POLICY BRIEF

AN APPROACH TO SUSTAINABLE DEVELOPMENT BASED ENERGY AND CLIMATE POLICY

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SUMMARY

Planning for India's energy future requires addressing multiple and simultaneous economic, social and environmental challenges. While there has been conceptual progress towards harnessing their synergies, there are limited methodologies available for operationalizing a multiple objective framework for development and climate policy. We propose a 'multi-criteria decision analysis' (MCDA) approach to this problem, using illustrative examples from the buildings and cooking sectors. An MCDA approach enables policy processes that are analytically rigorous, participative and transparent, which are required to address India's complex energy challenges.

Introduction

India faces a challenging decade ahead in energy and climate policy-making. The problems are multiple: sputtering energy production capabilities; limited energy access; rising fuel imports; continued electricity governance and pricing challenges; and growing environmental contestation around land, water, and air. In addition, India's intended climate 'contribution' for the global climate negotiations will necessarily influence its domestic energy use, given that energy accounts for 77% of its greenhouse gas emissions (WRI 2014). India's energy future thus requires addressing multiple and simultaneous challenges, that together suggest great complexity.

So far, India's approach to energy policy-making has been largely supply oriented and in silos, leading to a number of disconnects: between energy planning and social objectives; between domestic and foreign policy energy debates; and between energy and climate policy. Bridging these disconnects requires a shift in the decision-making process to explicitly consider the linkages across India's multiple sustainable development objectives. This principle is already enshrined in the National Action Plan on Climate Change's "co-benefits" approach. However, while conceptually promising, the approach has not yet been backed by a methodology to operationalize it.

In this brief, we introduce "Multi-Criteria Decision Analysis" or MCDA, as a potentially useful way forward. MCDA presents a set of well-established approaches for a range of decision-making arenas, and can be deeply salient to Indian energy policy because it allows decision-making to account for complexities, while maintaining rigor and deliberation. In presenting an MCDA approach, we build on other efforts to operationalize multiple objective approaches to Indian energy decisions. These include an early framework for multi-criteria analysis (Dubash et al. 2013), energy dashboards (Sreenivas and Iyer 2015; SSEF 2015), and state and sectoral analyses (Jain et al. 2015; GGGI 2014).

The remainder of the brief describes the essence of an MCDA approach and lays out its benefits, details and applications. The approach is applied illustratively to two case studies: access to modern cooking fuels and building energy efficiency. We present key insights from the two cases in the following sections.

Operationalizing a MCDA Approach

The synergies between sustainable development and climate considerations are of growing significance. While some national studies track achievement *ex post* of these sustainable development objectives, the primary challenge is to move beyond an illustration of their potential to a methodology that allows an *ex ante focus* during policy making.

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Four broad sustainable development objectives comprise the common set of social preferences that cut across decision making within an energy policy context. These are economic, social, environmental and institutional objectives which should ideally be served simultaneously. Within this context, we apply the MCDA approach illustratively to two sectors, cooking and buildings. The cooking sector is important because over 700 million people in India do not have access to modern cooking fuels and the adverse health effects of traditional, open-stove cooking result in an estimated one million premature deaths annually (Census 2011; Smith et al. 2014). Selecting effective policies to provide modern cooking fuels for rural households is therefore a development imperative.

Buildings, on the other hand, represent India's rapid urban transformation, and it is expected that two-thirds of the buildings stock to exist in 2030 is yet to be built (Kumar et al. 2010). Building energy efficiency policies offer benefits that go beyond energy savings, such as carbon mitigation, energy security, job creation, and increased socio-environmental outcomes. However, if unaddressed, the sector could lock India into a high-carbon growth path. We focus on evaluating energy efficiency policy options for new building envelopes in the residential sector, where most new construction is expected.

We analyze both sectors using an MCDA approach and discuss its advantages for decision making in the following section. The input data for the case studies, and part of the methodology in the buildings case, draw on NITI Aayog's Indian Energy Security Scenarios, a bottom-up energy accounting model.[1] The MCDA approach results are presented graphically in the "spider diagrams" in Figure 1 and 2. The larger the area of a spider, the better the policy alternative will be at fulfilling multiple objectives. These outcomes are illustrative, because they are preliminary and are not fully based on stakeholder consultations beyond expert input.

Insights for Policy

An MCDA approach provides important benefits: a structure for addressing multiple objectives simultaneously; a means to account for information that is not easy to quantify (such as distributional questions); and a rigorous consideration of choices involving synergies and tradeoffs when there are different stakeholder opinions on policy priorities. Examples from the two cases help demonstrate these benefits.

First, the approach requires policymakers to explicitly state the policy objectives to be achieved, and the weight given to each objective. For example, in the cooking case, the economic, social, environmental and institutional objectives are explicitly laid out at the start of decision making. Figure 3 shows the policy question with its explicit objectives and their translation to specific metrics or criteria against which different policy options can be evaluated. This approach encourages consideration of factors that are often ignored, such as household drudgery. Further, the approach requires identifying the relative weight given to each objective, such as minimizing household air pollution versus reducing greenhouse gas emissions. This attention enhances the transparency of process, and the effectiveness of the final decision.

Second, MCDA offers a range of tools for incorporating both quantitative and qualitative information with equal rigor. Importantly, the approach allows the use of qualitative information, for example, the consideration of implementation obstacles, which are often hard to analyze but nonetheless crucial to consider. In the buildings case, institutional questions are explicitly considered as a combination of ex ante implementation challenges, such as interests for or against a policy, and ex post elements such as the availability of required capacity or skills. As Figure 2 demonstrates, by including qualitative analysis on implementation, the results shift considerably - the building energy code policy that fares

Figure 1: Illustrative MCDA results for the cooking sector study

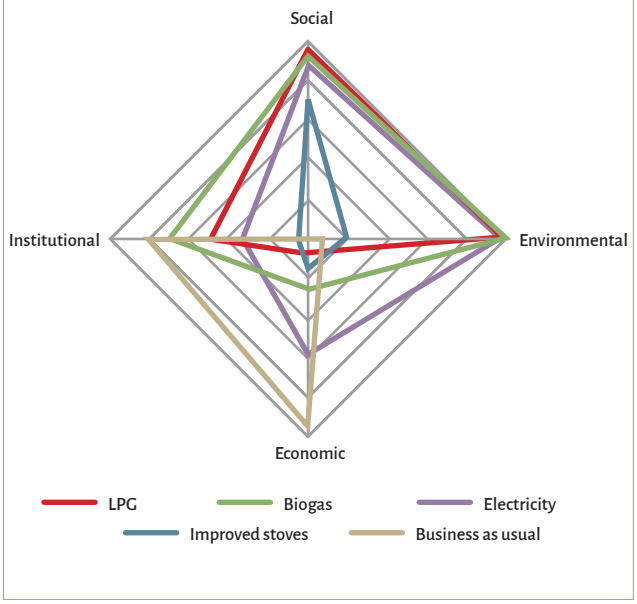


Figure 2: Illustrative MCDA results for the buildings sector study

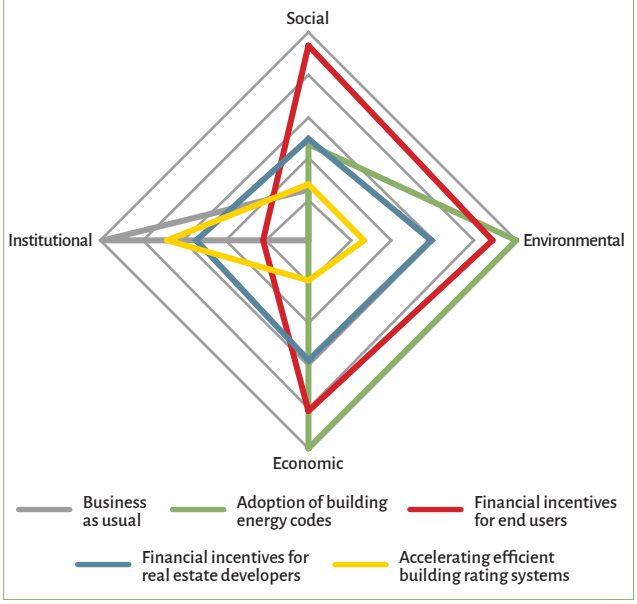
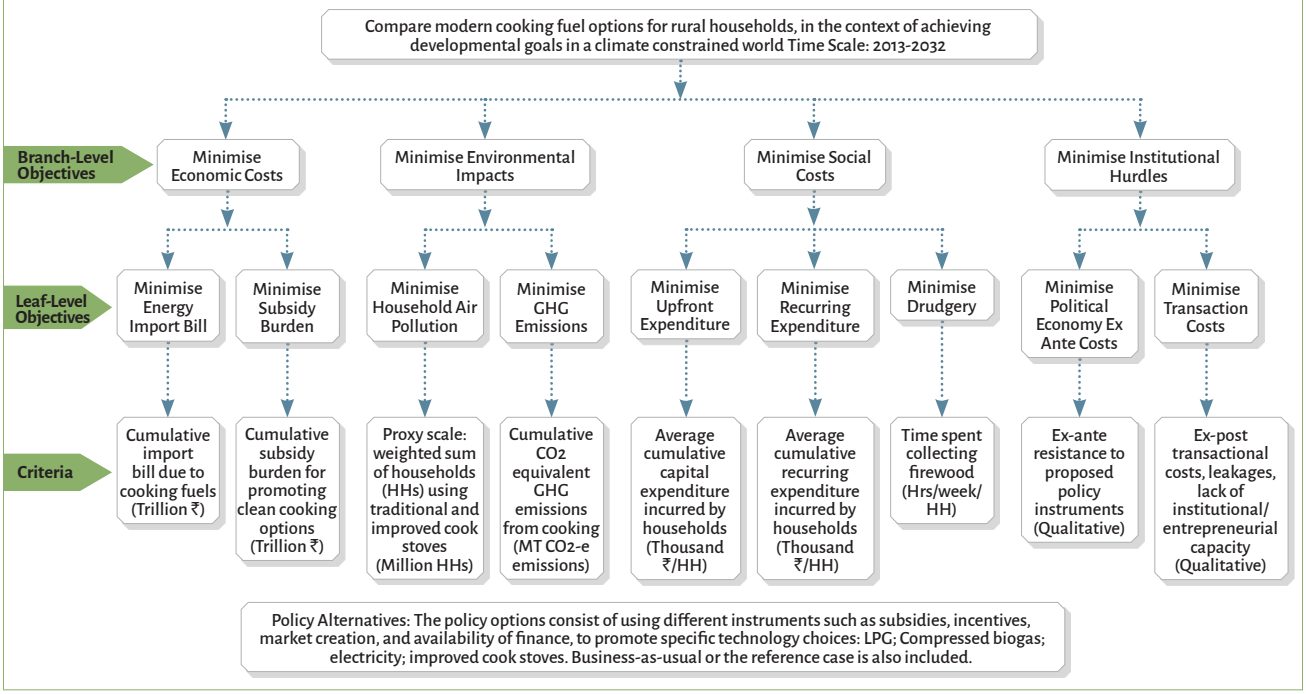


Figure 3: Multiple objectives and policy alternatives for the cooking sector study



best on environmental, social and economic fronts, scores worst on ease of implementation. It thereby brings the attention of policymakers to the institutional trade-offs of this policy option.

Third, given the careful consideration of qualitative information and subjective weighting of objectives, MCDA approaches are necessarily underpinned by an early involvement of stakeholders. These include technical experts, policymakers, industry, end-users and civil society. For example, in the cooking case, to assess the relative importance of limiting drudgery versus other objectives, it is important to understand the preferences of the target cook stove users themselves. This broadening of the information base beyond expert analysis to include relevant stakeholders likely adds to the complexity of the process, but certainly enhances buy-in and enriches the analytical base.

Last, the process of deliberation and repeated iteration involving a wide range of stakeholders improves the sectoral knowledge base. The approach demands an identification of key issues, addition of information and refinement of argument and scores, all of which help plug data gaps to create a robust energy and sustainable development data spine. The buildings example is a case in point, as answering the policy problem requires researching data varying from the upfront investment needed for efficiency, to the local pollution reduced from lower diesel generator use.

Approaching a policy problem in this manner sheds light on the complementarities and tradeoffs between different objectives, which could either lead to clear winners or losers amongst the alternatives being considered. Or, it could facilitate further deliberation on the tradeoffs, and ways to improve the policy alternatives (by piecing together components that do well on many objectives, if possible) to further minimize tradeoffs and identify better policy options.

Key Steps of a MCDA Approach

Step 1: *Define the problem.* Identifies the policy question's scope and time horizon by bringing all stakeholders on board at the start.

Step 2: *Identify policy objectives and specific metrics for assessment.* Requires a clear understanding of national priorities thereby allowing for a greater range of alternatives to be considered.

Step 3: *Identify policy alternatives to evaluate.* Requires consideration of alternative policy approaches and an identification of the metrics for success.

Step 4: *Analyze the alternatives.* Identifies data gaps and provides a transparent basis for discussions.

Step 5: *Elicit stakeholder preferences and normalize quantitative and qualitative information.* Allows qualitative information to be equally integrated with quantitatively determined objectives.

Step 6: *Aggregate through weights and compare consequences.* Captures the interactive effects across policy objectives and the relative importance of the criteria.

Step 7: *Uncertainty and sensitivity analysis.* Tests the robustness of the inputs and the process by identifying any inordinate changes to the results from changing assumptions.

Step 8: *Choose the preferred policy alternative.* Implement the preferred alternative and evaluate results to feed back into the policymaking process.

Conclusion

Development policymaking, which incorporates energy and climate considerations, is a complex undertaking. It involves multiple objectives and various actors operating at different levels of governance. The MCDA approach proposed offers a useful way to work within this complexity, and facilitates a sustainable development approach to energy and climate policy making.

MCDA is particularly suitable in the climate context as it allows policymakers to place relative weights on economic and social development objectives, compared to climate objectives, consistent with India's co-benefits based approach to climate policy. Moreover, it allows transparent assessment of complementarities and tradeoffs across development and climate objectives. While this brief is focused on mitigation, an MCDA approach can be used for a wide range of applications, including adaptation, as well as for other questions of social policy. In the immediate term, using the approach would strengthen coherence between India's domestic and international position on climate change which rests on the principle of not compromising development needs. Further, it can be employed to distinguish between additional climate actions that India could undertake with external aid which fall outside the scope of co-benefits. In the longer term, it can be used for opportune planning purposes that are already in progress, such as India's National Energy Policy, or sectoral feasibility of India's climate commitments.

Ultimately this approach, underpinned by active deliberation, gives rise to decision processes that are participative, transparent and repeatable. Recognizing that MCDA approaches can be time and resource intensive, they are proposed as a starting point for more structured and inclusive policy making – to allow for India's energy and climate actions to be compatible with its broader social, economic and environmental goals.

ENDNOTES

1. Our calculations use a draft version of IESS version 2, made available to us for this analysis. Version 2 of the IESS is now available at indiaenergy.gov.in.

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