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Bright green idea: solar mallee trees light up Adelaide. The South Australian city will host the 2008 International Solar Cities Congress – see Diary Dates, P7. [PHOTO GOVERNMENT OF SOUTH AUSTRALIA/ADELAIDE CITY COUCIL]

PV POWER



1 MW plant in Kang-Jin, south-west Korea. Korea's PV installation in 2006 is estimated to be about 21 MW; a rapid increase from about 5 MW in 2005, due largely to the FiT.

Amidst the international clamor for increasing the funding of market support measures for grid-connected PV, a recurring call from most lobbyists is for the 'feed-in tariff' (FiT) such as the one that has driven the PV market explosion in Germany in recent years. This article briefly explores the nature of the FiT and market support in some of the IEA PVPS countries.

WHAT IT IS - AND ISN'T

In the world of grid-connected PV, the term FiT simply refers to an explicit monetary reward for producing PV electricity, at a rate per kWh somewhat higher than the retail electricity rates being paid by the customer – which is why the measure is often more correctly termed an enhanced FiT.

In principle the measure encourages efficient production of PV electricity; the output from the PV system is normally monitored and recorded, with 'rewards' tied to actual generation. The FiT has consequently been promoted as the performance-based market support measure. As discussions about PV policy support mature, other performance-based measures are now also attracting some interest, such as expected performance-based buydowns and incentive hold-backs.

The FiT does not directly help with the problem of the large up-front costs associated with installing a PV system, unless the future cash flow projections help the customer to more easily secure some sort of financing. For some classes of potential PV users this remains a significant barrier.

VARIATIONS ON THE THEME

There are two main variations of the FiT approach: in the first case, all the electricity produced by the PV system, irrespective of how much is used by the customer or fed into the grid, qualifies for the feed-in tariff. In the other situation, only the PV electricity that is surplus to the customer's requirements is paid under the feed-in tariff. The remainder has the same value to the customer as their retail electricity rate. In the extreme, e.g. if the FiT payment is calculated over a long period for systems that are sized to generate no more than the on-site demand during that period, the customer may see little or no financial advantage from the FiT compared to a simple net-billing approach.

The FiT becomes most attractive for all parties when time-of-use metering and pricing are employed, reflecting the real benefits to the electricity network of reducing customer demand or adding power to the system when it is most needed. From the electricity utility's perspective this may be either when bulk power is most expensive to purchase or in locations where supply is constrained, or both.

Typically, funds for the FiT are raised through a levy on electricity bills across the board, which has two main attractions: the scheme is not subjected to the usual budgetary whims associated with government funds, and, potentially, all electricity customers are contributing to improvements in their electricity supply system.

THE REWARD

There are a number of ways that the level of the FiT can be set. Simple financial calculations can indicate the cash flow required to provide a certain return on investment for a given PV customer in a particular location. Estimates of the value of externalities, such as the unfunded costs of pollution associated with traditional energy supply, can form the basis of the tariff. The specific electricity network benefits that may be relevant, such as peak demand reduction or line support, can be monetized. Or it may simply be decided that twice (or three times or so on) the retail electricity price sounds about right!

TARGET AUDIENCE

In isolation, the FiT is best targeted at entities with a business cash flow requirement such as housing developers, investors, commercial entities. If the FiT is combined with a direct capital subsidy, it also becomes appealing for customers with a limited access to capital such as households, small businesses and public organizations.

COUNTRIES USING THE MEASURE

FiT schemes are becoming more widespread and are showing a variety of outcomes. Amongst the IEA PVPS countries notable examples can be found in Austria, France, Germany, Italy, Korea, the Netherlands, Portugal and Spain. While a high tariff level has been shown to be capable of driving substantial market growth, some of the controlling conditions that have been placed on different countries' schemes have resulted in difficulties in achieving such a result or



sustaining high levels of investment. These controlling conditions have included caps on PV capacity allowed under the scheme, exclusion of certain types of projects such as BiPV or large-scale plants (or lack of appropriate differentiation of tariffs), inadequate period guaranteed for the FiT and overly complex administrative requirements. Germany has avoided many of these problems, yet even here the FiT has created its own challenges. The tariff is quite generous and an annual tariff reduction is built in to the programme, designed to compensate early investors. This combination has been successful in driving huge demand very guickly. However, sustaining investor interest may become difficult if system prices do not also fall steadily, and at some stage there may be political fallout if the German industry is not seen to be the major beneficiary of the local demand for PV.

ALTERNATIVE MARKET SUPPORT APPROACHES

Notable amongst countries that have not yet pursued the FiT approach but which, in many cases, have still seen significant development of their grid-connected PV markets are Japan, the USA, Switzerland and Australia. In these countries the PV support mechanisms of choice have been direct capital subsidies, renewable portfolio standards, green electricity schemes or tax exemptions, or some combination of these. Generally, in these countries growth of the PV market is typically slower but steadier than in the countries using the FiT. Japan's residential sector in particular is worth noting for the emergence of what may well be the world's first unsupported grid-connected PV market

PROBLEMS AND SOLUTIONS

The FiT mechanism does not lend itself to ready prediction of outcomes where, for example, a certain amount of PV electricity or rates of deployment are being sought. If the pool of potential investors is not adequately understood – their motivations, financial positions and so on – overheated markets



A 26,7 kW grid-connected system on a flat roof in Anterselva, Bolzano, Italy.

IF AT FIRST YOU DON'T SUCCEED...

After a challenging 18 months that stimulated huge numbers of applications but little new capacity, the picture for serious PV investment in Italy appears clearer following recent revisions to the national feed-in-tariff structure.

The new arrangements still recognize three system capacity bands, but these have been adjusted particularly to acknowledge residential-scale systems. The new bands are 1 to 3 kW, 3 to 20 kW and >20 kW. There are also three recognized integration categories: effectively fully building-integrated, building retrofitted and ground-mounted. The major difference is that the maximum tariff of 0,49 EUR/kWh now applies for BIPV systems in the 1-3 kW range with gradually lower rates applying for systems in the larger band ranges and/or those that are less well integrated.

This reverses the previous tariff structure that tended to favour larger-scale systems. That resulted in many speculative applications which are unlikely to see systems implemented. The programme modifications retain encouraging investment aspects such as 20 years' guaranteed production tariff, but should reduce the prospects for speculation.

can result if the tariffs are set too high. Set the tariffs too low and the investments could be negligible, consequently wasting the time and effort that has been invested in development of the scheme.

The most obvious solution is to set the tariff at the 'right' level – but this is easier said than done if the FiT is being used as a broad support mechanism. A simpler solution is to more clearly target the approach on specific, limited market segments, which can then be expanded over time. This also avoids the need for setting the problematic cap on the size of the scheme, a source of considerable angst in some previous cases.

POLICY CONSIDERATIONS

As with any proposed tool of public policy, a mechanism should be evaluated broadly against a number of criteria. In the case of a proposed FiT, the outcomes that have been achieved elsewhere are becoming easier to document. But are the local barriers to be addressed the same as those tackled elsewhere? Is the local electricity industry structure compatible with the approach? Will the scheme be flexible enough to survive political change? Can the scheme alone transform the market? How costly is the administrative burden compared to that of other approaches? Is the free-rider effect minimized? And what are the overall socio-economic-environmental impacts of the measure? In summary, the simple answer to a complex problem can often raise many more questions – but they are always worth tackling in the long run.

Descriptions and analyses of the latest PV support mechanisms in the participating countries are presented in the *Trends in photovoltaic applications* report, published by IEA PVPS in August each year.

EUROPEAN PV POLICY BEST PRACTICE

What makes for sound policy for effective and efficient PV market and industry development? That is the central question facing the 'PV Policy Core Group' under the European Commission's 'Intelligent Energy Europe' programme.

The Core Group, an initiative involving energy agencies from 8 European countries as well as the European PV Industry Association (EPIA), has recently released a report summarizing and analyzing the policy frameworks in twelve countries (eleven from Europe as well as Japan). This includes a distillation of key lessons to help policy decision-makers and other interest groups better understand the combination of factors that support effective and efficient PV programmes.

The work is principally directed towards supporting countries that are lagging behind in regard to the effectiveness of their PV programmes to improve national policy frameworks for PV. By definition the work is oriented towards the European Union, however other countries will no doubt benefit from the analysis, while for the EU it may well support closer harmonization of policies in future. The report reflects the situation in mid-2005 and as such precedes some important recent developments (for instance the introduction of favourable feed-in tariffs in Greece and Italy). Nonetheless, the key conclusions remain extremely valid.

Encouragingly, the study goes beyond what could have been the simple line of 'adopt a feed-in-tariff; bigger is better'. Certainly feed-in tariff arrangements have been valuable in some markets, but (as noted in the preceding article) other factors such as whether any capacity caps are in place, guarantee periods, tariff decreases and other issues are at least as important for the effectiveness of such a measure as the scale of the tariff. Notably the report seeks to clarify that, in the case of feed-in tariffs, the market is not proportional to the level of financial incentive, but rather is sensitive to an incentive threshold that provides appropriate reward for investors. This will vary from country to country.

Overall the Core Group confirms that fundamental requirements for any policy framework are longevity and stability. Any strategy must have ambitious long-term targets and a clearly defined implementation programme, generally using a mix of instruments. The enabling environment – in other words the application and authorization processes for support measures as well as those required for installation – should be simple and clear; complicated and lengthy administrative processes are cited as a substantial barrier to market diffusion.

For off-grid market promotion, subsidy schemes remain the most effective support mechanism, though typically their shortterm nature may not result in the creation of a sustainable market and if badly managed, subsidies can cripple the market entirely. In all cases, secure public budgets for the duration of any programme are crucial to avoid 'stop and go' effects.

In relation to process administration, decentralized arrangements managed by regional or local bodies are generally more cost-efficient but less predictable and homogenous than those managed by a central national body. Differences in implementation approaches between regions can lead to investor and industry confusion.

For further information and to download the report visit: www.pvpolicy.org

Lamelas, Portugal, 124 kW amorphous silicon plant. Portugal's Directive 2001/77/CE targets 39 % of gross electricity consumption from renewables by 2010, with PV set to increase from about 3 MW today to 150 MW. An important incentive is the feed-in tariff, guaranteed for 15 years. For PV, the tariff was revized down in April 2005 to 0,45 EUR/kWh for systems up to 5 kW and 0,28 EUR /kWh for systems above 5 kW. [PHOTO JAYME DA COSTA, SA]



After a period of almost unrestricted interest and seemingly undifferentiated investment, the finance community is now looking at the PV industry in a more critical manner. Under the banner of the IEA PVPS Programme, a finance and PV workshop, Solar PV Electricity: a Wealth of Investment Opportunities Under the Sun, was held in Zurich in November 2006 to shed some light on the issues for those trying to 'separate the wheat from the chaff'.

Analysts are quite aware that favourable government PV policies are creating rewarding short-term opportunities for project developers in certain markets, as well as for technology investors globally. Today's main markets are in Germany, Japan and the USA. Countries such as Spain, Italy, France and Greece are expected to provide significant markets in the next few years.

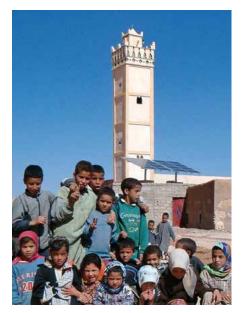
In the rush for the short-term rewards, however, smart investors need to be aware of the potential uncertainties concerning the future of policy driven markets as well as the tempering impacts on industry of the explosive demand seen in some regions.

Important considerations for analysts include growth potential in the face of solar grade silicon scarcity, the capacity of enterprises to compete in the burgeoning industry and of course the clarity and viability of business models.

Along the value chain the risks and returns associated with each segment present a moving target. The current sweet spots are feedstock and modules, and integrators to a lesser degree. Investment banks tend to prefer vertically integrated companies because they control larger segments of the supply chain, diminishing their risks.

HEALTHY DISCUSSIONS

Achieving the technology cost reductions to underpin PV pricing that is competitive with the alternatives will require further public support – probably significant and possibly over an extended period of time. Failing to achieve this could see the technology only advancing slowly beyond the current almost imperceptible contribution to global energy supplies, while attaining marketable price levels within the next decade could herald undreamt of possibilities for growth of the industry and a real impact on energy supplies in coming decades.



Alongside the opportunities to reap rewards from market stimulation measures in many OECD countries, IEA PVPS also promotes awareness of the needs and opportunities in 'real' markets where PV is already often the least-cost option for delivering electricity services. [PHOTO ISOFOTON]

One of the clear messages from the workshop was that of technology evolution rather than revolution. In other words spectacular technical breakthroughs should not be expected from this industry but rather there will continue to be gradual improvements in technology. New materials from nanoscience may create breakthroughs, but these developments should not be expected to happen overnight.

A real difficulty is predicting what will happen with cell and module prices when the feedstock supply situation eases. Feedstock prices are fixed for a number of years and hedging contracts are in place – sudden drops in price should not be expected from these players. However order volumes should go up and consequently costs should go down. Module production costs comprize about 70 % cost of materials – including such things as aluminium, copper and other minerals. It appears that many companies are continuing to face difficulties in securing the necessary raw materials.

Continuing political support for PV will be required both for research and development and for applications. Getting the balance right between R&D and market stimulation funding will be a challenge and will vary from country to country, but it is important for future market growth. Cost and prices must come down steadily for PV to maintain public favour and to grow the emerging investor interest. And all this in an environment where most consumers are not currently paying the real cost of energy!

'REAL' MARKETS

Although often lost amongst the discussions about PV and high market growth rates, industry expansion, retail price parity and energy policy alternatives, IEA PVPS gives equal significance to the roles for PV in developing countries. The electricity access situation in such places is expected to worsen over the next few years as a result of population growth. PV offers the ability, sometimes uniquely, to provide electricity services to populations remote from power grids and to enhance the quality of existing electricity supplies, dramatically improving quality of life. An important issue here is not the great number of potential applications but the lack of spending power and financing options. Novel approaches (such as the examples on Page 8) will continue to be required to maximize the impacts and rewards that PV offers in these markets. IEA PVPS plans to hold further such events throughout the world during 2007/2008.

The event was organized by Nova Energie GmbH and RTS Corporation, with the support of the Swiss investment and finance sector through INRATE AG, and the Swiss PVPS Pool. Presentations from the workshop can be found on www.iea-pvps.org.

For information on future IEA PVPS finance and PV workshops contact Pius Hüsser, pius.huesser@novaenergie.ch

IN BRIEF

AUSTRALIA

The Australian Commonwealth Government and the Victorian State Government have both committed funds towards what is currently the largest planned solar PV plant in the world. The proposed 154 MW plant will use a ground based array of suntracking mirrors to focus sunlight at 500x concentration onto high-efficiency PV receiver modules mounted on one of 246 40 m high towers. The 420 million AUD (256 million EUR) Heliostat Concentrator Photovoltaic project, proposed by Victoria-based firm, Solar Systems, has been awarded 75 million AUD (46 million EUR) under the federal Low Emissions Technology Demonstration Fund, with a further 50 million AUD forthcoming from the State government. The installation will commence in 2008 and is expected to be complete by 2013. At well under 1,7 EUR/ W, the plant is coming in at around half the installed cost of current International best-practice large-scale systems based on flat-plate modules.

ISRAEL

With a long history of successful solar energy R&D and an excellent solar resource, Israel has yet to embrace the concept of grid-connected PV – until now. New governmental policies will allow grid-connected PV electricity generation and Israeli society appears more than willing and able to tackle the challenge if the results of a workshop on BIPV held in February this year are anything to go by. This was the first time an event concerning BIPV had been held in Israel.

As part of the 14th Sede Boqer Symposium on Solar Electricity Production, more than eighty professionals and members of the general public gathered at the Ben Gurion National Solar Energy Center to hear scientists, engineers, architects, environmentalists, and government officials address a variety of BIPV related topics – including Policy and Attitudes, Economics and Applications, Architectural and Product Presentations. The event attracted speakers from the US, the UK and Germany, as well as Israeli scientists, officials and members of environmental groups.

JAPAN

In January, a special subcommittee within the Ministry of Economy, Trade and Industry (METI) agreed on a new target for the 'Law on Special Measures for New Energy Use by Electric Utilities'. The RPS Law, as it is commonly known, governs the obligation placed on all electricity companies to secure supply contributions from 'new energy' sources, including solar PV. The revized goal builds on the current 2010 baseline target of 12,2 billion kWh, requiring new energy usage to increase by 950 million kWh annually to reach 16 billion kWh in FY 2014. This implies an increase from 1,35 % of total electricity sales in 2010 to 1,63 % in 2014.

At the time of writing no specific contributions of individual energy resources or technologies to the total obligation had been indicated. However, PV has been dealt a favourable hand by METI: in recognition of the current higher cost of PV generation relative to other new energy options, any PV electricity sales will count double against a utility's individual liability.

SWITZERLAND

The Swiss parliament has approved a feed-in tariff scheme for electricity from renewables. The new law is expected to come into force by 1 January 2008. However, installations commissioned since January 2006 will also qualify for the premium.

The scheme details, including the specific tariff levels for 3 PV system categories (greenfield, building ret-



A private home in St. Moritz, Switzerland. The integrated energy concept incorporates a 22,5 kW structurally glazed PV façade, solar thermal collectors and a heat pump. [PHOTO/ARCHITECT JOSEF TROXLER]

rofit and building integrated) and 4 bands of rated power, are still to be clarified. However a series of triggers have been proposed which will see gradually more funds made available for new PV systems. The triggers relate to a weighted average cost of electricity generated from PV. While these generation costs remain above some 0.6 CHF/kWh (0.38 EUR/kWh) the funds will be limited to 15 million CHF (9 million EUR) per annum. This would effectively mean the tariff can support a total installed capacity of around 25 MW over the next 3-5 years, which is when the generation costs are expected to hit the first target. Then an additional 15 million CHF will be made available, with a further 30 million per year promised once costs dip below approximately 0,5 CHF/kWh. The tariff will be financed by a levy of around 0,35 Eurocents per kWh on electricity sales.

UK

The UK Government's flagship Low Carbon Buildings Programme, which supports deployment of distributed renewable energy systems and other low emission energy technologies has been temporarily suspended to allow for restructuring. This comes after unexpectedly high public demand has placed severe strain on funding allocations.

The programme was launched in April 2006, with 6,5 million GBP (9,5 million EUR) as incentives for house-

holders, public and private sector organizations to uptake low carbon technologies. The funds were intended to support the scheme through to mid-2008, however the exceptional demand has prompted the government to successively increase the budget first to 12,7 million and then 18,7 million GBP. Towards the end of 2006, a monthly budget allocation of 0.5 million GBP was also introduced as an attempt to ensure the scheme funds were not exhausted prematurely. However, this has led to frustration for many applicants and businesses; the available funds for March were exhausted within just 75 minutes of the monthly allocation being opened to applicants, prompting a major rethink of the funding process. Of almost 7 million GBP committed to date, 57 % has been earmarked for PV systems.

USA

The US Department of Energy has selected the first 13 industry-led solar Technology Pathway Partnerships to compete for funding under the Solar America Initiative (SAI). The partnerships, which involve more than 50 companies, 14 universities, 3 nonprofit organizations, and 2 national laboratories, will negotiate for up to 168 million USD in funding over the 2007 to 2009 Fiscal Period. Some 51,6 million USD is expected to be awarded this year. The projects focus on a range of technology developments, including concentrating technologies, improved materials utilization, new building integration approaches and AC modules. The teams will themselves contribute more than 50 % of the funding for these projects for a total value of up to 357 million USD over three years.

For further information contact the relevant national newsletter representative (see list on P7).





PV PUMPING WORKSHOP

Water pumping, particularly in relation to rural community development in less developed countries, was one of the earliest viable terrestrial applications for solar PV.

Despite this long history and the vital functions for water services in helping to meet the UN's Millennium Development Goals, the application remains largely under-utilized and key knowledge and lessons are still not widely known. As a first step in addressing this shortcoming, Renewable Energy Services for Developing Countries, Task 9 of IEA PVPS, is organizing a workshop for invited experts on PV Pumping, to be held in Bangkok in late June 2007.

NEW ON OUR WEBSITE

The IEA-PVPS website holds

numerous PV-related statistics,

reports, news and other features

to view or download. The site is

regularly updated.

Recent additions include:

• A new summary report from

Task 8: Energy from the Desert

Large Scale Photovoltaic Power

– Practical Proposals for Very

Generation (VLS-PV) systems

• Presentations from the Zurich

Investment Opportunities Under

• The IEA PVPS Annual Report for

Finance Workshop:

Visit www.iea-pvps.org

the Sun

The most basic of human needs. PV has a valuable role to play in extending access to clean water, but its role is still not widely known. [PHOTO GRUNDFOS]

The meeting will in part review and assess previous and ongoing PV-water projects to identify key lessons and will also provide an opportunity to discuss recent technological advances. Participants will also explore strategies for improved dissemination models. The workshop conclusions will form the basis of a new Recommended Practice Guide that will be broadly disseminated, including via a future workshop for water sector users and choosers.

Contact Bernard McNelis,

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IDEAS CHALLENGE – TAKE 2

The winners of the first Lisbon Ideas Challenge (LIC) were announced at the end of November. From the ten short-listed challengers (see PV Power #25), Powerfold, designed by a team of young Portuguese architects, was selected as the overall winner. PV 4All, Sun Square and Sunrise Apartments each received Honourable Mentions. Attention has now moved to a new challenge: the 2nd LIC is soliciting ideas to transform a low-income residential neighbourhood of Lisbon into a Solar Neighbourhood. Teams are invited to submit urban planning proposals indicating how 1 MW of PV could be integrated into the structures presented in the local council's urban renovation plans. Alternatively teams can choose to propose interventions for specific (pre-defined) urban-structures. For further details visit: www.lisbonideaschallenge.com.pt

DIARY DATES...

22nd European PV Solar Energy Conference & Exhibition Milan, Italy 3-7 September 2007 • WIP-Renewable Energies Tel: +49 (0)89 720 12735 www.photovoltaic-conference.com

ISES Solar World Congress 2007 Beijing, China 18-21 September 2007 • Zhen Yingjun, SWC2007 Tel: +86 (0)10 6218 0145 www.swc2007.cn

Solar Power 2007 Long Beach, CA, USA 24-27 September 2007 Solar Electric Power Assoc. Tel: +1 202 8570898 www.solarpowerconference.com European Meeting Point: Energy for Development 2007 Beja, Portugal 10-12 October 2007 Teresa Bertrand Tel: +351 (0)21 841 9755 / 7372 www.energyanddevelopment-2007.net

17th International PV Science and Engineering Conference Fukuoka, Japan 3-7 December 2007 • Yoshio Ohshita Tel: +81 (0)52 809 1875 www.pvsec17.jp

3rd International Solar Cities Congress Adelaide, Australia 17-21 February 2008 Plevin & Associates Tel: +61 (0)8 8379 8222 www.solarcitiescongress.com.au

IEA-PVPS NEWSLETTER

NATIONAL NEWSLETTER CONTACTS

If you have any comments or require further information about any articles appearing in PV Power, or if you have suggestions for new features, please contact your national representative. Full contact details are provided on the PVPS website.

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PV POWER

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CASE STUDY

PROJECT SUMMARY

- Location: Kerala & Karnataka, South India (model now replicated elsewhere)
- Mechanism: Consumer credit scheme offered through 2076 local bank branches
- Approach: Technical and initial financial support helped reduce risks to engage banks
- Impact: >17000 SHS financed (compared to 1400 pre-project)

Contact: Eric Usher, UNEP E-mail: eric.usher@unep.fr

Although much of India is nominally electrified, a high proportion of homes are not connected to the electricity grid and many that are connected are subjected to an unreliable power supply. For rural customers in particular, solar home systems (SHS) can offer a simple, reliable, quality power supply and access to energy services that is often more cost-effective in the long term than traditional options such as kerosene. However, limited consumer credit for SHS purchases has severely restricted many households' opportunities to procure a suitable solar system.

In 2003 UNEP launched a four-year initiative in two southern Indian states to help establish a consumer credit market for financing SHS. The programme, a partnership between UNEP, the UNEP Risoe Centre in Denmark, and two of India's largest banking groups (Canara and Syndicate Banks) made loans available to would-be SHS buyers through over 2000 of the banks' rural branches.

Initially the programme incorporated an interest rate reduction so that SHS loans were below commercial rates. These subsidies have now been phased out. The scheme also adopted a vendor qualification process to ensure quality systems sales and support reliable energy services.



This roadside store can operate in the evenings thanks to a simple PV lighting system. [PHOTO SELCO]

Over 17 000 SHS have been financed since the programme commenced and today over 50 % of all SHS sales in these two states are financed. Eighteen other banks are now offering SHS loans, and UNEP has recently initiated similar bank partnership programmes in Tunisia, Morocco, Ghana and China, with more to follow.

IEA

PYRAMID POWER

Access to modern lighting services is an important contributor to development, enabling income-generation and supporting educational activities, as well as reducing the indoor pollution and fire hazards associated with many traditional fuel-based lighting options. Simple but effective modern solutions invariably also offer a lower lighting service cost, which is another important benefit when one considers that, amongst the poorest of the poor, one-third of total household income may go towards light. However, relatively capital-intensive modern lamps, sub-optimal products and limited distribution channels are some of the factors that have contributed to maintaining the lighting status guo for many of

those people that would benefit most from improved lighting services.

Lighting the Bottom of the Pyramid is an initiative of the International Finance Corporation (the private sector arm of the World Bank) aimed at extending modern lighting services to the world's poor. Recent encouraging technological progress in the lighting industry has given IFC cause to believe a new private sector approach to be timely. Solid state lighting developments – particularly white LEDs – offer attractive prospects for high quality lighting at affordable prices. Importantly the power demands of such devices are considerably smaller than for existing electrical solutions (even compared to compact fluorescents lamps). For products such as electrical lanterns, this means battery storage needs can be reduced. It also expands the viability and affordability, for instance, of solar-powered solutions as a good light service of satisfactory duration can be achieved with a far smaller PV module for recharging.

The project pilot, which will involve identifying users' product preferences, as well as supporting private sector companies to develop new distribution approaches and appropriate finance mechanisms through local and international partnerships is targeting Kenya and Ghana.

For further information or to register your interest to be a partner in the programme, visit www.ifc.org/led.