



CEHEEN

CENTRE FOR HOUSEHOLD ENERGY AND ENVIRONMENT

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**ENGINEERS IN TECHNICAL, HUMANITARIAN
OPPORTUNITIES OF SERVICE – LEARNING
(ETHOS) 2006 CONFERENCE**

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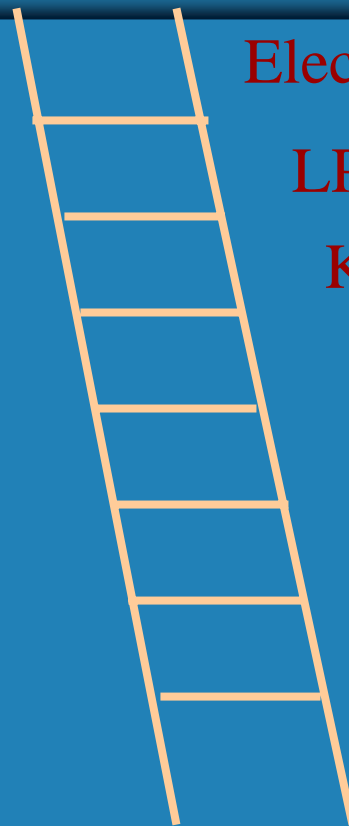
“The Energy Ladder”

“History has shown that when alternatives are available and affordable, consumers opt for more modern energy carriers. As incomes rise and opportunities for using better technologies become available, consumer preferences shift to more efficient, convenient, cleaner energy systems. That is, consumers move up the energy ladder”.

(UNDP World Energy Assessment, 2000)



The Energy Ladder



Electricity

LP Gas

Kerosene

Charcoal

Wood

Dung

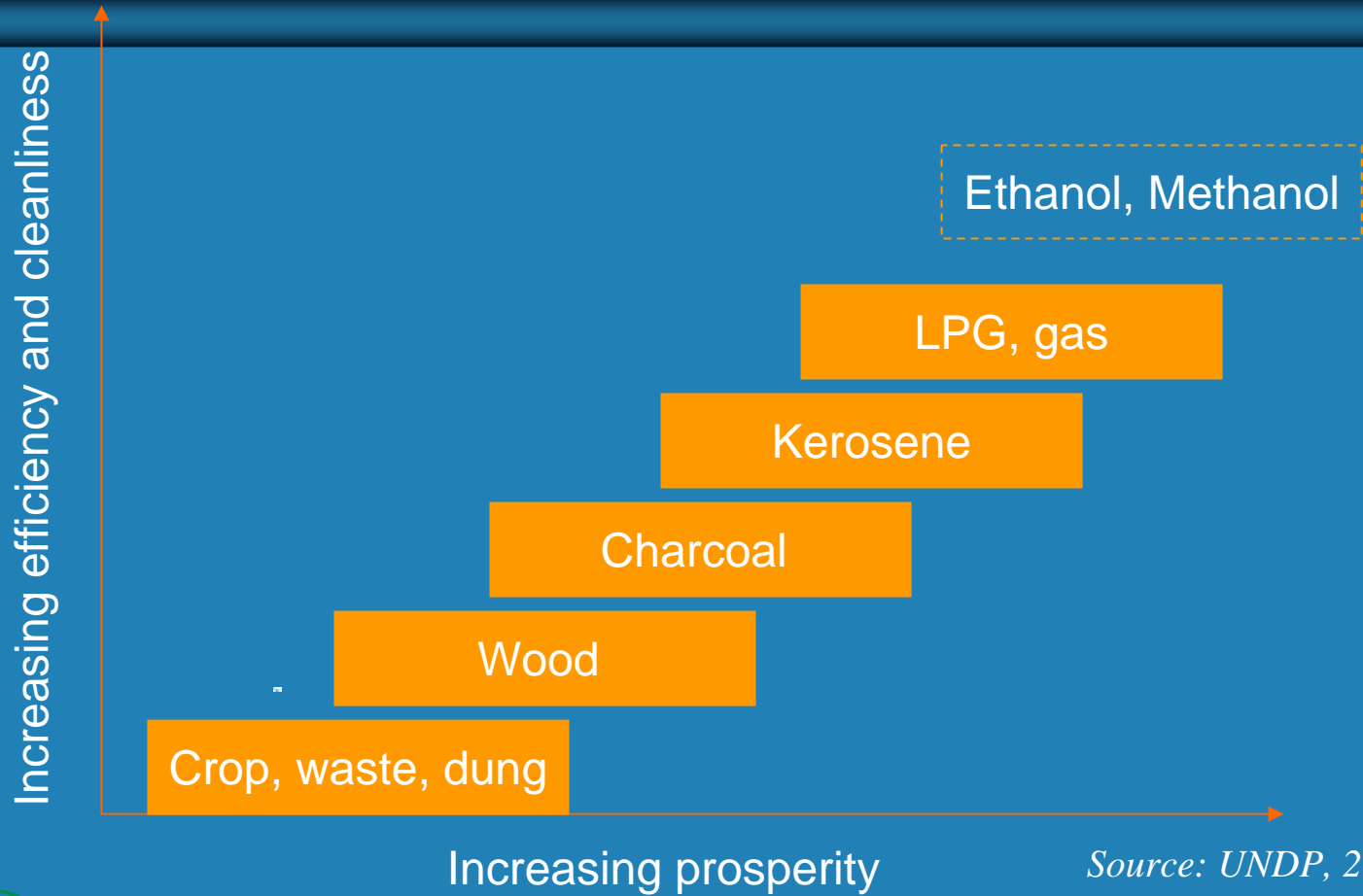
Leaves & Twigs,

Ag Residues, Sawdust, etc.

**Where do the
alcohol fuels,
methanol and
ethanol, fit in?**



Do we now have a new energy ladder?



Source: UNDP, 2005



PROJECT GAIA NIGERIA

Project Objectives

This project is designed not only to prove the Dometic CleanCook Stove in the developing world market place but also to prove it with Methanol Fuel. While the pilot studies in Ethiopia and Brazil are based on Ethanol, the project in Nigeria is based on Methanol. For this reason, HydroChem Linde/BOC is an important technical partner in this study. HydroChem Linde will provide the Gas Synthesis Technology that will manufacture methanol from Delta State's abundant natural gas.



Project Gaia Nigeria

Project Status

- Delta State Government's Ministry of Power & Energy and CEHEEN are working actively together to conclude a pilot study of 300 stoves. Both the USEPA grant budget and the Delta State project budget have been established and are being drawn upon.

CEHEEN has assembled a pilot study staff comprising a director, a manager, and 10 field surveyors, supported by office staff. These surveyors (all university graduates) have been trained and assisted management in the just concluded first phase of the pilot study.

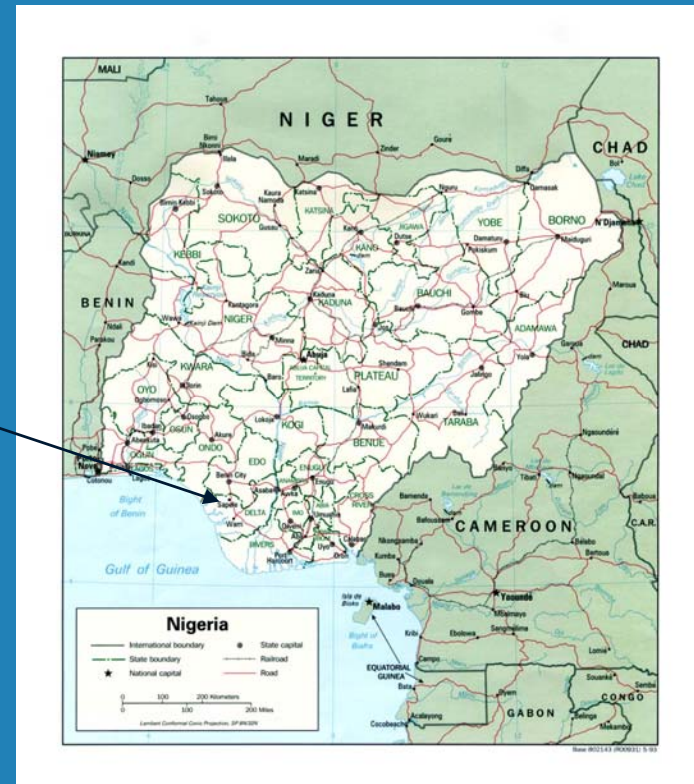


Project Gaia Nigeria

Project Status

- DSG Ministry of Power & Energy has provided 4 of its staff to the field Survey, as quality control team.

Three pilot study sites have been selected. These are Asaba (state capital), Abraka (the governor's town) and Warri (important center for Shell Petroleum). The surveyors were assigned to the pilot sites during baseline study.



Project Gaia Nigeria

Project Status

- Two American staff of the Stokes Consulting Group (SCG), Jim Murren and Cheryl O' Brien, were in Asaba, the project headquarter to assist DSG and CEHEEN.
- DSG will sign soon an agreement with HydroChem for preliminary engineering for the gas to methanol plant. This plant will be pursued as a design-build project to accelerate completion.
- Delta State has approached the major oil companies to purchase and add stoves to the pilot study by time of commercial scale-up. DSG has been offered gas by Pan Ocean Oil and Gas Company, a Nigerian company, to take gas, allowing PanOcean to comply with the Federal requirement of "Flares-Out by 2008".



Project Gaia Nigeria

General Baseline Conditions



Kerosene is not only expensive, but also it is in short supply. This has left a large void in the household energy fuel market, because no other improved fuel has penetrated into the market so deeply. With kerosene scarce and expensive, there is a large void to fill. LPG will remain too expensive to make an impact.

Kerosene has another problem. It is dirty and dangerous and is universally feared and disliked. Methanol fuel can easily displace kerosene as the improved fuel of choice, not only in Nigeria but throughout Africa.

Project Gaia Nigeria

General Baseline Condition of Kerosene



Composite pictures show victims of kerosene explosion as recorded at the UBTH yesterday.

Kerosene explosion:

More victims in hospital

By GLORY OBAYAGBONA
BENIN CITY - As more unsuspecting consumers of petroleum products in -adversely ill prey to the killer kerosene explosions that have continued to rock parts of Benin City and its environs, several public and private health institutions are now flooded with scores of patients being treated for severe burns.

Some of the hospitals where latest victims of the kerosene explosion were admitted include; Bambi Hospital along Silako Road, Evangel Hospital along New Lagos Road and the University of Benin Teaching Hospital (UBTH), all in Benin City.

Conducting newsmen round the Accident Unit of UBTH, a nursing officer in the hospital and Deputy Coordinator-General, Save Accident Victims Association of Nigeria (SAVAN) Mrs. O. Ehigiamusoe discussed that out of the 19 kerosene explosion patients admitted in the past three days, nine had been transferred to the Surgical Ward Annex because of their piteous, critical conditions occasioned by the second degree burns they sustained.

One of the patients, Mt. Elisha Irabor who resides along S and T Road, Uselu area in Benin metropolis, pathetically and sorrowfully in an emotion laden voice, narrated how he and his family narrowly escaped from the raging inferno that not only scorched him and five out of his six children, but completely mazed down the entire residential building without a pin being spared.

According to him, the fire that has left him permanently disfigured, started when one of the children, attempted to light a lantern which exploded on him and other inflammable items in the room. The fire later spread to other parts of the building until it was gutted down.

Commenting on the situation of the victims, the Coordinator-General of SAVAN, Dr. Eddy Ehikhamenor berated the authorities of

More victims of Kerosene explosion in Benin



Govt orders ban on kerosene

By GLORY OBAYAGBONA
BENIN CITY - As part of efforts to save the lives of the victims of kerosene explosion in hospitals, the Edo State Government is applying special materials for dressing as

well as drugs to the Central Hospital, Benin City and University of Benin Teaching Hospital (UBTH), where victims are currently receiving treatment.

A government statement signed by the Chief Press Secretary to the governor, Mr. Lucky Wusu, said the government, in order to avert further cases of explosion from the killer kerosene had ordered a total stoppage of the use of kerosene by residents of the state until full investigation on the origin and nature of the

Bad kero caused fire incident

By OLUFERAH AJAYI
BENIN CITY - New lath have emerged from the fire incident that occurred at 27, Uselu-Lagos Road, Benin City, at the weekend.

Speaking with newsmen

Editorial/Cartoon - Pg 4 • Leisure - P.14 • International - P.17 • Today's man -

Kerosene which has been tagged “killer fuel”, is scarce, dirty and expensive.

Kerosene explosions have claimed over 2000 lives in Nigeria since 2001 and still counting with the Niger Delta worst hot.



Project Gaia Nigeria

General Baseline Conditions Contd.



Pollution from gas flares impacts living homes, and the environment in the process resulting to acid rain which is threatening buildings, forests and aquatic resources.



Agip's perpetual gas flare at Ebocha. A Nigerian court ruled such flares violated the rights of nearby residents; they are to be put out by 2008.

Project Gaia Nigeria

General Baseline Conditions Contd.



Even in Delta State, with its oil and gas wealth, 95% of people use either some fuel wood or only fuel wood. People also rely on kerosene, but, with deregulation, kerosene has jumped from \$0.30 US per liter to over \$1.00 per liter in just a few years.



Project Gaia Nigeria

Baseline Survey on Health

Warri Communities IAP Cases

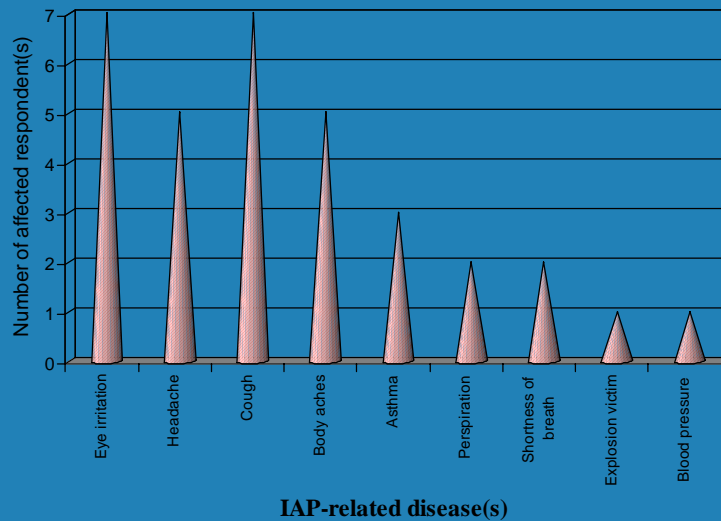
Eye irritation	Headache	Cough	Body aches	Asthma	Perspiration	Shortness of breath	Explosion victim	Blood pressure
7	5	7	5	3	2	2	1	1

From the above data, it was observed that these symptoms were experienced by our respondents. Out of 50 households, 33 representing 66% had medical cases relating to Indoor Air Pollution. Respondents say they are likely to visit the hospital monthly.



Project Gaia Nigeria

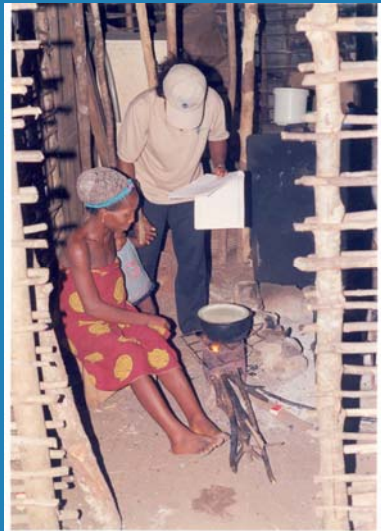
Baseline Survey on Health Contd.



Ekene Okoh, a son to one of the respondents. Ekene coughs every morning while packing out ashes under the tripod stove; a daily chore that now threatens his health.



Project Gaia Nigeria Baseline Survey on Health Contd.



This pregnant woman in Abraka – Delta State, sitting with her child has been cooking with fuelwood for many years, she laments about the negative impact on her health.



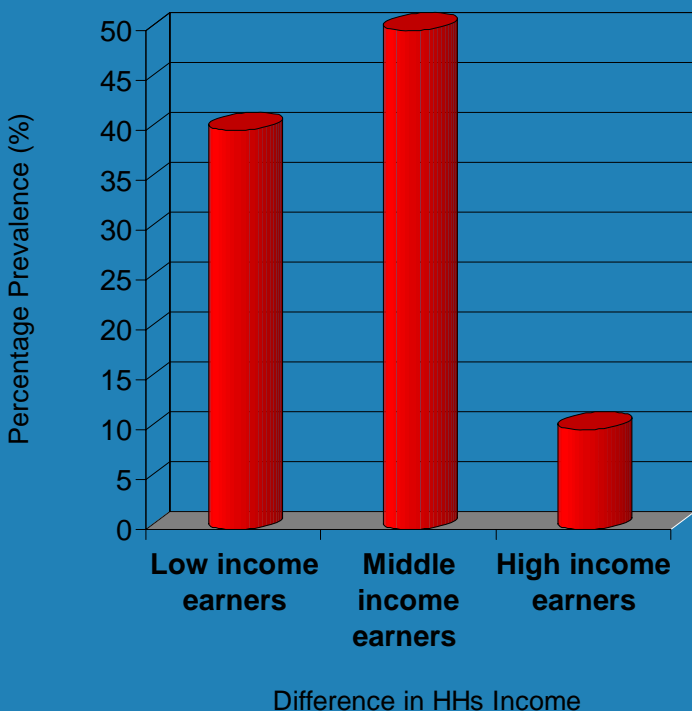
Project Gaia Surveyor interviewing our respondents amidst thick smoke from the fuelwood tripod stove.



Project Gaia Nigeria

Baseline Survey on Income

Asaba Communities



Low income earners	Middle income earner	Higher income earner	Total
20 (40%)	25 (50%)	5 (10%)	50 (HHs)

This chart explains that the middle income earners use kerosene stove sometimes substituting it with LPG stove. The low income earners on the other hand use fuelwood with occasional substitute with kerosene stove. While the high income earners use LPG stove which they sometimes substitute with kerosene stove



Project Gaia Nigeria

Baseline Survey



BASELINE HEALTH EFFECTS MONITORING

- We selected 30 homes (10 homes from each of the 3 pilot sites) for IAP monitoring. The 30 homes will have air quality instruments (to be brought to Nigeria from Ethiopia) placed in them 2 days before the stoves will be given out. Indoor air quality will be monitored before and after the study. The instrument will stay in the homes for 48 hours with the surveyors checking each day.
- Field staff received preliminary training on indoor air pollution monitoring and evaluation from our expatriate staff, who have acquired the expertise of IAP from the Ethiopia pilot study.
- We developed the final health questionnaire within the context of existing traditional norms in the pilot study locations.
- We developed an IAP and health awareness information system with the Delta State Ministry of Information which required the ministry using the public address system under our supervision to inform and educate families in the 3 pilot location on the dangers of IAP in the homes and how to use a clean cooking system and simple behavioural changes to address the issue. The exercise lasted for one week during which families gathered and asked questions related to IAP and their health.

Project Gaia Nigeria

Immediate Next Steps

STOVE INTRODUCTION IN THE HOMES:

Surveyors bring the stove, methanol in bottles, safety sheet, and one supply of 10 long wood sticks (wrapped in a rubber band) to the household.

Surveyors go 3 days/week to visit each of his/her homes in the beginning of the study to make sure everything is going OK and to familiarize the family with the stove so that they are comfortable with the use of the stove.

1st phase (Feb.): free methanol delivered to the homes by litre or the fuel canister.

2nd phase (Mar.): households pick up methanol fuel and pay the expected production cost of 15 Naira.

3rd phase (Apr.): households pick up methanol fuel and pay the expected market price of methanol; slightly higher than the price to be paid during phase two.



Harvesting the Last Tree



Thanks for Listening !!!

