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ANALYZING THE INDUSTRIAL CONTRIBUTION OF HUMAN RESOURCE DEVELOPMENT IN RENEWABLE ENERGY SECTOR USING SUPPLY-SIDE INPUT-OUTPUT MODEL

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Overview

Human resource development in renewable energy sector is important issue in the aspect of securing the national energy security and preparing the base of environment-friendly and sustainable growth. Therefore, it is possible to study the importance of personnel training by quantifying industrial effects in accordance with the shortage of technical personnel in renewable energy. In the study of Davar(1994)[1], it tried to approach to the supply-side input-output model. It has the merit possible to calculate the potential contracting effect when the input factors of production such as the labor, capital and energy were insufficient. The supply-side input-output model was applied to various studies since then. In the study of Bon, R. and T. Yashiro(1996)[2], the value supply shortage was calculated in accordance with the decrease in supply at the steel sector. In the study of Jeong(2006)[3], supply shortage effect of water resources was derived though the model. Psacharopoulos(1996)[4] is the representative study analyzing the shortage in supply of personnel. In this study, Economic loss by labor supply shortage for the renewable energy of major countries (Korea, United States, Japan, United Kingdom, China, Brazil, Taiwan) was estimated by supply-side input-output mode. The data is obtained from the 2007 OECD input-output table. For the positive analysis, it was assumed that all of the countries do not turn out identical number of technical personnel in renewable energy sector.

Methods

Unlike the demand-side input-output model using an input coefficient, the supply-side input-output analysis is the method approaching by using the distribution coefficient. The supply-side model connects gross products between sections with the input of initial factors of production which are input into the input-output system at the initial stage of production. This approach can materialize the model by approaching to it from the aspect of row not by seeing it at the beginning of the column.

The output can be calculated not only in the sum of rows but also in the sum of columns, and W_i is used as the sum of whole factors in the payment column for j section. For example, labor input, governmental service, capital and land are the input factors.

Result

Amount in the economic loss by labor supply shortage by country is represented in Table 1. It was analyzed that the effect of industry was largest in China. Countries whose Economic loss by labor supply shortage is relatively small are United Kingdom, Indonesia and United States. The differences in economic loss by energy type are presented in the figure 1 for the case of Korea. Solar thermal and photovoltaic energy sector was shown the output decrease as 225% and 185%, respectively.

Table. 1. Economic loss by labor supply shortage of major country

Country	Labor supply shortage (A)	Economic loss by Labor supply shortage (B)	Ratio of the loss (%) (B)/(A)*100
United States	1,111	-2,106	190
Korea	1,024	-2,301	225
Japan	1,111	-2,234	201
United Kingdom	1,111	-1,787	161
China	1,111	-2,552	230
Brazil	1,111	-2,476	223
Taiwan	1,110	-2,122	191

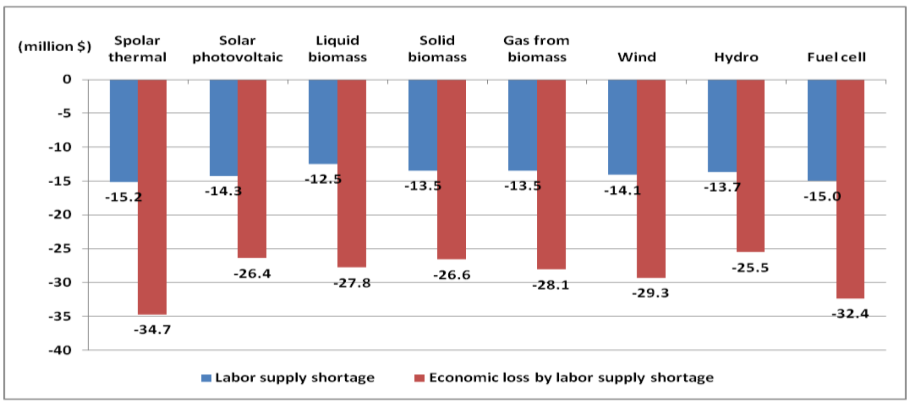

Fig. 1. Economic loss by labor supply shortage of renewable energise

Conclusions

In this study, we tried to conduct a qualification analysis on the industrial total effect in accordance with the shortage of technical personnel for renewable energy by applying the supply-side input-output model. The result of this study can be utilized at the establishment of national renewable energy policies.

Reference

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