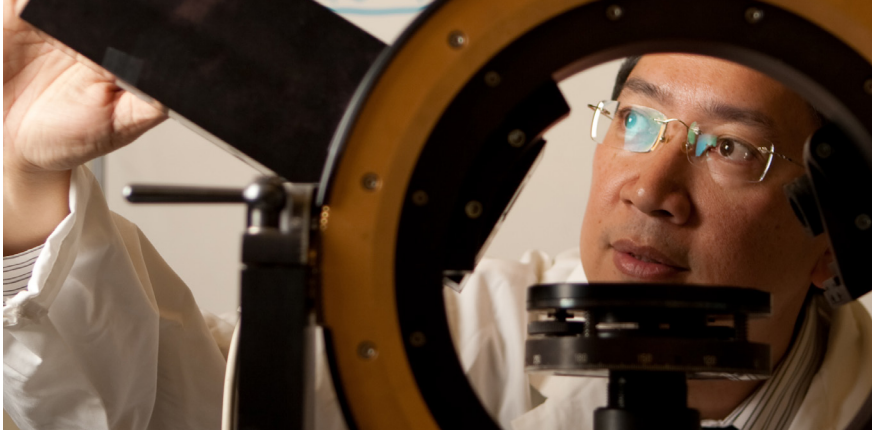




# The Economic Value of UH Energy on the Greater Houston Region

Executive Summary



**UH** Energy is an enterprise that positions the University of Houston as a strategic partner for the energy industry. UH Energy produces not only a trained workforce, but also the research and developments needed for innovations and new technologies in the field. The enterprise plays a key role in helping students increase their employability and achieve their individual potential. It facilitates new research and company developments and also draws students to the region, generating new dollars and opportunities for the Greater Houston Region. UH Energy provides students with the education, training, and skills they need to have fulfilling and prosperous careers in energy. Furthermore, UH Energy is a place for students to meet new people, increase their self-confidence, and promote their overall health and well-being.

UH Energy influences both the lives of its students and the regional economy. The enterprise supports a variety of industries in the Greater Houston Region,<sup>1</sup> serves regional businesses, and benefits society as a whole in Texas from an expanded economy and improved quality of life. The benefits created by UH Energy extend to the state and local government through increased tax revenues and public sector savings.

This study measures the economic impacts created by UH Energy on the business community and the benefits the enterprise generates in return for the investments made by its key stakeholder groups—students, taxpayers, and society. The following two analyses are presented:



### Economic impact analysis



### Investment analysis

All results reflect employee, student, and financial data, provided by UH, for fiscal year (FY) 2017-18. Impacts on the Greater Houston Region economy are reported under the economic impact analysis and are measured in terms of added income. The returns on investment to students, taxpayers, and society in Texas are reported under the investment analysis.

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*The value of UH Energy influences both the **lives of its students** and the **regional economy**.*

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<sup>1</sup> For the purposes of this analysis, the Greater Houston Region is comprised of Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties.



# Economic impact analysis



UH Energy promotes economic growth in the Greater Houston Region through its direct expenditures and the resulting expenditures of students and regional businesses. UH Energy serves as an employer and buyer of goods and services for its day-to-day and research operations. Numerous start-up companies have formed as a result of programs and knowledge at UH Energy. The enterprise's reputation and activities attract students from outside the Greater Houston Region, whose expenditures benefit regional vendors. In addition, UH Energy is a primary source of higher education to the Greater Houston Region residents wanting to enter the energy field and a supplier of trained workers to regional energy industries, enhancing overall productivity in the regional workforce.

## Operations Spending Impact



UH Energy adds economic value to the Greater Houston Region as an employer of regional residents and a large-scale buyer of goods and services. In FY 2017-18, the enterprise employed 1,385 full-time and part-time faculty and staff (not including research employees), 97% of whom lived in the Greater Houston Region. Total payroll at UH Energy was \$146.2 million (excluding payroll from research employees), much of which was spent in the region for groceries, mortgage and rent payments, dining out, and other household expenses. In addition, the enterprise spent \$94.1 million on day-to-day expenses related to facilities, supplies, and professional services (excluding research expenditures).

UH Energy's day-to-day operations spending added \$219.7 million in income to the region during the analysis year. This figure represents the enterprise's payroll, the multiplier effects generated by the in-region spending of the enterprise and its employees, and a downward adjustment to account for funding that the enterprise received from regional sources. The \$219.7 million in added income is equivalent to supporting 2,217 jobs in the region.

IMPACTS CREATED BY UH  
IN FY 2017-18



**\$219.7 million**

Operations Spending Impact



**\$38.3 million**

Research Spending Impact



**\$29.3 million**

Construction Spending Impact



**\$8.9 million**

Start-up Company Impact



**\$54.6 million**

Student Spending Impact



**\$1.3 billion**

Alumni Impact



**\$1.6 billion**

**TOTAL IMPACT**

- OR -

**13,878**

**JOBS SUPPORTED**

## Research Spending Impact



Research activities impact the economy by employing people and requiring the purchase of equipment and other supplies and services. In FY 2017-18, UH Energy spent \$17.6 million on payroll to support research activities. This, along with \$15.8 million in other research spending, created a net total of \$38.3 million in added income for the regional economy. This added income is equivalent to supporting 398 jobs.

## Construction Spending Impact



UH Energy commissioned contractors to build or renovate its facilities in FY 2017-18. The quick infusion of income and jobs that occurred in the regional economy as a result of this construction spending is considered short-term due to the one-time nature of such projects. Nonetheless, the enterprise's construction spending had a positive impact on the regional economy in FY 2017-18, equal to \$29.3 million in added income and equivalent to supporting 395 jobs.

## Start-up Company Impact



UH Energy creates an exceptional environment that fosters innovation and entrepreneurship, evidenced by the number of UH Energy start-up companies created in the region. Start-up companies are created to license and commercialize UH Energy technology or knowledge. In FY 2017-18, UH Energy start-up companies added \$8.9 million in income to the Greater Houston Region economy, which is equivalent to supporting 38 jobs.

## Student Spending impact



Around 21% of students attending UH Energy originated from outside the region in FY 2017-18, and some of these students relocated to the Greater Houston Region to attend UH Energy. These students may not have come to the region if UH Energy did not exist. In addition, some in-region students, referred to as retained students, would have left the Greater Houston Region if not for the existence of UH Energy. While attending UH Energy, these relocated and retained students spent money on groceries, accommodation, transportation, and other household expenses. This spending generated \$54.6 million in added income for the regional economy in FY 2017-18, which supported 1,265 jobs in the Greater Houston Region.

## Alumni Impact



The education and training UH Energy provides for regional residents has the greatest impact. Since its establishment, students have studied at UH Energy and entered the regional workforce with greater knowledge and new skills. Today, thousands of former UH Energy students are employed in the Greater Houston Region. As a result of their UH Energy educations, the students receive higher earnings and increase the productivity



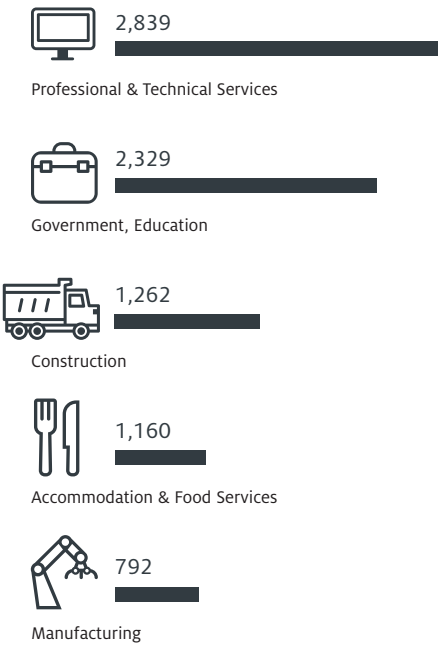
of the businesses that employ them. In FY 2017-18, UH Energy alumni generated \$1.3 billion in added income for the regional economy, which is equivalent to supporting 9,565 jobs.

Total Impact

UH Energy added \$1.6 billion in income to the Greater Houston Region economy during the analysis year, equal to the sum of the operations, research, construction, start-up company, student spending, and alumni impacts.

UH Energy’s total impact can also be expressed in terms of jobs supported. The \$1.6 billion impact supported 13,878 regional jobs, using the jobs-to-sales ratios specific to each industry in the region. In addition, the \$1.6 billion, or 13,878 supported jobs, impacted regional industries in different ways. UH Energy supported the most jobs in the Professional & Technical Services industry sector – supporting 2,839 jobs in FY 2017-18. These are impacts that would not have been generated without the enterprise’s presence in the Greater Houston Region.

TOP INDUSTRIES IMPACTED BY  
UH ENERGY (JOBS SUPPORTED)





# Investment Analysis

An investment analysis evaluates the costs associated with a proposed venture against its expected benefits. If the benefits outweigh the costs, then the investment is financially worthwhile. The analysis presented here considers UH Energy as an investment from the perspectives of students, taxpayers, and society in Texas.

## Student perspective



In FY 2017-18, UH Energy served 14,578 credit students. In order to attend UH Energy, the students paid for tuition, fees, books, and supplies. They also took out loans and will incur interest on those loans. Additionally, students gave up money they would have otherwise earned had they been working instead of attending college. The total investment made by UH Energy's students in FY 2017-18 amounted to a present value of \$358 million, equal to \$124.3 million in out-of-pocket expenses (including future principal and interest on student loans) and \$233.6 million in forgone time and money.

In return for their investment, UH Energy's students will receive a stream of higher future earnings that will continue to grow throughout their working lives. For example, the average UH Energy bachelor's degree graduate from FY 2017-18 will see an increase in earnings of \$49,100 each year compared to a person with a high school diploma or equivalent working in Texas. During a working lifetime, the benefits of the bachelor's degree over a high school diploma will amount to an undiscounted value of \$2.2 million in higher earnings per graduate. Altogether, UH Energy's FY 2017-18 students will receive \$1.6 billion in higher future earnings during their working lives, as a result of their education and training at UH Energy.

The students' benefit-cost ratio is 4.5. In other words, for every dollar students invest in UH Energy, in the form of out-of-pocket expenses and forgone time and money, they will receive a cumulative value of \$4.50 in higher future earnings. Annually, the students' investment

STUDENTS SEE A HIGH  
RATE OF RETURN FOR THEIR INVESTMENT  
IN UH ENERGY.



15.7%

Average annual return for  
UH Energy students



10.1%

Stock market 30-year  
average annual return

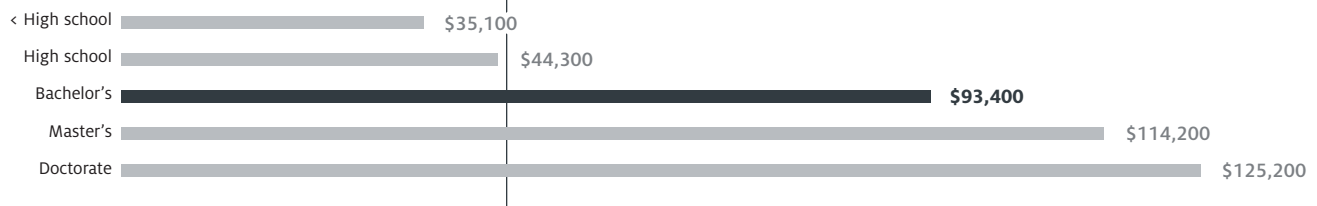


0.8%

Interest earned on savings account  
(National Rate Cap)

Source: Forbes' S&P 500, 1987-2016. FDIC.gov, 7-2016.

The average bachelor's degree graduate from UH Energy will see an increase in earnings of **\$49,100** each year compared to a person with a high school diploma or equivalent working in Texas.



Source: Emsi complete employment data.

in UH Energy has an average annual internal rate of return of 15.7%, which is impressive compared to the U.S. stock market's 30-year average rate of return of 10.1%.

Taxpayer perspective



UH Energy generates more in tax revenue than it takes. These benefits to taxpayers consist primarily of taxes that the state and local government will collect from the added revenue created in the state. As UH Energy students will earn more, they will make higher tax payments throughout their working lives. Students' employers will also make higher tax payments as they increase their output and purchases of goods and services. By the end of the FY 2017-18 students' working lives, the state and local government will have collected a present value of \$518.2 million in added taxes.

Benefits to taxpayers will also consist of savings generated by the improved lifestyles of UH Energy students and the corresponding reduced government services. Education is statistically correlated with a variety of lifestyle changes. Students' UH Energy educations will generate savings in three main categories: 1) health care, 2) crime, and 3) income assistance. Improved health will lower students' demand for national health care services. In addition, students will be less likely to interact with the criminal justice system, resulting in a reduced demand for law enforcement and victim costs. UH Energy students will be more employable, so their reduced demand for income assistance such as welfare and unemployment benefits will benefit taxpayers. Altogether, the present value of the benefits associated with a UH Energy education will generate \$72.4 million in savings to state and local taxpayers.

Total taxpayer benefits amount to \$590.5 million, the present value sum of the added taxes and public sector savings.

Taxpayer costs are \$83.8 million, equal to the amount of state and local government funding UH Energy received in FY 2017-18. These benefits and costs yield a benefit-cost ratio of 7.0. This means that for every dollar of public money invested in UH Energy in FY 2017-18, taxpayers will receive a cumulative value of \$7.00 during the course of the students' working lives. The average annual internal rate of return for taxpayers is 15.6%, which compares favorably to other long-term investments in the public and private sectors.

Social perspective



Society as a whole in Texas benefits from the presence of UH Energy in two major ways. Primarily, society benefits from an increased economic base in the

*For every dollar of public money invested in UH Energy, taxpayers will receive a cumulative value of **\$7.00** during the course of the students' working lives.*



STUDENT PERSPECTIVE

\$1.6 billion  
Present value benefits

\$358 million  
Present value costs

\$1.2 billion  
Net present value

Benefit-cost Ratio	Rate of Return
4.5	15.7%



TAXPAYER PERSPECTIVE

\$590.5 million  
Present value benefits

\$83.8 million  
Present value costs

\$506.8 million  
Net present value

Benefit-cost Ratio	Rate of Return
7.0	15.6%



SOCIAL PERSPECTIVE

\$8.5 billion  
Present value benefits

\$605.2 million  
Present value costs

\$7.9 billion  
Net present value

Benefit-cost Ratio	Rate of Return
14.1	n/a*

\* The rate of return is not reported for the social perspective because the beneficiaries of the investment are not necessarily the same as the original investors.

state. This is attributed to higher student earnings and increased business output, which raise economic prosperity in Texas.

Benefits to society also consist of the savings generated by the improved lifestyles of UH Energy students. As discussed in the previous section, education is statistically correlated with a variety of lifestyle changes that generate social savings. Note that these costs are avoided by the consumers but are distinct from the costs avoided by the taxpayers outlined above. Health care savings include avoided medical costs associated with smoking, alcohol dependence, obesity, drug abuse, and depression. Savings related to crime include reduced security expenditures and insurance administration, lower victim costs, and reduced expenditures by the criminal justice system. Income assistance savings include reduced welfare and unemployment claims.

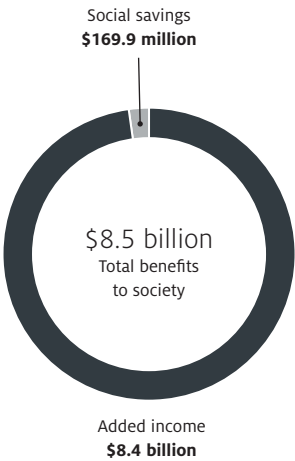
Altogether, the social benefits of UH Energy equal a present value of \$8.5 billion. These benefits include \$8.4 billion in added income through students’ increased lifetime earnings and increased business output, as well as \$169.9 million in social savings related to health, crime, and income assistance in Texas. People in Texas invested a present value total of \$605.2 million in UH Energy in FY 2017-18. The cost includes all the enterprise and student costs.

The benefit-cost ratio for society is 14.1, equal to the \$8.5 billion in benefits divided by the \$605.2 million in costs. In other words, for every dollar invested in UH Energy, people in Texas will receive a cumulative value of \$14.10 in benefits. The benefits of this investment will occur for as long as UH Energy’s FY 2017-18 students remain employed in the state workforce.

Summary of investment analysis results

The results of the analysis demonstrate that UH Energy is a strong investment for all three major stakeholder groups—students, taxpayers, and society. As shown, students receive a great return for their investments in a UH Energy education. At the same time, taxpayers’ investment in UH Energy returns more to government budgets than it costs and creates a wide range of social benefits throughout Texas.

SOCIAL BENEFITS IN TEXAS FROM UH ENERGY





# Conclusion

The results of this study demonstrate that UH Energy creates value from multiple perspectives. The enterprise benefits regional businesses by increasing consumer spending in the region and supplying a steady flow of qualified, trained professionals to the workforce. UH Energy enriches the lives of students by raising their lifetime earnings and helping them achieve their individual potential. The enterprise benefits state and local taxpayers through increased tax receipts and a reduced demand for government-supported social services. Finally, UH Energy benefits society as a whole in Texas by creating a more prosperous economy and generating a variety of savings through the improved lifestyles of students.

## About the Study

Data and assumptions used in the study are based on several sources, including the FY 2017-18 academic and financial reports from UH Energy, industry and employment data from the U.S. Bureau of Labor Statistics and U.S. Census Bureau, outputs of Emsi's Multi-Regional Social Accounting Matrix model, and a variety of studies and surveys relating education to social behavior. The study applies a conservative methodology and follows standard practice using only the most recognized indicators of economic impact and investment effectiveness. For a full description of the data and approach used in the study, please contact the university for a copy of the main report written for the economic value of the entire university.

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*The results of this study demonstrate that UH Energy creates value from*  
**multiple perspectives.**

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