

# The Economic Impact of the Northern Arizona

## Center for Emerging Technologies



### The Arizona Rural Policy Institute

A Unit of the Center for Business Outreach

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## Introduction

The Arizona Rural Policy Institute at the W. A. Franke College of Business at Northern Arizona University was retained to conduct an economic impact analysis of the Northern Arizona Center for Emerging Technologies (NACET). NACET is a high-tech business incubator funded by the City of Flagstaff and a broad selection of public and private enterprises in an attempt to help diversify the economy and create high-quality jobs in Flagstaff.

Business incubators are a tool many communities use to encourage business growth and survival. Incubators are typically locally-based institutions that provide shared physical space and business support services to new and developing firms. The founding principle of business incubators is to encourage the creation of income and jobs within the local community. They also create linkages among firms inside and outside the local economy. Research by Markley and McNamara (1995) has shown that the costs of creating jobs and income through incubators are competitive with those associated with attracting manufacturing investment from outside the local community. Markley and McNamara argue that incubators can have an impact on communities that are not well-positioned to attract external investment due to their location or a lack of a manufacturing base.

Incubators offer start-up firms and other newly-formed enterprises numerous tangible and intangible benefits in an effort to foster economic growth and success. Tangible services provided by many incubators lower operating costs through the provision of flexible, sub-market rental space and shared administrative services (Beyers and Nelson, 1998). In the case of NACET, office and lab space is available at prices comparable to market rates, in addition to the incubation services. Intangible benefits include services such as moral support, networking opportunities, and access to professional advice and information (Beyers and Nelson, 1998).

According to McKinnon and Hayhow, incubators may be classified into the following types: (a) mixed-use, (b) manufacturing, (c) technology, (d) service, (e) empowerment, and (f) targeted. Mixed-use incubators support firms from a variety of different industry segments. Firms in these incubators do not fall into a single industry niche. Manufacturing, technology, and service incubators on the other hand, focus exclusively on firms operating within the manufacturing, service, and technology sectors. Empowerment incubators (also known as microenterprise

incubators) concentrate on firms in economically-distressed areas with the goal of stimulating local economic activity. Finally, targeted incubators are defined as incubators that focus exclusively on an industry niche such as retail. NACET by definition is a technology incubator focusing on new technologies related primarily to energy and biosciences.

## NACET History

The following history of NACET is obtained directly from the NACET website (2010):

The Northern Arizona Technology & Business Incubator, Inc., (“NATBI”) was founded in 2001 by community and business leaders’ intent on diversifying the greater Flagstaff economy. Funds for this project came from the City of Flagstaff, the Arizona Department of Commerce, and community investors, including Northern Arizona University, Coconino Community College, the Flagstaff Chamber of Commerce, the Coconino County Board of Supervisors, Arizona Public Service, Bank of America, McCoy Motors, LNN Enterprises, and others. In addition, many volunteers and supporters have donated their time and energy.

In August 2007, the organization went through a “rebranding” with a new trade name, a new president, and plans for a new facility. The Northern Arizona Center for Emerging Technologies (NACET) began building pathways to client companies, starting with technology transfers in collaboration with NAU. We hosted a series of workshops on the NAU campus to solicit client companies with technology transfer opportunities, most notably in the Colleges of Engineering and Biology. Our signature event, “Invention to Venture — Northern Arizona,” draws inventors, entrepreneurs, service providers and graduate students from around the region to learn from NACET’s community of entrepreneurs who have successfully launched businesses.

## Methodology

A study jointly conducted by the University of Michigan and the National Business Incubation Association in 1998 (Chapell and Berman) determined macroeconomic analysis to be the most useful methodology in determining the total economic impact incubator firms have on local economies. Determining the economic benefits generated by an incubator allows for comparison with other economic development tools. A macroeconomic model such as IMPLAN can be used to determine the spending, employment, personal income, and tax impacts of an incubator.

The IMPLAN model used in this study enumerates employment, income, tax, and gross state product impacts of NACET clients. It should be noted, however, that there are additional impacts created by incubators. Impacts including wealth creation, technology transfer (new products developed in the incubator that would not have otherwise been brought to market) joint ventures, and partnerships (synergistic efforts which bring revenue benefits to both partners) are outside the scope of this study.

Data for the macroeconomic analysis were supplied by NACET through profit and loss statements, surveys of clients, and both graduation records and status reports of clients occupying the NACET facility in 2009. Firms were not identified by name to preserve privacy, but their North American Industrial Classification System (NAICS) code definitions were supplied in order to develop accurate inputs for the IMPLAN model used to estimate economic impacts. All data are reported in aggregate to avoid identifying any individual companies. The area of analysis was defined as Arizona to account for all potential linkages; this therefore implies that the impacts to Arizona include impacts to Coconino County where the incubator is located.

## Characteristics of Current and Former NACET Client Firms

This economic impact analysis focuses on operations during the year ending December 31, 2009. During this time, the incubator was in full operation. Data analyzed reflects the activities of those clients admitted to the incubation program as resident clients or non-resident affiliate clients.

The industrial classifications of incubator firms during calendar year 2009 can be found in Table 1; they are grouped according to NAICS code descriptions reflecting the author’s understanding of the firms’ classifications.

**Table 1 – Industry Classification of Current Incubator Tenants**

Industry	Percent Distribution
Engineering	56%
Biotechnology	25%
Software & Computer Services	13%
Other	6%

NACET has graduated 12 firms since its inception in 2001. Table 2 lists the industrial classifications of six graduate firms still in operation as independent entities.

**Table 2 - Graduated Firms**

Industry	Percent Distribution
Aerospace	17%
Biotechnology	17%
Engineering	17%
Information Technology	33%
Other	17%

**Percentages total over 100 due to rounding**

The total employment levels for current and former clients were also calculated from data supplied by NACET. These are shown in Table 3.

Table 3 - Employment Levels of Active (2009) and Former Clients

Active 2009 and Graduate Firms Employment Levels	Current	Graduated	Total
Aerospace	0	22	22
Biotechnology	87	12	99
Engineering	64	1	65
Information Technology	0	11	11
Other	1	9	10
Software & Computer Services	7	1	8
Total Employment (Full & Part-Time)	159	56	215

## IMPLAN Analysis of NACET Clients

The economic impact of NACET clients on the state of Arizona was estimated using IMPLAN, an industry-leading input/output model. The IMPLAN model was used to estimate the economic, employment, labor income, and tax impacts of these new businesses.

To quantify the economic impact of a new business in the marketplace, economists measure three types of economic impacts: direct, indirect, and induced. The *direct economic impacts* are generated as new businesses make purchases and hire workers to fill new positions. This direct spending increases local sales activity, employment, and income levels. The *indirect economic impacts* occur as the firms that sell goods and services to the new businesses increase their output to accommodate the increase in business. The purchases these firms make generate further economic activity and hiring. Increases in employment generate increases in household income, which lead to *induced economic impacts* as households increase their purchases from local businesses.

IMPLAN expresses its output in a number of ways, including *direct output*, *jobs*, *labor income*, and *taxes*. *Direct output* is the dollar amount spent by new firms. *Jobs* are the full-time equivalent increases in employment due to hiring and spending by the new firms. *Labor income* is defined as the sum of salaries and wages, other labor income, and proprietors' income less transfer payments, dividends, and rent. *Tax impacts* are the governmental fiscal impacts created by incubator clients. This is primarily driven by income tax revenues, sales tax revenues, and additional real property tax revenues generated by households and firms.

The IMPLAN model relies on multipliers to determine indirect and induced effects of industry segments or firms. Multipliers represent the relationship between direct effects and the sum of the direct, indirect, and induced effects. For example, an employment multiplier of 1.9 means that for every job created due to a firm’s direct output, a total of 1.9 jobs are created within the local economy after considering indirect and induced effects.

## Economic Impact of Incubator Firms

Only the economic impacts of firms working with NACET in 2009 were considered in the IMPLAN analysis. Detailed information on graduate firms was limited, although a brief survey of six of these firms indicates 56 current employees earning competitive wages ranging up to \$120,000 annually. For 2009 clients, wages ranged up to \$200,000 annually. Table 4 lists the output of the IMPLAN model applied to NACET clients in 2009. The client firms within the incubator generated a total of \$17.7 million in direct economic activity. This direct spending yielded an indirect impact of \$6.3 million, and an induced impact of \$5.2 million. During this time, direct effects accounted for 159 direct jobs. Indirect effects lead to 76 jobs, and induced effects added an additional 67 jobs. Direct spending included \$4.1 million in labor income. Labor income from indirect and induced spending totaled \$2.2 million and \$1.7, respectively. The total tax revenue from direct, indirect, and induced effects was estimated to be \$2.5 million.

**Table 4 - Economic Impact of the NACET Incubator, 2009**

	Direct	Indirect	Induced	Multiplier	Total
Direct Output	\$17,658,000	\$6,321,000	\$5,210,000	1.7	\$29,189,000
Jobs	159	76	67	1.9	302
Labor Income	\$4,143,000	\$2,197,000	\$1,733,000	1.9	\$8,073,000
Taxes	\$163,000	\$711,000	\$1,653,000		\$2,527,000

Overall, NACET's 16 clients in 2009 had a total impact on the state of \$29 million, creating 302 total jobs, producing \$8 million in labor income and generating indirect business taxes of \$2.5 million.

## Ancillary Economic Impacts

The client firms at NACET have other economic impacts that are not measured in the IMPLAN model. The 16 firms in incubation by the end of 2009 had received an aggregate of \$32 million in pledged equity capital. The capital pledged indicates to some extent the strength of the companies and the potential investors see in them. Additionally, the client firms had also obtained \$500,000 in grant funds for the operating year. This pledged capital, totaling over \$32 million, will generate continued significant economic impacts as it is collected and expended.

## Conclusion

In conclusion it is apparent that NACET is a successful and evolving incubator. The incubator is currently evaluating new clients for possible inclusion. It is also considering a future expansion onto adjacent property. This economic impact study documents how NACET clients contribute to the state and local economy, through payrolls and purchases. A further benefit is the positive effect on the local economy created by graduate firms that remain in the area.

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