

Development and assessment tools for LCS policy systems

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Despite a cumulative effort of modeling engineers and policy makers, still there is a gap between modeling and policy making for low-carbon society (LCS). We assumed the gap basically comes from the difference of tight structure of the formal and quantitative models and flexible and more qualitative nature of the actual policy making process.

The objective of this study is to propose a series of tools to fill the gap, namely “LCS Policy Development Tools” (LCS-PDT). LCS-PDT consists of following five tools.

1) Action Breakdown Structure (ABS): Hierarchical structure of LCS policies. It is used to organize a large number of programs while so-called “MECE” criteria is met. The ABS should include all necessary programs to achieve the low-carbon target. In particular, an ABS includes several Actions, an Action includes several Sub-actions, a Sub-action includes several measures and a measure includes several programs. A program should appear only under a measure so that duplication of programs is avoided.

2) Direct contribution analysis: This is the rather primitive method to estimate the contribution of policies to emission reduction. Emission reduction is first allocated to the changes of model parameters (such as energy efficiency) using a decomposition technique and simply attributed to corresponding programs.

3) Action Design Structure Matrix (ADSM): ADSM is a square matrix which has emission reductions, technical parameters, programs and its measurements, and actors for both of the rows and columns elements (“entities”). It shows the mutual relationship of those elements with the size of the relative effect of column elements to row elements.

4) Action ripple diagram (ARIPPLE): ARIPPLE is a tool to calculate the contribution of “entities” to the emission reductions given an ADSM. It can analyse how much of the emission was reduced by an actor or an program, even if the program is an indirect one (such as education) or many actors are involved (R&D by business, subsidy by government, application of the technology by residents).

5) Backcasting Tool (BCT): BCT is a dynamic model to project a roadmap of programs under constraints of time and input resources. It can also estimate the time necessary for discussion and decision making in the government and stakeholders.