

Globale Solarwirtschaft – Eine Chance für Afrika?
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Which Sort of Energy for Cooking?

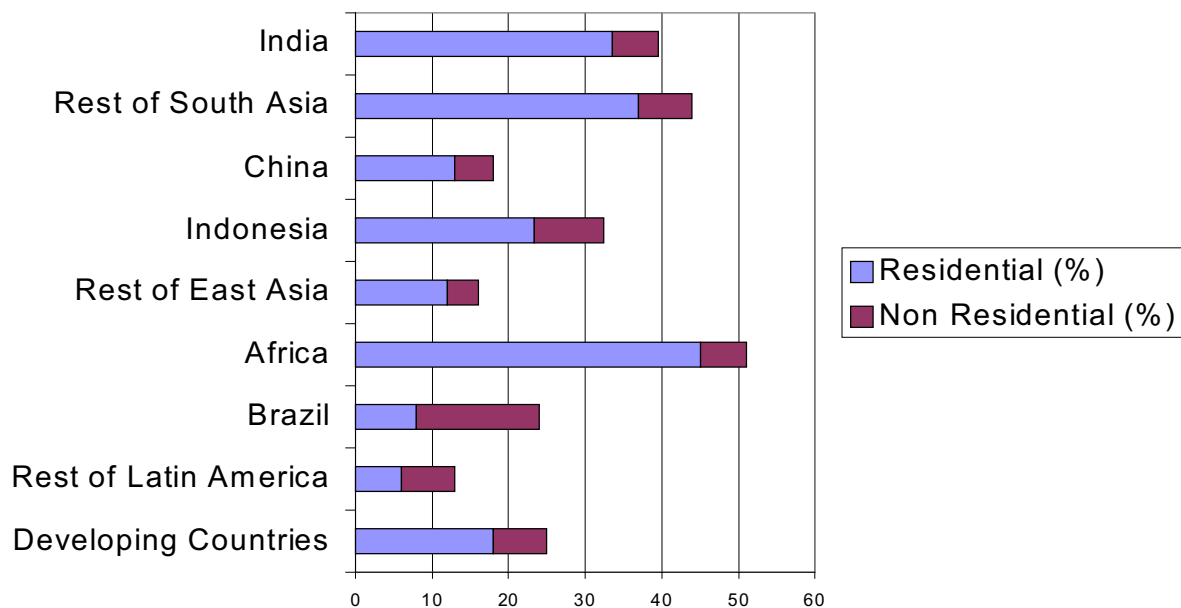
By Paul Krämer

The subject of renewable energies is a matter of growing interest in discussions on development policy, as evidenced by meetings on “Upcoming Energies for the South” or “Global Solar Economy – a Chance for Africa?” In southern countries, however, a renewable energy has been used for cooking since time immemorial, namely wood or biomass. In this respect, there has been little change. Does this mean, everything is o.k.? Growing consumption of wood resources and insufficient supply point in another direction. But what is the core of the problem?

Is it possible – now and in future – to produce the necessary amount of wood/biomass in such a way, that the off-take should be fully compensated by new growth? And if not, can other renewable energies replace biomass to the necessary extent? The “World Energy Outlook” (WEO) 2002 published by the International Energy Agency (IEA) in its chapter 13 (Energy & Poverty) gives us some hints [1].

Diagram 1: Share of biomass demand in total energy demand in 2002, and share of households in this demand, based on data contained in „World Energy Outlook 2002“,

Share of Biomass Consumption as Part of Total National Energy Consumption, 2000, Adapted from "World Energy Outlook" 2002

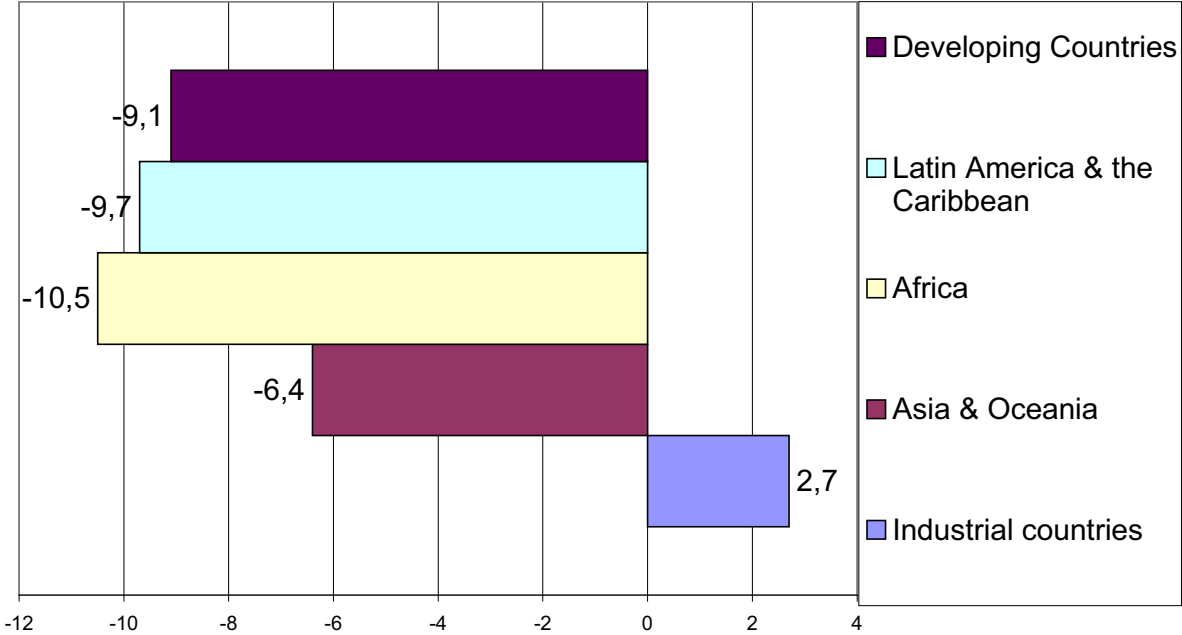


International Energy Agency, chapter 13 (Energy & Poverty, Tab 13A3).

We see that in southern countries an important part of the energy demand is covered by biomass; the lower the degree of industrialization, the higher is the importance of biomass. This is due to the relative bigger part of residential energy consumption. Most households are nearly totally dependent on biomass for cooking; even in India and China. Projections by IEA for 2010, 2020 and 2030 differ little from this general picture. In absolute numbers the consumption of biomass will even increase, except in China, Indonesia, and in the Brazilian household sector. The United Nations Environmental Programme (UNEP) states in its "Africa Environment Outlook" [2] that the demand for wood and charcoal in Africa is bound to increase over the next 30 years by over 45 %. The felling of round wood for export will also increase by 1,7 % annually over the next ten years. The conclusion drawn in "Africa Environment Outlook" is that the development of alternative energy sources is a priority for the African region and that it needs promotion, among others via the financing mechanisms of the Kyoto Protocol. However, the document does not ask the question, which sort of energy could replace – or at least limit – the demand for wood as cooking fuel.

What is the effect of this high and rapidly growing demand of wood fuel on forest surfaces? The distinction, whether the felling was motivated by the demand for wood or by clearing of land for agricultural purposes is secondary, the result is the same, and the wood felled is burnt in any case.

Diagram 2: Changes in forest surfaces between 1980 and 1995 in developing and industrial countries, according to "Africa Environment Outlook" [2] .



The Diagram shows that in all regions of the world wood surfaces are diminishing, only in industrialized countries are they on the increase. This points to the fact that industrialized countries have access to energy sources other than wood, and can also meet their demand of wood for non-energy purposes by imports from the south.

An assessment ordered by the European Union (EU) and the Food and Agricultural Organization of the United Nations (FAO) on documents pertaining to the wood energy situation in 23

African countries [3] puts the problem like this: “Based on the available information we state that in several countries the situation of demand and supply has reached a critical point or is approaching a point which corresponds to a scenario, in which the poorest are deprived of their most elementary goods. In several countries the consumption of wood energy is falling, due to diminishing supply and rising prices.” The document continues: “The use of charcoal fundamentally alters the relation between the energy needs of households and wood resources in the region, and transforms what had been always accepted as self-supply – namely the collection of firewood – into a vicious circle with potentially dramatic consequences for forests and wood supply.” The document further states that the shift from wood to charcoal leads to a doubling of consumption in terms of resources (wood as primary energy). Wood, the “oil” of the poor is becoming scarce.

With a view to the rapidly growing preference for charcoal over wood in towns, coupled with rapid urbanization [4] in Africa, we have to count with growing problems on the continent. And this is where other renewable energies enter the stage. But attention: wind, photovoltaics and hydropower generally lead to electricity as final energy¹. However, the IEA [see I, chapter 13] is quite right in stating: “It is a common misconception that electricity simply replaces biomass”, and “Expanded access to electricity, which low-income households use primarily for lighting, is unlikely to reduce the demand for biomass in many countries in Africa and South Asia.” Electricity from renewable sources — where it is available at all — is even more likely to be used selectively due to the still high investment costs.

It is unrealistic to expect large-scale use of electricity in developing countries for cooking. The same is true for fossil energies like gas or kerosene, which are considered as intermediary steps on the “energy ladder”², even if poverty reduction strategies were successful. Poor countries cannot compete with rich ones on the world energy market. Despite this, the IEA [see I, chapter 13] expresses optimism: “As poor families in developing countries increase their incomes, they can afford more modern appliances, and they demand more an better energy services.”

This sentence is equivocal: It can be perceived as a statement on an abstract logical and/or psychological relationship and in this sense it is true, but it should better begin like this: *Let us suppose poor families increase their incomes* However, it may also be understood as factual statement: *Poor families increase their incomes, and for this reason, they demand more modern appliances and more modern energy services.* In this sense, it is false, because the first part of the sentence (the premise) is not true.

This ambiguity hampers a clear view on the problem of overexploitation of wood resources for cooking and the corresponding social and economic problems. Realistic proposals for a solution do not come into view. Solar cookers are not mentioned in the document, and are probably not meant by “modern appliances”. “Modern” in the sense of the World Energy Outlook of the IEA are mainly electrical appliances. But as the same document states that electricity cannot replace biomass in a foreseeable future, there is a lack of logic and consistency in the argument.

The difficulty disappears only if we acknowledge solar cookers as “modern” appliances and include them in our deliberations. They can replace wood/biomass, at least partially; and this is the leading idea underlying their construction. Solar cookers are able to escape the threefold dilemma:

- lack of ecological sustainability of wood resources
- lack of social and economic sustainability of fossil alternatives to wood fuels

¹ Only biogas, another biomass derivative, can be used directly for cooking, but the production and use of biogas depends on many factors usually without reach for individual households.

² “In a general way, it is a journey from nearly exclusive reliance on traditional biomass to the access and use of electricity together with a range of other modern fuels.”

- lack of appropriateness – or suitability – of electricity (and renewable energies leading to electricity as final energy) for cooking purposes, if large-scale use is considered.

Moreover solar cookers – if used on an important scale – can contribute to the attainment of a balance between wood production and consumption, and thus restore full sense to the term “renewability” of wood energy. Renewability has to be defined or confirmed geographically for individual countries or areas, not in abstract terms. Solar cookers as a competing energy source may even limit the rise of prices for wood fuels and benefit thus even those who do not use them.

If we further consider the severe health consequences of indoor air pollution (IAP) because of the use of wood fuel without proper ventilation, the gravity of the neglect of solar cooker technology becomes even more obvious. IAP leads to about 2 million additional deaths annually in developing countries, mainly between women and children under 5 years of age, and is responsible for 4 % of the global burden of disease [5]. By comparison, the negative health consequences of the use of solar cookers are less important [6].

Solar cookers are available in technically ripe variants and for different fields of use: for family use the Papillon (butterfly type), developed in Jülich, and the SK 14, developed in Altötting (both in Germany) are available among others; for large bakeries and institutional kitchens for up to several hundred or even thousands of people the fix-focus (Scheffler type) cookers can be used as well as cooker types using a heat exchange system. But there are also very simple low-priced variants like the Cookit (Solar Cookers International, SCI) for use in emergency situations, like in refugee camps.

It is time for the public interested in development policy to review older prepossessions and to recognize the enormous political, economic, social and environmental chances brought about by solar cookers. Renewable energies for the South without solar cookers, that is like an appetizer without the main dish. People in the south want to eat, and they are not necessarily fond of uncooked food.

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