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A balanced matrix of energy efficiency policies to support SE4All objectives and sustainable development¹

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Introduction

In 2012 the UN SG launched the Sustainable Energy for All (SE4All) Initiative, in which global objectives for sustainable energy development were launched. These objectives were to; double the rate of energy efficiency uptake, double the share of renewables in the global energy mix, and ensure access to modern energy services. In order for the world to accelerate its progress toward the SE4All objectives during the International Decade of Sustainable Energy for All (2014-2024) and to provide the energy needed for sustainable for development, there is a need for an improved strategic foundation and accelerated implementation of relevant policies.

Meeting these objectives requires a significant acceleration from current rates of progress in sustainable energy, though the benefits from these efforts have been demonstrated successfully in a number of countries. Some countries have developed energy efficiency policies that appear to be succeeding in decoupling energy demand growth from economic and population growth and reducing the long-term average rate of growth in the demand for energy. For example Australia has almost 30 years' experience in policies to advance appliance efficiency and has seen grid demand for electricity flatten since 2008 despite continued economic growth.

Adopting or adapting operational sustainable energy policies directly from other countries is not always effective, as policies apply in local political, infrastructure and market conditions and are reliant on consumer readiness to act and change. Significant policy, infrastructure and market drivers need to be in place in order for these policies to be effective. Indeed, much of the apparent slow progress in EE development can be explained largely by inadequacies in the policy and market contexts that are required for energy efficiency to be effective. The contextual failures include inadequate infrastructural policies, energy price failures such as subsidies and inadequate pricing of externalities, inadequate market supply lines, and energy market rules and practices that hinder innovative and more sustainable development of available resources.

The greatest changes may need to occur at the level of being clear on objectives. The notions of 'saving energy' for its own sake, or of reducing GHG emissions, are by themselves inadequate foundations for the required changes. On the other hand, an integrated objective of sustainable economic and social development as well as environmental improvement would provide the needed foundation. Efforts to develop strategic, infrastructural and energy market policies that enable energy efficiency operational policies would underpin successful acceleration.

Context

Energy is the engine of economic and social development. Energy enables wealth production from labour and capital. In developed economies there is little concern about the availability of electricity for computers, whereas in many developing countries the need for computers must await power supply.

Efficient use is critical to energy access and development. The efficient development, transformation, and transport/transmission of energy resources are as important as the availability of energy to consumers. The metrics for access must focus on end-use energy services (e.g., lighting or heating) not just on delivered energy products (electricity for operating the lamp) or primary energy (the coal for the power station). Some of the most developed economies rely on imported energy, but have mastered its efficient use.

Most energy efficiency options are economically sound and deliver diverse development benefits², but often lack supporting context and complementary policies. In most countries, regardless of development status, they are often operational, rather than strategic.

This paper proposes a sustainable energy policy matrix that:

- Integrates and mainstreams policy options for energy efficiency these are not independent or competing policy options but must be considered strategically with policies integrated from a systems perspective even though different players implement these options.
- Clarifies the high level policies and strategies that are pre-cursors to change.
 Governments should consider how they create environments that are conducive for energy efficiency investments.
- Recognises the role that infrastructure agencies play in in shaping how mobility, buildings, and energy systems are provided.
- Identifies energy markets and utilities as key players in improving energy efficiency and seeks a greater role for utilities in pursuing SE4All goals.

What strategies and policies for sustainable energy could be effective?

Strategic considerations issues that influence policy and strategy development fall under three main themes: Prices, Products, and Players.

Prices

Energy pricing policies are as important as sustainable energy policies. The IEA has identified cost-reflective energy prices as a "key factor driving expansion of the energy efficiency market". Addressing energy subsidies, environmental externalities, market information is as important as policy for attaining sustainable energy. Prices should reflect the costs of energy supply and delivery to both consumers and suppliers so that both have clear signals for investment. Pricing policies that are cost-reflective, including returns on investment, motivate all players in an energy system to make smarter investment decisions. Regardless of political context or state of development, economic pricing of critical resources like energy, labour and capital avoid waste and drive economic, social and environmental performance.

² For a thorough evaluation of outcome benefits from energy efficiency see 'Capturing the Multiple Benefits of Energy Efficiency. http://www.iea.org/w/bookshop/475-Capturing_the_Multiple_Benefits_of_Energy_Efficiency

³ IEA Energy Efficiency Market Report 2013

Where inadequate pricing policies exist (subsidies, inadequate cost recovery, poor environmental impact pricing), consumers typically get poor service. Service can only be improved if consumers pay for it because the cash flow supports investment throughout the energy value chain. Efficiency can only be improved if consumers are rewarded for their efficiency gains by avoiding the full cost of supply. Second-order price instruments like environmental taxes and carbon trading mechanisms are impotent in the face of policies to keep energy prices low.

In many developing and emerging economies the utility sector is the only sector that has the technical, financial, management, and marketing capability to develop energy access and ensure optimal energy productivity. The sector is a key developer of the 'supply lines' that deliver energy efficiency services and products, and become the future markets for these sustainable energy drivers for sustainable development.

The role of smart meters and smart grid technologies in more advanced systems can only be realized when electricity and heat systems embrace the key elements of cost-reflective pricing. Arguably there is little prospect to advance the levels of resolution in metering and billing without first ensuring that cost reflective pricing is instituted.

Cost-reflective pricing is 'the one policy that can bind them all'. If there is a silver-bullet policy solution for sustainable energy, it is this.

Products

Clear alignment of sustainable energy policies with national development goals. Economic and social development objectives should drive sustainable energy objectives, not just 'saving energy', climate change or local environmental responses. The environmental objectives will be more easily expedited when they are perceived as part of a broader development strategy.

Some countries use less than 3 tonnes of oil equivalent per capita per year and need more, whereas others already use more than this, but only partly because of their industrial energy intensity or climate. All countries face a challenge to achieve more from the energy they use in an increasingly competitive world. This measure of performance can be called energy productivity.

Unless policies contribute to development ambitions there will be little motivation to resource or maintain the policies. Current climate policies by themselves are too unstable and unpredictable to be an effective basis for implementing sustainable energy policies or making investment decisions. GHG emissions would be reduced and energy demand minimised if energy efficiency policies were pursued actively to economic levels.

Effective Policy Portfolios. A number of recommended policy portfolios from different sources exist for energy efficiency. The policies are fairly universal, cost effective, politically acceptable, and widely applied. For example, over 70 countries have minimum efficiency performance standards (MEPS) and labelling for appliances. IEA Governance work⁴ and Regional EE Policy Recommendations⁵ can help energy efficiency practitioners, government officials and stakeholders establish the most effective energy efficiency governance structures in their specific country contexts. While pertinent to any country, the

http://www.iea.org/publications/freepublications/publication/regional-energy-efficiency-policy-recommendations-.html

 $^{^{4}\} Energy\ Efficiency\ Governance\ {\color{blue} \underline{http://www.iea.org/publications/freepublications/publication/energy-efficiency-governance.html}$

⁵ Regional Energy Efficiency Policy Recommendations

guidelines would need to be customised to local political contexts and country development priorities.

The policy recommendations are quite operational, but if implemented without supporting high-level strategy, sound design, marketing, and complementary policies they could be less than effective. Table 1 sets forth a range of strategic policy options for pursuing energy efficiency.

Statutory (legal) frameworks, regulations and normative instruments. Durable solutions and outcomes require durable policy commitments. Governments can best signal this durable intent by implementing statutes and legal commitments to sustainable development. Service and product quality standards enable all players to have confidence in new products and reinforce government's commitment to sustainable development. For consumers the standards become quality marks that ensure confidence and for industries they ensure that investments in better products and service quality cannot be undercut by inferior imports. Aligning country standards with internationally developed standards (ISO, IEC etc.) ensures that local industry is aligned with global markets, thereby enabling trade.

Innovative financial products are being developed to increase the amount of capital applied to sustainable energy. Development banks work through local banks to leverage their funds with local resources and to establish funding instruments for sustainable energy. The instruments include a range of direct financing, loans, equity, guarantees, risk underwriting instruments as well as working with energy service companies (ESCos) to link financial and engineering capabilities. Governments could take care to ensure that their financial services regulations and practices create an enabling environment for private investment and financial transactions.

Effective data for planning and evaluation. Relatively few countries have complete sets of demand side energy data that enable policy makers and investors to fully understand how and why energy is demanded. The benefits of quality data include gaining insights into consumer behaviour and motivations. Energy data priorities can be identified and developed to provide focused data to support stated sustainable development priorities. This approach is cheaper and more effective than large surveys, which often provide static global data sets rather than needed information. Data priorities can be identified by undertaking a review of energy statistics and ensuring that clearly identified demands for information to support policy objectives shape the priorities for new or expanded data gathering efforts.

Research and Development. As with data, R&D priorities can only become clearer when clear strategies for development and sustainable energy are agreed. A government-led process that includes private sector players, consumers and suppliers can then identify R&D needs. A research investment prioritisation process (for example a stage-gate process) can help assign funding to clearly scoped research proposals that meet policy needs.

Players

Market structure, energy sector policy. Liberalised energy markets encourage new entrants and investments and enable diversification of supply and demand side options like energy efficiency. Any government will struggle to maintain the investments necessary to develop and maintain growing energy networks for the increasingly diverse services demanded by consumers. The role for government is establishing and managing policies that enable energy markets, where private and corporatized public generators can compete openly and consumers can choose competitive energy supply services and products.

National political, development and geographical situations very, so there is no single ideal path to liberalising energy systems, but this step is key to reducing barriers to entry, opening access to customers and networks, and moving to more dynamic cost-reflective pricing where supply and network costs can be socialised more effectively. A useful example of these changes is the recent progress made in the Russian electricity market and the PEPDEE project outlines useful examples of utility delivery of energy efficiency initiatives.

An enabling private sector operational focus. Sustainable energy polices create enabling environments for households, businesses and government decision makers to make better decisions about investments and practices. These 'better decisions' are implemented by private sector suppliers of products: insulation, wind turbines, zero energy homes, energy services; energy management, sustainable architecture, design, and so forth. The ability of the private sector to finance energy efficiency must be enhanced. USD310 billion were invested in energy efficiency around the world in 2012⁸, and a significant share of the total was private money, but these are only minute portions of total private capital flows. Governments alone are unable to provide the total funding requirements estimated by analysts to achieve low carbon futures. Policies should therefore encourage and enable private capital and motivate private sector provision of products and services.

The development of government policies can easily crowd out private sector players as decision-makers delay investment while awaiting anticipated government incentives or seek short-term hand-outs.

Which policies can progress quickly to UNSE4All goals?

Clear Governance Strategies and Institutional Policies for a Conducive Context

There are many examples of energy efficiency and renewable energy policies around the world. No one size fits all and a high degree of customisation to local markets is required; often only the policy principles can be taken from one country to another. It is useful to consider which types of policies would work well, and how they can be best applied in member economies.

- 1. Polices tailored to local economic, social and environmental needs and policy priorities work best as they can influence decision makers to deliver energy efficiency solutions.
- 2. Ensuring the context is right. Essential price signals and supporting policies from utilities and infrastructure agencies underpin the outcomes from policies. These enabling contexts empower changes to sustainable energy options. It is impossible for an operational policy to achieve success without essential market and structural drivers in place or while undercut by subsidised energy prices. The lack of a conducive context stifles progress in sustainable energy in many countries.
- Developing local capacity in sustainable energy services and products quickly highlights the job creation and the economic potential of policies to create local markets for sustainable energy.
- 4. Drawing on international best practices ensures that local markets are aligned with trading partners. Regulatory policies in particular need to be aligned with international

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 $^{^{6} \}underline{\text{http://www.iea.org/publications/insights/insightpublications/russian_electricity_reform.pdf} \\$

http://www.iea.org/topics/energyefficiency/energyutilities/pepdee/

⁸ http://www.iea.org/w/bookshop/463-Energy_Efficiency_Market_Report_2014

best practices and regional trade partners to enable trade and grow the supply options for more sustainable technologies.

- 5. Policies that integrate to create synergies and spillovers will create local capacity. Offering finance options with the private sector, alongside improved building codes, and training for the construction industry will increase the ability of customers to undertake projects and deliver faster results than simply creating new codes.
- 6. Recognising that there is still much to learn, policy should be considered evolutionary. Well-designed policies will include evaluation and enable governments and private sector players to learn how to grow and realise the potential for energy efficiency and renewable energy and the best ways to exploit the opportunity.

A Balanced Programme of Energy Efficiency and Renewable Energy Policies

To produce a concise but more complete 'matrix' of needed policies and actions the table on the following page is structured with the following features:

- Both energy efficiency (the top axis) and renewable energy policies (the left hand axis) are shown on an integrated policy 'field'. Although different players deliver these sustainable energy outputs, they are complementary and it can be useful for each set of players to see how their efforts combine to a more complete sustainable energy outcome.
- Critical political and high level institutional and infrastructure policy actions are highlighted in blue in the top left hand corner: these create a national / regional / municipal governance mandate for sustainable energy. This in turn creates a governance mandate for further institutional and infrastructure policy and actions that enable both energy efficiency and renewable energy, in light blue
- Critical energy market policies are highlighted in orange: cost-reflective pricing, consumer pricing polices underpin all decision about energy and institute an essential economic drivers for sustainable energy investments in both energy efficiency and renewable energy. This in turn creates a number of energy, transport, water resource utility based policies which enable better investments in sustainable energy across all end-use sectors light orange.

By implementing these institutional and utility policies a much more constructive environment is created for operational policies.

 Operational energy efficiency and renewable energy policies and measures in green are mapped across sectors. These are the typical and necessary policies that are implemented, but often without a supportive institutional and utility policy structure.

Table 1. A Balanced EE - RE Policy Portfolio for Economic and Social Development

	Policy Options for Energy Efficiency							
	Cross-Sectoral		Cross-Sectoral	Utilities	Business		Residential	
				& Infrastructure	Industry	Transport	Housing (& appliances)	Transport
	to development goals. Clear accountabilities an objectives in clear strategy / actio plans for national and regions government.		Clear accountabilities and objectives in clear strategy / action plans for national and regional	Integrated Resource Planning requires EE where less than SRMC of new generation	Focus on SME's energy productivity for high growth.	Reflect transport system costs to users. Improved logistics and connectivity between modes.	Sustainable city design that better links home, school and workplace. Deliver social subsidies thru home EE	Apply UNEP's Reduce- Improve- Shift policy framework to transport
able Energy	Enable private sector investment in energy sector, inc. demand side, renewables, on-site generation		in energy sector, inc. demand side,	Cost-reflective pricing. Dynamic Time of Use / Demand charges to customers.	Demand pricing. Demand Side Management.	Ensure all freight options face full costs	Time of Use & progressive tariffs options	Ensure Public Transport options are enabled
Policy Options for Renewable Energy		Industry	Develop bio energy, bio fuel, and PV standards and industry capacity	Markets support Co gen and CHP Co -firing biomass	Lo or Zero energy comm. bldgs. EE lighting, MEPS for equipment PV SWH	Transport Logistics	Bio-fuel heaters	
	Business	Transport	Electrification of transport Alternative and Bio –fuel standards	Business fleets actopt electric vehicles. Networks to enable electric and multifuel vehicles	Transport logistics for supply and distribution chains	HDV VFEL Multi fuel vehicles Eco-driving		Multi-fuel vehicles
		Housing	Develop Photo voltaic (PV) & Solar Water Heating (SWH) industry	Energy market rules allow purchase and transfer of self-generated electricity and ration lise district heating services	PV and Solar water heating in commercial buildings		Building codes Lo - Zero energy buildings. Appliance MEPS & L	Improved passenger transport system options and integration
	Residential	Transport	Strategies for passenger Electric vehicles and electric public transport.	Support electric vehicle charging networks				Electric Vehicles LDV VFEL

Operational Policies for Sustainable Energy suited to ECE **Economies**

This section outlines identified examples of policies, (that are at least good examples of policies and at best represent best practices) from countries with similar climates (cold or temperate) or economic structures (emerging economies where possible).

The examples are drawn from published sources like the ODDYSEE-MURE9, WEC10 and IEA PAMS 11 databases and included references. The Energy Charter Secretariat also undertakes energy efficiency policy reviews of ECE member states, and the PEEREA process for energy efficiency policies¹².

This list is not exhaustive; rather these references are a 'smorgasbord' of policies that outline what is possible and highlight features of effective policies already being implemented.

Table 2 Operational policies suited to ECE Economies

Table 2a Cross-sectorial

Table 2a Cross-sectorial				
Policy	Country	Reference		
National Strategy for	Latvia	http://www.measures-odyssee-		
transport and		mure.eu/public/mure_pdf/transport/LT6.PDF		
communications				
Plan for Strategic	Spain	http://www.measures-odyssee-		
Infrastructure and		mure.eu/public/mure_pdf/transport/SPA50.PDF		
intelligent transport				
National Energy	Estonia	http://www.measures-odyssee-		
Efficiency Plan		mure.eu/public/mure_pdf/general/EST8.PDF		
EE, RE and CO ₂	Global	http://www.iea.org/policiesandmeasures/		
policies and measures	database			
Energy Efficiency	Russian and	http://www.iea.org/publications/freepublications		
Governance	English	/publication/energy-efficiency-governance		
guidebook	language	handbookrussian-version.html		
	versions			
Progress tracking 25	IEA	http://www.iea.org/publications/insights/insight		
EE policy	members	publications/name,15211,en.html		
recommendations				

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⁹ ODDYSEE-MURE http://www.odyssee-mure.eu/

¹⁰ World Energy Council. Energy Efficiency Policies and Measures, Enerdata. http://www.wec-policies and Measures, Enerdata. policies.enerdata.eu/

II IEA Polices and Measures Database http://www.iea.org/policiesandmeasures/

¹² Energy Charter http://www.encharter.org/index.php?id=4&L=0L50A

Table 2b Utilities and Infrastructure

Policy	Country	Reference
SMUD smart billing	US	http://www.wec-
motivates consumers		policies.enerdata.eu/Documents/cases-
to EE		studies/US_Smart_billing.pdf
Financial incentives	Latvia	http://www.measures-odyssee-
for public lighting		mure.eu/public/mure_pdf/tertiary/LV11.PDF
Efficient Urban form	Netherlands	http://www.measures-odyssee-
		mure.eu/public/mure_pdf/transport/NLD23.PDF
Partnership with IFC	Russia	http://www.wec-
for efficient lighting		policies.enerdata.eu/Documents/cases-
		studies/RU communication.pdf
Subsidies for public	France	http://www.measures-odyssee-
lighting efficiency in		mure.eu/public/mure_pdf/tertiary/FRA23.PDF
small municipalities		
Energy efficient	Sweden	http://www.measures-odyssee-
infrastructure		mure.eu/public/mure_pdf/transport/SWE24.PDF
Policies for Energy	Global	http://www.iea.org/topics/energyefficiency/ener
Provider Delivery of		gyutilities/pepdee/
Energy Efficiency		
PEPDEE		
Russian Electricity	Russia	http://www.iea.org/publications/insights/Russia
Market reform		nElectricityReform2013Update Juillet2013 FI
		NAL.pdf
Lighting efficiency	Kazakhstan	http://www.kz.undp.org/content/dam/kazakhsta
		n/docs/prodocs/EE/Lighting/Pro%20Doc.pdf
Urban remodelling	Netherlands	http://www.measures-odyssee-
schemes		mure.eu/public/mure_pdf/transport/NLD23.PDF

Table 2c Buildings and Appliances

Policy	Country	Reference
Multi-dwelling	Latvia	http://www.measures-odyssee-
minimum energy		mure.eu/public/mure_pdf/household/LV35.PDF
standards		
Addressing energy	Useful study	http://www.wec-
efficiency for low-	of UK EE	policies.enerdata.eu/Documents/cases-
income households	for poverty	studies/GB_low_income.pdf
	program	
Household energy	New	http://www.wec-
efficiency health	Zealand's	policies.enerdata.eu/Documents/cases-
outcomes	heat smart	studies/NZ_Financing_energy_efficiency_buildi
	programme	ngs.pdf
Criteria for passive	Norwegian	http://www.measures-odyssee-
houses and low	Standard	mure.eu/public/mure_pdf/household/NOR31.PD
energy residences		<u>F</u>
Appliance and	China's	http://www.wec-
Equipment MEPS	appliance	policies.enerdata.eu/Documents/cases-
and labeling	and	studies/CN compliance.pdf
programme,	equipment	
ENERGYSTAR	policies	
endorsement of high-		
efficiency products		

Table 2d Transport

Table 2d Transport				
Policy	Country	Reference		
Transaction and	Netherlands	http://www.measures-odyssee-		
modal shift		mure.eu/public/mure_pdf/transport/NLD6.PDF		
Cycling programme	Finland	http://www.measures-odyssee-		
		mure.eu/public/mure_pdf/transport/FIN26.PDF		
Transport fleet audits	Finland	http://www.measures-odyssee-		
		mure.eu/public/mure_pdf/industry/FIN12.		
		PDF		
Rail efficiency	Romania	http://www.measures-odyssee-		
planning		mure.eu/public/mure_pdf/transport/RO5.PDF		
Intelligent transport	Poland	http://www.measures-odyssee-		
systems development		mure.eu/public/mure_pdf/transport/PL13.PDF		
Agreement for freight	Finland	http://www.measures-odyssee-		
transport and logistics		mure.eu/public/mure_pdf/transport/FIN18.PDF		
Optimising freight	Poland	http://www.measures-odyssee-		
and traffic		mure.eu/public/mure_pdf/transport/PL2.PDF		
management				
Upgrading efficiency	Romania	http://www.measures-odyssee-		
of city metro system		mure.eu/public/mure_pdf/transport/RO8.PDF		
Eco-driving	Canada	http://greencommunitiescanada.org/programs/ec		
programme		odriver/		
		http://fleetsmart.nrcan.gc.ca/index.cfm?fuseacti		
		on=fleetsmart.smartdriver		
Electric vehicle	Spain	http://www.measures-odyssee-		
infrastructure		mure.eu/public/mure_pdf/transport/SPA49.PDF		

Table 2e Industry

Policy	Country	Reference
Funding for SME	Germany	http://www.measures-odyssee-
energy efficiency		mure.eu/public/mure_pdf/industry/GER36.PDF
Long term industry	Netherlands	http://www.measures-odyssee-
energy efficiency		mure.eu/public/mure_pdf/industry/NLD10.PDF
programme.		
Energy manager	Lithuania	http://www.measures-odyssee-
training scheme		mure.eu/public/mure_pdf/industry/LT1.PDF
Compressed air	Germany	http://www.measures-odyssee-
energy efficiency		mure.eu/public/mure_pdf/industry/GER37.PDF
contracting		
Boiler assessment	Ireland	http://www.measures-odyssee-
programme		mure.eu/public/mure_pdf/industry/IRL1.PDF
Combustion	Bulgaria	http://www.measures-odyssee-
efficiency		mure.eu/public/mure_pdf/industry/BG12.PDF
assessments		
Motor challenge	France	http://www.measures-odyssee-
programme		mure.eu/public/mure_pdf/industry/FRA8.PDF

Table 2f Energy and Financial Data

Policy	Country	Reference
Credit lines for	Poland	http://www.measures-odyssee-
energy efficiency		mure.eu/public/mure_pdf/industry/PL12.PDF
Substantial chapter	Global	http://www.iea.org/W/bookshop/463-
on financing energy		Energy_Efficiency_Market_Report_2014
efficiency.		
Guidance on	Global	http://www.iea.org/w/bookshop/475-
monetizing outcomes		Capturing the Multiple Benefits of Energy Ef
of EE policies		<u>ficiency</u>
Funding for energy	France	http://www.measures-odyssee-
efficiency		mure.eu/public/mure_pdf/industry/FRA9.PDF
investments		
Household energy	New	http://www.branz.co.nz/HEEP
demand study	Zealand	
Identification of	New	http://www.stats.govt.nz/browse_for_stats/indust
energy data needs	Zealand	ry_sectors/Energy/energy-domain-plan.aspx
and priorities		
Energy demand data	Romania	http://www.measures-odyssee-
and balances		mure.eu/public/mure_pdf/industry/RO3.PDF