CHAPTER 14. NET NATIONAL EMPLOYMENT IMPACTS

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CHAPTER 14. NET NATIONAL EMPLOYMENT IMPACTS

14.1 INTRODUCTION

The Department of Energy (DOE) conducted a net national employment impact analysis for the notice of proposed rulemaking (NOPR). It designed the employment impact analysis to estimate indirect national job creation or elimination resulting from possible standards, due to reallocation of the associated commercial expenditures for purchasing and operating distribution transformers. DOE estimated national impacts on major sectors of the U.S. economy, using publicly available data and incorporating different energy price scenarios.

The net national employment impact analysis did not evaluate direct employment impacts at manufacturers' facilities; DOE considered these impacts in the manufacturer impact analysis (see Chapter 12 of this technical support document).

14.2 ASSUMPTIONS

DOE expects today's distribution transformer energy-efficiency standards to decrease energy consumption, and therefore to reduce energy expenditures. The savings in energy expenditures may be spent on new investment or not at all (i.e., they may remain "saved"). The standards may increase the purchase price of distribution transformers, which includes the retail price plus sales tax, and any increases in installation costs.

Using an input/output econometric model of the U.S. economy, this analysis estimated the year-to-year effect of these expenditure impacts on net economic output and employment. DOE intended this analysis to quantify the indirect employment impacts of reduced expenditures for energy and the reallocation of that money toward other sectors of the economy.

14.3 METHODOLOGY

The Pacific Northwest National Laboratory (PNNL) developed a spreadsheet model for DOE of the U.S. economy (IMBUILD II), focusing on the sectors of the economy most relevant to industrial, commercial, and residential building energy use.[1] PNNL originally developed IMBUILD II as a special-purpose version of the Impact Analysis for Planning (IMPLAN) national input-output model to specifically estimate the employment and income effects of energy-efficiency technologies.[2] IMPLAN is used by more than 1500 clients at all levels of the government, in academia, and in the private sector (http://www.implan.com/references.html). IMBUILD II includes structural coefficients to characterize economic flows among key sectors of the economy and track the inter-industry employment impacts resulting from energy-efficiency standards.

Efficiency standards are represented in IMBUILD II by a combination of capital investments and energy savings. These capital investments and energy savings divert spending away from some business sectors and toward others. Accordingly, IMBUILD II measures the economic effect of a standard as (1) the expansion enjoyed by businesses that receive diverted funds, minus (2) the contraction suffered by businesses that lose diverted funds.

IMBUILD II includes a series of input tables that quantify the size of the capital investments and energy savings resulting from energy-efficiency standards. These tables also designate industrial sectors that manufacture efficient products (e.g., distribution transformers) and other sectors (including utilities) that lose sales as a result of efficiency standards.

In an input/output model, the level of employment in an economy is determined by the relationship of different sectors of the economy and the spending flows among them. Different sectors have different levels of labor intensity, and so changes in the level of spending (e.g., resulting from an efficiency standard) in one sector of the economy will affect flows in other sectors, which affects the overall level of employment. For example, distribution transformer standards may reduce energy expenditures and increase equipment prices in the utility sector and the commercial and industrial sectors. These expenditure changes are likely to reduce employment in these sectors. At the same time, transformer standards may increase commercial and industrial sector investment, and thus increase employment in other sectors of the economy. DOE designed the net employment impact analysis to estimate the year-to-year net employment effect of these different expenditure flows.

IMBUILD calculates the total effect of standards on employment, including job creation or deletion in the manufacturing, commercial, industrial, and retail sectors of the economy, not including transformer manufacturers. Direct employment impacts, i.e., those that would occur at transformer manufacturing plants, are considered separately in the manufacturer impact analysis (Chapter 12).

14.4 RESULTS

Energy-efficiency standards for transformers are expected to reduce electricity bills for commercial and industrial customers, while increasing the costs of transformers. This shift in spending has beneficial implications for net national employment. The electric utility sector is more capital-intensive and less labor-intensive than other sectors. A shift in spending away from payments of electricity bills into other sectors is expected to increase employment. A previous study concluded: "By shifting economic activity away from energy supply and by saving consumers and businesses money that will be re-spent throughout the economy, energy-efficiency improvements will result in a net increase in jobs and personal income."[3] Energy savings from national energy-efficiency standards for transformers are diffuse, spread among all commercial and industrial customers, and small relative to total national expenditures, so employment impacts are small relative to total national employment.

Figures 14.4.1 and 14.4.2 show the estimated net national employment impacts of the six different trial standard levels for the two distribution transformer superclasses: liquid-immersed and dry-type, medium-voltage transformers, respectively. These trial standard levels are presented in greater detail in the descriptions of the analyses of shipments (Chapter 9) and national energy savings and net present value (Chapter 10). The figures show, for any given year, the change in the number of jobs in the economy relative to the number of jobs if there were no change in standards (and thus no resulting change in spending and cash flow patterns throughout the economy). Similarly, Tables 14.4.1 and 14.4.2 show the net national employment impacts of the transformer standards, by standard level, for specified years.

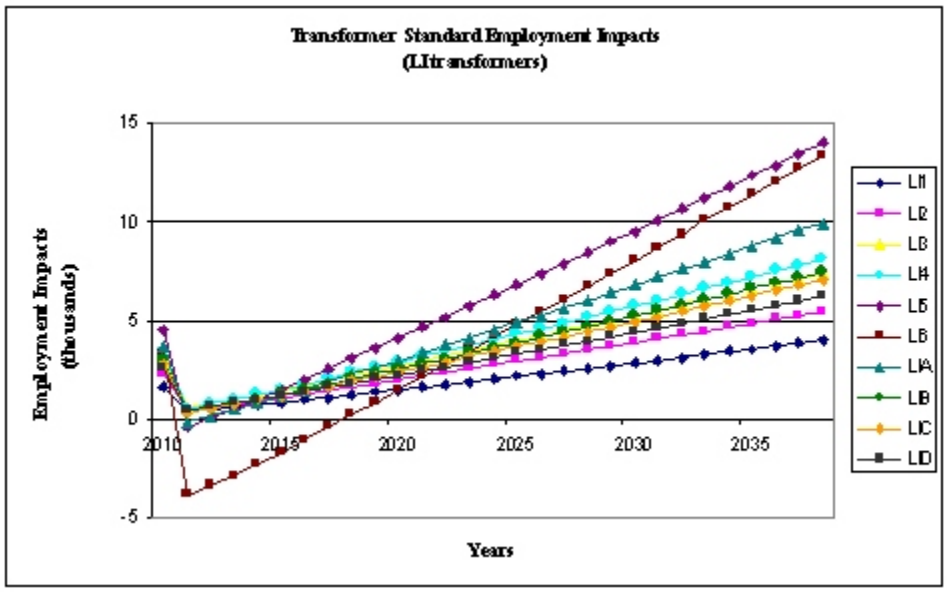

Figure 14.4.1 Employment Impacts: Liquid-Immersed Transformers

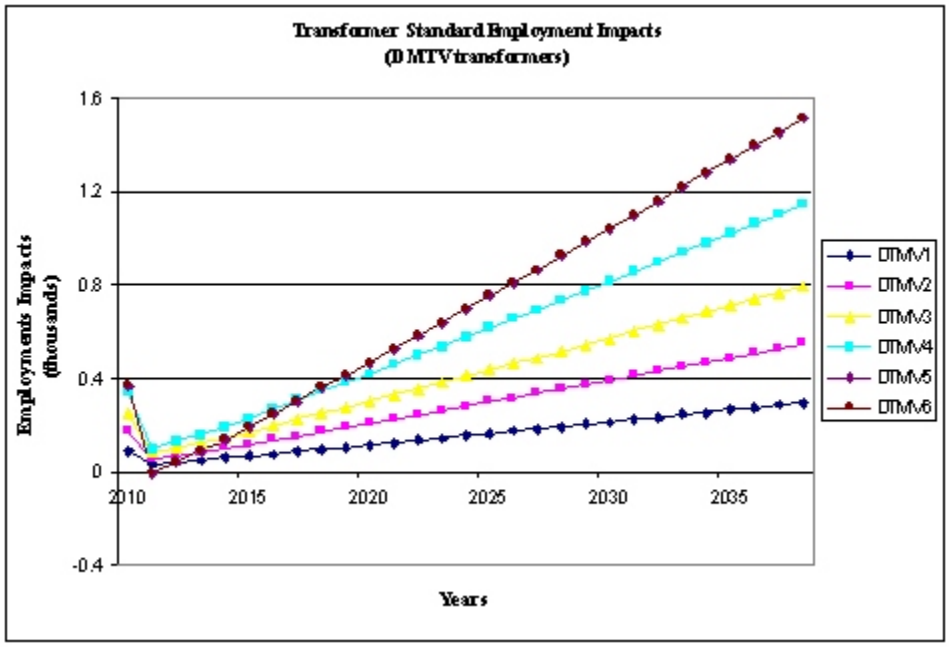

Figure 14.4.2 Employment Impacts: Dry-Type, Medium-Voltage Transformers

Table 14.4.1 Net National Change in Jobs: Liquid-Immersed Transformers

Trial Standard Level	Net National Change in Jobs (in thousands)			
	2010	2020	2030	2038
1	1.7	1.5	2.8	4.0
2	2.3	2.0	3.9	5.4
3	3.2	2.7	5.3	7.4
4	3.4	2.9	5.7	8.1
5	4.5	4.1	9.5	14.0
6	3.3	1.5	8.0	13.4
A	3.7	3.0	6.8	10.0
B	2.9	2.5	5.2	7.4
C	2.8	2.4	4.9	7.0
D	2.5	2.2	4.4	6.2

Table 14.4.2 Net National Change in Jobs: Dry-Type, Medium-Voltage Transformers

Trial Standard Level	Net National Change in Jobs (in thousands)			
	2010	2020	2030	2038
1	0.1	0.1	0.2	0.3
2	0.2	0.2	0.3	0.5
3	0.2	0.3	0.4	0.8
4	0.3	0.4	0.6	1.1
5	0.4	0.5	0.8	1.5
6	0.4	0.5	0.8	1.5

As shown in Figures 14.4.1 and 14.4.2, distribution transformer standards for the two transformer superclasses can have an initial negative impact on jobs starting in year 2011 immediately after the implementation of a standard. This is caused by the shift in spending toward transformer manufacturers. In later years, the standards have a positive impact on jobs, due to the shift in spending away from the electricity sector, with its low employment intensity (jobs per dollar expenditure), and toward other sectors of the economy, with higher employment intensity. The liquid-immersed transformer standard involves relatively high investment expenditures and leads to relatively larger employment impacts, compared to the dry-type, medium-voltage transformer standard.

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