



The Economic Contribution of the Navajo Generating Station (NGS) on the City of Page

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By the
**Alliance Bank Business Outreach Center
Northern Arizona University**

Thomas Combrink, M.S., Senior Research Specialist
Ryan Fitch, Ph.D., Research Associate
Wade Rousse, Ph.D., Interim Director
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Executive Summary

The total annual economic contribution of the Navajo Generating Station (NGS) on the City of Page is estimated to be approximately \$51 million.

Payroll, and operations and maintenance are the NGS's direct expenditures, which affect the City of Page. These expenditures are roughly \$34 million.

These direct expenditures lead to approximately \$17 million of induced and indirect economic activity within the City of Page. Of this total, approximately \$5.5 million went to supplementary labor income, and roughly \$11.5 million went to economic value added.

Approximately 147 additional jobs are created in the City of Page due to the economic activity spawned by

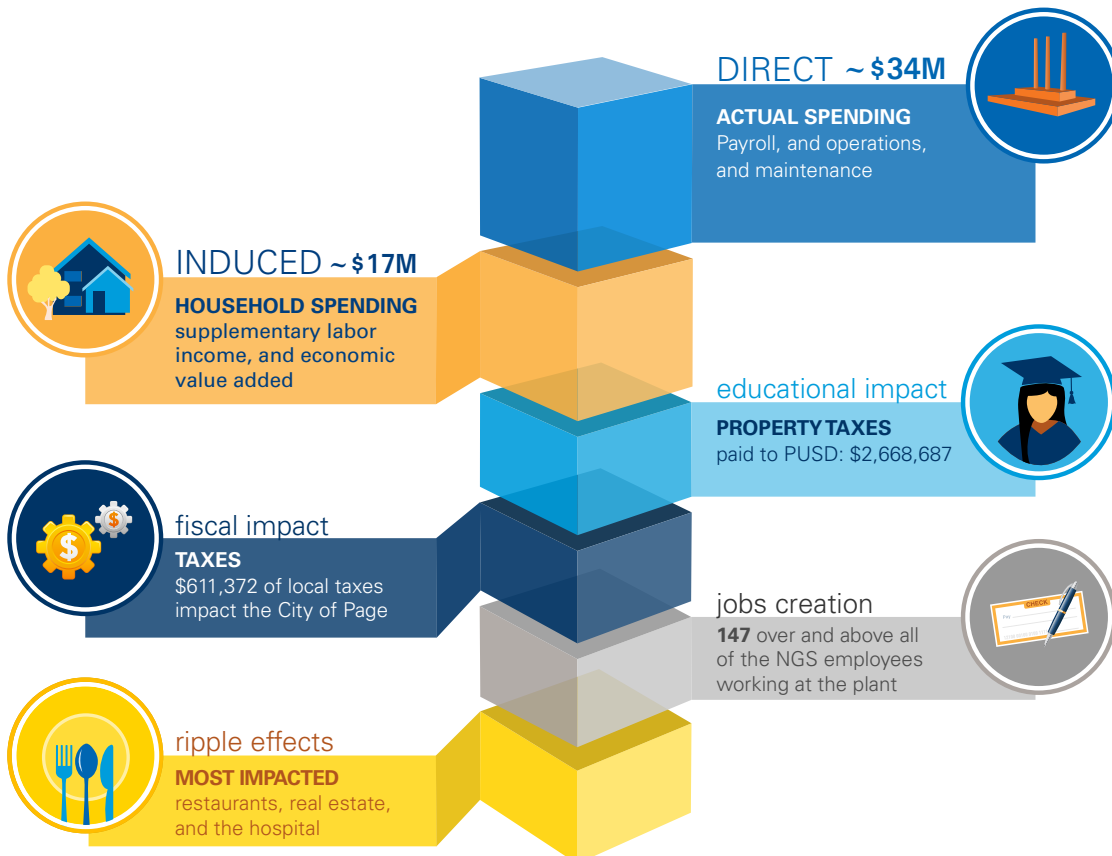
the NGS. *Note:* These jobs are over and above the 266 NGS employees living in the City of Page.

The ripple effects generated by the economic contribution of the NGS, impacts industries throughout the City of Page. Industries most impacted are restaurants, real estate, and the hospital.

The NGS paid approximately \$2.7 million in property taxes to the Page Unified School District (PUSD).

Additional state and local taxes generated through the NGS's economic activity are approximately \$1.7 million. Of this amount, roughly \$611,372 are local taxes directly affecting the City of Page. In addition, roughly \$1.2 million of federal taxes are spawned from the NGS's undertakings.

Total Annual Economic Contribution \$51M



The Economic Contribution of the Navajo Generating Station (NGS) on the City of Page

Introduction

The City of Page is located in northern Arizona, on the southern shores of Lake Powell. The city serves as the employment and retail hub for communities located in northern Arizona and southern Utah. The story of employment in Page is a tale of two economies, one seasonal and one permanent. The seasonal economy is dominated by tourism. Domestic and foreign visitors are attracted to the city and the region by the Lake Powell National Recreation Area, the Colorado River, and the landscape of the Paria Plateau. The tourist season begins in April and runs through November. Winter's arrival brings a slowdown to tourist activities. Seasonal work in the local economy is dominated by the accommodations, recreation, and food service industries, which account for 24% of local employment. Furthermore, retail trade accounts for 13% of Page's employment. The permanent economy, not as affected by seasonality, is comprised of educational services, health care, and social assistance, which makes-up 18% of total employment. Transportation, warehousing, and utilities, account for 8% of all employment, and public administration contributes to 4% of total employment. Altogether,

these five major employment sectors account for two-thirds (66.4%) of all employment in the City of Page.¹ The 8% of employment in transportation, warehousing, and utilities is mostly driven by workers at the Navajo Generating Station (NGS), which is located adjacent to the city. As a result, the plant is a significant contributor to Page's local economy. The NGS provides a relatively constant stream of above average wages and salaries paid to workers employed at the plant.

Salt River Project (SRP) is interested in determining the impact of the NGS on the economy of the City of Page. SRP commissioned two prior studies from Arizona State University's Morrison Institute that examined the impact of the NGS and the Kayenta Mine on the Navajo economy. These studies specifically focused on the tribal communities of northern Arizona, and not the City of Page. Our research is attempting to fill this void.

SRP and the Navajo Nation are currently in negotiations about the future of the NGS. Discussions seem to be revolving around whether to close the plant and rehabilitate that land, or to continue operating until 2020 and to then begin the process of

returning the land to its natural state. Again, this study focuses specifically on the impacts of the NGS (operated by SRP) on the City of Page, and is Part 1 of a much larger proposal to investigate the plants economic contribution to the entire region. The Kayenta mine will be included in the larger (Part 2) analysis, but is not included in Part 1. This study (Part 1) does not consider any activities outside of the area defined by the 86040 Zip Code, which includes the City of Page and Navajo Chapters located in the immediate vicinity.

Methodology

The Impact Analysis for Planning (IMPLAN) model is an input/output software system that generates social accounts and multiplier effects specific to a county within the United States. IMPLAN models are derived from databases of regional data estimates. The regional database information can be amended by end-users; however, a default database is created on a yearly basis by MIG, Inc. for IMPLAN. In our analysis, we were able to input payroll, operations, and maintenance data for the Navajo Generating Station to estimate the overall economic impact to the City of Page, Arizona (zip

code 86040). The default database was used in our estimates, and in order to narrow down the results to such a small geographical area, some crude assumptions had to be made.

In addition to the direct effects of NGS's payroll, other primary impacts of the plant on the City of Page occur at two separate levels. First are the induced effects resulting from plant employees' payroll expenditures in Page. And, the second wave results from the portion of NGS's operating expenses spent on goods and services in Page. In order to properly model, and thus determine the impact of NGS's payroll on the City of Page, it is necessary to divide the employees into four distinct geographical areas. The four groups are as follows:

1. employees living in Page
2. employees living in LeChee
3. employees in the surrounding area
4. employees outside the Page market area.

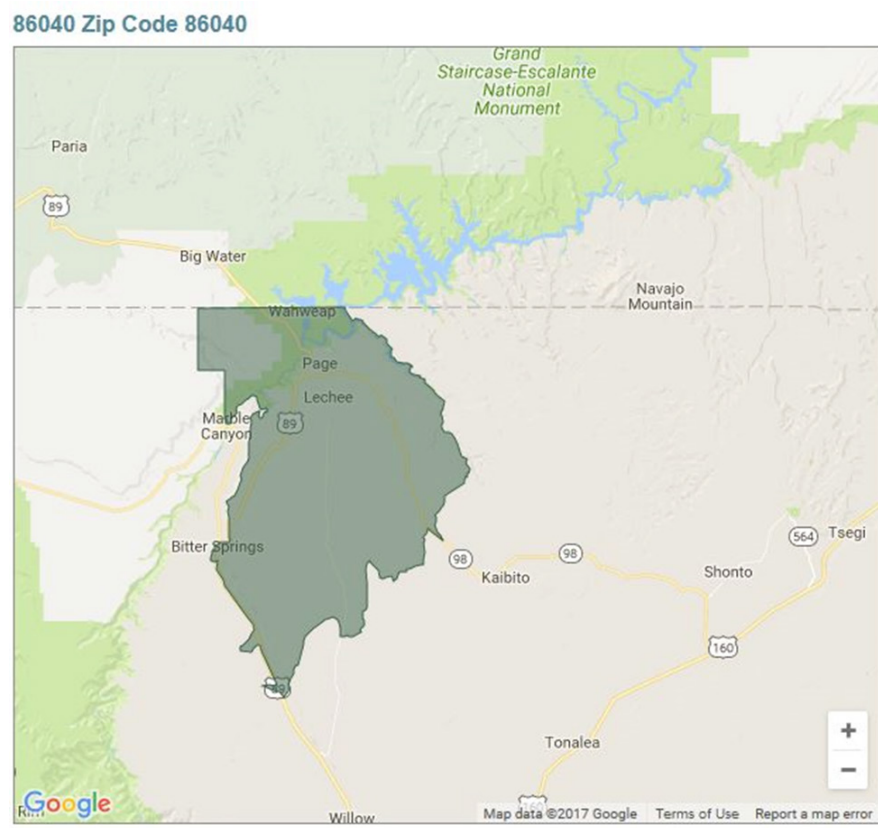
Groups 1 through 3 listed above are included in the modeling process to determine the impact of the NGS on Page. Group 1 consists of employees who have listed addresses in the City of Page. Group 2 are employees living in the Navajo Nation's LeChee Chapter, located adjacent to Page. Group 3 are employees who live in the immediate area. Since the employees located in Group 3 are likely to spend some portion of their household

income in Page, it's prudent to include them in the model. Group 4 encompasses employees who live outside the market area (e.g. in other counties in Utah and New Mexico). These employees are not likely to spend a significant portion of their income within the City of Page, and thus employees in the fourth category are not included when modeling the NGS's economic impact on Page.

When examining the geographical location of NGS's payroll, a total of 395

employees or 84% of the total payroll recipients live within Page, LeChee Chapter, and the "surrounding area." Within the study region, Page accounts for more than two-thirds of all the payroll (67.3%), followed by the surrounding area (19.7%), and the LeChee Chapter (12.9%). The surrounding area was defined by communities within, and neighboring the 86040 zip code. This includes the Navajo Nation Chapters of Big Water, Bitter Springs, Coppermine, Gap, Kaibeto, Marble Canyon, Shonto and Tonalea (Figure 1).

Figure 1. Geographical boundaries of zip code 86040





It was assumed that not all payroll from employees living in the surrounding area would be spent in Page for goods and services. As a conservative estimate, 56% of payroll in the adjacent areas was considered to be spent in Page. This assumption is based on a spending study for the Shaa tohi Artist & Travel Plaza carried out by the Center for American Indian Economic Development (a unit of NAU's Alliance Bank Business Outreach Center) for the Shonto Chapter which found that 56% of the chapter members shopped in Page for goods and services.

In addition to the primary induced effects mentioned above, secondary employment and payroll impacts are also realized in Page when considering the property taxes paid to the Page Unified School District #8, by NGS. And lastly, a further payroll impact on Page results from NGS payments to contract labor. Due to the nomadic nature of contract labor, we assumed 50% of contract labor's payroll is spent in the community.

Therefore, induced impacts of household expenditures in Page are attributable to the following specific effects:

- Employees living in Page
- Employees living in LeChee
- Employees living in the surrounding area
- Page School District payroll from property taxes paid
- NGS contract labor

More local economic activity is initiated when the NGS purchases goods and services within Page. To account for this, all of the NGS expenditures for goods and services within the 86040 zip code were identified from data supplied by SRP. Current study year expenditures (2016) were isolated and assigned to their respective IMPLAN sectors for analysis. In addition, another set of operations expenditures included in this analysis, are the Page Unified School District's payments for operations and maintenance funded by the NGS property taxes. School District operations were allocated to IMPLAN sector 62 (maintenance and repair construction of nonresidential structures). Therefore, the impacts to the local community of NGS's expenditures for goods and services are captured by the following two activities:

- NGS expenditures for goods and services in Page
- Page USD#8 operations expenditures as a percentage of taxes paid to the school district.

Summing up, primary induced payroll impacts for NGS employees living in Page, LeChee Chapter, and the surrounding area were assigned to IMPLAN sector 10005 (Household Income Change, Households 50-70K), while the payroll impacts of Page USD#8 supported by NGS taxes were also assigned to sector 10005.

The induced payroll impact of NGS's Contract Labor were assigned to IMPLAN Sector 10005, and it was adjusted for the underlying assumption that contact labor is temporary, thus only 50% of their compensation is spent in the community. NGS expenditures for goods and services were assigned to IMPLAN sectors 54, 237, 238, 246, 364, 395, 396, 399, 407, 417, 425, 440, 461, 471, 504, 513, 516, based on the best allocation of the expenditures for goods and services purchased. Each level of impact will be enumerated in the following analysis.

Induced payroll impact of NGS

In IMPLAN, induced effects are the response by an economy to an initial change (direct impact), which occurs through re-spending of income. IMPLAN's default multiplier assumes that labor income (employee compensation and proprietor income) has no leakage from the regional economy. This money is recirculated through the household spending patterns causing further local economic activity.

The direct payroll impacts of NGS are incontrovertible, the plant has an employee payroll of \$39.7 million dollars, with 330 hourly and 133 salaried employees. Two-thirds (65.9%) of employees living in Page are hourly workers, with an average annual income of \$74,390, and





34.1% are salaried with annual average income of \$99,923. Overall the average annual income for all NGS employees living in Page is \$86,278. In a similar vein, three-fourths (80.9%) of NGS employees living in LeChee Chapter are hourly workers, with an annual average wages of \$77,028, the remaining 19.1% are salaried with an annual average salary of \$83,900. The overall average annual income for all NGS employees living in LeChee Chapter is \$82,424. Finally, for the surrounding area more than four-fifths (87.5%) of employees are hourly workers with average annual wages of \$70,902, the remainder (12.5%) are salaried employees with annual average salaries of \$96,109. The overall average annual income for all NGS employees living in Page and the surrounding area is \$82,573 (Table 1).

Average payroll impacts were obtained for the three areas by multiplying the number of employees by the respective percentage of hourly or salaried employees and the average wages or salaries. The estimated hourly and salaried payrolls are combined for a total estimated payroll by geographic location. For the sake of presentation, large numerical values are rounded to the nearest tenth of a million within the text of this report. Page, with the largest number of employees (266 employees), has the biggest estimated payroll with \$13 million in hourly wages and \$9.1 million in salary for a total estimated payroll of \$22.1 million. The remaining two areas yield \$4 million in payroll expenditures for LeChee Chapter, and \$3.2 million for the surrounding area. It should be mentioned that the payroll from

the surrounding area has been reduced to 56% of actual payroll estimates to account for the fact that NGS employees living in the surrounding area have alternatives to the City of Page as a place to purchase goods and services (Table 2).

Total estimated payroll was entered into the IMPLAN model for the analysis. No business to business or indirect impacts are calculated by the model since payroll or household income is entirely an induced effect. The household income change is based on a spending pattern of goods and services that each household income group is likely to purchase. A total of \$29.3 million in payroll spent by NGS employees living within the analysis area resulted in a further \$14.8 million of income generated in Page. The

Table 1. Breakdown of wages and salary for the NGS workers living in Page and the immediate vicinity

	Employees	Hourly (%)	Average Annual Wages	Salary (%)	Average Annual Salary	Overall Average Wages/Salary
Page	266	65.9%	\$74,390	34.1%	\$99,923	\$86,278
LeChee	51	80.9%	\$77,028	19.1%	\$83,900	\$82,424
Surrounding Area	78	87.5%	\$70,902	12.5%	\$96,109	\$79,016
Total	395		\$74,107		\$93,311	\$82,573

Table 2. Total estimated payroll by geographic area

	Employees	Hourly (%)	Estimated Hourly Payroll	Salary (%)	Estimated Salaried Payroll	Total Estimated Payroll
Page	266	65.9%	\$13,040,121	34.1%	\$9,063,616	\$22,103,736
LeChee	51	80.9%	\$3,178,098	19.1%	\$817,270	\$3,995,368
Surrounding Area	78	87.5%	\$2,708,874	12.5%	\$524,755	\$3,233,629
Total	395		\$18,927,093		\$10,405,641	\$29,332,733



payroll is recirculated through the household spending patterns causing further local economic activity in Page, until it all exits as leakage. The \$14.8 million total induced impact of payroll is comprised of approximately \$4.0 million in labor income, and \$8.6 million in value added. IMPLAN's definition of "value added" is the difference between an establishment's total output and the cost of its intermediate inputs. Therefore, value added can be loosely interpreted as

the NGS's contribution to local Gross Domestic Product (GDP), or NGS's contribution to the overall wealth of Page's economy. In total, payroll expenditures support an additional 110 jobs in Page (Table 3).

Next, the impact of payroll spending is also shown in the way that payroll expenditures affect other parts of the economy. The impact of NGS's payroll is shown on the top ten industries, sorted by the largest contribution to the value added portion of the Page

economy (Table 4). The top ten industries account for almost three-fifths of employment (57.8%) of the total contribution.

Payroll spending also have fiscal impacts including state, local, and federal taxes. NGS's payroll expenditures resulted in state and local taxes of approximately \$1.5 million, of which \$510,837 are local taxes directly affecting the City of Page. Payroll spending also resulted in roughly \$966,139 in federal taxes (Table 5).

Table 3. Estimated economic contribution of NGS payroll by geographic area

Impact Type	Employment	Labor Income	Value Added	Total Economic Contribution
Page	82.9	\$3,053,081	\$6,483,700	\$11,120,941
LeChee Chapter	15.0	\$551,861	\$1,171,963	\$2,010,169
Surrounding area	12.1	\$446,784	\$948,816	\$1,627,423
Total	110	\$4,051,726	\$8,604,479	\$14,758,533

Table 4. Top Ten Industries affected by NGS payroll

IMPLAN Sector	Description	Employment	Labor Income	Value Added	Economic Contribution
482	Hospitals	6.9	\$602,706	\$674,400	\$1,123,270
395	Wholesale trade	5.2	\$253,605	\$540,368	\$1,011,019
502	Limited-service restaurants	9.8	\$189,225	\$457,540	\$799,049
440	Real estate	7	\$38,228	\$391,956	\$757,438
405	Retail - General merchandise stores	6.6	\$170,412	\$304,407	\$468,971
400	Retail - Food and beverage stores	6.3	\$186,801	\$285,902	\$421,102
501	Full-service restaurants	10	\$248,127	\$267,590	\$493,547
504	Automotive repair and maintenance	3.1	\$153,750	\$186,961	\$290,871
514	Charitable trusts, awarding grants	3.4	\$131,767	\$131,868	\$540,626
503	All other food and drinking places	5.3	\$145,189	\$125,241	\$212,870
Total of Top 10 Industries		63.6	\$2,119,810	\$3,366,233	\$6,118,763



Secondary Induced Payroll Impacts

The previously discussed impacts of the NGS's payroll can be considered the direct, and primary induced effects to the economy of Page. However, these are not all the payroll impacts resulting from the NGS's activity in the local area. There are two other easily identifiable payroll effects. One results from property tax contributions by NGS to the Page Unified School District (PUSD), and the other impact is attributable to a portion of NGS's contract labor payments. Contract labor was not included in the payroll of NGS's employees, which was used to calculate the primary induced payroll impacts in the previous section.

In 2016, NGS paid PUSD \$2,668,687 in property taxes, accounting for 17.6% of the total PUSD budget. If the NGS were to close, we realize state aid would increase to assist in

filling this void. However, this is an economic contribution study, and the current \$2,668,687 property taxes paid by the NGS is contributing to the Page economy. Thus, it is included in the model.

This income was incorporated into the school district budget where we assumed it was allocated according to the categories in the published school budget. In the official budget, salaries and benefits account for 81.1% of the budget, and maintenance and supplies account for the remaining 18.9% of the budget. Applying these proportions to the NGS's school district payment of \$2,668,687 yields \$2,164,652 to salaries and benefits, and \$504,035 to maintenance and supplies. These payroll expenditures were then applied to IMPLAN sector 10005 (Household Income Change, Households 50-70K). The maintenance and supplies

expenditures are used in the examination of operations and maintenance, and this analysis will be presented later in this study.

The payroll expenditures of NGS's Contract Labor were assigned to Sector 5001 (Employee Compensation), and to account for the underlying assumption that contract labor is temporary (i.e. they complete a job or task and travel back to their place of residence or business), it is adjusted to reflect only 50% of the compensation spent in the community. The secondary impacts of sector 5001 are higher than for household income change and, as such, have a greater value added impact (Table 6).

As illustrated in Table 6, secondary payroll impacts are estimated to have created an additional 31 jobs. \$1.2 million in labor income, and approximately \$2.5 million in additional GDP

Table 5. Estimated fiscal impacts of the NGS's payroll expenditures in Page

Taxes	Sales Tax	Property Tax	Other Taxes & Fees	Total
Local taxes	\$135,004	\$290,472	\$85,361	\$510,837
County	\$63,929	\$53,139	\$116,919	\$233,987
State	\$449,860	\$45,663	\$244,206	\$739,728
State & Local totals	\$648,793	\$389,273	\$446,485	\$1,484,552
Federal				\$966,139

Table 6. Estimated secondary payroll impacts from Page School District and the NGS Contract Labor

Impact Type	Employment	Labor Income	Value Added	Total Economic Contribution
Page USD payroll	8.1	\$298,993	\$634,958	\$1,089,090
NGS Contract labor	23.4	\$856,535	\$1,819,657	\$3,116,151
Total	31.5	\$1,155,528	\$2,454,615	\$4,205,241





to the local economy. Payroll spending also resulted in fiscal impacts including local, state, and federal taxes. Payroll spending from PUSD's employees and NGS's contract labor resulted in local and state taxes of roughly \$229,707 of which approximately \$87,636 are local taxes directly

affecting the City of Page. Payroll spending also brought about an estimated \$200,125 in federal taxes (Table 7).

The combined effects of all payroll spending are found in Table 8. Induced impacts from primary and secondary payroll

effects create 141 jobs in the Page area, and has a total economic contribution of approximately \$16.3 million.

The top 11 industries impacted by payroll expenditures are shown in Table 9.

Table 7. Estimated fiscal impacts of Page USD payroll and NGS Contract Labor

Taxes	Sales Tax	Property Tax	Other Taxes & Fees	Total Taxes & Fees
Local taxes	\$26,000	\$55,941	\$5,695	\$87,636
County	\$12,312	\$10,234	\$7,800	\$30,346
State	\$86,638	\$8,794	\$16,293	\$111,724
State & Local totals	\$124,950	\$74,969	\$29,788	\$229,707
Total Federal Tax				\$200,125

Table 8. Estimated combined impacts of primary and secondary induced payroll expenditures on Page

Payroll origination	Employment	Labor Income	Value Added	Total Economic Contribution
Page	82.9	\$3,053,081	\$6,483,700	\$9,536,781
LeChee Chapter	15	\$551,861	\$1,171,963	\$1,723,824
Surrounding area	12.1	\$446,784	\$948,816	\$1,395,600
Page USD payroll	8.1	\$298,993	\$634,958	\$933,951
NGS Contract labor	23.4	\$856,535	\$1,819,657	\$2,676,192
Total	141.5	\$5,207,254	\$11,059,094	\$16,266,348

Table 9. Top industries impacted by payroll expenditures in Page

Total 11 sectors	Description	Employment	Labor Income	Value Added	Economic Contribution
482	Hospitals	8.9	\$774,046	\$866,121	\$1,442,594
395	Wholesale trade	7	\$348,311	\$742,166	\$1,388,575
440	Real estate	10.5	\$57,875	\$593,397	\$1,146,712
502	Limited-service restaurants	12.5	\$239,880	\$580,026	\$1,012,960
513	Charitable trusts, awarding grants	4.7	\$184,563	\$184,704	\$757,240
405	Retail - General merchandise stores	9.1	\$230,391	\$411,544	\$634,026
501	Full-service restaurants	12.6	\$314,979	\$339,686	\$626,522
400	Retail - Food and beverage stores	8.4	\$252,601	\$386,612	\$569,437
504	Automotive repair and maintenance	3.8	\$191,028	\$232,291	\$361,395
503	All other food and drinking places	6.8	\$184,190	\$158,883	\$270,049
480	Home health care services	1	\$40,212	\$32,116	\$42,106
	Top 11 sectors	85.3	\$2,818,076	\$4,527,546	\$8,251,616





Payroll spending also resulted in fiscal impacts including local, state, and federal taxes. Payroll spending from all sources resulted in local and state taxes of approximately \$1.7 million, of which about \$598,473 are local taxes directly affecting the City of Page. This spending also resulted in an estimated \$1.2 million in federal taxes (Table 10).

Operations and Maintenance Impacts

The primary economic impact of NGS on Page is driven by payroll expenditures. However, a smaller, but still meaningful impact of the NGS on Page results from estimating the portion of the NGS's operating and maintenance expenditures occurring within the city.

The vast majority of the NGS's operating and maintenance expenditures are spent outside of Page. Areas located outside of

Page are not part of this study. However, these communities will be accounted for in a much larger research proposal, which will investigate the economic contribution of the NGS in its entirety. A proposal has been submitted to SRP, and it is referred to as Part 2.

Regardless, for this study (Part 1) we must account for the operating expenditures that occur in the Page area. Therefore all expenditures for goods and services within the 86040 zip code were identified from NGS data. These local expenditures for 2016, totaling \$680,461, were isolated and assigned to their respective IMPLAN sectors for the analysis. In addition, a second set of operating expenditures were considered for this analysis. These were the Page Unified School District expenditures for operations and maintenance. The operating expenditures were determined by applying

the relative weights for payroll and operations found in the official 2016 School District budget, to the property tax paid to the school district resulting in expenditures of \$112,944. School District operations were assigned to IMPLAN sector 62 (maintenance and repair construction of nonresidential structures) (Table 11).

The two inputs were run as a single model and their impacts are therefore not differentiated between NGS operations and School District operations. The operations analysis includes both direct effects (expenditures by both the plant and the school district), indirect or business to business transactions within Page, and induced or payroll effects. The expenditures of \$793,405 for operations and maintenance leverage a further \$76,893 as indirect or business to business expenditures, and \$124,258 as

Table 10. Estimated fiscal impacts of all sources of payroll spending in Page

Taxes	Sales Tax	Property Tax	Other Taxes & Fees	Total Taxes & Fees
Local taxes	\$161,004	\$346,413	\$91,056	\$598,473
County	\$76,241	\$63,373	\$124,719	\$264,333
State	\$536,498	\$54,457	\$260,498	\$851,453
State & Local totals	\$773,743	\$464,242	\$476,273	\$1,714,259
Total Federal Tax				\$1,166,264

Table 11. Operations and maintenance expenditures in Page

Description	Expenditures
NGS contracts in Page (1 year)	\$680,461
Page USD#8 Operations/Maintenance	\$112,944
Total	\$793,405





induced or payroll. In total the operations expenditures support 6 jobs in the community (Table 12).

The impacts of NGS's and the School District's operations and maintenance are shown on the top ten industries (Table 13). The top ten industries account

for more than three-fourths of total employment. The largest contribution to the Page's economy in terms of output is for construction (Table 13).

Finally, operations and maintenance spending also resulted in fiscal impacts through

local, state, and federal taxes. Operations spending from all sources resulted in state and local taxes of approximately \$36,338, of which an estimated \$12,899 are local taxes directly affecting the City of Page. This spending also resulted in \$60,511 in federal taxes (Table 14).

Table 12. 2017 annual estimated impacts from operations and maintenance expenditures in Page

Impact Type	Employment	Labor Income	Value Added	Total Economic Contribution
Direct Effect	4.5	\$296,635	\$395,436	\$726,594
Indirect Effect	0.6	\$25,430	\$42,719	\$76,893
Induced Effect	0.9	\$33,942	\$72,678	\$124,258
Total Effect	6.0	\$356,007	\$510,834	\$927,745

Table 13. Top industries annually impacted by operations and maintenance expenditures in Page

Sector	Description	Employment	Labor Income	Value Added	Output
54	Construction of new power and communication structures	2.2	\$83,615	\$145,892	\$264,872
62	Maintenance and repair construction of nonresidential structures	0.8	\$31,694	\$40,408	\$113,445
440	Real estate	0.4	\$1,986	\$20,359	\$39,342
425	Radio and television broadcasting	0.3	\$133,719	\$127,385	\$173,354
407	Retail – Non-store retailers	0.3	\$3,190	\$13,333	\$25,607
471	Waste management and remediation services	0.2	\$25,585	\$29,185	\$49,577
395	Wholesale trade	0.2	\$8,175	\$17,420	\$32,592
461	Management of companies and enterprises	0.1	\$7,250	\$9,254	\$22,365
501	Full-service restaurants	0.1	\$2,360	\$2,545	\$4,695
502	Limited-service restaurants	0.1	\$1,642	\$3,969	\$6,932
	Total	4.7	\$299,216	\$409,750	\$732,781

Table 14. 2017 annual estimated fiscal impacts of operations and maintenance spending in Page

Taxes Operations	Sales Tax	Property Tax	Other Taxes & Fees	Total Taxes & Fees
Local taxes	\$3,539	\$7,615	\$1,744	\$12,899
County	\$1,676	\$1,393	\$2,389	\$5,458
State	\$11,794	\$1,197	\$4,990	\$17,981
State & Local totals	\$17,009	\$10,205	\$9,124	\$36,338
Total Federal Tax				\$60,511





Combined Impacts

As a final point, all impacts are combined including direct, primary, and secondary induced payroll, and operations and maintenance to show the total economic contribution of the NGS on Page. Expenditures from payroll and operations and maintenance totaled \$34.3 million, which leveraged a further \$17.1 (\$5.6 million in labor income and \$11.6 million in value added (Table 15)), for a total economic contribution of \$51.5 million. These expenditures generated an additional 147 jobs in the City of Page.

All of these expenditures resulted in fiscal impacts at the local, state, and federal levels. Total expenditures from all sources

resulted in local and state taxes of approximately \$1.7 million, of which approximately \$611,372 are local taxes directly affecting the City of Page. Federal taxes generated through these expenditures are roughly of \$1.2 million (Table 16).

Conclusion

The total annual economic contribution of the Navajo Generating Station (NGS) on the City of Page is estimated to be \$51,465,728. Considering Page's limited population of approximately 8,000, this figure is significant. Using the \$11,570,094 value added estimate, and the limited population figure, a \$1,446 annual GDP per capita approximation is easily computed.

In terms of employment, the City of Page benefits from induced and indirect effects, which generate an additional 147 jobs in the community. These jobs are over and above the 266 NGS employees living in Page and working at the plant.

According to the U.S. Census Bureau's 2017 Longitudinal-Employer Dynamics Program, there are 2,950 jobs located within the City of Page. Therefore, the 147 jobs represent approximately 5% of Page's total employment.

The ripple effects generated by the economic contribution of the NGS impacts industries throughout the City of Page. In terms of employment, industries most impacted are restaurants, real estate, and the hospital.

Table 15. 2017 annual estimated combined economic impact of NGS on the City of Page

Origin of expenditures	Direct Expenditures	Additional Employment	Additional Labor Income	Value Added	Total Economic Contribution
Page	\$22,103,736	82.9	\$3,053,081	\$6,483,700	\$31,640,517
LeChee Chapter	\$3,995,368	15.0	\$551,861	\$1,171,963	\$5,719,192
Surrounding area	\$3,234,630	12.1	\$446,784	\$948,816	\$4,630,230
Page USD payroll	\$1,089,090	8.1	\$298,993	\$634,958	\$2,023,041
NGS Contract labor	\$3,116,151	23.4	\$856,535	\$1,819,657	\$5,792,343
Operations/Maintenance	\$793,405	6.0	\$356,000	\$511,000	\$1,660,405
Total	\$34,332,380	147.5	\$5,563,254	\$11,570,094	\$51,465,728

Table 16. 2017 annual estimated total fiscal impacts of NGS on Page

Taxes	Sales Tax	Property Tax	Other Taxes & Fees	Total Taxes & Fees
Local taxes	\$164,544	\$354,028	\$92,800	\$611,372
County	\$77,917	\$64,766	\$127,108	\$269,791
State	\$548,292	\$55,654	\$265,489	\$869,434
State & Local totals	\$790,752	\$474,447	\$485,397	\$1,750,597
Total Federal Tax				\$1,226,775





The estimated fiscal impacts generated by the NGS are approximately 1.7 million in state and local taxes, and 1.2 million in federal taxes. Of these amounts, roughly \$611,372 are local taxes directly affecting the City of Page. Given that the City of Page receives approximately \$10 million a year in sales taxes, the \$611,372 estimate represents about 6.1% of that revenue source.

This analysis, and the estimates generated, are Part 1 of a much larger and more complete study. Many of the assumptions made in this first part are crude, but needed when using IMPLAN and attempting to isolate the NGS's economic contribution to a small geographical location – the City of Page. As Part 2 of the study evolves, more data will be obtained and analyzed, the geographic area of interest will be broadened, and some of the unsophisticated assumptions used in Part 1 will be relaxed. As these assumptions are relaxed, a detailed and complete picture of the Navajo Generating Station's entire economic contribution will become more evident.

Sources

¹U.S. Census Bureau; American Community Survey, 2011-2015 American Community Survey 5-Year Estimates, Table B19001 B19051 B19055 B19059 B19056 B19057 B22001 B19013 B19025 B19061 B19065 B19069 B19066 B19067; generated by Thomas Combrink; using American FactFinder; (5 June 2017)





Photo taken by Wolfgang Moroder.