

# ASIA CLEAN ENERGY FORUM 2015



## Lessons Learned for Renewables Integration

Manila, June 2015

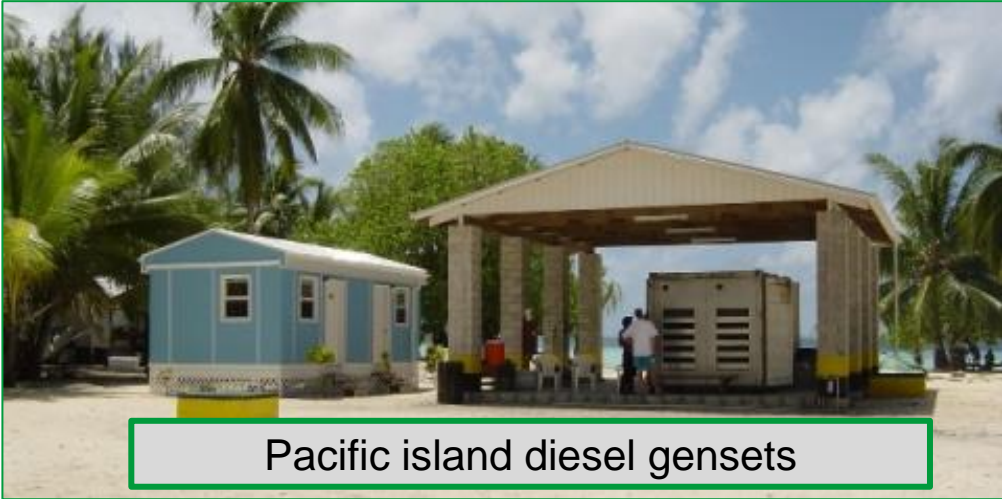
# REDAVIA: REDUCE ELECTRICITY COST WITH RENTAL SOLAR FARMS



# DIESEL ENERGY: PRIMARY POWER SOURCE IN FRONTIER MARKETS



Mining camp diesel gensets



Pacific island diesel gensets



Grid-connected diesel gensets

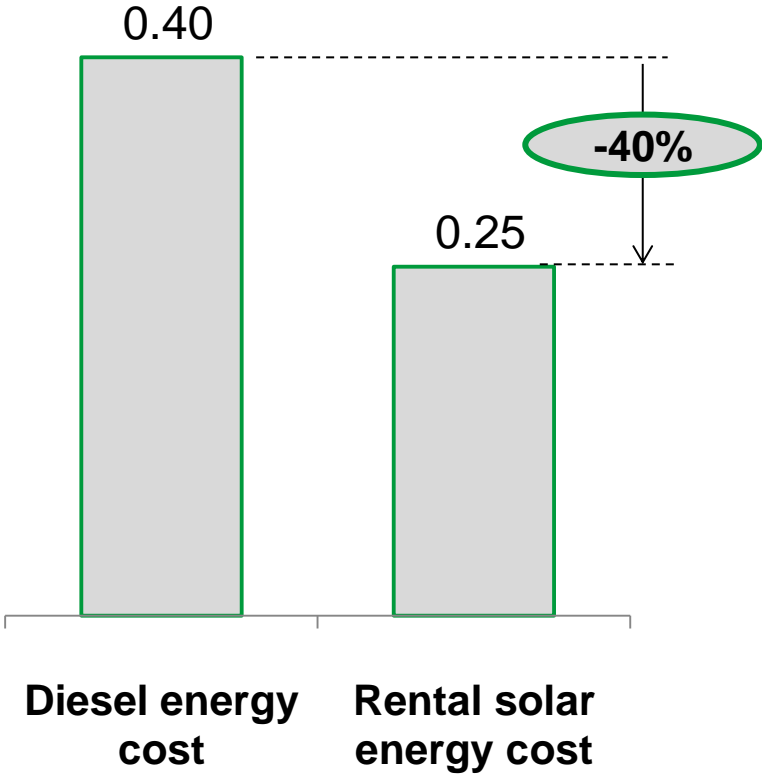


Micro food-processing w. diesel

# SOLAR IS CHEAPER THAN DIESEL ON MOST SIDS

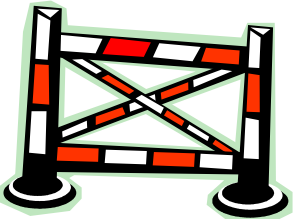
Rental solar energy cost vs. diesel power cost

US\$/kWh



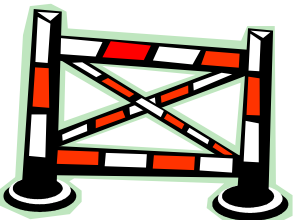
# BUT BARRIERS IMPEDE THE SCALING OF CURRENT SOLAR OFFERINGS

1  
Sell solar farm



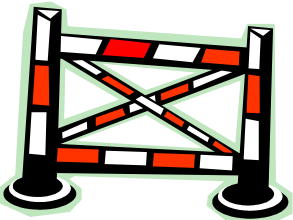
Up-front costs too high

2  
Sell solar energy on 20+ yr contract (to avoid up-front costs)



Too few customers with required credit quality and 20+ year power need

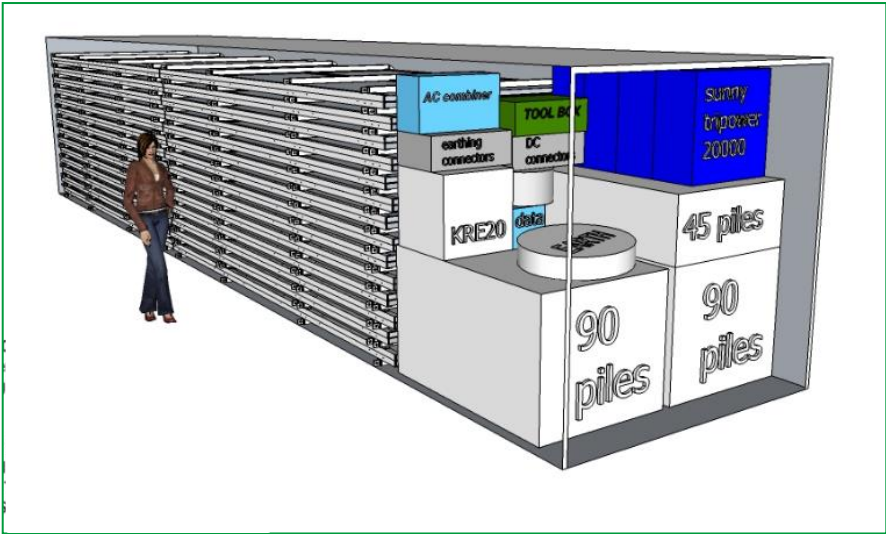
3  
Sell solar plus batteries (to manage solar intermittency)



Cost per kWh of solar + batteries too high

Rental solar provides solutions for each of these barriers

# RENTAL SOLAR OFFER OVERCOMES THESE BARRIERS



- Rent a solar farm for a 3+ years
- No up-front cost
- Turnkey installation
- Full-service operation
- 30-40% savings per kWh vs. diesel power
- Savings vs. diesel from day 1!

# CASE STUDY: GOLD MINE



Containerized Solar Farm pre-shipment



On-site installation step 1



On-site installation step 2

**System load:** 2.5 – 3.5 MW  
**Redavia solar cost:** \$ 0.26/kWh  
**Solar capacity:** Phase 1: 63 kWp ; Phase 2: 0.5-2 MWp  
**Carbon abatement (5yrs):** Phase 1: 350t, Phase 2: 11Kt



Power on! First rental solar farm in the world!!

# CASE STUDY: FORESTRY AND SAW MILL



Containerized solar farm arrived on-site



Container unpacking



On-site installation

Power on! Largest solar farm in Tanzania



**System load:** 2.5 – 3.5 MW  
**Solar capacity:** Phase 1: 87 kWp ; Phase 2: 0.5-2 MWp  
**Carbon abatement (5yrs):** Phase 1: 500t, Phase 2: 11Kt



# CUSTOMER RESPONSES

*"We contacted them via their website in March, liked the savings they were offering as well as clean power on flexible terms, and have an 87kWp power plant feeding in power in less than 2 months."*

*Aadu Polli, Industrial Director, Green Resources Timber*

*"We are extremely interested ... the offer sounds fantastic."*

*Andy Evans, Camp Director of West-African gold miner*

*"It does what it says on the tin. We're very satisfied."*

*Power Manager, Tanzanian gold miner*

*"We are interested in your offer. We suffer from daily outages, sometimes lasting up to a week."*

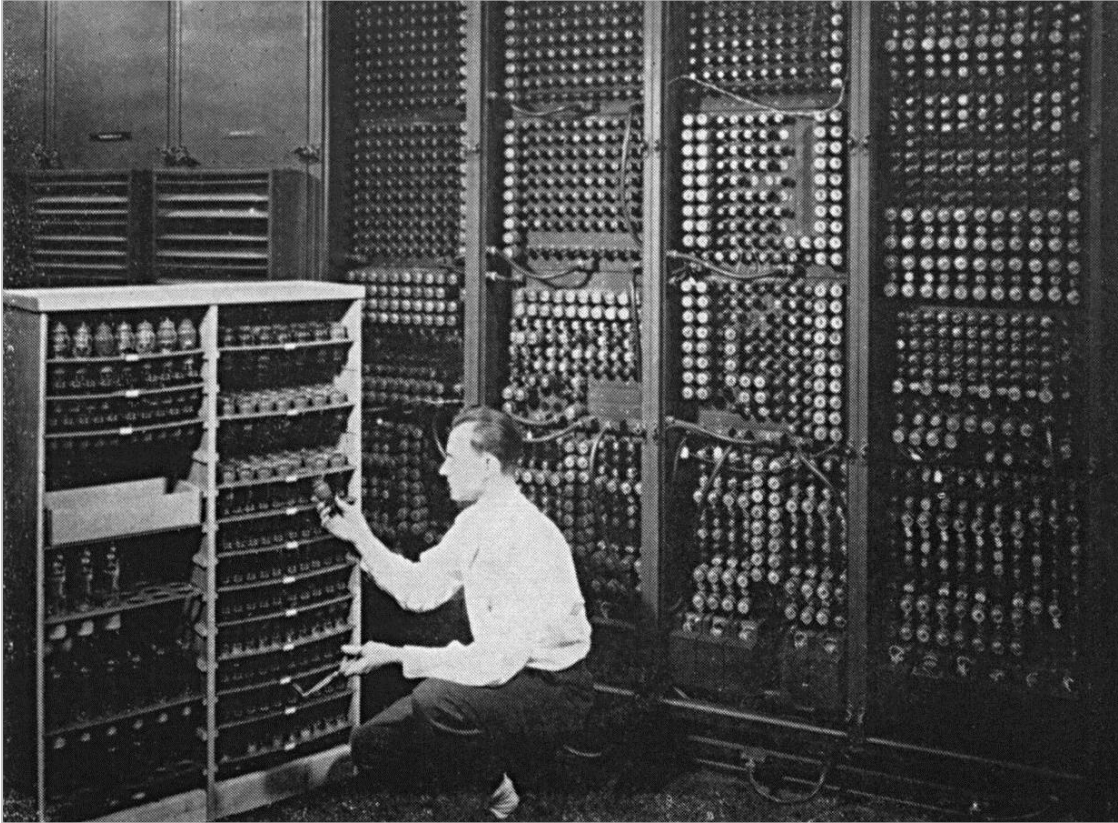
*Kondo, Manager Grain Mill, Greater Dar es Salaam, Tanzania*

# LESSONS LEARNED

- Trust economics
- Start small, then scale
- The customer knows best
- Speed simplifies everything
- Remoteness changes everything
- Space is the ultimate luxury

## PARALLEL WITH ANOTHER “PRODUCTIZATION PLAY” (1/4):

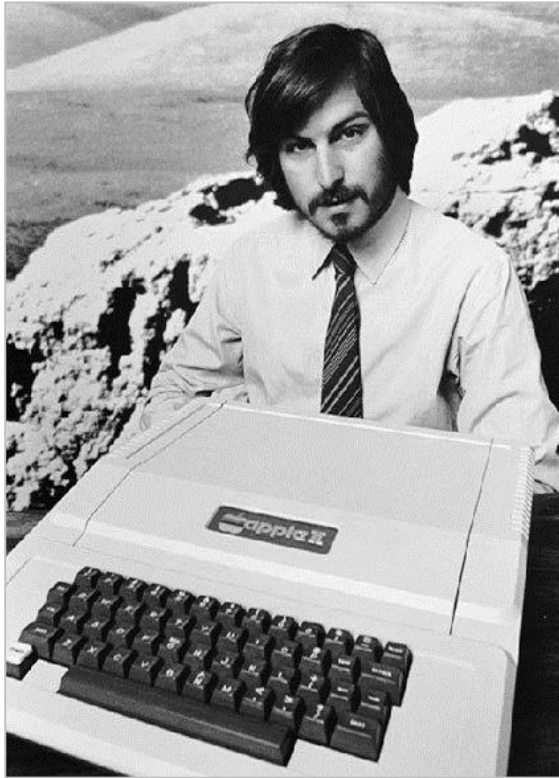
FROM... VACUUM-TUBE MAINFRAME COMPUTERS (circa 1950's)...



- Centralized
- Bespoke
- Long lead times
- Only for big customers
- Expensive
- „Projects“

## PARALLEL WITH ANOTHER “PRODUCTIZATION PLAY” (2/4):

### TO... PERSONAL COMPUTERS AND SMART-PHONES (1970's & onward)



- Decentralized
- Standardized
- Available anywhere, anytime
- For everyone
- Low cost
- „Products“

**Enabler: Solid-state semiconductors replace vacuum tubes, causing drastic reduction in cost and complexity of computing**

## PARALLEL WITH ANOTHER “PRODUCTIZATION PLAY” (3/4):

### FROM... FOSSIL-FUELED CONVENTIONAL POWER PLANTS (20th century)



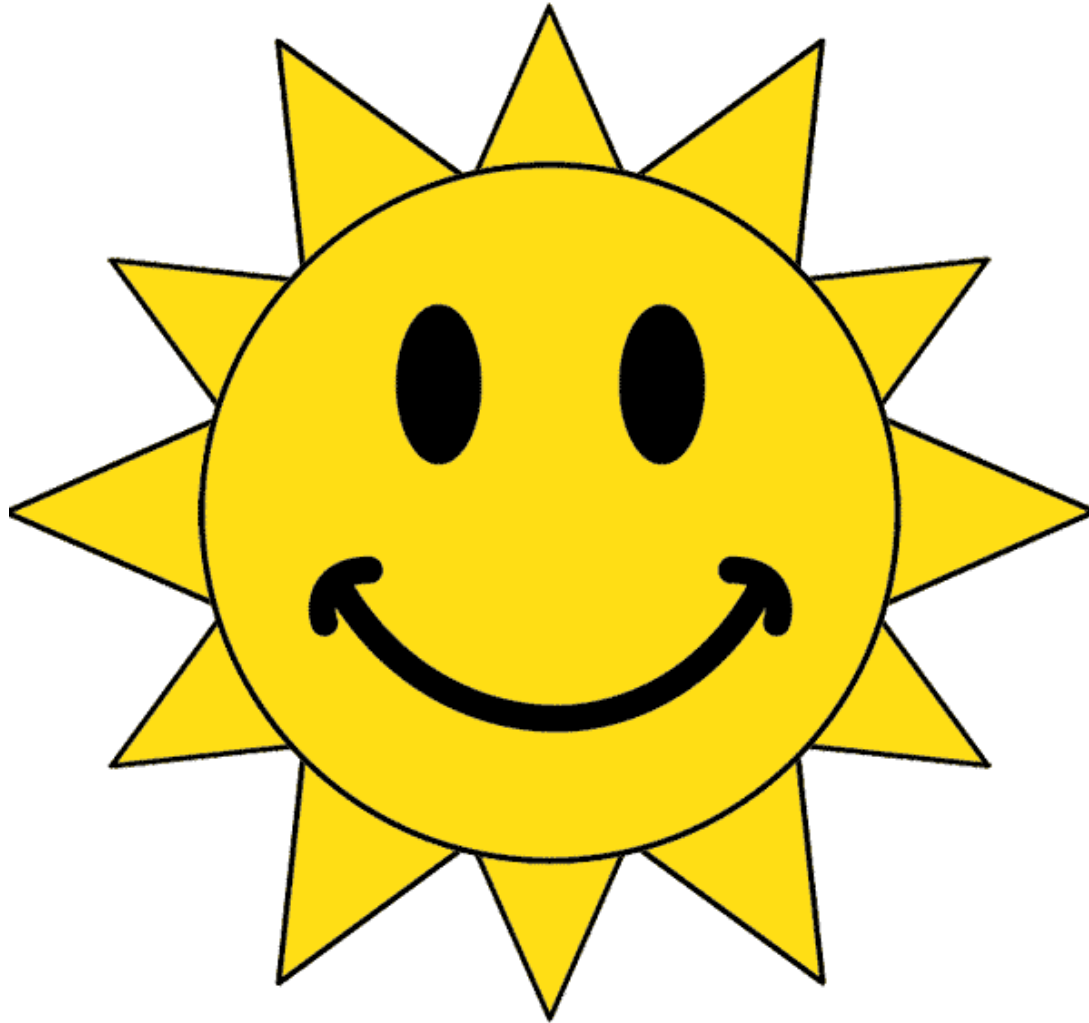
- Centralized
- Bespoke
- Long lead times
- Only for big customers
- Expensive
- „Projects“

# PARALLEL WITH ANOTHER “PRODUCTIZATION PLAY“ (4/4): TO DISTRIBUTED SOLAR ENERGY SYSTEMS (21st century & onward)



- Decentralized
- Standard
- Available anywhere, anytime
- For everyone
- Low cost
- „Products“

**Enabler: Solar photovoltaics replaces electromagnetic-induction, causing drastic reduction in cost and complexity of electricity generation**



**THANKS FOR YOUR ATTENTION**