micro Grid → Off Grid

BAU Gap 

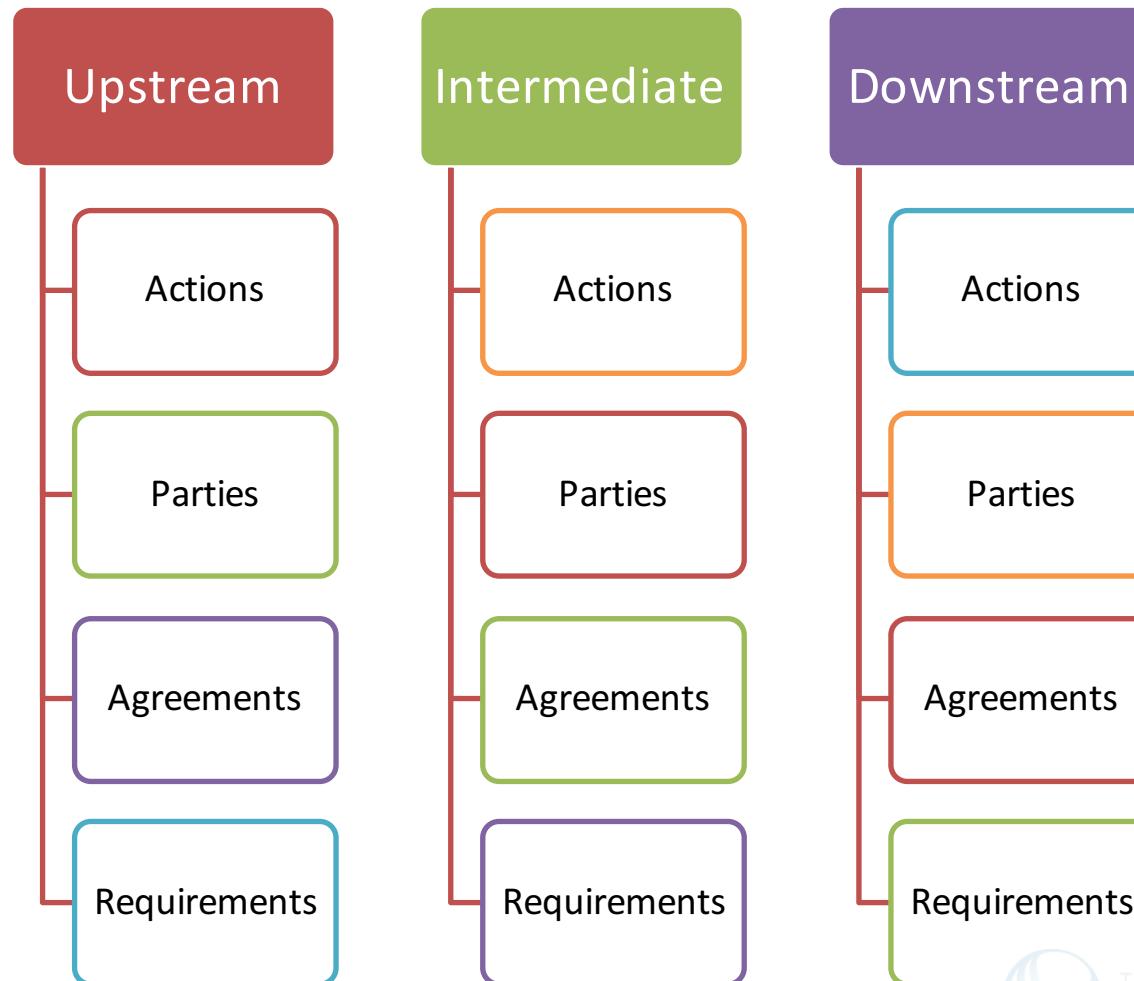
Aggregation 

Standardization 

Better Use of Tools 

New Business Models 

Business Implementation Model



Business Implementation Model

Phase/Activity	Upstream	Intermediary	Downstream
Action	<ul style="list-style-type: none"> • Set policy and market goals • Create policies and measures • Map public, private finance • Create business model • Mobilize initial funds 	<ul style="list-style-type: none"> • Receive funds • Structure markets, products, instruments and tools, delivery programs, administration • Build and install program capacity • Coordinate full business model • Set technical specs and standards 	<ul style="list-style-type: none"> • Customer acquisition • Product sales • Acquire and install technology • Manage products and services, including updating and enhancing • Manage energy systems • Sell secondary products
Parties	<ul style="list-style-type: none"> • Funders (e.g. social impact, commercial investors) • Government agencies (national, local, regional) • Stakeholders (business and citizen) • Intermediaries • Multilateral institutions 	<ul style="list-style-type: none"> • Central bank sustainable finance units • Development corporations • Development banks • Commercial banks • Investment banks • Green banks • NGOs 	<ul style="list-style-type: none"> • Technology providers • Installers • Residential RE buyers • Commercial RE buyers • Industrial RE buyers • Institutional RE buyers • Secondary investors
Agreements	<ul style="list-style-type: none"> • Goals • Funding • Actors • Outcomes • Instruments • Business model 	<ul style="list-style-type: none"> • Regulatory actions • Financial bodies • Financial aggregation • Financial instruments • Financial products • Target return, risk, and impact 	<ul style="list-style-type: none"> • Price of product (e.g. asset or service) • Terms and conditions (e.g. payback period, performance guarantees) • Ownership of RE assets • Price, terms of secondary financial product
Requirements	<ul style="list-style-type: none"> • Policy and Governance • Risk, Return, Impact • Business model 	<ul style="list-style-type: none"> • Regulatory authority • Financial solvency • Management capacity 	<ul style="list-style-type: none"> • RE product performance • Financial product pricing • Acquisition and use procedures

Business Implementation Model

Public/Private Developers	Upstream Funders	Intermediaries	End-Product Buyers	Secondary Investors
<u>Government Agencies</u> (national, state/provincial/local) Energy • Environment • Economic • Interior • Finance • Industry	<u>Commercial Investors</u> <ul style="list-style-type: none"> • Commercial Banks • Individuals • National Corporations • Transnational Corporations • Pension Funds • Mutual Funds <u>Social Impact Investors</u> <ul style="list-style-type: none"> • Mutual Fund Managers • Development finance institutions • Diversified financial institutions/banks • Private foundations • Pension funds and insurance companies • Family Offices • Individual investors • NGOs • Religious institutions • Development Banks • Foreign Governments • Philanthropies 	<u>Banks</u> <ul style="list-style-type: none"> • Central banks • Development banks • Green banks • Commercial banks • Investment banks <u>Others</u> <ul style="list-style-type: none"> • Public-private partnership entities • Special purpose institutions • Development corporations • Consulting firms • NGOs 	<u>Retail</u> <ul style="list-style-type: none"> • Residential households • Commercial sector/business • Large industrial consumers • Military bases • Hospitals • Large government facilities • others <u>Wholesale</u> <ul style="list-style-type: none"> • Investor owned electricity utilities • Government owned utilities • Municipal power companies • Cooperative electric utilities 	<ul style="list-style-type: none"> • Pension funds • Investment funds • Corporate investors • Individual investors
<u>Private Entities</u> <ul style="list-style-type: none"> • Technology providers • Service organizations • Public interest groups • Philanthropies • Foreign Governments Multi-Lateral Institutions 				

Policy and Finance

Sources of Funds	Business Model Functions	Uses of Funds
<ul style="list-style-type: none">• Debt• Equity• Gifts• Grants• Hybrids	<ul style="list-style-type: none">• Set public policy goals• Create policies and measures• Financial mapping for public and private funds• Enable upstream funding• Create intermediary bodies to receive and disburse funds• Create end product delivery mechanisms and markets• Create necessary instruments• Structure investable products• Enable secondary investments	<ul style="list-style-type: none">• Technology acquisition• Services and products• Installation and use