Commercial Viability Key to Rural Energy Program Sustainability

ESRES
ENERGY SECURITY AND RESOURCE EFFICIENCY IN SOMALILAND

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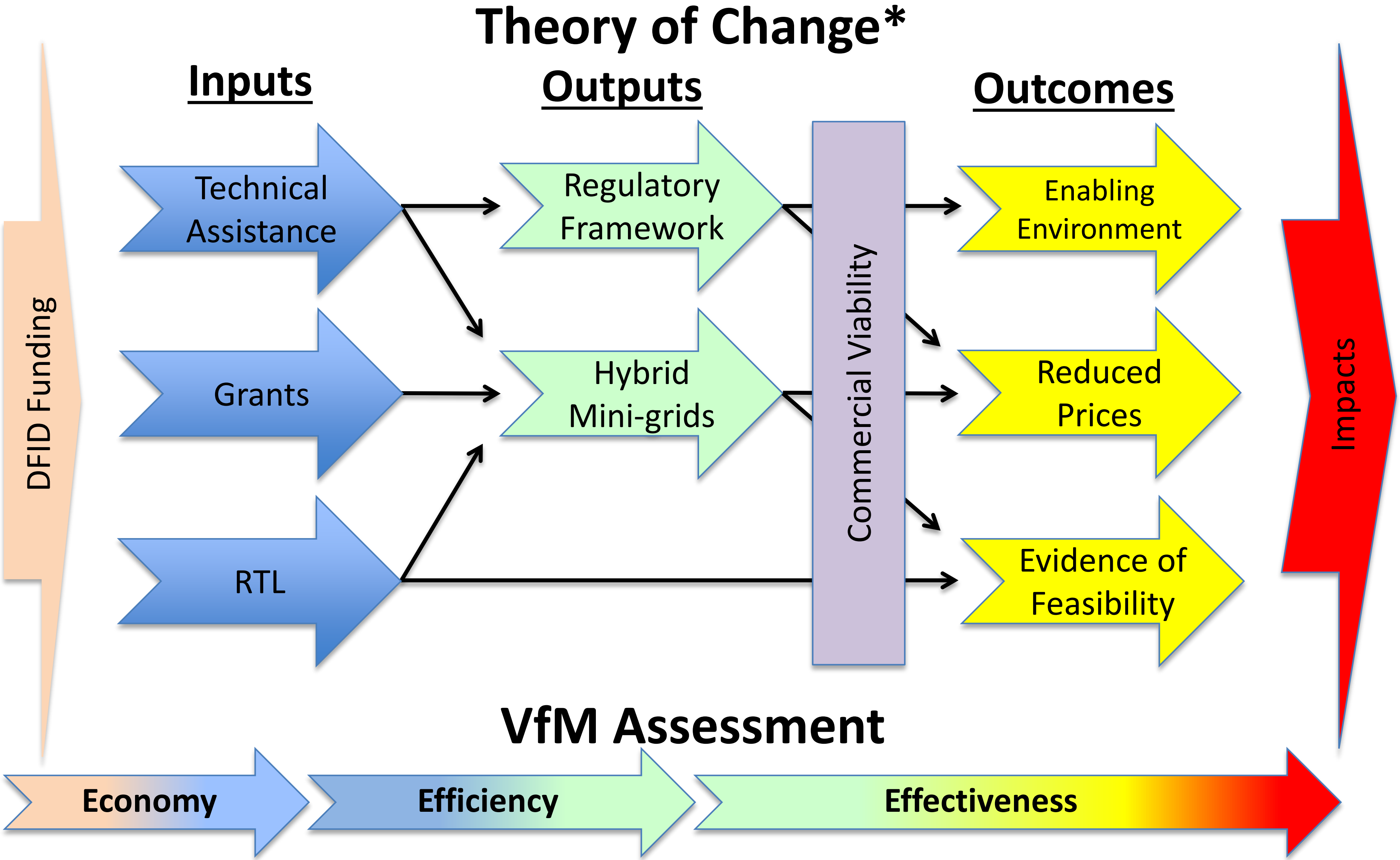
Why Hybrid Mini-Grids Fail

Challenge	Solution
Lack of Load Planning/Forecasting	• Develop and implement training in basic load analysis and planning • Conduct load design, planning, and forecasting exercise • Communicate lessons learned with stakeholders
Inappropriate Generation Technology	• Gather information on available technology options • Identify criteria for technology selection • Present case studies and best practice
Inadequate Grid	• Field survey • Load planning and forecasting • Evaluation of distribution policy and ownership options
Lack of Maintenance Budget and Spare Parts	• Evaluate operations and develop maintenance budget • Create proper maintenance schedule and calculate costs • Incorporate O&M costs into appropriate tariff structure and collection mechanism
Metering/Billing Implementation	• Evaluate local conditions and propose appropriate metering and payment plan • Community outreach campaign on importance of metering and billing for sustaining system • Develop case study of successful implementation

Why Hybrid Mini-Grids Fail (2)

Challenge	Solution
Poor Community Outreach/Engagement	• Identify key stakeholders • Establish issues and concerns • Develop outreach materials and community engagement plan • Organize and host stakeholder events
Wrong Ownership/Governance Model	• Evaluate existing arrangement • Recommend options for strengthening existing system or implementing new model
Lack of O&M capacity	• Capacity assessment of operators • Identify existing training resources • Develop O&M training materials and deliver training (if necessary)
Inappropriate Revenue Model/Poor Tariff Design	• Document existing revenue model • Propose alternative models/tariff structures and assess impact on stakeholders • Communicate importance of appropriate tariff for system sustainability
Economic Viability	• Calculate cost of sustainable O&M and investment • Identify and promote viable end-user model • Propose appropriate revenue model/tariff structure • Develop case study of successful implementation
Failure to Gain Key Stakeholder Support	• Identify potentially hidden stakeholders • Determine motivations, interests, and agendas • Proactively engage stakeholders in planning and process

Commercial Viability Key to Sustainability



*Simplified. Pilot phase only.

Designing Mini-Grids for Commercial Viability and Sustainability

- Appropriately designed system: Understand and manage costs of capital, installation, operation, and maintenance.
- Tariff structure suitable for market and sufficient to recover costs and provide reasonable rate of return.
- User mix has willingness and ability to pay for electricity.
- Metering and collections capable of capturing revenue.
- Operator and community committed to sustainability of system.

What Can You Do with 100 kW Generator?

100 kW (125 kVA) Generator

OR*

10 W Light Bulb

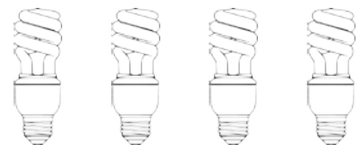
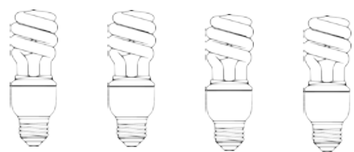
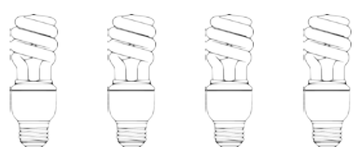
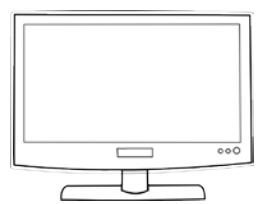
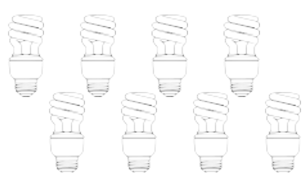
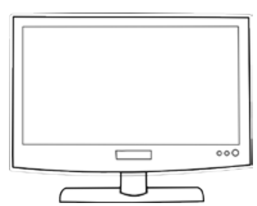
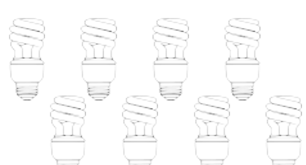
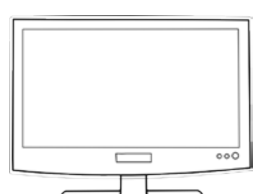
x 10,000

2,000 W Hotplate

x 50

*Assuming people want to use at same time.

What Does Household Load Look Like?

Watts	**Lighting**	**Entertainment**	**Appliances**	**Cooking**
50				
250				
500				
1,000				
2,500				

The New System Should Increase the Power Available per Household

100 kW
Generator

→

500
Households

=

200 W
per Household

100 kW
Generator

+

50 kW
Renewables

→

600
Households

=

250 W
per Household

↘

1,000
Households

=

150 W
per Household

Several Proposed Projects Would *Reduce* Power per Connection

Summary of Proposed Capacity and Connection Additions from Concept Notes Received for ESRES Phase I

			Current			Planned Additions			Total			Change
No.	Province	Bidder	Capacity (kW)	Connections	Power/ Connection (W)	Capacity (kW)	Connections	Power/ Connection (W)	Capacity (kW)	Connections	Power/ Connection (W)	Power/ Connection (W)
1	Sanaag	Badhan Electricity Co.	60	2,000	30	250	1,000	250	310	3,000	103	73
7	Sanaag	EEPCO	1,500	5,000	300	300	2,000	150	1,800	7,000	257	(43)
21	Awdal	Aloog Electricity Co.	1,240	11,250	110	700	700	1,000	1,940	11,950	162	52
3	Awdal	Horn Renewable Energy	40	150	267	93	200	465	133	350	380	113
10	Togdheer	Telesom Electricity Co.	360	1,800	200	140	100	1,400	500	1,900	263	63
8	Togdheer	HECO	3,700	23,751	156	500	3,500	143	4,200	27,251	154	(2)
2	Saaxil	Beder Electricity Co.	480	900	533	100	1,600	63	580	2,500	232	(301)
11	Saaxil	Home Star Power	238	500	476	100	-	NA	338	500	676	200
6	Hargeisa	Alel Electric Co.	440	2,200	200	300	1,500	200	740	3,700	200	-
16	Hargeisa	KAAH	1,280	400	3,200	1,000	-	NA	2,280	400	5,700	2,500
4	Sool	LESCO	480	2,000	240	250	-	NA	730	2,000	365	125
20	Sool	Taleh Electricity Co.	56	300	187	60	500	120	116	800	145	(42)
Total =			**9,874**	**50,251**		**3,793**	**11,100**		**13,667**	**61,351**		

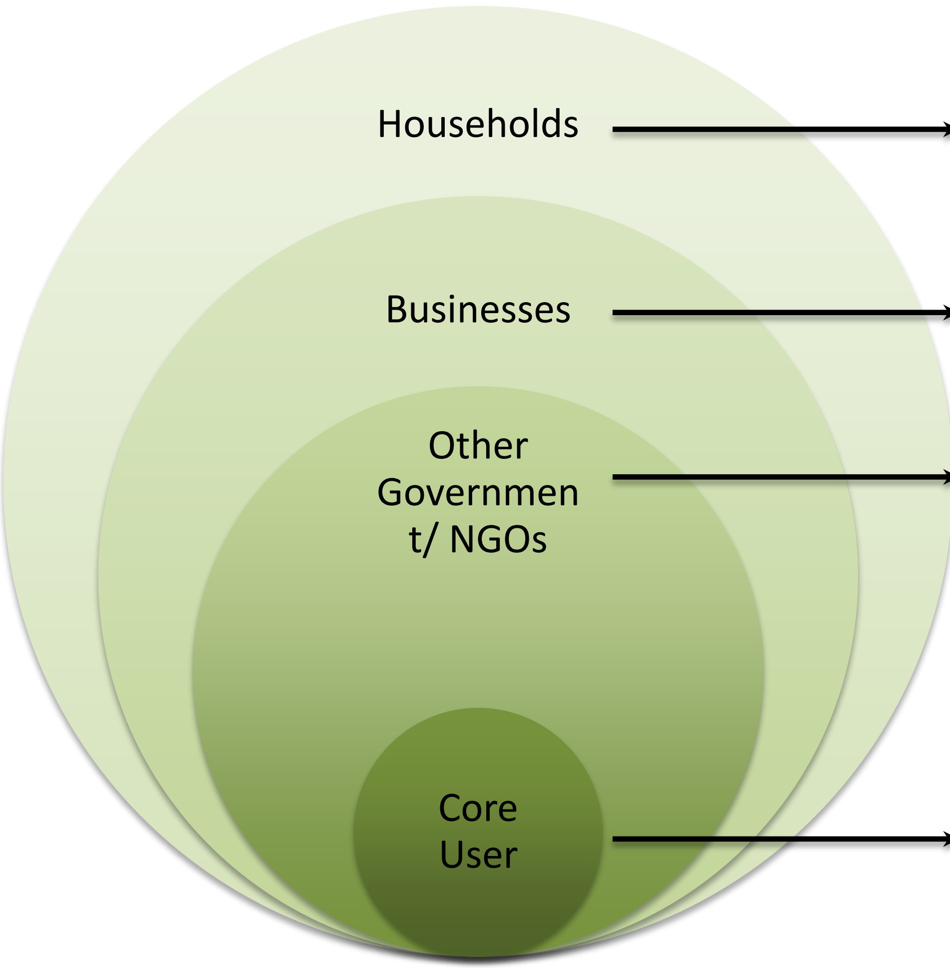
Note: Some of the concept notes were unclear, so it is possible that some of the information here is in error and based on a misunderstanding.

Depending on the goals of the project, perhaps this should be basis for rejection.

What Does it Take to Power Economic Development?

Item	Power (W)	Business/Benefit
CFL Light Bulbs	50	• Extend shop hours • Restaurant/café • Night classes/studying • Security
Sewing Machine	100	• Dress-maker/tailor
TV & Satellite Dish	250	• Restaurant/café
Computer (2-3) & Printer (1)	250-500	• Education • Internet access • …
Refrigerator/Freezer	500 – 1,500	• Drink vendor • Restaurant/café • Grocery shop • Health clinic
Power Tools	500 – 2,000	• Construction • Furniture-making
Air Compressor (2 HP)	2,000 – 2,500 (10 Amp Three-Phase)	• Tire/auto repair • Construction • Small manufacturing
Water Pump	2,000 – 5,000 (10 – 15 Amp Three-Phase)	• Reduce water-gathering time • Crop irrigation • Livestock

How Does the User Mix Affect Economic Viability?



Households

- Usage improves quality of life but does not generate revenue
- Usage supported by local income
- Usage may either displace or promote other consumption
- 75% of users with 30-35% of load (Evening)

Businesses

- Usage generates revenue
- Usage supported by local income
- Usage promotes other consumption
- 20% of users with 20-25% of load (Mixed)

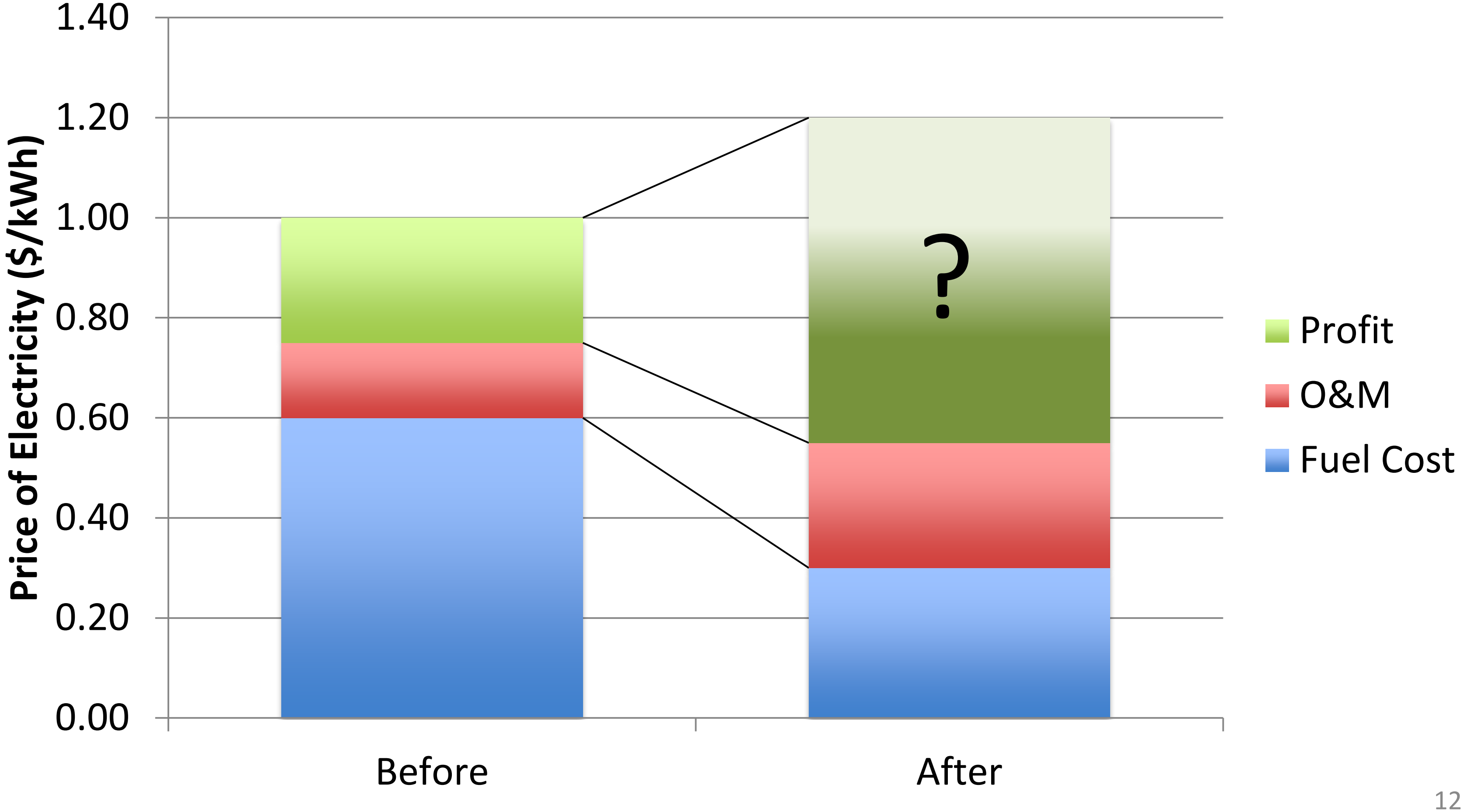
Other Government/ NGOs

- Other large users with strong need and ability to pay
- Usage supported by outside resources
- 5% of users with 20-25% of load (Daytime)

Core User

- Largest user with significant need and guaranteed ability to pay
- Vested interest in system
- Usage supported by outside resources
- Usage may explicitly subsidize other customer classes
- 1 user with 15-20% of load (Depends)

How Does Reducing Cost of Electricity Lead to Reduced Price?



Pressure on Prices

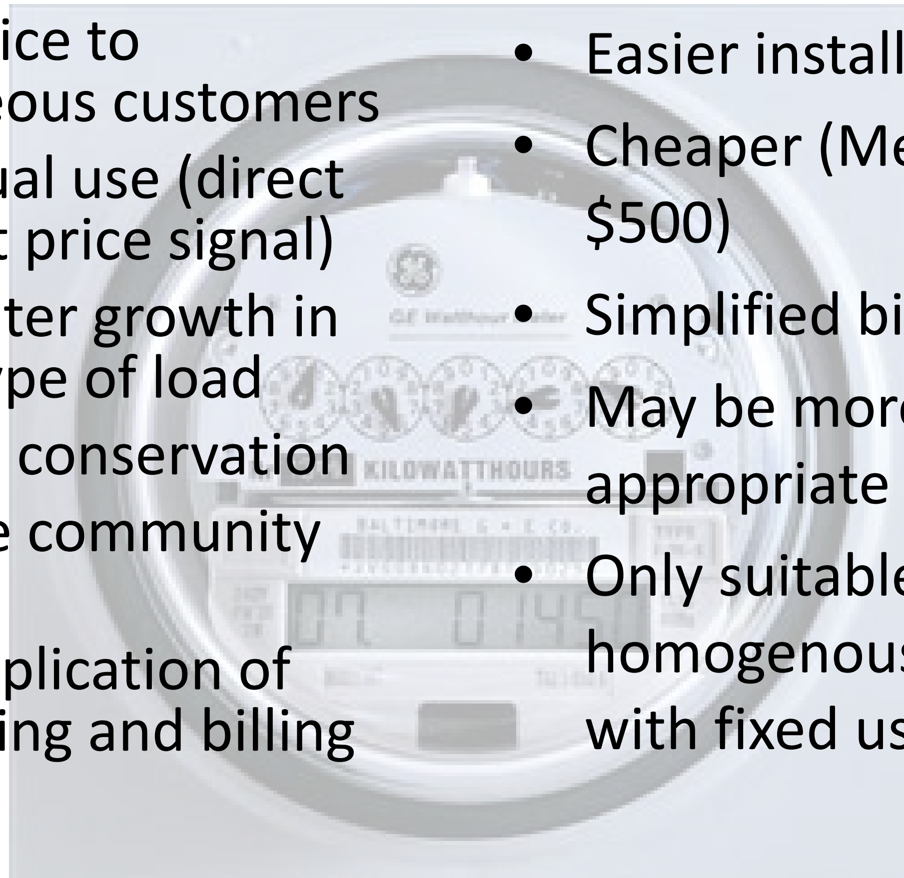
Pulling Prices Down

- Contractual terms
- Government regulation
- Community pressure
- Verified baseline costs and tariff

Pushing Prices Up

- Increased availability of power (better service)
- IP seeking return on investment
- Increase in diesel cost
- Unverified baseline costs and tariff

To Meter or Not to Meter?



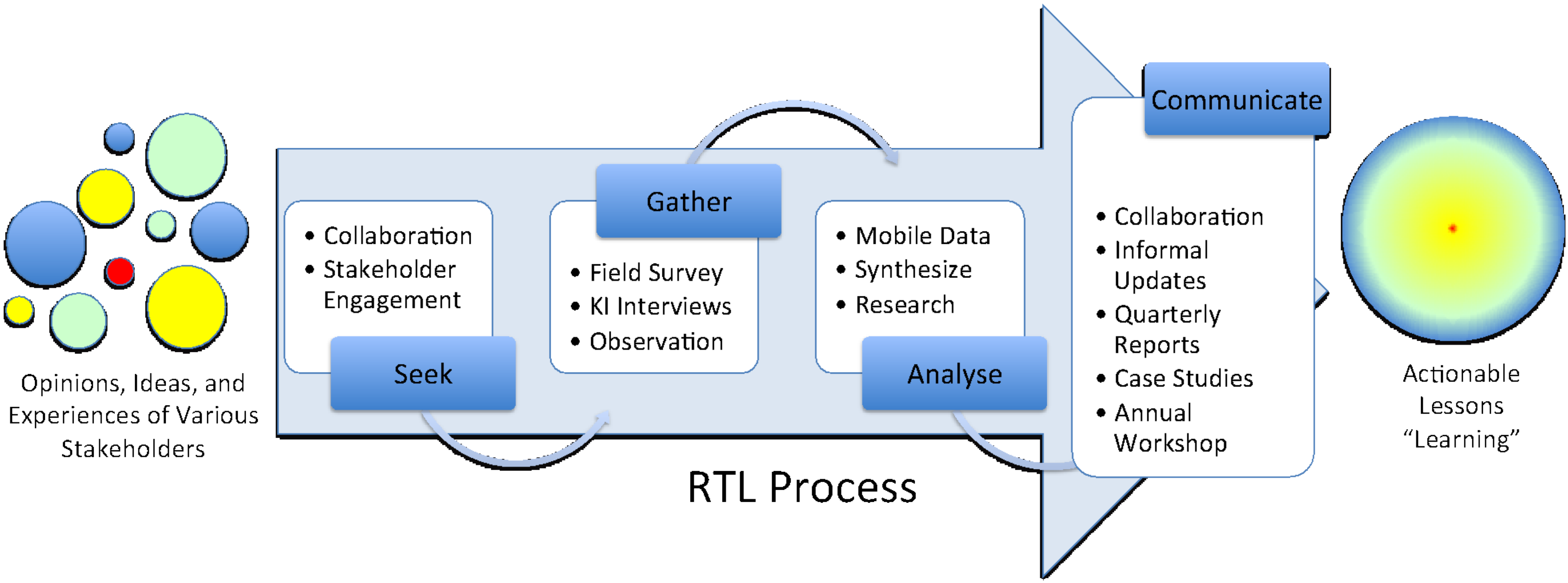
Meter

- Allows service to heterogeneous customers
- Pay for actual use (direct transparent price signal)
- Allows greater growth in level and type of load
- Encourages conservation
- May reduce community disputes
- Added complication of meter reading and billing

No Meter

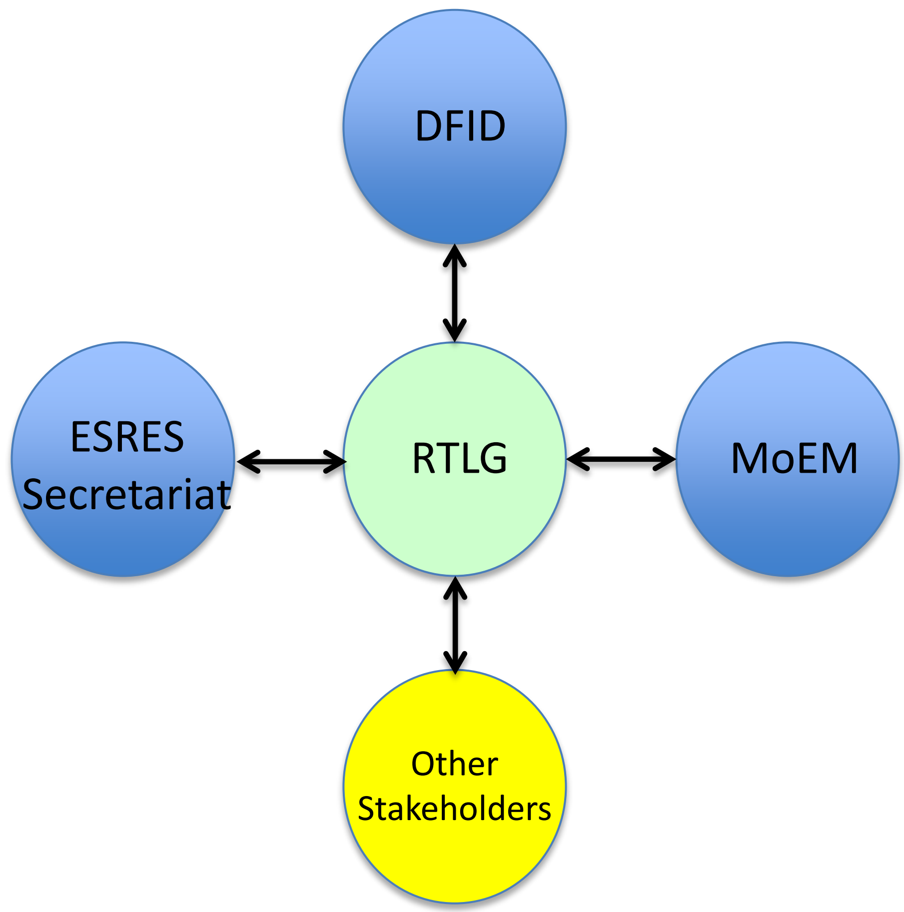
- Easier installation
- Cheaper (Meter Cost = $50-$500)
- Simplified billing
- May be more community appropriate
- Only suitable for homogenous customers with fixed usage

Components of RTL Process



Real Time Learning Group

- Representatives from key stakeholders in ESRES
- Focal point at DFID, ESRES Secretariat, and MoEM
- Regular engagement with RTL team
- Formal meeting as part of JSC
- Communication of "lessons learning" through RTL quarterly report, case studies, workshops, and other deliverables
- Ongoing informal collaboration to ensure successful implementation of ESRES



Join the ESRES Real Time Learning Group!

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