

National Plans, Emission Reduction Targets, Energy Security, and the Paris Agreement: *Finding a Sustainable Solution That is Affordable and Reliable*

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“The ultimate objective of all agreements under the [UNFCCC](#) is to stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system, in a time frame which allows ecosystems to adapt naturally and enables sustainable development”.

The [Paris Agreement](#) is a landmark, legally binding international treaty on climate change. Article 4 of the Paris Agreement requires the reduction of GHG emissions, to be made “*on the basis of equity and in the context of sustainable development*”.

Any climate action national plan, policy, or strategy relied on to achieve emission reduction targets must be made in accordance with the Paris Agreement’s binding obligations.

One goal of the UN 2030 Agenda for Sustainable Development is [Sustainable Development Goal 13, “Climate Action”](#) (“SDG 13”). A key target of SDG 13 is to “*Integrate climate change measures into national policies, strategies and planning*”, and to achieve this goal by 2030.

Achieving sustainable development outcomes requires three competing dimensions (or “objectives”) - environmental, economic, and social (including cultural)– to be assessed and balanced equitably. Multi-objective analysis enables a sustainable solution for energy security & climate action to be found.

Multi-objective analysis combined with the application of attributes relevant for the diffusion and adoption of a scientific innovation *e.g., relative*

advantage, complexity, compatibility, trialability and risk are the cornerstones for reaching agreement on a national plan/policy/strategy for a preferred power system that is sustainable, affordable, and reliable.

An Outline of the Multi-Objective Analysis Methodology

Established concepts and principles from conflict resolution and environmental management and protection are the foundation for the methodology adopted by environmental scientists and planners.

Multi-objective analysis determines whether, proposed power system climate action plans to reduce emissions to meet the Paris goals for emission reductions, are in accordance with the concept of sustainable development.

A **scenario** is a hypothetical construction of possible climate action options for a power system that a country plans to undertake to reduce their emissions to meet the Paris Agreement's goals to reduce emissions.

The methodology requires the scenarios to be constructed along a “*continuum of sustainability*” i.e. by varying the mix and proportions of climate action options for each scenario's power system.

Option(s) for reducing emissions that may warrant inclusion for evaluation in a power system mix, could include one or more of the following: -

- ❖ *Replacing coal, gas, and oil-fired power with energy from renewable sources, such as wind or solar*
- ❖ *Ending fossil fuel subsidies*
- ❖ *Clean energy technology*
- ❖ *Carbon capture and storage*
- ❖ *Tidal power*
- ❖ *Alternative fuels such as hydrogen*
- ❖ *Nuclear power, natural gas*
- ❖ *Carbon offsets or carbon credits*
- ❖ *Carbon removal technologies* *to remove CO₂ from the atmosphere and storing it e.g. restoring forests, degraded lands*
- ❖ *A national electric vehicle strategy...*

- *For energy security, construction of national “power system scenarios” could be constructed with only one option to reduce emissions - or a mix of options.*
- ***An innumerable number of scenarios could be constructed. But the methodology requires a finite number of scenarios - with one proviso: All feasible options, from the national perspective to reduce emissions, are to be included in at least one scenario.***
- *Each scenario should be both climate change-effective and cost-effective.*
- ***Technological measures to reduce carbon emissions, where scientific uncertainty exists e.g. Hydrogen, would only be included in a scenario when the uncertainty/environmental risk for their application had been resolved.***
- ***Framing the appropriate multiple objectives for sustainable development- environmental, economic, social (including cultural)** - is crucial for ensuring the multi-objective analysis methodology is an effective decision-making aid for sustainable development.*
- ***To remove any subjectivity in the evaluation of scenarios, the multiple objectives for sustainable development must be able to be measured.***
- *The **multiple objectives** that provide the foundation for evaluating each scenario for its compatibility with sustainable development could be assessed as “**compatible**”, “**non-compatible**”, or “**uncertain**”. Reasons should be given for these conclusions.*
- ***At the outset, it is crucial to ensure that an adequate scientific data and information base is available to evaluate the multiple objectives.***
- *The use of **objective criteria** to evaluate the objectives in each scenario is an essential pre-condition for success. Selection of the criteria is pivotal. **All criteria have equal weight** in the evaluation process.*

- *The same objective criteria are used to evaluate all scenarios. The objective criteria need to be selected based on standards such as: Scientific merit or equity; to be independent of each Paris Agreement Party's will; and to be legitimate and practical standards.*
- *Problems that must be avoided are to use unnecessarily complex objective criteria; or objectives that cannot be measured or quantified; and, of overriding importance, criteria that cannot be evaluated because of the absence of a suitable information base.*

See Appendix 1 for a model template setting out the goal of the multiple dimensions/objectives for sustainable development, and the objective criteria that could be used to evaluate each dimension/objective. Appendix 1 is an example, for the approach required to prepare the framework that underlies the multi-objective analysis methodology.

- *Equity is a binding obligation under the Paris Agreement and a cornerstone for achieving the concept of sustainable development.*
The application of equity requires sustainable outcomes for climate action to reduce emissions, to minimise the extent to which environmental costs and benefits are shared disproportionately between all 193 Parties that have ratified the Paris Agreement.
- *The continuum of scenarios is not fixed - but may change after evaluation commences.*
- *The preferred scenario is one that most effectively balances the multiple and competing objectives for sustainability. It may be one of the original scenarios evaluated.*

In the situation that no single scenario is clearly superior, a new scenario could be constructed based on the best features of one, or more, or all the scenarios evaluated to become the preferred scenario. It must then be evaluated for its compatibility with sustainable development.

Conclusion: The Preferred Scenario ~ A Scientific Innovation *Diffusion and Adoption Concepts as a Decision-Making Aid*

1.0 The approach should be to recognize the *preferred power scenario* for reducing emissions sustainably, as a scientific innovation; and for decision-making on its implementation, to be based on the characteristics (or “attributes”) which are relevant for its *diffusion* (or “spread”) and *adoption* (or “uptake”) of scientific innovations.

Diffusion and adoption concepts

*have been an accepted body of knowledge
in the social sciences for over half a century.*

Characteristics that impact on the spread and uptake, include: -

- **RELATIVE ADVANTAGE:** *Does the preferred power system scenario have a clear advantage over competing scenarios e.g.in terms of climate action effectiveness, reliability, and affordability. Expert opinion suggests that relative advantage is an essential condition absolutely necessary for adoption.*
The impact of costs (both direct and indirect) versus benefits is a relevant consideration as an innovation attribute for adoption.
- **COMPATIBILITY:** *In transitioning to a low or zero carbon economy - from resources to renewables or other energy sources - a mix of mitigation or adaptation measures to achieve an emission reduction target that is compatible with intended industry and community values, norms, and perceived needs is more likely to be readily taken up and to have a significant impact on a decision to adopt.*
- **COMPLEXITY:** *Where the outcome of an emission reduction target is perceived as easy to understand it is more likely to be adopted.”*
To be persuasive, policies on action for climate change need to translate outcomes using language and experiences of everyday life
e.g., By reporting outcomes in terms of the effectiveness of emission reductions to offset a country’s actual contribution to historic global temperature rise for a defined baseline period e.g. 1800-2021.

- **TRIALABILITY:** *The extent to which the operation of the preferred power system scenario has been effectively evaluated, before a commitment to adopt is made, is a key factor determining the likelihood of it being taken up.*
- **RISK:** *If there is a high degree of risk and uncertainty in terms of predictability and dispatchability of energy for the power system scenario, it is less likely to be adopted.*

*“Diffusion and adoption concepts”
should be seen as the source of objective criteria
to enable an effective assessment
of different power system scenarios
in terms of their likelihood for “adoption”.*

In this regard, they are an essential complement to multi-objective analysis.

2.0 *Multi-objective analysis methodology enables a sustainable solution for energy security and climate action to be found. It ensures a national plan, policy, or strategy to reduce emissions has been made “on the basis of equity and in the context of sustainable development” to comply with the Paris Agreement.*

*To read more on Multi-Objective Analysis methodology and sustainable development, click on the following [LINK](#) to the author’s book,
“Finding Solutions for Environmental Conflicts: Power and Negotiation (2008)”
- at Chapter 5, “Sustainability and the Environment”, pp. 105 - 131.*

*A Google search on **Finding Solutions for Environmental Conflicts**
turns up over 300,000,000 results:
The book is at #1, Google p.1*

Appendix 1

The following examples of multiple objectives and objective criteria used to evaluate each scenario for achieving sustainable development, are presented as a guide to facilitate decision-making on these issues in a preparation stage prior to evaluating a national plan, policy, or strategy for each nation.

The objectives and the criteria that were framed, can be modified to apply, as appropriate, to the specific environmental conflict.

The following objectives and criteria listed are based on decisions and recommendations arising from past UNFCCC Conferences and publications.

I Environmental Objectives:

- (a) *Global warming kept to no more than 1.5°C by reducing emissions by 45% by 2030 [and reach net zero by 2050].*
- (b) *The power system is both predictable and dispatchable.*
- (c) ***“Green growth** that is efficient in its use of natural resources, clean in that it minimizes pollution and environmental impacts, and resilient in that it accounts for natural hazards and the role of environmental management and natural capital in preventing physical disasters.”*

II Economic Objectives:

- (a) *Cost-benefit analysis.*
- (b) *To enhance and promote the cost-effectiveness of climate action measures to reduce CO₂ emissions whilst ensuring that these measures do not aggravate existing inequities within and across UNFCCC Parties to the climate treaties.*
- (c) *To develop a strong, growing, and diversified economy together with maintaining and enhancing international competitiveness that enable economic development to proceed in a sustainable manner.*

III Social Objectives:

- (a) *To minimize the extent environmental costs and economic benefits are shared disproportionately between all UNFCCC Parties to the climate treaties.*
- (b) *Ensuring affordability and reliability to offset inequalities in access to energy.*

IV Cultural Objectives:

- (a) *To provide financial and technology capacity-building support for developing countries for preparing their climate action plans to reduce emissions for moving to meet the Paris Agreement's goals for 2030 and 2050 and for achieving sustainable development.*
- (b) *To provide funds for vulnerable developing countries through an "Environmental Performance Bond" to cope or to adapt with any projected risks of climate change. If environmental damages occur, the bond would be used to rehabilitate or repair their environment.*