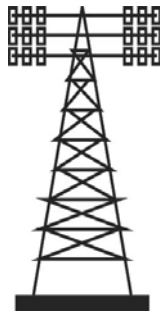


2000 Energy Dollar Flow Analysis for the State of Arizona



Arizona Department of Commerce Energy Office

Education and Community Outreach Programs

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EXECUTIVE SUMMARY

The 2000 Energy Dollar Flow Analysis examines energy consumption and its economic impact on the state of Arizona. This study updates an earlier Arizona Department of Commerce Energy Office report for 1996, and follows the flow of dollars spent for selected energy services by Arizona consumers in 2000; the last year for which relevant data is available, to determine the percentage of those end-users energy expenditures that are not re-circulated (“reinvested”) in the state by energy suppliers.

This report documents that 60.1 percent of the money Arizona residents spent on energy in 2000 – \$5.3 billion – left the state. Compared to the 1996 Analysis, this year’s study shows an \$872 million increase in dollars not reinvested in Arizona. This is due to an increase in economic development, an increase in energy consumption, and population growth. The good news is that the 2000 report shows a 2.6 percent decrease in the outflow of capital since 1996. Arizona businesses, citizens, and industry can stem this exodus of capital by increasing the use of energy efficient technologies and conservation measures, which leads to an increase in the disposable income of hard working Arizona citizens.

Below is 2000 Energy Usage Segmented by Sector

Industry	Not Reinvested	% Not Reinvested
Electricity	\$2,236,006,474	50.5%
Petroleum	\$2,844,014,844	79.0%
Natural Gas	\$305,735,463	50.2%
Coal	-\$15,841,202	-10.3%
Coal Adjustment Factor *	-\$87,616,572	
Total	\$5,282,299,007	60.1%

* Coal Adjustment Factor: A future level of analysis is necessary for an aggregated expenditure estimate, because electric utilities consume coal as a feedstock fuel for electricity generation. To eliminate double counting of coal revenues and purchases between the coal and electric utility sectors, a dollar adjustment factor equivalent to electric utility purchases of in-state coal is applied as a correction.

Published, publicly available data were used to prepare this report and were supplemented with information collected after discussions with accountants and economists from utilities, government agencies, and private companies.

This analysis was conducted by Mark Hope, Energy Economist.

2000 ENERGY DOLLAR FLOW ANALYSIS FOR THE STATE OF ARIZONA

INTRODUCTION

Energy and economic development are very much connected. In Arizona, the Department of Commerce is the lead agency responsible for promoting economic development. An integral part of the agency's mission is the understanding and optimal utilization of all resources available within the state that can benefit the state's economy. Capital is an essential resource for economic development and this report focuses on a potential source of that capital: *energy expenditures*. This report documents the flow of funds spent on energy by end-use consumers in Arizona during 2000, and identifies the portion of those expenditures that are not reinvested, within the state, as local expenditures and investment, state and local taxes, and wages paid. The intent of the analysis is to demonstrate the potential of retaining funds for expenditure or investment in Arizona through a more conscious effort to promote energy efficiency technologies and conservation measures. The percentage of energy expenditures not reinvested in Arizona, as calculated in this report, is not an exact figure. An exact figure can only be calculated through sophisticated models or through detailed audits of the electric utility industry, petroleum industry, natural gas industry, and coal industry records. This analysis is based on publicly available data, supplemented by information from conversations with representatives of the relevant industries, government energy economists, and some educated assumptions about that information.

METHODOLOGY

This report examines four principal energy sources: electricity, petroleum, natural gas, and coal. The base year 2000 was chosen for the analysis, the last year for which most relevant data is available as of this writing. Coal is a part of the energy mix in Arizona, but we were unable to collect the coal industry's data for calendar year 2000, thus we are using data provided in 1996.

The methodology of this analysis is straightforward. Data for the base year were collected concerning the energy expenditures made by Arizona end-use consumers and the allocation of those revenues by energy suppliers to various costs. Assumptions are made as to which costs are reinvested in-state and which costs are not. For example: wages and state and local taxes are considered reinvestments in Arizona. Once state and local costs are allocated and totaled, the balance of the business expenditures can be expressed as a percentage of energy dollars that are not reinvested, leaving the pocketbooks of Arizonans without subsequent economic benefit to the state. The individual industry-sector dollar outflows are then aggregated to determine an overall percentage dollar outflow.

ASSUMPTIONS

Several assumptions were made about the costs incurred by the Arizona energy industries. Because only a small amount of the raw energy resources used for fuel by energy suppliers is produced or refined in Arizona, direct fuel costs represent a major dollar outflow from the state economy. Additionally, it is assumed that most capital expenditures by electric utilities are not reinvested in Arizona, as utility repayment of debt financing of capital equipment purchases flow out-of-state in much the same manner as do dividend payments. Further, it is assumed that such capital expenditures of the electric utilities and coal industry leave the economy because heavy equipment manufacturers serving these industries are not headquartered in Arizona. Relevant in-state capital expenditure data were available for the natural gas industry in 2000, and so are included as a specific line item in this analysis.

Other Assumptions Worth Noting Are:

- Wage and salaries remain in Arizona
- Operating and maintenance expenditures remain in Arizona
- Federal taxes leave Arizona

ELECTRIC INDUSTRY

The electric industry's share of Arizona end-use energy expenditures surveyed was 50.4 percent during 2000. An estimated 50.5 percent of expenditures for electricity by Arizona end-users is not reinvested in the state economy. In order to estimate the percentage of electric expenditures not reinvested, the three largest utility companies were chosen to represent the industry: Arizona Public Service, the Salt River Project, and Tucson Electric Power. In 2000, these three utility companies accounted for 88.5 percent of total electric expenditures by Arizona end-use consumers.

The calculations for the estimate were fairly straightforward. The main sources of information utilized in the calculations were the Federal Energy Regulatory Commission (FERC) Form No. 1, corporate annual reports, and discussions with the three utility accounting departments. Revenue from sales of electricity within Arizona, wage and salary information, as well as maintenance expenses, also came from FERC Form No. 1. Fuels purchased in Arizona, and state and local tax information came from the utility companies' accounting departments. Dividend and bond interest figures were taken from company annual reports. The 2000 Arizona population, from the Census Bureau 2000, is 1.8 percent of the total United States population. Applying that percent to total dividends and total bond interest paid, an estimate for the amount of dividends and bond interest paid to Arizona residents was derived.

Arizona Public Service

Electric Revenues (sales within AZ)	\$1,814,035,000
Wage and Salaries	- \$447,968,812
Maintenance Expense	-\$389,768,816
Fuels Purchased in Arizona	-\$27,437,431
State and Local Taxes	-\$267,080,934
Dividends paid to Arizona residents	-\$8,322,111
Bond interest paid to Arizona residents	<u>-\$2,370,100</u>
\$\$ Not Reinvested In-State	\$671,086,796 =====

Salt River Project

Electric Revenues (sales within AZ)	\$1,439,865,000
Wages and Salaries	-\$273,858,067
Maintenance Expense	-\$134,909,154
Fuels Purchased in Arizona	-\$60,179,141
State and Local Taxes	-\$88,829,180
Dividends paid to Arizona residents	-\$0
Bond interest paid to Arizona residents	<u>-\$2,739,604</u>
\$\$ Not Reinvested In-State	\$879,349,854 =====

Tucson Electric Power

Electric Revenues (sales within AZ)	\$664,646,000
Wages and Salaries	-\$71,570,686
Maintenance Expense	-\$39,700,000
Fuels Purchased in Arizona	-\$0
State and Local Taxes	-\$119,728,829
Dividends paid to Arizona residents	-\$540,000
Bond interest paid to Arizona residents	-\$3,041,078
\$\$ Not Reinvested In-State	\$430,065,407
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Electric Utility Calculations:

Utility	Electricity Revenues*	\$\$ Not Reinvested
Arizona Public Service	\$1,814,035,000	\$671,086,796
Salt River Project	\$1,439,865,000	\$879,349,854
Tucson Electric Power	\$664,646,000	\$430,065,407
Total	\$3,918,546,000	\$1,980,502,057

* Revenues are for in-state sales of electricity only; does not include revenue from sales of electricity out-of-state.

Assumption:

- 1) These three companies represent 88.5% of the total electricity sector in Arizona.
- 2) Percent not reinvested in Arizona by these three companies equals 50.5%.
- 3) The 50.5% ratios were also applied to the remaining electric companies in Arizona which provide 11.5% of the total electricity market.

$$\text{Percent Not Reinvested in Arizona: } \frac{\$1,980,502,057}{\$3,918,546,000} = 50.5\%$$

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$$\text{Total Estimated Revenue for Electricity in Arizona: } \frac{\$3,918,546,000}{.885} = \$4,427,735,593$$

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$$\text{$$ Not Reinvested in Arizona: } \$4,427,735,593 * .505 = \$2,236,006,474$$

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PETROLEUM INDUSTRY

In 2000, 40.9 percent of surveyed energy expenditures in Arizona were for motor gasoline. Based on the information surveyed, an estimated 79.0 percent of each dollar spent on motor gasoline is not reinvested in Arizona. The calculation of this estimate of expenditures leaving Arizona is straightforward. The number of gallons of gasoline consumed in Arizona was supplied by the Arizona Department of Transportation. The Highway Users Federation provided state gasoline tax data (18 cents per gallon). Plus there is a one-cent Arizona state underground storage-tank (UST) tax. Wage and salary data came from the Arizona Department of Economic Security using SIC Code 5541. An average cost per gallon of motor gasoline (\$1.468) was estimated from data available from the Lundberg Survey. The Service Station Dealers of Arizona identified the average total margin per gallon of gasoline (\$.08), representing profits, maintenance, and capital expenses incurred in the marketing of gasoline. A total value of the margin was estimated by multiplying the average margin per gallon by the total number of gallons consumed.

Assumption: 50% of net margin is reinvested in-state; 50% is not.

Petroleum Industry - Motor Gasoline Calculations:

Gallons Consumed	<u>2,451,024,000</u>
Petroleum Revenues (sales within AZ)	\$3,598,103,232
State and Local Taxes	-\$465,694,560
Wages and Salaries	-\$190,352,868
Margin retained in Arizona	<u>-\$98,040,960</u>
\$\$ Not Reinvested In-State	\$2,844,014,844

Percent Not Reinvested In Arizona:	\$2,844,014,844		=	79.0%
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	\$3,598,103,232			

NATURAL GAS INDUSTRY

The natural gas industry accounted for 6.9 percent of Arizona's surveyed end-use energy expenditures in 2000. An estimated 50.2 percent of expenditures for natural gas by Arizona end-users is not reinvested in the Arizona economy.

Only Citizens Utilities and Southwest Gas have been analyzed in this report, as they are currently the two largest natural gas suppliers in Arizona, constituting 97.2 percent of the total dollars spent by Arizona consumers on natural gas services in 2000.

The main source of information utilized in the calculations came from annual reports filed with the Arizona Corporation Commission as well as discussions with the accounting departments of the two natural gas companies. Arizona revenues, wages, and operating and maintenance expenses came from their annual reports. Capital expenditures, state and local taxes, and dividends paid to Arizona residents came from discussions with the natural gas companies' accounting departments.

Assumption: All natural gas is purchased from outside of Arizona.

Citizens Utilities

Gas Revenues (sales within AZ)	\$56,891,263
Wages and Salaries	-\$9,741,032
Operating and Maintenance Expense	-\$15,075,113
Capital Expenditures	-\$22,721,000
State and Local Taxes	-\$5,550,027
Dividends paid to Arizona residents	-\$0
Bond interest paid to Arizona residents	-\$0
\$\$ Not Reinvested In-State	\$3,804,091
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Southwest Gas

Gas Revenues (sales within AZ)	\$535,090,550
Wages and Salaries	-\$65,715,493
Operating and Maintenance Expense	-\$27,293,064
Capital Expenditures	-\$84,623,021
State and Local Taxes	-\$58,235,147
Dividends paid to Arizona residents	-\$5,935,022
Bond interest paid to Arizona residents	-\$0
\$\$ Not Reinvested In-State	\$293,288,803
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Natural Gas Utility Calculations:

Utility	Natural Gas Revenues *	\$\$ Not Reinvested
Citizens Utilities	\$56,891,263	\$3,804,091
Southwest Gas	\$535,090,550	\$293,288,803
Total	\$591,981,813	\$297,092,894

* Revenues are for in-state sales of natural gas only; does not include revenue from sales of natural gas out-of-state.

Assumption:

- 1) These two companies represent 97.2% of the total natural gas sector in Arizona.
- 2) Percent not reinvested in Arizona by these two companies equals 50.2%.
- 3) The 50.2% ratios were also applied to the remaining natural gas companies in Arizona, which provides 2.8% of the total natural gas market.

$$\text{Percent Not Reinvested in Arizona: } \frac{\$297,092,894}{\$591,981,813} = 50.2\%$$

$$\text{Total Estimated Revenue for Natural Gas in Arizona: } \frac{\$591,981,813}{.972} = \$609,034,787$$

$$\text{\$ \$ Not Reinvested in Arizona: } \$609,034,787 * .502 = \underline{\underline{\$305,735,463}}$$

Note: We ignored direct sales to end users, such as mines and power plants, so estimates are somewhat understated. This is not believed to be significant for 2000, but, as Arizona's portfolio of merchant, gas-fired power plants grows, we will have to include direct natural gas purchases by these entities.

COAL INDUSTRY

The coal industry accounted for 1.8 percent of surveyed end-use energy expenditures in Arizona in 2000, based on 1996, the latest available numbers from the coal industry. An estimated 10.3 percent of expenditures for coal is not reinvested in Arizona.

Coal Revenues (sales within AZ)	\$154,284,879
Wages and Salaries	-\$58,194,607
Operating and Maintenance Expense	-\$57,805,572
Royalties Paid to Indian Tribes	-\$34,809,657
State and Local Taxes	-\$19,316,245
\$\$ Not Reinvested In-State	-\$15,841,202

Percent Not Reinvested In Arizona: $\frac{-\$15,841,202}{\$154,284,879} = -10.3\%$ **

** The negative number of **\$15.8** million represents expenditures in Arizona from the coal industry's out-of-state business to fund Arizona's in-state operations. We have no reason to believe that this number has materially changed.

Estimates of Expenditures Leaving Arizona for Fuel Types Surveyed, 2000

Fuel	Total Revenues	\$\$ Not Reinvested	% Not Reinvested
Electricity	\$4,427,735,593	\$2,236,006,474	50.5%
Petroleum	\$3,598,103,232	\$2,844,014,844	79.0%
Natural Gas	\$609,034,787	\$305,735,463	50.2%
Coal*	\$154,284,879	-\$15,841,202	-10.3%
Coal Adjustment Factor**		-\$87,616,572	
Total	\$8,789,158,491	\$5,282,299,007	60.1%

* The negative number of \$15.8 million implies that this amount was spent by the coal industry in Arizona during 1996; but the money was not generated from coal operations in Arizona in 1996.

** Coal Adjustment Factor: A future level of analysis is necessary for an aggregated expenditure estimate because electric utilities consume coal as a feedstock fuel for electricity generation. To eliminate double counting of coal revenues and purchases between the coal and electric utility analysis, a dollar adjustment factor equivalent to electric utility purchases of in-state coal is applied as a correction.

Net Energy Expenditures Not Reinvested In-State:	\$5.3 billion
Percentage of Energy Expenditures Not Reinvested In-State:	60.1%

CONCLUSION

This report quantifies that portion of Arizona's 2000 energy expenditures that flowed out-of-state without subsequent economic benefit. The outflow of \$5.3 billion equates to approximately 3.4 percent, Arizona's gross state product in 2000, underscores Arizona's dependence on other states, and can be viewed as an enormous lost opportunity.

Arizona is not endowed with vast reserves of the fuels examined in this analysis; as a consequence, the state will probably always experience a net outflow of dollars spent for energy services. Reducing this outflow by the cost-effective application of energy conservation and energy efficiency technologies can make funds available for other productive investment in the local economy.

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