SREP: Subsidy guidance note

Draft presentation 18th June 2011

Objectives of the note

- Broad guidance rather than exhaustive list of conditions/requirements

- Support the efficient and effective use of SREP funds in achieving SREP objectives:

  - piloting and demonstrating the economic, social and environmental viability of low carbon development pathways in the energy sector
  - overcome economic and non-economic barriers in order to scale-up private sector investments
  - initiate transformational change to low carbon energy pathways through improved market and financial conditions and increased investor confidence.

- Review subsidy mechanisms used in developing and developed countries, and provide guidance for application in SREP investment plans

- Complement SREP Financing Modalities note and the paper on financing mechanisms

Scope of RE covered

- Grid-connected RE electricity
- Mini-grid and off-grid RE electricity
- No large hydro
- No renewable heat
- No biofuels for transport

Investment plans need to address trade-offs between policy objectives

- Poverty alleviation/access vs. low carbon development
  - In grid-connected projects conventional generation may provide cheaper and more reliable access to electricity.
  - Off-grid applications are win-win when “avoided costs” are higher and quality of displaced electricity (e.g. kerosene generators) is lower.

- Social cohesion vs. low-carbon development
  - In community based projects efficient design and operation of renewable energy plants may not be compatible with operational model that promotes social cohesion (e.g. Nepal and Pakistan micro-hydro projects)

Why subsidising renewable energy?

- The answer depends on the point of view
  - **Public policy perspective** (interest in low system cost, security/reliability of energy and economy wide/social benefits, low carbon development)
  - **Investors perspective** (interest in appropriate risk/return balance)

Most common arguments for subsidising renewable energy

ARGUMENT	COUNTER-ARGUMENT
• Externality: level the playing field with polluting incumbents	*Better addressed by climate policies targeting emissions (e.g. carbon pricing)*
• Support nascent industry to reduce costs (learning curve)	*Learning effect of deployment subsidies not proven but virtuous circle likely*
•Address non-market barriers to investments	*Better targeted by regulatory improvements and technical assistance*
•Overcome entrenched behaviour	*Better targeted by information provision, unless temporary subsidies create entrenched subsidy dependence*
•Energy security of supply	*Not renewable specific, not always applicable to RE*
•Mitigating fuel price volatility	*Many RE are not immune to price volatility and have their unaccounted costs*
•Social cohesion, equity, affordability	*Better addressed by targeted social policies*

Most arguments justify government intervention; not necessarily subsidies

- "**Learning effect**" the most solid rationale for subsidizing renewable energy above the carbon price (current subsidies reduce future costs).
  - Not proven if deployment causes cost reduction or vice versa. Is there a virtuous circle?
  - Literature: R&D subsidies reduce costs in early stages of technology dev.; deployment subsidies better for mature RE technologies. Does it apply also to small, simple, off-grid RE?
  - RE technologies internationally tradable. Whoever and wherever pays for learning, it benefits all (international technology spillovers)
- Other arguments hold in some circumstances providing that subsidies are **temporary** substitutes for other policy failures (e.g. failure to price full cost of conventional energy) and do not delay more sustainable remedies.

Subsidies for TA and capacity building

- **Government level (upstream)**: Resource assessment, publication of data, least-cost studies, strategic environmental impact assessments of wind and small hydro, grid codes, analysis of integration of RE into rural electrification plans, streamlining licensing and permitting
- **Intermediate level**: know-how transfer to financial institutions/investors
- **Project level (downstream)**: project preparation and verification
- Where possible, TA funding should be linked to enabling investments and address specific market and institutional barriers that can not be addressed by investment financing (e.g. information asymmetry, institutional barriers).
- How far upstream could SREP reach?

Deployment subsidies support investments directly

- Likely to reduce costs for mature technologies through scale effect
- Private R&D increases if industry expects market growth when subsidies expire
- International technology spillover benefits have time lag:
  - Developed countries pay today for deployment of immature, still expensive technologies with steep learning curves (e.g. solar PVs);
  - Developing countries benefit tomorrow from reduced costs.
  - Costs and benefits of delaying deployment need to be considered

Review of different forms of subsidies

- Tax waivers/credits popular in developing countries
- Feed-in tariffs most common in developed countries but growing popularity in developing countries. Sometimes allocated through competitive auctions (e.g. Peru, Thailand, Brasil, China, California)
- Few countries apply renewable portfolio standards, some of them with tradable certificates (e.g. India)
- Capital grants/soft loans applied mainly in richer countries or are externally funded in developing countries
- Guaranteed grid connection and priority dispatch is a common rule, but not always enforced

ALL CAN BE STRUCTURED TO HAVE THE SAME SUBSIDY EQUIVALENCE BUT MAY HAVE VERY DIFFERENT IMPACT AND INCENTIVE EFFECT!

CO-EXISTENCE OF MUPTIPLE SUBSIDIES FOR THE SAME PROJECTS MAY LEAD TO UNWANTED INCENTIVES (e.g. BLENDING TAX EXCEMPTIONS WITH OTHER SUPPORT IN INDIA AND CALIFORNIA)

Criteria for evaluation of forms of subsidy

- Effectiveness (do they deliver projects?)
- Cost-effectiveness (at what cost? affordable to consumers and/or to public budgets?)
- Leverage of investments (how much more funds?)
- Sustainability of subsidized activities (will it die after subsidy expires);
- Administrative costs (to authorities);
- Transaction costs (to investors);
- Incidence (who pays and who bears final costs);
- Market integration (mainly for grid-connected applications)

Selected highlight 1: Effectiveness

- Can be measured as a share in total electricity generation, or annual generation growth rate
- Without effective deployment of renewable projects there is no demonstration effect
- Long term guaranteed tariffs and high capital grants most effective in attracting project developers,
- Result-based subsidies more effective in delivering electricity (as opposed to capacity)
- Effective deployment of high cost technologies has negative demonstration effect

Selected highlight 2: Cost-effectiveness

- Measured as total RE support divided by the total volume of renewable energy generated (not the same as reducing producer surplus)
- High RE cost can undermine public support
- Different considerations for grid connected and off-grid RE systems
  - Off-grid & mini grid renewable technologies in developing countries often competitive with diesel generators or grid extension investments
  - Lifetime cost of certain grid connected renewable technologies (solar PV, offshore wind) still higher than conventional power
- For grid-connected technologies: challenge to attract investors while avoiding back-loading of consumers/budgets with legacy of supporting expensive technologies that deliver relatively little energy (lessons from solar PV support in EU countries)
- Such legacy costs can be left behind with different subsidy forms:
  - Explicit legacy of opex subsidies (e.g. FIT contracts)
  - Implicit legacy of capex subsidies (grant expectations)
- Technology and location neutral subsidies tend to minimise cost of total renewable support, but may lead to lack of diversity
- Competitive support schemes (TGCs or auctions) help discover real RE costs

Unaccounted costs

Fossil fuels/nuclear

1. Environmental/heath damages/safety/risks
2. Fuel price volatility and availability risks (e.g.; Middle East oil and gas; limited diversity of fuel mix)
3. Scale and finance requirements

Renewable energy

1. intermittency and limited reliability (system balancing costs)
2. Availability (e.g. water during droughts, biomass)
3. Input price volatility and availability risks (mainly for biomass, biogas)
4. Output price volatility (e.g, ethanol in Brazil)
5. Environmental risks (in sensitive eco systems) such as for wind, solar, hydro

Highlight 3: Gradual integration of RE with energy market reforms

1. Removal of subsidies to fossil-fuel based energy
2. Phasing-in cost recovery tariffs and/or market-based pricing of wholesale energy;
3. Integration into the competitive electricity (and capacity) market segments;
4. Integration of renewables into the grid: changing the rules of transmission and distribution management (grid codes) from top-down planning to reactive approach and smart, bi-directional grids;
5. Phasing-in of economy wide carbon pricing imposed on conventional energy producers/consumers.

- With each of the above steps the level of RE support can be reduced
- Competitive and market-facing RE support schemes (auctions, TGCs, FIT premiums) better integrated from the outset

Choice of grant versus loan

- Should follow market sounding and precise definition of financing barriers (access, cost, risk, cash-flow profile?)
- No clear-cut argument for using grants for public sector and loans for private sector projects
- Concessional loans more likely to crowd-out private lending both from public and private sector projects unless carefully structured
  - With the same grant equivalent grants account for higher share of CAPEX
  - Loans are standard products of commercial banks (product competition)
- Commercial finance can be leveraged by SREP with matching investment grants, equity or risk management instruments depending on the financial barrier, or structuring lending products to leverage private finance (e.g. syndication or subordination)
- Trade-off between performance-based incentives vs upfront capital buy-downs not performance linked, although grants can be linked to performance and results (e.g. grants in some EBRD facilities are linked to NPV of estimated carbon emissions avoided or RE electricity generated)

“Smart” subsidies (I)

1. **Effective** in deploying projects on the ground
2. **Precisely targeted at the specific market failure or the barrier**, which can not be removed by market conforming interventions alone (e.g. removal of fossil fuel subsidies, providing information, reducing general investment risk);
3. Increase the overall volume of finance available for renewable energy investments through **high leverage** of private and MDB financing;
4. **Linked to results not technology cost** – e.g. to volume of green electricity and related emissions reduction;
5. Provide **incentives to maximise annual production** rather than installed capacity.

“Smart” subsidies (II)

5. **Do not create permanent risk-adjusted windfall profits**, although some windfall profits necessary to attract primary movers to nascent risky industry;
6. **Additional**: market sounding must show that without subsidies investors are not willing to make RES investments and commercial financing is not available
7. **Are part of a broader policy framework** that aims over time to fully price into conventional energy the cost of associated GHG emissions and removal of other policy barriers.
8. **Are market conforming**: Encourage competition and some market risk taking. Level of support decline over time to encourage sustainable policy reforms and early investments. SREP should not substitute for failure to enact reforms necessary to correct existing regulatory failures.
9. **Low administration and transaction costs**; easy to monitor

SREP and energy market reforms

- Applicable for grid connected schemes
- Many developing countries do not have energy markets but state owned, heavily subsidised non-transparent and non-commercially run vertically integrated utilities.
- Such systems naturally discriminate against IPPs and small dispersed energy sources (and are often unsuccessful in ensuring access and efficiency)
- Should SREP subsidise RE investments by such incumbents? What strings attached: unbundling, commercialisation, transparency, non-discriminatory access to grid?
- Should SREP instead focus on bringing private actors to on- and off grid generation (e.g. mini-hydro in Sri Lanka)?
- Without linking to underlying energy market reforms RE outcomes may not be sustainable.

Implications for SREP priorities

- Support for sustainable policy reform and capacity building can be transformational
- Financing enabling physical infrastructure for grid integration
- Focus on deployment support rather than manufacturing
- Focus deployment support on mature renewable technologies that are cost-effective in national context (small hydro, waste-based biomass, co-firing, wind, and provide access to cheap, reliable renewable energy
- Less mature/more costly technologies carefully assessed for their potential in specific niches (e.g. off-grid)

Implications for investment plans

- Live in the second-best world but do not make it an enemy of the first-best one
- There is no “international best practice” but many lessons learned. Even most advanced countries continuously discover mistakes and adjust their support schemes
- No one-size-fits-all solutions. Choice and design based on case by case evaluation of impacts and types of barriers
- Ensure that RE support schemes pave the way for sustainable policy environment for RE and for eventual integration with energy markets where relevant; design SREP support to strengthen sustainability
- Do not leave costly legacies behind
- Structure subsidies in a ‘smart’ way as part of “smart” development