Energy and Economic Growth
Applied Research Programme

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EEG Newsletter

Welcome to the second newsletter of the Applied Research Programme on Energy and Economic Growth!

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Interview with EEG Theme Lead, Shobhakar Dhakal

Shobhakar Dhakal is an Associate Professor and Coordinator of the Energy Programme at the Asian Institute of Technology in Thailand. His research focuses on energy and climate change mitigation policies, modeling and on issues of urbanisation and cities. He is also a visiting researcher of the National Institute for Environmental Studies Japan. Dr. Dhakal was one of the Coordinating Lead Authors for the IPCC-AR5-WGIII for the Chapter on Human Settlements, Infrastructure and Spatial Planning. He is also a co-editor of the ongoing international Assessment Report on Climate Change and Cities, serves in the steering committee of the Global Carbon Project - a premier scientific program under the Future Earth, and is an Editor-in-Chief of Carbon Management Journal by Taylor and Francis among others. He has over 50 publications including peer-reviewed journals and edited books.

As an EEG Theme Lead, how do you contribute to the programme?

I am the Lead for Theme 3, on energy access and energy efficiency in the context of sustainable urbanisation. My responsibilities are to help the EEG Research Director to identify the key research gaps, and to devise and implement the research agenda within this thematic area.

I work with and alongside research colleagues preparing State of Knowledge papers within my theme, and am responsible for drawing out the key findings from those papers. Given that our research programme emphasises policy relevance, an important role for me is in synthesising feedback received from the experts, policy makers and broader communities who attended the two regional workshops in Tanzania and Nepal, and the recent Research and Matchmaking Conference in Washington D.C.

It was also my pleasure to help organise the regional workshop in Nepal, including giving input to the substantive programme and ensuring participation from high level scholarly, policy, private sector and donor communities.

What are some of key insights and promising research areas emerging in your theme?

The objective of research within my theme is to understand the options and barriers for unlocking the constraints and harnessing opportunities for greater

energy access (especially to poor and disadvantaged) and enhanced energy efficiency in urban areas. Specific topics within the theme include subsidies, pricing, regulation, consumer behaviour, urban governance, municipal reforms and urban development.

We know that the accessibility, adequacy, quality, reliability, and affordability of energy are critical concerns in urban areas of South Asia and Sub-Saharan Africa. There is evidence to show that, when those factors are constrained, this has direct consequences for the productivity and growth of cities.

The scale of energy efficiency gaps is unknown in LICs and MICs, though we are aware of several barriers to energy efficiency that are related to pricing, regulation, awareness and investments, amongst others. By identifying options and barriers, we can work towards a paradigmatic set of market and governance solutions that can work in different settings, and understand what mechanisms need to be in place to operationalise those solutions. Reaching this goal will also require a clear appreciation of what can be learned from past experiences about what does and doesn't work. This is what the State of Knowledge papers will contribute to, in EEG Part 1.

You played a key role in the EEG South Asia policy workshop. What do you think we learned from that workshop in terms of priority areas for applied research to support decision-makers?

The deliberations in this workshop emphasised some of our established hypotheses and raised some additional interesting insights.

Firstly, one clear hypothesis was that lack of energy access is seriously constraining economic growth in the region. A related discussion considered the tension between energy supply for livelihoods vs domestic consumption (including for productive growth) vs trade, given real constraints in the investment and effort that can be spent.

Secondly, it was clear that the options and opportunities for boosting access are plenty in the region, but are constrained by the poor function of the implementation aspects, markets, political economy factors, and limited initial investment.

Thirdly, there are immense regional cooperation opportunities in relation to energy access (through regional electricity trade, especially) and energy efficiency; special attention should be paid to barriers to such cooperation.

Last, but not the least, the extent of the limitations in data and numbers for evidence-based policy making is enormous in the entire region for all domains of the EEG research agenda.

How specifically do you think EEG could impact policy in your thematic area?

EEG research has huge potential to help unlock barriers and options, and to harness opportunities though local research as well as bringing together knowledge from outside its focal regions.

Exploring the structural links between aspects including urban development, energy governance and political economy could provide valuable outcomes to guide urbanisation planning and policy. Further, EEG could help to clarify the distinct advantages associated with leap-frogging opportunities and addressing low-hanging fruits in energy access, particularly in rapidly urbanising LICs. Improved knowledge on what are the costs of lack of energy provision, and on how to provide better energy access and improved energy efficiency in urban areas, would help decision makers to devise appropriate policy measures. Decision makers throughout the region are trying to find knowledge to support them devise good policies, notwithstanding immense challenges to policy implementation. It is critical therefore that policymakers are, from the very beginning, core participants in the deliberations over the EEG research agenda- we have done well in achieving this so far, and it must continue.

South Asia policy workshop

On the 28th September 2016 the EEG programme held its second policy engagement workshop, this time for the South Asia region. The purpose was to discuss energy-related challenges and opportunities, and to identify priorities for new research under EEG.

Around 50 delegates attended the workshop, representing six countries in the region (Afghanistan, Bangladesh, India, Myanmar, Nepal and Pakistan), comprising policymakers and researchers, representatives of private sector, think tanks and the donor community.

The workshop was chaired by Dr. Bindu Lohani, former Vice President of the Asian Development Bank, who observed: “Intuitively, we all know that energy is linked to economic growth, but when you make policy you want to know the exact link. EEG could generate tremendous knowledge in these areas.”

Dr. Bindu Lohani, Distinguished Fellow, Institute for Global Environmental Strategies, Japan

The value of the workshop in sharing lessons and models that had been successful in various contexts was emphasised by Ahmad Zubair Fattahi, a public policy consultant from Afghanistan. He said that beyond sharing knowledge, the programme could generate evidence to support the tailoring of successful models for application in the Afghan context.

Keynote speeches were delivered by Suman Prasad Sharma, former Secretary to Nepal’s Ministry of Energy; Catherine Wolfram, Research Director for EEG Faculty Director of the Energy Institute at Haas, University of California, Berkeley; and Shobhakar Dhakal, EEG Theme Lead and Associate Professor of the Asian Institute of Technology in Bangkok.

Professor Catherine Wolfram, Faculty Director of the Energy Institute at Haas, University of California, Berkeley

Three panel discussions focused on energy access and supply, regional energy cooperation and the enabling environment for a well-functioning energy sector. Some of the highlights from those discussions are as follows (and are presented comprehensively in a report available online).

Across South Asia, some 400 million people lack access to electricity. In Nepal, electricity contributes only 3% of the total energy consumed. Research by the International Centre for Integrated Mountain Development (ICIMOD) has shown that of the total electricity consumed, only 2% is from the agricultural sector despite employing roughly 76% of the nation’s workforce. Aditi Mukherjee of ICIMOD suggested that an effort to synchronise energy policy with agricultural policy could make important headway in the food self-sufficiency of the country and its citizens.

A number of highly relevant research questions were raised concerning the relationship between electricity and productivity. Dr. Asad Gilani, the Secretary of Energy for the Government of Punjab in Pakistan, said that improved electricity systems could significantly improve productivity in Pakistan. Punjab state is losing an estimated 2% of

production per year due to a lack of electricity, he said, especially in manufacturing.

Others pointed out the enduring question of whether electricity drives GDP growth, or vice versa. A further question concerned whether there was a trade-off between promoting electricity access and electricity for growth; and if so, how should public funds be invested to maximise socio-economic benefits.

The workshop identified great opportunities for regional energy cooperation and electricity trade. The potentially positive outcomes included optimisation of regional load factors, better utilisation of endowed energy resources, improved energy security and reduced environmental impact. World Bank research was cited showing that unrestricted cross-border electricity trade in South Asia could save US$226 billion in electricity supply costs from 2015-2040 and reduce CO2 emissions from the power sector by 8%.

Panel session on regional energy cooperation

Participants highlighted the various challenges facing South Asian electricity grids that have led to widespread load shedding. In many nations, political instability and inappropriate institutional and policy structures have led to chronic underinvestment in generation. The seasonality of hydropower in Nepal, coupled with a lack of storage reservoirs, reduces supply in the dry season – a challenge that may be exacerbated by climate change. Several speakers, including Yash Khaitan of Gram Power, also pointed to the challenge of non-technical losses, and the potential for smart grids to identify the core areas of losses and the extent to which billing is inaccurate. “By reducing losses, the technologies pay back for themselves,” Mr. Khaitan said.

Several important points were raised concerning the political economy of energy policy and investments, and sector governance. Min Zarni Lin explained that as Myanmar transitions from military to civilian government and from a central economy to a market economy, it is aiming to attract FDI into its energy sector. The country launched a new electricity law in 2016 to enable investment, but Mr. Lin suggested that a reform of the tariff structure would be important to achieving this outcome. Another concern shared by many related to lack of good data upon which to base policy, an outcome of inadequate data collection and analysis systems across the region.

Min Zarni Lin, Centre for Economic and Social Development in Myanmar, speaks on a panel session on enabling environment for a well-functioning energy sector.

The workshop raised very valuable questions and considerations for EEG research, which have been shared in a report with EEG Theme Leads and State of Knowledge paper authors to feed into their work. Some of the relationships established through the workshop were subsequently consolidated by invitation to the EEG Research and Matchmaking Conference. More generally, the workshop laid a strong basis for continued engagement by the EEG programme with key energy stakeholders in the region going forward.

Research and Matchmaking Conference co-creates Energy and Economic Growth research agenda

Over 100 senior policymakers, academics and energy-stakeholders from around the globe gathered in Washington, D.C. in early November to discuss the electricity-related challenges and opportunities faced by decision-makers in the developing world. Many participants travelled to the conference from African and Asian nations plagued by pervasive power cuts and large populations without an electricity connection.

The Research and Matchmaking conference is a key moment in the timeline of EEG's first year, designed to consolidate, reflect and building upon the work done and relationships established so far. Further, the conference outputs will be an important ingredient in the process of formulating the EEG research agenda for subsequent years.

"EEG emphasises the active engagement of policymakers, researchers and practitioners in the co-creation of research to ensure maximum relevance and impact" explained EEG Research Director Professor Catherine Wolfram.

To this end, conference participants highlighted a series of knowledge gaps that will inform the EEG research agenda for years 2-5 of the programme. What follows is a sample of these gaps.

The merits, drawbacks and alternatives to power sector reform

Most energy systems in low-income countries remain vertically integrated, with a single state-owned utility responsible for generation, transmission and distribution. Most developed economies, in contrast, have 'unbundled' these functions.

Catrina Godinho, from South Africa's University of Cape Town, emphasised that the lack of competition in a vertically integrated sector leads to inefficiencies, while the close relationship between utilities and political elites enables rent seeking. However, Mohammad Arbaaz Nayeem, from Ricardo Energy & Environment, pointed out that many integrated companies operate just fine, and queried whether the performance of a power sector depends more on the strength of its institutions and governance structures than whether it is integrated or unbundled.

Participants suggested that EEG should explore whether there are alternatives to power sector reform, such as improved training for independent regulators. Rizwan Mehboob, from the Government of Pakistan, argued that regulating the energy sector is trickier than reforming it: 'The political drive often dries up when it comes to the nitty gritty of delivering.'

The specific benefits of electricity on growth and development

An improved understanding of the specific benefits of electricity can help governments better allocate limited budgets. 'I wouldn't make a policy choice based on correlation between GDP and electricity,' explained Suman Sharma, Former Secretary of Nepal's Ministry of Energy. 'The question is what marginal benefit you get from each extra dollar spent?'

Professor Adeola Akenikinju, from Nigeria's University of Ibadan, posed that greater insight into how the benefits from electricity vary between consumers will help prioritise energy investments between residential and industrial consumers, rural and urban ones, or different sectors.

Many participants emphasised that electricity may have a multitude of benefits beyond growth, for example, improvements in employment, poverty rates, gender equality and education and health outcomes. Margaret Matinga advised that these impacts may accrue over a long period of time, potentially generations: 'Longer term impacts become so ingrained in the fabric of society that they are often not reflected in impact studies.'

The causes and solutions to unreliable electricity systems

Widespread load shedding and blackouts in developing countries constrain productivity and leave families in the dark. Participants unanimously agreed that further research is needed on how to solve the reliability crisis.

Samson Ondiek, from Kenya Power, argued that poor reliability is generally the result of network mismanagement and poor T&D infrastructure, not supply. In contrast, Nameerah Hameed, from the Energy Department of the Government of Punjab, stated that in Pakistan, outages are primarily caused by a gap between electricity supply and demand. Her government is rapidly commissioning power plants and reducing demand through energy efficiency building codes and standards on appliance like fans.

The opportunities and challenges posed by new technologies

Costs of wind and solar technologies have declined rapidly in recent years, and many developing countries have the resource base to employ them. Jonathan Walters, from Castalia Advisors, compared the power sector today to telecoms in the 1990s, both poised to be transformed by disruptive technologies.

However, incorporating these technologies into national grids will present challenges, explained Professor Sam Fankhauser from the London School of Economics. Their intermittency demands that a premium be placed on generation capacity, so that when the wind stops blowing and the sun stops shining, alternatives are available to fill the gap. Renewable technologies also have higher capital costs (and lower operating costs) than fossil fuelled generation, requiring different relationships with financiers whom are risk averse. Participants felt that EEG should explore options to overcome these challenges.

Renewable generation was not the only technological innovation participants thought likely to transform electricity systems. Eric Masanet, from the International Energy Agency, provided a taste of the potential for 'smart' technologies to optimise electricity system management. Smart homes, for example, store data on the timing, quantity and source of electricity consumption. These are a treasure trove of data that are currently untapped.

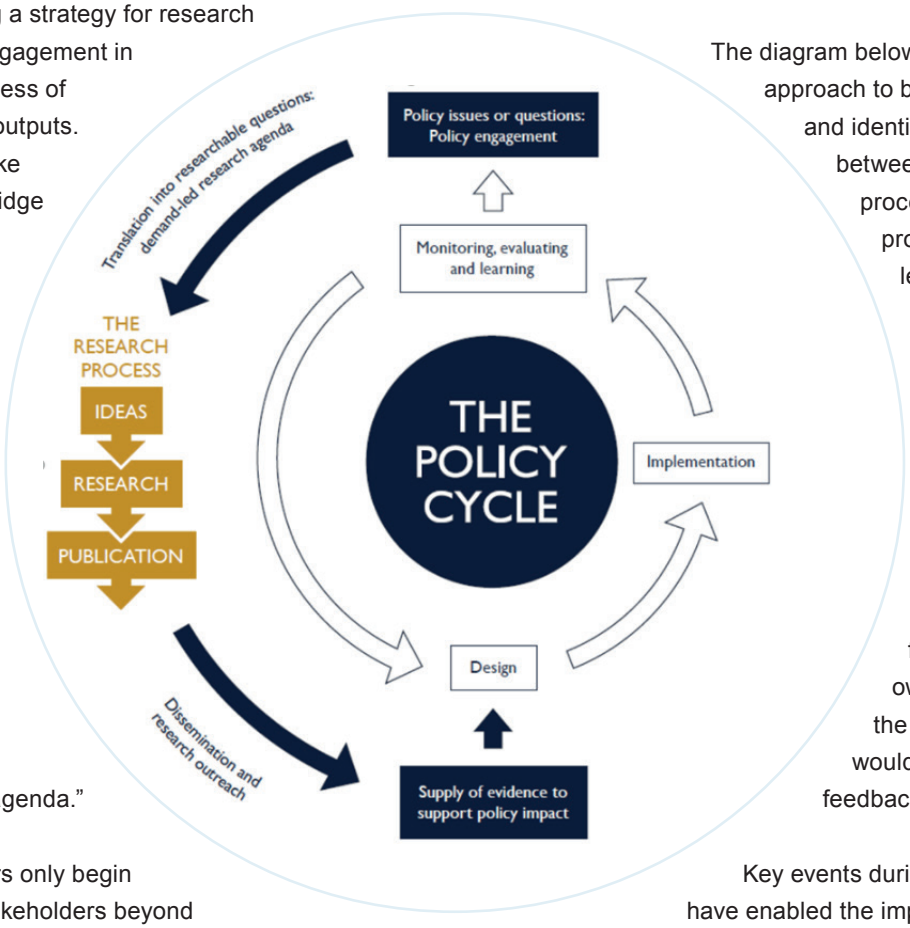
Participants' valuable contributions at the Research and Matchmaking Conference will help shape the research agenda for phase two of EEG beginning next year.

Marcela Tarazona, EEG Programme Director, said that "we are currently developing our strategy for the next four years, and based on the success of this conference we anticipate a series of future events which bring together representatives of the growing network of individuals and institutions for whom EEG presents an important opportunity". A full report from the conference will shortly be made available on the EEG webpage of the OPM website.

Policy Engagement in EEG

EEG aims to transform energy policy in developing countries by generating world-class research on the linkages between energy and economic growth.
If this goal is to be achieved, it is critical that the original research produced is also relevant to energy policy choices and challenges in developing countries. Further, it is important that the research findings lend themselves to practical application.

EEG is implementing a strategy for research uptake and policy engagement in parallel with the process of producing research outputs. EEG Research Uptake Advisor Mark Henstridge (OPM) explains that "the objective of this strategy is to find ways in which the 'supply' of research will be more likely to match policy stakeholder 'demand', by engaging with policy stakeholders from early stages in the inspiration and development of the academic research agenda."



Too often researchers only begin engagement with stakeholders beyond the research community only once academic outputs are complete, through dissemination of various kinds. In the case of EEG, this approach would risk producing research, however original, that fails to answer the questions policymakers are wrestling with, or causing policymakers to feel that they lack engagement with or ownership of the process.

To expand on this: we can think of the research process- albeit simplistically- as one that goes from ideas through the research itself to publication. This is illustrated in yellow in the diagram below. Frequently, research uptake approaches engage policy audiences only at the final stage. EEG is seeking to engage them at all stages- particularly, in Part 1, in the formation of research questions and ideas, for example in the translation of policy problems into researchable questions. Dissemination will be an important part of our strategy as well, but will build upon relationships and trust that have already started.

The diagram below depicts our approach to building bridges and identifying entry points between policymaking processes and research process. It shows how lessons and issues emerging from the policy process are invited to feed into the ideation stage of research. This approach is not locked in, and instead is adapting to feedback and our own learning from the EEG events. We would welcome readers' feedback.

Key events during Part 1 that have enabled the implementation of this strategy were the two policy workshops for East Africa and South Asia, and the Research and Matchmaking Conference in Washington D.C. The latter two events are profiled in this newsletter, and the first policy workshop was presented in newsletter 1. Each of these events has brought together key energy decision-makers in the regions, and linked them up with researchers, with the aim of sharing information and considering policy relevant research questions.

EEG Themes and Papers in Part 1

This table shows the themes of the EEG programme, theme leads, and the authors and working titles of the State of Knowledge papers being produced during Part 1.

Theme Name and Lead	Paper Authors	Paper Titles
The linkages between electricity supply and economic growth Theme lead: David Stern (Australian National University)	David Stern (Australian National University) Stephan Bruns (University Kassel) Paul Burke (Australia National University)	The Impact of Energy on Economic Development from a Macro Perspective
	Catherine Wolfram (UC Berkeley) Ted Miguel (UC Berkeley) Kenneth Lee (UC Berkeley)	Energy and Economic Development: A Microeconomic Research Agenda
	Neil McCulloch (Independent researcher) Dalia Zileviciute (Independent researcher)	Is Electricity Supply a Binding Constraint to Economic Growth in Developing Countries?
Financial and policy instruments and governance structures that encourage the development and better utilisation of appropriate large scale power infrastructure	Anton Eberhard (University of Cape Town) Catrina Godinho (University of Cape Town) Duke Ghosh (Global Change Research)	Rethinking Power Sector Reform in Sub-Saharan Africa and South Asia
	Neil McCulloch (Independent researcher), John Ward (Vivid Economics), Esmerelda Sindou (OPM)	The Political Economy of Aid for Power Sector Reform
Electricity supply and energy efficiency measures in supporting sustainable urbanisation Theme lead: Shobhakar Dhakal (Asian Institute of Technology)	Meredith Fowlie (UC Berkeley) Amol Phadke (Lawrence Berkeley National Laboratory)	Energy Efficiency in the Developing World
	Paul Gertler (UC Berkeley) Mushfiq Mobarak (Yale University) Kenneth Lee (UC Berkeley)	Electricity Supply and Urbanization: A Microeconomic Research Agenda
	Harry Smith (Heriot-Watt University)	Urban Governance, Urban Development, Land Use and Energy Access
The constraints in use of large-scale renewable energy sources, or “greener” energy sources Theme leads: Catherine Mitchell and Bridget Woodman (University of Exeter)	Frank Wolak (Stanford University) Goran Strbac (Imperial College London)	Power Markets and Renewables Deployment in Developing Countries
	Bridget Woodman (Exeter University) Catherine Mitchell (Exeter University) Mario Ragwitz (Fraunhofer ISI)	Economic and Non-Economic Barriers and Drivers for the Uptake of Renewables
An improved understanding of the role of extractives in electricity/energy provision and sustainable development Theme lead: Michael Ross (UCLA)	Michael Ross (UCLA) Paasha Mahdavi (UCLA)	The Political Economy of Hydrocarbon Wealth and Fuel Prices
	Michael Ross (UCLA)	What Do We Know about Economic Diversification in Resource Rich Countries?
The barriers and opportunities for innovative and appropriate design of larger-scale, centralised energy infrastructure to respond to evolving demand and support inclusive growth Theme lead: Vijay Modi (Columbia University)	Luis Munuera (International Energy Agency) Simon Mueller (International Energy Agency) Tim Dubbeling (International Energy Agency)	Modular and Discrete: Opportunities for Alternative Power System Planning, Expansion and Operation in Developing Countries
	Vijay Modi (Columbia University) Sebastian Rodriguez-Sanchez (Columbia University	Reducing Generation, Transmission and Distribution Inefficiencies and the Feasibility of Low Voltage Supply in LICs
	Vijay Modi (Columbia University)	Low-Voltage System Designs for Energy Access
Cross-cutting theme: Climate Change	Frank Jotzo (Australian National University) Sam Fankhauser (London School of Economics)	Economic Growth and Development with Low-Carbon Energy
Cross-cutting theme: Gender	Harold Wilhite (University of Oslo)	Gender Implications of Energy Use and Energy Access
Cross-cutting theme: Data	Roberta Quadrelli (International Energy Agency) Eric Masanet (International Energy Agency) Duncan Millard (International Energy Agency) Luis Munuera (International Energy Agency)	Leveraging Smart System Technologies in National Energy Data Systems: Challenges and Opportunities

We would be to glad to receive any feedback on the newsletter, relating to content, length and format- please send this to eeg@opml.co.uk.

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Stay in touch

If you would like more information about theApplied Research Programme on Energy and Economic Growth please visit http://www.opml.co.uk/projects/energy-and-economic-growth or write to eeg@opml.co.uk

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