27.2.97.

To:

Dr. M.Khalid Shams.

From:

Prof: Amulya Reddy.

Dear Dr. Khalid Shams,

Thank you for a most interesting and enlightening visit to the Gramcen Group on 25/2/97. I particularly appreciate the time spared by Professor Yunus and you and your colleagues including Dr. Dipal Banua.

The visit motivated me to think more about "Energy Services as an Instrument of Poverty Alleviation". I have jotted down some ideas which may be of some interest to you. If you want to pursue them with me, please let me know. As I indicated to you, it is the mission of IEI to promote the different production and use of energy for sustainable development, and the discharge of that mission is my interest.

With best regards

Yours sincerely,

Amulya Reddy.

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ENERGY AS AN INSTRUMENT OF POVERTY ALLEVIATION

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1 If goal of the energy system is to be *poverty alleviation*, i.e., improvement of the living conditions of the poor, then its focus must be on the *rural poor*.

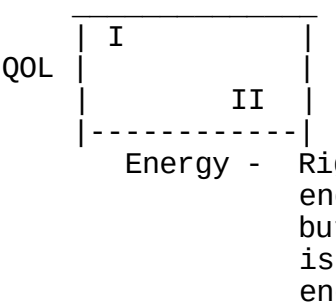
2 The emphasis must be on *energy services* as an instrument of Poverty Alleviation; not merely energy consumption (or supply) as an end in itself. Therefore, the requirement is energy services to improve life of the Rural Poor.

Life of Rural Poor depends on ---- QOL
access to energy services}
}Equity

----- Improvement
----- Environment

Therefore Energy to improve QOL
Increased access to energy services
Energy for improving environment

3.Provision : in between (Quality of Life) QOL Energy



Rigorously speaks energy services,, but if efficiency is a constant, energy is a proxy.

3a.Regime I ---- elastic region $\frac{\partial \text{ QOL}}{\partial \text{ E}}$ = high

Small inputs of energy ---- large improvements in QOL

3b. Regime II -- "inelastic" region - $\frac{\partial \text{ QOL}}{\partial \text{E}}$ - Low

Large inputs of energy --- small improvements in QOL

4. Regime Direct improvement of QOL from Energy ie Energy-QOL
Regime II Indirect improvement of QOL in a Income i.e.
Energy -- Income -- QOL

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Regime I- QOL decoupled from income//
Regime II - QOL coupled to income // Income coupled improvement of QOL depends on which sex income & what income is used for

Efficient improvements may actually lead Improvements of Energy Services through efficient improvements to lower operating costs of devices (eg kerosene lamps vs electric lights)
Efficient devices may have higher capital costs but capital cost can be converted into op.costs through innovation financing.

5. Impact of energy(∂ QOL) depends on end uses of energy
$\frac{\partial QOL}{\partial E}$ --- on tasks that energy performs

6. Direct/elastic impact of energy ------- Cooking (C)
Lighting (L)
Safe water (SW)
Indirect/"inelastic" impact of energy-- Electric drives(ED)
- Motors
- Pumps
- Compressors
- Process Heat (PH)
-Processing Industries

C/SW/ED/PH
Direct/Indirect
End-uses
Tasks

7. Sources
Fuels -- Cooking -- Stoves
Process--Boilers/Furnaces/ kilns
Electricity --Lighting - Lamps
Electric Drives -Motors-Pumps-Compressors

8. Rural Energy Systems for Poverty Alleviation (Rural Poor) we must not look only at supply) we must look at whole cycle from Energy source to Energy Source via Fuels/Electricity, end use device

---- Energy Sources
(Fuel Efficient
& + End use Device
Electricity)

----- Supply ----- Demand -------

9. Criteria for Choice of Energy Sources (Fuels & Electricity)
---- Other things being equal, Decentralized /Locally available sources in order to strengthen self-reliance and to empower people/communities
---- Renewable sources in order to promote environmental resources
---- compatible with high -efficiency and use devices
---- facilitate access by rural poor in - isolated homesteads- (low housing density)
- Home/HH systems

If Economic of scale > Distribution Costs-Micro Utilities
If Economic of scale < Distribution Costs- Home systems
Micro Utilities increase access by rural poor

Compact settlements -
(high housing density)
Micro utilities
Community- Scale

Systems

% penetration by cheap source

%HH
% penetration of HH by costly source

% income

Are micro-utilities pre-emptes by household systems that commandier capital, energy re-sources, enterprenuership?

10. Criteria for Choice of End-use Device (Stoves, Lamps, Thermal devices, Drives etc)
-- Accessible to Rural Poor -- Low enough first cost?
operating cost
-- Same/lower operating cost than traditional device after finance to convert initial cost into operating cost.
-- environmentally sound
-- directly improves QOL
-- generates income which(if used constructively) improves QOL
-- other things being equal, benefits women

11. Elitist Energy Source -- that which is inaccessible to rural poor (i.e. is accessible only to rural elite)
Elitist End-use device -- that which care only be afforded by rural elite (i.e., is beyond the means of rural poor)

Operating costs of traditional devices (eg. kerosene lamps) | Operating costs of improved devices (electric lights) | Maximum expenditure on energy (say 15%)

window of technological opportunity

12. Elitist end-use (sources & devices)

- bypass the rural poor
- do not alleviate poverty
- make negligible contribution
- to energy system
- hardly mitigate negative environmental impacts

BUT

- they can offer a high-profit market for profit making enterprises.

13. Important questions

- Do elitist sourced devices-prompt possibility of dissemination of sources/devices for rural poor?
- Is there a level playing field for elitist sources/devices for rural poor?
- Hijack capital that would otherwise be used for poverty alleviation?
- Are banks biased towards elitist devices?
- Direct resources that would be used for the rural poor? This is what happens when household size biogas plants use up what could be used by community-scale plant

14. Cost-effective Technological Sources/Devices for various Tasks

TASK	PRESENT	NEAR TERM	MEDIUM TERM	LONG TERM
Cooking	Wood stoves	Improved Stoves	LPG/Biogas/ Electric?	Gas/NG stoves
Safe water	Surfaces/ Well water	Filtered water	?	?
Lighting	Kerosene Lamps	Electric Light	Fluorescent / Compact Fluorescent Lamps	?
Drives	Human/animal	Motors	Improved	

			motors	
Appliances	-	Electric Appliances	Electric Appliances	Electric Appliances
Process Heat	-	Electric furnaces	Induction furnaces	Biofricts,Solar
Transport	Human/Animal/bicycles	Petroleum NG fueled vehicles	Bio-mass vehicles	Fuel cells driven vehicles
Electricity	Grid	Bio-mass based generation	Bio-mass generation/ PV/ small hydel/ solar thermal	Fuel cells base wood power
Fuels	Wood	NG/LPG, Improved wood stoves	Biofuels	Ciofuels

15. Characteristics of Technologies

PRESENT	NEAR TERM	MEDIUM -LONG TERM
Environmentally unsound	Environmentally sounder	Environmentally sustainable
Inefficient flow productivity	More efficient	Efficient
Traditional – no longer optional	Greater access	Access
"Western" – not accessible to poor because expensive	More cost effective	Cost effective
Employment generation - little	Empowerment (self defence) of rural areas	Lead balance shifted to rural areas

16. Programme of Energy for Poverty Alleviation

BANK	ENERGY ENTERPRISE(S)
Loans for purchase of energy efficient devices to improve QOL directly via income generation (stoves, lamps, drives, boilers/furnaces/kilns etc)	*Marketing of energy efficient devices * Joint ventures build up decentralized renewable energy systems compatible with high efficiency devices accessible to rural poor
Leasing/financing of energy efficient devices so that unacceptable first cost becomes acceptable operating cost	* Establishment & Development of micro-utilities run by women * Comercialisation of decentralized renewable energy sources & energy efficient devices

Above items can be elaborated.

Amulya Reddy