

Study on economic and environmental evaluation of bioenergy production and biomass utilization society

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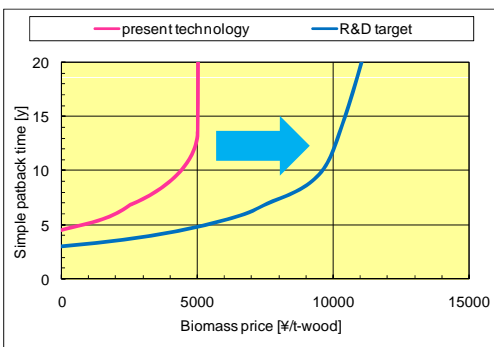
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Summary

- We have studied the economic and environmental evaluation of bioenergy production base on process/system design.
- The economically and environmentally key step/process and technologies could be clarified through sensitivity analysis.
- The simulation results of material and energy balance could be used for Life Cycle Analysis (LCA) as inventory data.
- We have also applied the simulation technology to the estimation of biomass utilization society; construction of a new input-output table in Japan which has biomass utilization sector, and of biomass accounting scheme in local town.

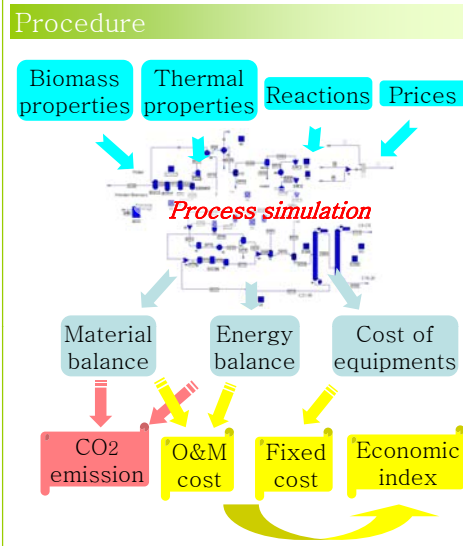
Methodology & Results

Economic analysis of bio-ethanol production plant using present technology or R&D target technology

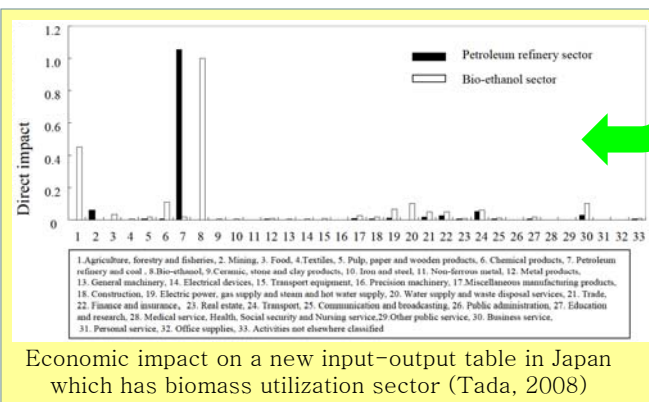
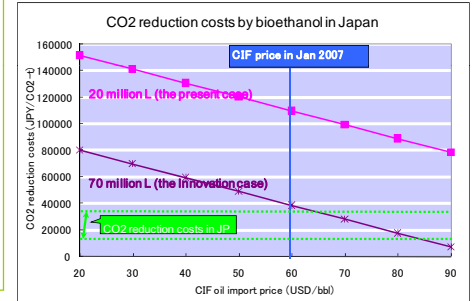
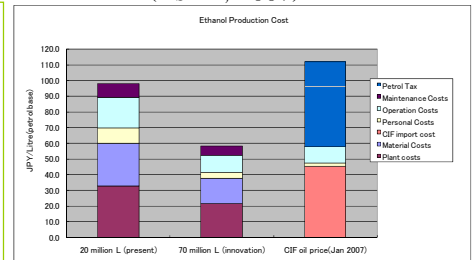


R&D targets were clarified;

- low energy milling treatment,
- low cost enzymatic saccharification,
- xylose fermentation, and so on.



Analysis of production cost and CO₂ mitigation cost of bio-ethanol in Japan (Asano, 2007)



Stock	Economy	Environment		Flow	Economy	Environment			
		land use	Embodied EI			Resource use/production/substitution	Load/Effect		
		(m ²)	Energy (MJ) CO ₂ (kg)			Type	Biomass Other resources	Energy CO ₂	
Activity 1	Total	Breakdown of asset value	Energy and CO ₂ embodied in stock life-cycle	Activity 1	Income	type of material (biomass or other resource) used, produced, or substituted	Used and produced biomass volume	Used and substituted other natural resources	Direct and embodied environmental load/effect
Activity 2	Total	Breakdown of asset value	Energy and CO ₂ embodied in stock life-cycle	Activity 2	Income	type of material (biomass or other resource) used, produced, or substituted	Used and produced biomass volume	Used and substituted other natural resources	Direct and embodied environmental load/effect
Activity 3	Total	Breakdown of asset value	Energy and CO ₂ embodied in stock life-cycle	Activity 3	Income	type of material (biomass or other resource) used, produced, or substituted	Used and produced biomass volume	Used and substituted other natural resources	Direct and embodied environmental load/effect
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The biomass accounting scheme in local town (Bespyatko, 2008)

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