

Backcasting Model*: Current Status and Future Activities

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Main objective of the AIM/Backcasting Model (BCM) is to depict a feasible policy and technology roadmaps, optimal CO₂ reduction pathways and energy and infrastructure transition strategies toward a low carbon society in Japan, Asia as well as the globe. Current BCM is similar to the AIM/Enduse model – technology-rich description of energy system and service demands are given and input data for the Enduse Model could use for the BCM without adjusting formats/macros, but optimization technique is different between these models; the Enduse model relies on recursive dynamic optimization approach, in contrast, the BCM is under the inter-temporal optimization approach (or perfect foresight model). In addition, two features have been included only in the BCM: (1) Linearized learning curve and (2) Autonomous market penetration of technologies. So far, the BCM has been applied to the analysis of the feasibility and a roadmap of a low carbon society in Japan by 2050. Examples of specific outputs of the BCM are shown in Figure 1-3 (pick up from our recent journal articles: Ashina et al. (2010, 2012)).

As for the development of the model, three activities have been conducted in recent years: (1) Development of the global BCM based on AIM/Enduse [Global], (2) Analysis of national LCS roadmap in Asia, and (3) Development of subnational scale model. In particular, since national LCS scenarios has been established in several Asian countries, for example, Thailand, India, Indonesia and Malaysia, and some countries started analysis of Enduse model such as Prof. Bundit team, in this year and coming years, the BCM-related research work will focus on national LCS roadmap analysis in Asian countries under the collaboration with our AIM friends.

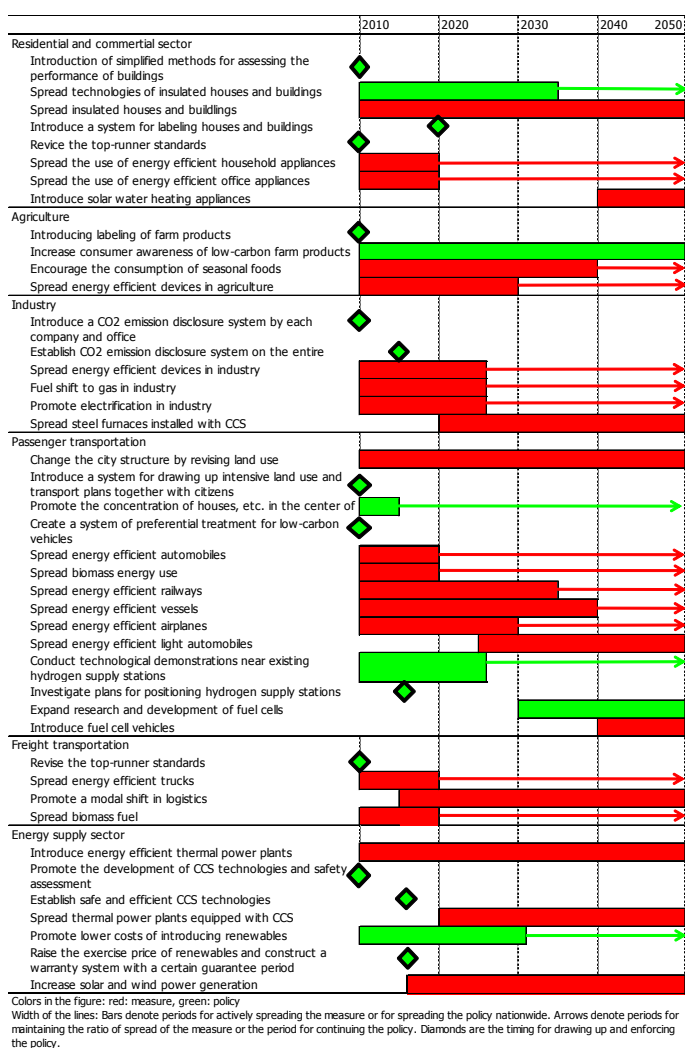


Fig. 1: Example of Output of Gantt Chart

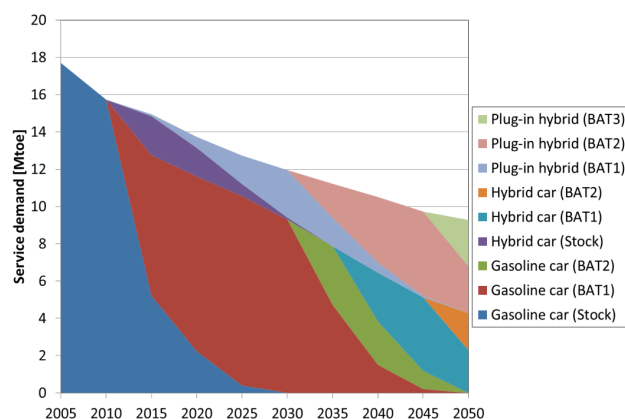


Fig. 2: Example of Technology Diffusion Pattern (Passenger Car) (Note: No share constraint for intermittent years)

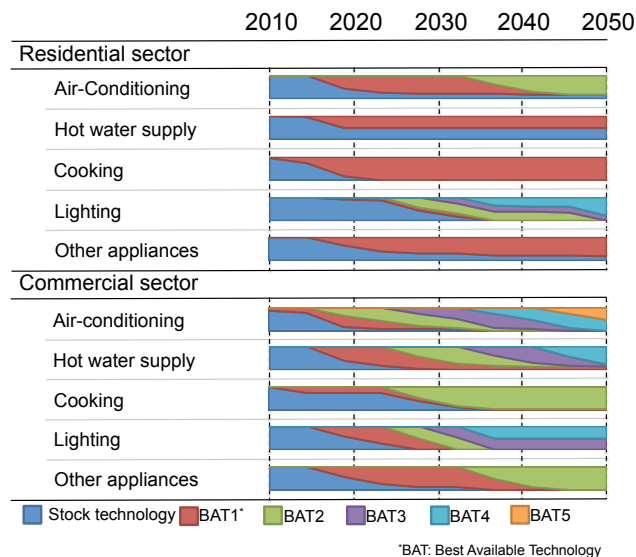


Fig. 3: Example of Technology Roadmap (Res and Com Sector) (Note: No share constraint for intermittent years)

Reference: Ashina et al. (2012) A roadmap towards a low-carbon society in Japan using backcasting methodology: Feasible pathways for achieving an 80% reduction in CO₂ emissions by 2050. Energy Policy, 41, 584-598.

Ashina et al. (2010) Japan roadmaps toward Low-Carbon Society by backcasting: Optimal CO₂ reduction pathways and investment timing for Low-Carbon Technologies. Journal of Renewable and Sustainable Energy, 2, 031001-031017.

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