Sustainable Solar Development to Reduce Indoor Air Pollution in Vietnam

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We believe in simple living in our shared world.
We promote sustainable choices for food,
water, energy, transportation and housing.

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Cooking

BACKGROUND STATISTICS

- ½ the world's population, (3 billion people), rely on dung, wood, crop waste or coal to meet their most basic energy needs.
- Cooking and heating with these solid fuels on open fires or stoves without chimneys leads to indoor air pollution.
- Indoor smoke is **the number 4 killer** in 'least developed' countries after malnutrition, unsafe sex and unsafe water and sanitation. It is responsible for 1.6 million deaths or **one every 20 seconds.**
- The UN estimates that the impact of indoor smoke is the equivalent of smoking **two packs** of cigarettes a day.

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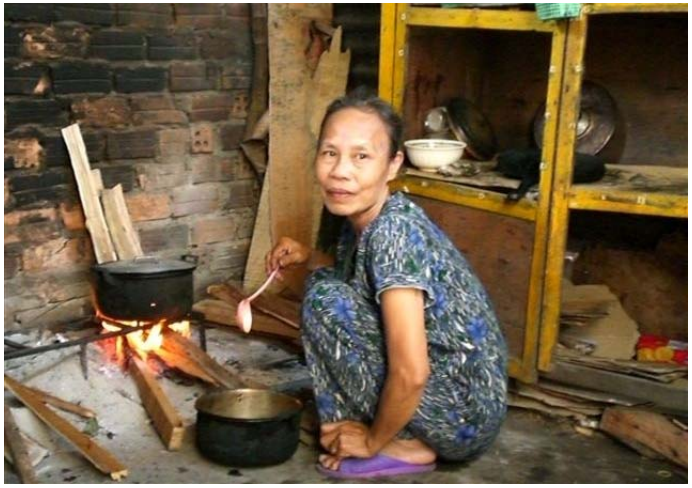
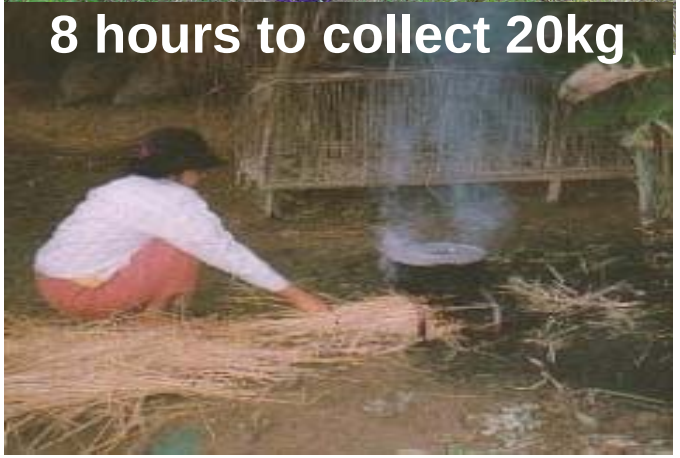


5kg wood needed per day

8 hours to collect 20kg



WHO IS AT RISK?

- Women generally spend 3-7 hours per day preparing food in front of open fires.
- Young children, (esp. <5 yrs) who spend most of their time with their mothers.
- Infants are often carried on their mother's back, kept close to the warm hearth.

Infants spend many hours breathing indoor smoke during their first year of life when their developing airways make them particularly vulnerable to hazardous pollutants.

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HEALTH RISK

- Pneumonia (acute lower respiratory illness) among children under five years
- Chronic respiratory disease and
- Lung cancer (esp. in relation to coal use) among adults over 30 years old.

Others risks are Asthma, Cataracts, Tuberculosis, Adverse Pregnancy Outcomes, Ischemic Heart Disease and Nasopharyngeal and Laryngeal Cancers.

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OTHER BURDENS

- Wood fuel collection can impose a serious time burden on women and children.
  - Alleviating this work will free women's time for productive endeavors and child care.
  - Children have more time for education.
- Deforestation leads to soil erosion, floods, climate change, and severe environmental degradation, which result in increasing poverty and hunger.

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SOME SOLUTIONS

- Cleaner burning fuels such as LP gas
  - however this is out of reach of most of the world's rural poor.
- Solar cookers/ovens
  - however they can generally supplement, not replace, firewood use.
- Well-designed fuel-efficient stoves with chimney
  - improves health conditions, but does not address underlying issues.
- Clean renewable fuels (i.e. biogas from animal dung and other organic waste)
  - requires community infrastructure for economies of scale.
- Other possible supplements include biofuels, wind, water, and solar electric power.
  - but many are out of reach of rural poor

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WHAT IS IN THE FUTURE?

- Number of people relying on biomass fuels for cooking and heating will continue to rise.
- Health impacts of indoor air pollution have yet to become a central focus of research, development aid and policy-making.
- Tackling indoor air pollution in the context of household energy can:
  - Reduce child mortality
  - Promote gender equality and empower women
  - Open up opportunities for income generation
  - Promote environmental sustainability.
- The international community has committed itself to significantly reduce poverty and child deaths by the year 2015, the “Millennium Development Goals”.
  - If smoke in the home is not tackled there will be little chance of reaching these goals.

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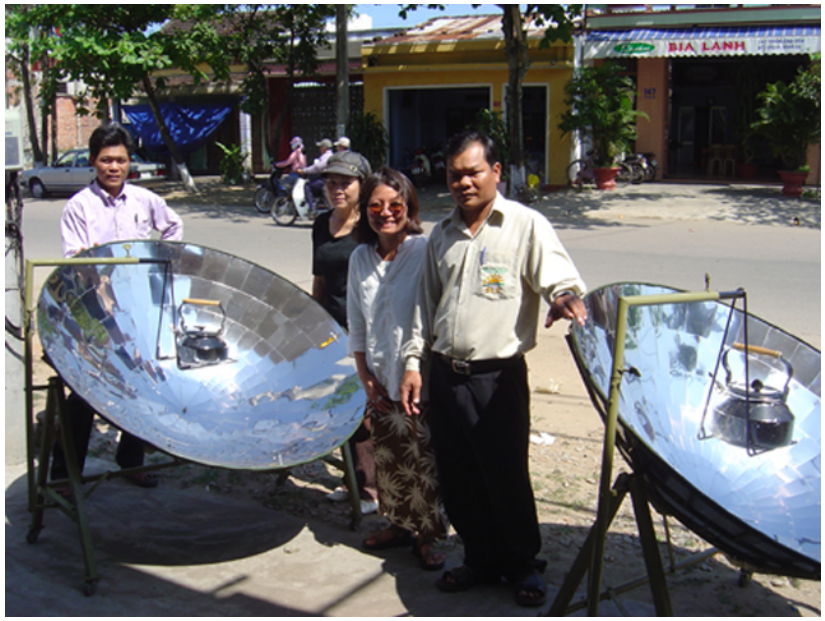
A FEASIBLE OPTION FOR VIETNAM



Vietnamese designed and built, affordable solar parabolic cookers

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CHALLENGES

- Training in new technology
- Behavioral changes in cooking habits
- Commodity price of imported materials (esp. stainless steel)
- Cost of delivery of bulky product to remote users

Lighting

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FUEL BASED LIGHTING

- 1/3 of the world's population (2 billion people) have no access to electricity
- Fuel based lighting is inefficient, expensive, dangerous and unhealthy
- Kerosene lamps provide only 0.2 % of the light available to people in industrialized countries for a similar price.
- Per unit of emitted light or heat, the poor pay higher prices than the rich

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WHO IS AT RISK ?

- The World Bank estimates that 780 million women and children are breathing particulate laden kerosene fumes
- 2/3 of adult female lung-cancer victims in developing nations are non-smokers.

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DANGER OF KEROSENE

- Health risks such as ENT irritation, lung cancer, kidney and liver afflictions, and respiratory illnesses
- Fire catastrophes
- Fuel based lighting releases 244 million tons of CO_2 (a greenhouse gas) in the atmosphere each year. Also CO, and oxides of sulfur and nitrogen

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COST OF KEROSENE

- A villager using about 1.5 liter/month for 3-4 hours a day, pays approximately $52 a year (VND 10K/liter)
- Prices can fluctuate due to transportation costs to rural areas as well as dilution of mixture, and black market forces

SOLAR LED LIGHTING

- LED – ultra-low power consumption, durability, reliability and extended lifetime (over 50,000 hours)
- LED Illumination is 25-50 lumens/watt vs. the wick of a kerosene lamp 0.3 lumens/watt
- Solar rechargeable lantern – renewable energy from the sun is free (Vietnam lies in the equatorial belt)
- Cost of NiMH Batteries and LED has come down significantly, with corresponding increase of efficiency
- Reduces the toxic waste of D-Cell batteries from use of flashlights
- Provides superior lighting at least cost

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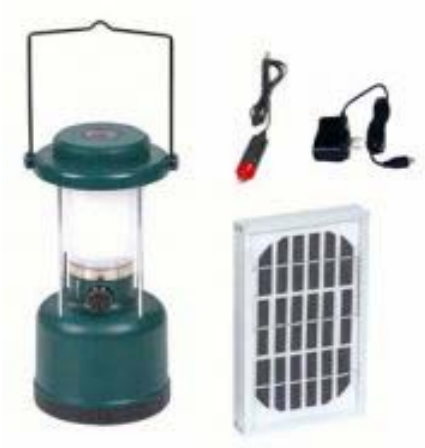
BENEFITS

- Increase literacy because people can read after dark more easily
- Schoolwork improves and eyesight is safeguarded
- Economic Development –
  - It is dark by 6:30 year round in the equatorial latitudes. Solar electric lighting empowers families to extend their productive workday into the evening hours
  - Instead of being compelled to migrate to over-crowded towns and cities in search of economic opportunity, rural villagers may now choose to stay close to home

A FEASIBLE OPTION FOR VIETNAM



- Lantern for less than $25
- Collaboration with other NGOs
  (PALS, Children of Vietnam)
  - use established projects for distribution and monitoring
  - potential to develop local assembly facilities
- Localized energy source provides new opportunities for rural development and jobs
- Reduce greenhouse gas emissions

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