

Workshop Report



Innovation Histories Workshop on the Solar Home System Market in Kenya

3 June, 2013

Silver Springs Hotel, Nairobi



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List of Acronyms

ATPS	African Technology Policy Studies Network
CE	Chloride Exide
CEO	Chief Executive Officer
CIC	Climate Innovation Centre
CSC	Commonwealth Science Council
DANIDA	Danish International Development Agency
DfID	UK Department for International Development
EA	East Africa
EAA	Energy Alternatives Africa
ERC	Energy Regulatory Commission
ESD	Energy for Sustainable Development
ESDA	Energy for Sustainable Development Africa
ESMAP	Energy Sector Management Assistance Program
GIZ	German Gesellschaft für Internationale Zusammenarbeit
GTZ	German Gesellschaft für Technische Zusammenarbeit
HFCK	Housing Finance Corporation of Kenya
IFC	International Finance Corporation
infoDev	Information for Development
IPPS	International Programme in Physical Sciences
JICA	Japan International Cooperation Agency
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KARADEA	Karagwe Development Association
KEBS	Kenya Bureau of Standards
KENGO	Kenya Environmental NGO
KEREA	Kenya Renewable Energy Association
KES	Kenyan Shillings
KNBS	Kenya National Bureau of Statistics
KPLC	Kenya Power and Lighting Corporation (now Kenya Power)
KPVCB	Kenya Photovoltaic Capacity Building
KREP	Kenya Rural Enterprise Project
KUSCCO	Kenya Union of Savings and Credit Co-operatives
KWS	Kenya Wildlife Service

MoE	Ministry of Energy
NGO	Non-Governmental Organisation
NITA	National Industrial Training Authority
PV	Photovoltaic
PVMTI	Photovoltaic Market Transformation Initiative
SACCO	Savings and Credit Co-operative
SHS	Solar Home System
SIDA	Swedish International Development Cooperation Agency
SMEs	Small and Medium Enterprises
SOLARNET	Solar Energy Network
UCB	University of California Berkeley
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
UoN	University of Nairobi
VAT	Value Added Tax
VOK	Voice of Kenya

Executive Summary

This report presents proceedings of an innovation histories workshop on the Solar Home System (SHS) Market in Kenya. The workshop was held on 3 June 2013 at Silver Springs Hotel in Nairobi Kenya. Stakeholders in the SHS market convened to reflect, draw on, capture and share thoughts and experiences to develop a comprehensive national innovation history, illustrating actions of key actors in Kenya who have contributed to the success of the Kenyan SHS market. Stakeholders from the United Kingdom and Kenya comprised researchers, policymakers, private sector actors and the media. The one-day workshop saw the participants developing a personal innovation history timeline as well as contributing through participatory and interactive approaches to develop a national SHS innovation history timeline. Participants expressed satisfaction in the process that led to the development of the innovation history timeline and expressed interest to participate in any future research and workshop on the subject.

Background: Why the innovation histories workshop? Why now?

Access to modern energy services is a critical human development priority and can be transformative to the livelihoods of poor people and their economic potential. A tension is sometimes perceived between increasing energy access and pursuing low carbon development. High carbon, conventional energy options are often viewed as cheaper and hence easier for poor countries to pursue thereby problematising the idea of “pro-poor, low carbon development”. However, multiple synergies potentially exist between human and economic development priorities and access to low carbon energy technologies. Renewable energy technologies can facilitate electricity access in areas where grid based services are prohibitively expensive and unreliable. Energy efficient technologies can improve availability of energy services such as lighting and heat as well as increase local and national energy security and economic resilience. Access to low carbon energy technologies is therefore potentially critical to meeting the Millennium Development Goals as well as sustainable development objectives.

Already, many developing country governments recognise these synergies and welcome international engagement in facilitating the uptake of low carbon energy technologies. Indeed, the Kenyan government has begun to formulate its own low carbon development plan, among its other responses to climate change. Kenya also hosts the world’s first Climate Innovation Center (CIC), supported by DfID, DANIDA and infoDev of the World Bank. With a view to informing the activities of the CIC, the African Technology Policy Studies Network (ATPS) and the University of Sussex are implementing a research project – funded by the Climate and Development Knowledge Network – that will draw on the experiences of the Kenyan SHS market. This market is one of the most successful in the developing world and so understanding the factors that helped and/or hindered its evolution could inform initiatives such as the CIC, not just for SHSs in Kenya but for other low carbon energy technologies and other countries.

Effective policy and practice depend critically on learning from those who have the relevant deep knowledge and experience. ATPS and the University of Sussex therefore undertook a one day workshop that brought together stakeholders from the Kenyan SHS market in order to learn from

their knowledge and experience. It is hoped that such knowledge and experience will inform future policy and practice in the SHS market in Kenya as well as provide insights for the CIC. It could also contribute more broadly towards the implementation of Kenya's National Climate Change Response Strategy and the Kenya Vision 2030. These insights could also contribute to other centre-based approaches (such as the UNFCCC Climate Technology Centre and Network) that aim to maximise development benefits from the wider uptake of low carbon energy technologies in lower-income developing countries.

Workshop Objectives and Methodology

The overall objective of the workshop was to provide insights toward improving low carbon energy access and development using the case of SHSs in Kenya. Specifically, the objectives were to:

1. Construct a detailed timeline of SHS innovation in Kenya (in technical innovation, and in other ways such as social, cultural, political, etc.)
2. Identify the actors involved in key SHS innovation events, projects and processes throughout the evolution of the SHS market
3. Identify significant events, projects, processes and actors for follow-up research after the workshop

The research methodology adopted was derived from the Innovation Histories method developed by Boru Douthwaite and Jacqueline Ashby¹ as a way of drawing on experience from past innovation processes. The method comprises a set of flexible guidelines on how to run a workshop with stakeholders involved in an innovation process and in this case, constructing an innovation history of SHSs in Kenya, beginning with the introduction of photovoltaic (PV) technology. The stakeholders were those with knowledge of: key technologies (PV modules, batteries, charge controllers and loads); consumer preferences and demand; supply chains; donor and civil society involvement; related aspects (such as finance, training, business models); and international and national policy developments. The choice of the method was derived from the participatory nature of the process that gives rise to a sense of ownership and voice to policy impacts that will be useful to the participants and other relevant stakeholders. Workshop facilitators enabled participants to voice their opinions freely on the subject. The interactions and discussions between participants during the workshop helped to elicit useful information regarding the dates, events, processes, actors, significance and other necessary information to ensure the construction of the innovation history. About 20 stakeholders were invited to participate in charting this innovation history.

Setting the Stage: Opening Remarks from the Workshop Conveners

The Executive Director of ATPS, Prof Kevin Urama, welcomed participants to the workshop, referring to them as agents of change with respect to the SHS initiative. He urged them to treat the dialogue as a platform for creating policies that will change the SHS market, reminding them that they are authorities in their fields with rich experience to share. Dr Rob Byrne of the University of Sussex then

¹ Douthwaite, B. and J. Ashby (2005) "Innovation Histories: A method for learning from experience", *Brief 5*, Institutional Learning and Change Initiative, available at http://www.cgiar-ilac.org/files/publications/briefs/ILAC_Brief05_Histories.pdf

sketched some of the history of the Kenyan SHS market, noting that it is one of the largest off-grid markets for SHSs globally. He then described key features of the innovation histories methodology, including an explanation of the timeline template the participants were to use. Dr Nicholas Ozor of ATPS also welcomed the participants and reiterated the overall workshop objectives. He also noted the intention of the research to provide insights on low carbon energy access and development more generally, using the successful Kenyan SHS market as a case study. Finally, Mr Twalib Ibrahim – the lead workshop facilitator – re-emphasised the workshop’s aims. He urged the participants to engage fully in the process: to reflect, capture and share thoughts on the Kenyan SHS innovation history, how they got into the SHS market, how it has evolved and what the key enabling factors were in the past and what they are now.

Sizing up the Challenge

After the opening remarks, and a brief round of introductions, participants were invited to construct their own personal innovation histories on SHSs in Kenya by providing dates; descriptions of events, projects or processes that took place; identification of other actors involved; the significance of the events, projects or processes; and information on any documentation that is necessary to the understanding of the history. Participants took about an hour to develop these timelines with guidelines and clarifications being provided by the researchers and facilitators. Prior to the workshop, the template for the innovation histories timelines was sent to the participants to enable them to prepare for the workshop, giving them time to remember their personal histories within the SHS market in Kenya. This strategy was helpful as some of them had already made notes that helped them in completing their personal timelines more quickly. At this stage, there were minimal interactions between the participants. With each participant’s consent, the completed personal timelines were collected to serve as benchmark information on individual experiences in the SHS market in Kenya, and could be used later for further analysis.

After a break, participants were invited to work together to construct a national innovation history on the Kenyan SHS market. The result of this is given in Table 1, which can be found in Appendix I. The original methodology was to have the participants break out into two groups for this exercise. However, given that only thirteen of the twenty invited actually managed to attend, the facilitators took the initiative not to break them up into groups. This turned out to be useful in concentrating efforts and leading to cohesive discussions by the participants. Prior to the workshop, the conveners prepared paper strips cut from flipcharts. Each participant could then identify items for the innovation timeline, writing the details of one item on one strip: date, description, actors involved, significance and documentation. The strips could then be fixed to flipchart sheets on boards, using Blu-tack, and moved around as necessary as the group populated the national innovation timeline. The participants would then continue in this way, placing individual items on the flipchart sheets, for as many items as they felt were relevant (see Figure 1, showing this in progress). It was interesting to note that participants had more in-depth discussions and interactions while performing this exercise and took time to adjust their own timelines based on more authentic information and discussions provided by fellow participants.

After the lunch break, participants were asked to elaborate on the entries they had placed on the national innovation timeline. This gave the opportunity for every participant to speak, and for others to ask them questions. The information provided at this stage helped to enrich the timelines with

some clarifications and more details. The names of the participants were also tagged on each of the timeline items they had developed to help for future interactions with the researchers if need be. Participants also provided additional names and contacts of individuals who the researchers might need to contact for more information and follow-on research.

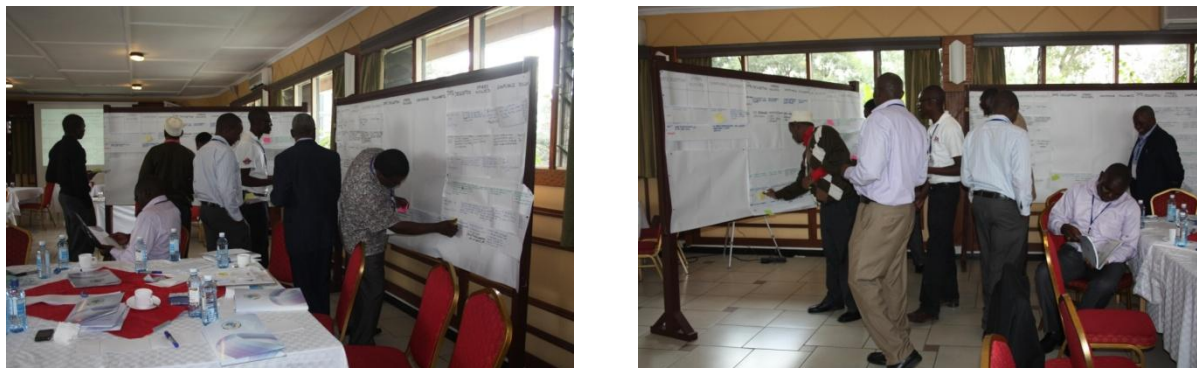


Figure 1: Participants working on the innovation history timeline

Overall, the workshop was successful as shown by the positive feedback received from the participants. Participants noted that objectives of the workshop were met and rated the quality of discussions as excellent. They noted that the length of the workshop was adequate while the time allocation to various activities was just sufficient. The suggestions for next steps to ensure that the pro-poor, low carbon development research project in Kenya is of benefit to stakeholders included more engagement with stakeholders, such as government agencies like the Energy Regulatory Commission and Ministry of Energy, as well as evaluation by the research users, and enforcement of standards. Suggestions for improvements to the workshop included giving participants as much advance notice as possible and conducting a longer workshop. Some of the aspects that participants found most useful about the workshop were the networking opportunity, the simplicity of the tasks, sharing individual experiences and perspectives of the evolution of SHS uptake and the discussions.

Closing Remarks and Conclusion

The facilitator, in his closing remarks, thanked the workshop organizers and participants stating that the workshop was a success. He expressed confidence that the comprehensive innovation history would impact policy at the national scale, providing a foundation for future global development, as energy is central to greening and development. The Executive Director of ATPS, Prof Kevin Urama, urged participants to disseminate the project widely across their own networks and assured them that the project team would get back to them with updates and more information in the near future. He then concluded by thanking participants for their contributions and declared the workshop closed.

Appendices

I. Kenyan SHS Market Innovation Timeline

Table 1: Draft SHS Innovation Timeline, as constructed in the Innovation Histories Workshop, June 3rd 2013

Text in red italics includes interpretations or questions from the researchers

Date	Description	Others involved	Significance	Documents	Elaborations
1978 (Henry Watitwa)	Brother used dry cell with wires to light a spot light bulb in our room	Friends and other brothers	For fun – <i>indicates interest in, and awareness of, electricity</i> (power was only in selected houses in town, institutions and Government buildings)	<i>Personal memory motivation</i>	There was no solar.
August 1982 (Enos Orongo)	Failed Coup	<i>Contextual event</i>	<i>Stimulated</i> Government directive to increase TV network country wide	<i>Possible press reports?</i>	
1983 (E. Orongo)	The government directed Voice of Kenya (VOK) to increase TV <i>network country-wide</i>	Ministry of Public Communication	Increase in TV network country wide and demand for <i>electricity</i> [originally recorded as “solar panels”] in the rural areas	<i>Possible press reports, government documents?</i>	<i>Extending the TV network country-wide must have been a long process. It would be helpful to know more detail about it.</i>
Dec. 1983 (E. Orongo)	First solar and TV in rural Kisumu	Nairobi dealer, Fred Orongo (my father)	Created awareness <i>in local area</i>	<i>Personal memory</i>	There was a solar panel for charging the battery to power the TV
1985 (Mark Hankins)	Solar Shamba for solar installations and training	Harold Burris and Mark Hankins	Solar installations and training	-	
1992 (?)	KENGO solar training	<i>Hankins, Burris, KENGO, African Development Foundation (ADF), participants</i>	<i>First solar training course run with participants from across east and southern Africa</i>	<i>Proceedings of the training</i>	

Date	Description	Others involved	Significance	Documents	Elaborations
1993 (Henry Watitwa)	Household lighting systems Meru	Mark Hankins, UN	Awareness and sensitisation	Hankins, UN	H. Watitwa's friend had a solar system and asked if he could be introduced to whoever installed it and was introduced to Mark who saw he had interest in solar energy and he invited him for a training for basic solar installation held in TZ (<i>in KARADEA Solar Training Facility? YES</i>) – Ashden Trust (<i>funded? YES</i>) and he became a solar technician in January 1995
1995 (H. Watitwa)	Solar basic installation training	Mark Hankins, Karagwe Development Association (KARADEA, Tanzania), Ashden Trust, CSC (<i>Commonwealth Science Council YES</i>)	Capacity building	Energy Alternatives Africa (EAA), KARADEA, Ford Foundation	
1995 –2013, 2010 (Bernard Aduda)	-Training of MSc and PhD students on PV systems -Curriculum (MSc) revised to include more course units in solar energy materials	Dr. Justus Simiyu, Dr. Sebastian Waita, Dr. Alex Ogacho, Dr. Robinson Musembi, Prof. Julius Mwabora, Mr. Thomas Nyang'onda, International Programme in Physical Sciences (IPPS) - Sweden	Increased high level (MSc and PhD) human resources on PV systems	MSc and PhD theses, University of Nairobi (UoN)	Got a proposal for students of about 100M KES for fellowships and capacity building in infrastructure. Infrastructure has been put up and training has started 2year training. (80) MSC curriculum was revised to involve PV technology and where one can use PV and use materials for solar innovations. Working with ERC (<i>Energy Regulatory Commission?</i>) who are on track with solar installations.

Date	Description	Others involved	Significance	Documents	Elaborations
1986 (H. Watitwa)	Saw amorphous solar panel for the first time introduced to electrical dept. at Comboni Polytechnic, by then Gilgil Youth Polytechnic <i>(Polytechnic in Gilgil? YES)</i>	Awareness to students of the whole college	Awareness	-	
<i>December 1996 – March 1997</i>	<i>Survey conducted through EAA covering 410 SHSs in 12 districts across Kenya</i>	<i>EAA (research), ESMAP (funding)</i>	<i>Articulates market demand, user-practices and savings from use of SHSs compared with kerosene</i>	<i>-Hankins, M. et al. (1997). PV electrification in rural Kenya -van der Plas & Hankins (1998) Solar electricity in Africa: a reality</i>	<i>-Survey was done on the panels to test and see their viability as some products had failed -To create awareness.</i>
1997 (H. Watitwa)	Solar battery charging <i>Where did this project take place? Kamukuywa Market, Bungoma District, Western Province Kenya</i>	EAA, World Bank, Energy Sector Management Assistance Program (ESMAP), World Bank	Rural awareness <i>Was there any other significance? Yes we did it as a business since the place had no power and we offered a charging service saving them money from long distances</i>	EAA, World Bank, ESMAP	Solar battery charging system to create awareness in rural areas and keep their batteries charged. Solar was still expensive and had not penetrated all areas.

Date	Description	Others involved	Significance	Documents	Elaborations
1997 (H. Watitwa)	SHS pilot project Bungoma teachers	EAA, KREP, World Bank	Financing and awareness	EAA, KREP, World Bank	Installing systems for teachers, teachers are trend setters) -Mark <i>Hankins</i> came up with a financial model -consultancy and training - KREP handling finances to recover loans was the first micro finance for financing solar household systems. - Henry was handling installation component as Bright Home Solar Energy
1998 – present (Justus Simiyu)	Solar energy materials research	-University of Nairobi -IPPS, Sweden (SIDA – <i>was SIDA the funder?</i>)	Capacity building for basic research and applied research in solar energy materials and applications	List of publications on http://physics.uonbi.ac.ke	Enrolled (<i>who enrolled?</i>) in the Swedish programme to pursue SHS International Programme in Physical Sciences (IPPS)
1999 (H. Watitwa)	SHS survey on uses <i>It was done in three parts But I was in charge of Western Kenya. other parts was Meru and Nyanza but Nyanza did not yield much</i>	EAA (Mark Hankins)and University of California - Berkeley – Daniel Kammen and Shannon Graham(<i>UCB</i>)	Product analysis and information	EAA, UCB	-To get information on the products
2000- 2001 H. Watitwa	STEP Solar Technician Evaluation Project and Businesses Country wide in over 18 towns in Kenya	EAA(Mark Hankins, and UCB(Arne Jacobson PHD student and Shannon Graham)	Evaluation on technicians and Solar PV businesses	EAA UCB	Evaluation and PHD studies the report was released to all PV stake holders and this opened up opportunities linking rural towns to partner with Nairobi suppliers, it also motivated Chloride and other PV to scale up its operations
Sep. 2001 (Jackson Maina)	Consultative meetings on energy policy	Ministry of Energy (MOE) and stakeholders (<i>who were they?</i>)	Formed comprehensive energy policy	Several draft energy policy documents, forming a final Sessional paper number 4 of 2004 on Energy Policy	-A group of people from the Ministry of Energy and stakeholders in the Energy market came up with 5 drafts before the final one was out.

Date	Description	Others involved	Significance	Documents	Elaborations
2001? (J. Maina)	Solar PV installation in all KWS posts	Kenya Wildlife Service (KWS) (<i>who did the work, who funded, and was anyone trained?</i>)	To power communication equipment and light offices (<i>what was powering equipment before?</i>)	KWS reports	-Ministry of Energy ensured that the KWS stations have solar systems to power their communication systems and offices. The ministry wanted to create awareness on PVs and solar water heaters to the general public.
2003-2004 (J. Maina)	Installation of PVs in 10 energy demo. Centres	Min. Of Energy and contractors (<i>who were the contractors?</i>)	Created awareness of PVs and solar water systems	Ministry of Energy reports	- MOE and contractors to install the equipment
2003 (?)	VAT exemption on solar accessories	KEREA, Ministry of Finance, KEBS (Kenya Bureau of Standards) -local solar companies (<i>which companies?</i>)	easier adoption because of reduced cost of SHSs	VAT Act/ Budget	The solar installation cost was lowered as it became VAT exempt. Vat then was 16 %, after that the installation became 16% cheaper
2004 H. Watitwa	Uses of Solar household systems Bungoma Western Kenya	Massachusetts University (John Murray Height) and Henry Watitwa	Phd studies	Massachusetts University	PV types and material used
2005 (Teddy Ongamo)	Sustainable dissemination network for solar PV	Energy for Sustainable Development (ESD), Conserve Consult and MEGEN power limited	Strengthening private sector ability to supply PV systems through consumer awareness creation and experience sharing	Project report 2006	Regional (<i>which region – East Africa?</i>) dissemination of PV networks -work on sensitising private sector -how to work with solar suppliers -how to raise awareness

Date	Description	Others involved	Significance	Documents	Elaborations
Sep. 2005 (J. Maina)	Chesewew Secondary School pilot PV project <i>(Chesewew Secondary School is a boarding school for boys, located in the Rift Valley)</i>	MOE and contractor (<i>who was the contractor?</i>) and school administration	-Boosted rural electrification and increased students' study time -Reduced use of kerosene -Increased demand for PV (<i>demand from who?</i>)	Project report for Chesewew	-to provide longer hours of study for students -mainly interested in increasing access in off grid areas and also to reduce kerosene use -saved xxx? (<i>what did it save and how much?</i>) The ministry installed the PV's in sec. schools first project was in Chesewew, putting solar energy to see if there would be an impact on performance. A student from Chesewew became 4 th national wide 2 years back so the project was successful. They would save money on kerosene as it was their source of energy. The students were to influence the parents to use solar. <i>Was there any documented influence on parents?</i>
March 2006 (J. Maina) 2006-2009 (T. Ongamo)	KPVCB (Kenya Photovoltaic Capacity Building) Project	RENCON, Energy for Sustainable Development Africa (ESDA) and Kenya Renewable Energy Association (KEREAA) International Finance Corporation (IFC), ESD and integral advisory services (IT power) multiple industry players e.g. suppliers and financial companies	Photovoltaic Market Transformation Initiative (PVMTI) grant for curriculum development and market support Developed both technical and marketing capacity of industry players including national freelance PV installers training, trainers of trainers, creation of PV awareness	PVMTI report Kenya PV capacity building report 2009	-create curriculum of solar PV and market support -PV market transformation initiative -funded by IFC -Kenya PV capacity -this was part of setting up KEREAA?

Date	Description	Others involved	Significance	Documents	Elaborations
2008 (T. Ongamo)	New SACCO Act – Liberalisation of SACCOs	Ministry of Co-op Development KUSCCO, CIC (<i>what is CIC here?</i>), Coop Bank	Liberalisation of SACCO lending regulations that allowed non traditional lending that allowed introduction of PV loans by SACCOs and other Apex bodies (<i>what are Apex bodies?</i>)	SACCO Act 2008/2009 Mkopo wa Solar (solar loan)	<ul style="list-style-type: none"> -liberalisation of SACCO act -reform of that act allowed SACCOs to give loans to their members for solar technology -leading to more solar allowances (loans) -To help set up technologies to help the solar markets, -How best solar stakeholders can be supported -Commercial banks were not lending for solar installations but SACCOs did and have products on solar eg. Mkopo wa solar
2009 (Rashid Mohammed)	Kenya National Bureau of Statistics (KNBS) on maternal death rates (demographic death survey)	<ul style="list-style-type: none"> -Women in northern Kenya and selection of rural households -Researchers (<i>from KNBS or others?</i>) 	<ul style="list-style-type: none"> -Mortality rate in Northern Kenya -Adoption of SHS technologies for traditional birth attendance 	Statistics for maternal death rates (Survey, 2009)	<ul style="list-style-type: none"> -particularly focusing on rural households in northern Kenya -statistics show high mortality rates even in main stream hospitals but mostly in traditional births -solar panels installed to improve traditional births so the traditional midwives can have ease in carrying out their work. It has impacted a lot and the maternal death rates have now decreased. -Proximity of the village to the school is far, the uptake would improve the education system. Isiolo is the only one connected to the national sphere on solar connection. (<i>This last sentence is not clear – is it saying that Isiolo is now connected to the outside world because of solar?</i>)

Date	Description	Others involved	Significance	Documents	Elaborations
2009 (T. Ongamo)	Lighting Africa development market place initiative	International Finance Corporation (IFC), University of California - Berkeley	-Conducted quality testing of solar systems in the market -These were then promoted by IFC to clients and projects	www.lightingafrica.org	-testing products in market in conjunction with Uni. of California -standards were set for solar systems and panels
2010 (Kiprotich Koros)	Cheap solar panels for rural areas	Philips EA	Lighting for school going children in rural areas	Science Africa	
Jan. 2007 - Dec. 2010 (Personal experience: Andrew Kilonzo)	Working with an NGO (Solar Energy Network) Solarnet.	-Renewable energy (RE) stakeholders in Kenya (solar companies) -GTZ (now GIZ) -MOE (RE Dept.) -IFC (Lighting Africa programme) -French and Finnish embassies (<i>were these providing funds too?</i>)	-Developed and published a RE directory in Kenya -organised solar events (solar days) -published quarterly magazines -solar hardware projects (SEEP – <i>what does this stand for?</i>) different schools benefited	-RE directory available -copies of past magazines -several unpublished reports available	-To install solar in schools -Influenced the ministry of energy on renewable energy under solar systems -Information is not in the public on who sells the panels and that creates a problem -GTZ helped bring in funds
2010? (K. Koros)	Solar laptops and phones	Safaricom/Samsung	Source of power in rural areas	Press	Introduced by Safaricom and is now used by the communities to charge their phones
2010 (B. Aduda)	MSc curriculum revised to include more course units in solar energy materials	Simiyu, Waita, Ogacho, Musembi, Mwabora, Nyan'gonda, IPPS Sweden	Increased high level (MSc and PhD) human resources on PV systems	MSc and PhD theses UoN	A review of the earlier curriculum

Date	Description	Others involved	Significance	Documents	Elaborations
Feb. 2011 (Edward Namasaka)	Pay-as-you-go home solar system is introduced in Kenya and required trials to be carried out	-CEO of Eight19 (UK based company) -Solaraid Kenya -Mibawa suppliers Ltd.	-to reach out to the people at the low end of the pyramid who would ordinarily be unable to access clean energy due to high initial cost <i>What was the outcome of the trials – what sort of things were learned?</i>	Actual samples were provided	-Missing link from other parts (<i>of the country, or supply chain, or something else?</i>) as most people do not have access to the solar panels -It was only accessible to the rich: upfront financing help for PV systems -targeting people who were not able to get access to RE -installations were done and more was learnt on the use
2011 - present (Justus Simiyu)	Development of solar panel testing/standardisation laboratory	UoN, IPPS - Uppsala University, Funding from SIDA, KEBS, IFC	To partner with Kenya Bureau of Standards in testing solar modules for quality and warranty	-	-yet to develop standards for solar modules -running research for equipment -acquired a solar simulator -a testing unit for solar accessories is yet to be established to do standardization and testing
2011? (K. Koros)	Loans for cheap solar lamps in rural areas/school going children KES 40/mth.	Safaricom in collaboration with SMEs	Lighting in rural areas with no power	Press reports	-Pay over period of time Solar lamps by safaricom -It is on-going

Date	Description	Others involved	Significance	Documents	Elaborations
October 2011 (E. Namasaka)	Commercial introduction of pay-as-you-go home solar system branded 'Indigo', Deposit KES 1000, then cards of KES 120 for 7 days	Representative from Eight19 and Mibawa Suppliers Ltd.	<ul style="list-style-type: none"> -commercially viable -recruitment of distributors and sub-distributors -recruitment of scratch card sellers -training of installers/technicians 	-	<ul style="list-style-type: none"> -realised that it is a commercially viable thing and first 500 units were delivered in Oct. -a household pays a deposit of KES 1000 and they keep buying scratch cards for 7 days for 2 lights and phone charging, so around 17 schillings a day -very soon shall be covering the whole country -Started in the North Rift, moving nationally, now in Western Kenya -Needs to recruit people to sell the scratch cards, distributors and people to sell the product -There is a software, clients are chosen carefully to be able to buy the top ups to earn at least 120 KES a day. <i>The meaning here is not clear – is it saying that those who earn at least KES 120 per day are eligible to be clients?</i> -There is a customer care representative. The unit goes for 120 (<i>which currency?</i>). The battery lasts around 3 years then it is changed at around 500 – 600 (<i>Kenyan shillings?</i>)

Date	Description	Others involved	Significance	Documents	Elaborations
July 2012 (J. Simiyu)	Curriculum development workshop for T1 and T2 T1- primary level education involved in SHs T2 - high school level involved in the SHs T3 - more informed (<i>is this a higher level of education or meant to recognise more experience before training?</i>)	UoN, JKUAT, United Nations Development Program, KEREA, Min. of Energy, National Industrial Training Authority (NITA)	To develop curriculum for short professional courses in PV in readiness for licensing of solar PV technicians	MoE (ERC – <i>Energy Regulatory Commission?</i>) website	-approached by government to participate -developed curriculum for those already dealing without formal training to get formal training -It is available on ERC website.
Aug. 2012 – Jan. 2013 (Paul Simiyu)	Distribution of portable PV kits to the rural households – an alternative to kerosene lamps	-Barefoot Energy Ltd. -Chloride Exide depots sales team -Tough Stuff	Substitution of kerosene lighting lamps with cheap PV kits to the rural households	-last quarter -technical sales team inputs report – Date 5.08.12 at Chloride Exide (CE)	-documented need to access solar with limited capital -developed small solar modules -came up with a small solar system going for KES 1500 to provide lighting to 3-5 lamps and phone charging -Batteries were developed by CE whereas the sister company (<i>Barefoot or Tough Stuff?</i>) made the panels
October – December 2012 (P. Simiyu)	Consultancy and advising in development of a PV training syllabus and material assembly for rural technicians	-JICA (Japan International Cooperation Agency) -JKUAT (Jomo Kenyatta University of Agriculture and Technology) -CE	Equipping electrical technicians and artisans with some PV design and installation knowledge and skills outside Nairobi	-training syllabus -materials included (<i>what sort of materials?</i>)	-JKUAT and JICA wanted to provide a programme for training rural technicians -CE was involved through providing the solar panels to be installed

Date	Description	Others involved	Significance	Documents	Elaborations
20.02.13 (B. Aduda)	-engaged MOE -Training of technicians on PV Systems (92 trained so far) – course runs for two weeks; 20 people per intake	Drs. Justus Simiyu, Sebastian Waita, Robinson Musembi, Alex Ogacho, NITA	-Capacity building in sizing installation and maintenance	-available at the department of Physics, UoN, contact Dr. Justus Simiyu or Dr. Sebastian Waita	A two week training course in design and installations and a second training with 20 participants. So far has trained 92 participants, planning another one in August. Perfecting on the needs for example the solar lanterns were not there during the first two sessions but the third one, they were there and trainees were shown how to care for them. -JICA tries to roll it out whereas ours is residential. Planning to roll out outreach programmes with ATPS
April 2013 - present (P. Simiyu)	Partnership proposal presentation and discussion between Altech Engineering Ltd. and Equity Bank for countrywide distribution of PV power through power loans.	Distribution of solar power as alternative energy source to enable Kenyans through instalment payments, mostly equivalent to monthly power bills	-Equity Bank -Altech Engineering Ltd. -Bernard Keiru (<i>is this correct?</i>)	Signed agreement proposal and terms of operation – 21.05.13	-current programme -target people who have already adopted electricity (<i>who are connected to grid?</i>) There was a need to developing a technical company to reach the population that would like steady power distribution owing to unreliability to KPLC. Those who use Electricity to adopt the solar system. Powerbase is sized and a unit is installed according to the usage of a household
May 2013 (J. Simiyu)	Kenya private sector engagement in development of T3 solar PV curriculum	KEREA, UoN, JKUAT, Strathmore University, UNIDO, UNDP, Housing Finance Corporation of Kenya (HFCK), GIZ, IFC	Brought together stakeholders in the solar PV/thermal sectors to brainstorm on key areas to develop the advanced PV curriculum to be rolled out	-	- With the Green sky system, hybrid systems, the ministry has no capacity to test for licensing, there is no capacity to test credibility and license technicians. Trying to work together to come up with the equipment and have them centrally placed as they are expensive. Energy efficiency – HFCK is interested in this.

II. Actual Workshop Programme

Time	Activity	Facilitator
08:30-10:00	Registration	
10:00-10:30	Welcome: Kevin Urama Innovation histories: Rob Byrne Workshop outline and introductions: Twalib Ebrahim	Nicholas Ozor
10:30-11:30	Session I: Individual innovation histories	Twalib
11:30-11:45	Break	
11:45-13:00	Session II: Constructing a national innovation history: <ul style="list-style-type: none"> • Timeline of events, projects and processes in the evolution of the Kenyan SHS market • Actors involved, and role, in timeline items 	Twalib Assistance from Adrian Ely, David Ockwell, Nicholas and Rob
13:00-14:00	Lunch	
14:00-15:30	Session III: Elaborations on innovation history timeline items, plus questions and discussion	Twalib Assistance from Adrian, David, Nicholas and Rob
15:30-16:00	Reflections and wrap-up: Participants discuss what needs further investigation for the rest of the research, and reflect on workshop	Twalib

Rapporteurs: Evelyn Otieno, Jacinta Kahi and Sarah Becker

III. Participants List and Contacts

Name	Affiliation	Email
Adrian Ely	University of Sussex, UK	a.v.ely@sussex.ac.uk
Andrew Kilonzo	Power Options Ltd, Nairobi	andrew.kilonzo@gmail.com
Bernard Aduda	University of Nairobi	boaduda@uonbi.ac.ke
David Ockwell	University of Sussex, UK	d.g.ockwell@sussex.ac.uk
Edward Makhino Namasaka	MIBAWA Suppliers Ltd, Kitale	emnamasaka@mibawa.co.ke
Enos Orongo	Telesales Solar, Nairobi	telesales@wananchi.com
Henry Watitwa	Kenya Solar Technician Association (KESTA), Webuye, Bungoma	henrywatitwa@yahoo.com
Jackson Maina	Farmer, Karatina	salimaina@gmail.com
Justus Simiyu	University of Nairobi	simiyuj@uonbi.ac.ke
Kevin Urama	ATPS, Nairobi	executivedirector@atpsnet.org
Kiprotich Koros	Science Africa, Nairobi	korospro@gmail.com
Mark Hankins	African Solar Designs, Nairobi	mhankins@africansolardesigns.com
Nicholas Ozor	ATPS, Nairobi	nozor@atpsnet.org
Otieno S. Owino	Science Africa, Nairobi	Oti.owino@gmail.com
Paul Simiyu Mabonga	Chloride Exide (K) Ltd, Nairobi	pmabonga@gmail.com
Rashid Mohammed	Kenya Pastoralist Consortium on Climate Change, Mandera	kenpaccc@gmail.com
Rob Byrne	University of Sussex, UK	r.p.byrne@sussex.ac.uk
Teddy Ongamo	CAMCO Clean Energy, Nairobi	teddy.ongamo@camcocleanenergy.com
Twalib Ebrahim	Facilitator	twalib@humanhouse.co.ke

Additional support was provided during the workshop by the following people

Name	Affiliation
Akenga Nelson Anyasi	ATPS, Nairobi
Eunice Kariuki	ATPS, Nairobi
Evelyn Otieno	ATPS, Nairobi
Jacinta Kahi	ATPS, Nairobi
Sarah Becker	University of Sussex, UK