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CHARACTERIZATION AND ECONOMIC FEASIBILITY OF A PROTOTYPICAL AG-SCIENCE "NEW USES" INCUBATOR FACILITY

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I. OVERVIEW

This study analyzes and defines a prototypical incubator facility for use in commercializing much of the agricultural and bio-science based research that is being produced by Wisconsin's public and private research organizations. Linked to both the research and industrial base of the state, such facilities will play an important role in making Wisconsin a leader, both nationally and internationally, in the emerging carbohydrate economy of the 21st century.

Section II of this report provides a description of the carbohydrate transition that is occurring and the role incubator facilities will play in that transition. Section III provides a discussion of the general characteristics incubator facilities will need in the new economy and defines a prototypical incubator facility that could be constructed and operated within the Wisconsin context. Section IV provides preliminary economic feasibility estimates of the prototypical facility described in Section III. The report is summarized in Section V.

II. BACKGROUND

The global transition from a hydrocarbon-based economy to a carbohydrate-based economy will define much of the upcoming millennium. For states such as Wisconsin, the emerging transformation can provide significant benefits to both agriculture and manufacturing sectors. If Wisconsin is to be a leader in this transition, new ways of transforming science-based information into commercial goods and services will need to be developed. A potentially important part of this process will be creation of "nexus" points where science produced in the laboratory is developed and tested, producing commercially viable goods and services. The state's recent BioStar initiative is a major step towards this transformation and reflects the commitment of the state to be a national and international leader in the emerging new economy.

The public and private research sectors in Wisconsin are among the leaders nationally in producing new bio-tech science. The University of Wisconsin System, for example, is a national leader in terms of the research done in the bio-sciences, engineering, computation and information systems. The BioStar

initiative is intended to further enhance these strengths. An important part of the overall "new uses" transformation that is missing in Wisconsin, however, is creation of the "nexus" points where research conducted in the laboratory is developed into commercially viable goods and services.

The International Center of Agricultural Trade and Technology (ICATT) is a private sector effort that is intended to create a nexus point for much of the agricultural-related research that is conducted in Wisconsin. Located in Dane County, this 700 acre development will create an "agri-science village" that contains a major science transformation park, modern residential development and pristine environmental amenities. Upon completion it is estimated that ICATT will generate between 7,000 and 10,000 jobs and over $300,000,000 in new investment.[1]

The science transformation portion of ICATT will contain approximately 200 acres dedicated to the office, research, development and testing operations of agri-science-based companies. Many of these companies will be established mid- to large sized corporations. An important feature of ICATT, however, will be dedicated to providing facilities and services to new start-up companies. Unlike their larger counterparts, start-up companies are often small, under-capitalized and in the need of shared and relatively inexpensive research and development facilities and services. These facilities will be provided in what is called the "new uses incubator facility."

The purposes of this study are to (1) characterize a prototypical incubator facility that could serve as a model in the ICATT and other similar projects in the state, and to (2) conduct preliminary economic feasibility analysis of the prototypical incubator.

III. CHARACTERIZATION OF A PROTOTYPICAL "NEW USES" INCUBATOR FACILITY

[1]Jack Huddleston, *Economic Impacts of Windsor Center-International Center of Agricultural Trade and Technology (ICATT) on Dane County and State of Wisconsin* (Madison, Wisconsin: Huddleston Planning Group, 1997).

This section discusses general features that should be included in a prototypical agri-science-based incubator facility located in Wisconsin. This information is, in turn, used to produce a preliminary specification for the design of a prototypical incubator facility. Section IV conducts preliminary economic feasibility analysis on the proposed prototypical facility.

A. General Characterization Dimensions

The concept of a business incubator was first advanced and implemented in Batavia, New York in 1959. Today there are over 600 incubators in the United States and many more in other parts of the world. Through the early part of this history, incubators were primarily dedicated to the start-up and development of new manufacturing operations, with the emphasis shifting to information services and software development in recent years. It appears that to date, there have been no incubator facilities dedicated to the development and commercialization of agri-based science and technology start-up companies.

The concept of a science-based incubator has previously been articulated by Smilor and Gill.[2] This concept has been summarized by Kumar and Kumar and clearly states the goal of technology incubators to be:

> …an innovative system designed to assist entrepreneurs in the development of new technology-based firms, both startups and fledglings. It seeks to effectively link talent, technology, capital and know-how to leverage entrepreneurial talent in order to accelerate the development of new companies, and thus speed the commercialization of technology[3]

While most (if not all) existing business incubators do not pertain directly to agri-science-based activities, Kumar and Kumar have identified 12 "best practices" that have a direct impact on the

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[2]R. Smilor and M. Gill, *The New Business Incubator: Linking Talent, Technology and Know-How* (Lexington, MA, Lexington Books, 1986).

[3]U. Kumar and V. Kumar, *Incubating Technology: Best Practices* (Ottawa, Ontario: Logitech Systems Management Consultants, 1997), p. 9.

success of an incubator facility. These best practices include:

1. The incubator has a minimum of 30,000 square feet of rental space with room to expand in order to be able to generate enough income to become self-sustainable. The space is flexible with movable walls to manage tenants' variable needs.

2. There are at least 10 in-residence members for generating enough networking activity and sustaining the variety of shared services and support operations.

3. The incubator is located either near a university or near a research laboratory so that tenants have easy access to technical facilities. Incubators located near a university get added advantage of access to students, faculty members, research labs and libraries.

4. The incubator is situated in a high-tech, top quality building, preferably with a telecommunication infrastructure to electronically connect companies with each other and the outside world.

5. The incubator has a practice of enrolling non-resident clients who would get all services provided to resident clients except a lab or office space.

6. A selection committee is set up to prescreen the clients. The selection criteria include: the homology between the incubator services offered and the clients' needs; a business plan that covers the key focus, market information on competitors and customers, costs, pricing and cash flow forecasts; technology sophistication; management team; practical experience; and personal commitment.

7. An advisory committee, consisting of five to six experts from different business areas has been established for each tenant company to assist in developing a business plan, in obtaining funding, and for marketing and legal issues.

8. The incubator has created an opportunity for its tenants to network among themselves, with the industry, and with contacts of the advisory/mentor group members.

9. The funding and support from private, public or government organizations, specifically to pay off the heavy costs associated with the real estate component is already in place.

10. The (incubator) manager is a highly motivated visionary individual whose goal is to see his/her tenant firms succeed.

11. Boards of directors are generally responsible for policy development and not day-to-day operations which are left to the incubator manager.

12. The incubator focuses more on support programs than on space or physical infrastructure.[4]

[4]Kumar and Kumar, pp. 4-5.

As part of this project, project descriptions for five technology related incubators were examined in light of the above 12 best practices. In addition, the Director of the University of Wisconsin-Madison Research Park was also interviewed. Based on this examination, it appears that many of the above elements are present in currently operating incubator facilities.

B. Characterization of a Prototypical Agri-Science Incubator Facility

Currently existing incubator facilities appear to display significant variation in terms of their design and operation. Much of this variation appears to depend upon local circumstances and specific missions of each incubator. A resource that captures the variation and general themes of contemporary incubator facilities is a publication of the National Business Incubator Association entitled *Bricks & Mortar* (Washington, D.C.: National Business Incubator Association, 2000).

Based upon the general plans contained in *Bricks & Motar* and upon discussions with Wisconsin architectural consultants, a prototypical agri-science incubator facility has been defined for use in Wisconsin. As shown below, this facility would contain approximately 40,000 square feet over its various uses.

Prototypical Agri-Science Incubator Facility for Wisconsin

Type of Use	*Approximate Square Footage*
Office	10,000
Laboratory	10,000
Laboratory support	5,000
General support	10,000
Operations	5,000

The appendix to this report contains a useful "Function/Space Needs" form that can be used in specific circumstances to estimate and plan the square feet of space that will be needed by an agri-science incubator facility. The following floor-plan illustrates how a typical facility could be physically developed.

IV. ECONOMIC FEASIBILITY

The economic feasibility of a agri-science-based incubator facility largely involves whether or not such a facility could be constructed and operated over a meaningful period of time at rates of return that would be sufficient to attract private capital. If this is not the case, public subsidies might be needed to sustain the facility over time.

Economic feasibility analysis was conducted on the prototypical incubator facility described in Section III.B. The pro-forma resulting from this analysis is shown in Table 1. Although the details associated with any specific facility are unique to that case, the following assumptions were used in this analysis.

Assumptions Used in Economic Feasibility Analysis

Land Costs	$582,000	Rent/ Square Foot	$18.60
Depreciation Basis	$4,350,000	Expenses /Square Foot	$6.05
Depreciation Years	39	Tax Rate	34.0%
Amortization Years	22	Capital Gains Tax Rate	34.0%
Broker Commissions	5%	Capitalization Rate	9.25%
Building Size	40,000	Vacancy Rate	5.0%
Interest Rate	7.75%		

Using the above assumptions, Table 1 shows that the prototypical incubator facility should produce a positive cash in each year of the initial 10 year start-up period. Like most projects of this nature, the cash flow grows each year after construction and initial lease-up. More importantly, the internal rate of return (IRR) is approximately 15 percent if the facility is sold to new investors in either year 5 or year 10. An IRR greater than 10 percent normally signals that a project would be of interest to prospective private sector investors.

TABLE 1. Ten Year Pro-Forma for Prototypical 40,000 Square Foot Agri-Science Incubator Facility

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
TOTAL REVENUE	744,000	762,600	781,665	801,207	821,237	841,768	862,812	884,382	906,492	929,154
less vacancy (5%)	37,200	38,130	39,083	40,060	41,062	42,088	43,141	44,219	45,325	46,458
EFFECTIVE GROSS	**706,800**	**724,470**	**742,582**	**671,147**	**780,175**	**799,680**	**819,671**	**840,163**	**861,167**	**882,696**
Less operating expenses	242,000	250,470	259,236	268,310	277,701	287,420	297,480	307,892	318,668	329,821
NET OPERATING INCOME	**464,800**	**474,000**	**483,346**	**492,837**	**502,474**	**512,260**	**522,191**	**532,271**	**542,499**	**552,875**
less interest payments	301,803	296,140	290,021	283,411	276,270	268,556	260,222	251,219	241,493	230,985
less building depreciation	111,531	111,531	111,531	111,531	111,531	111,531	111,531	111,531	111,531	111,531
less tenant improvement depreciation	103	103	103	103	103	103	103	103	103	103
less broker commissions	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
TAXABLE INCOME	**49,363**	**64,226**	**79,691**	**95,792**	**112,570**	**130,070**	**148,335**	**167,418**	**187,372**	**208,256**
plus depreciation	111,634	111,634	111,634	111,634	111,634	111,634	111,634	111,634	111,634	111,634
less principal payment	70,520	76,184	82,302	88,912	96,053	103,767	112,101	121,105	130,831	141,338
Less tenant improvement cost	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
CASH FLOW	**86,477**	**95,676**	**105,023**	**114,514**	**124,151**	**133,937**	**143,868**	**153,947**	**164,175**	**174,552**
TAX SAVING or	0	0	0	0	0	0	0	0	0	0
INCOME TAX	16,783	21,837	27,095	32,569	38,274	44,224	50,434	56,922	63,706	70,807
MARKET VALUE	**5,024,865**	**5,124,324**	**5,225,355**	**5,327,963**	**5,432,156**	**5,537,938**	**5,645,314**	**5,754,287**	**5,864,858**	**5,977,029**
less mortgage balance	3,855,586	3,779,402	3,697,100	3,608,187	3,512,134	3,408,367	3,296,265	3,175,161	3,044,330	2,902,992
NET WORTH	**1,169,279**	**1,344,922**	**1,528,255**	**1,719,776**	**1,920,022**	**2,129,571**	**2,349,049**	**2,579,126**	**2,820,528**	**3,074,037**
MARKET VALUE	5,024,865	5,124,324	5,225,355	5,327,963	5,432,156	5,537,938	5,645,314	5,754,287	5,864,858	5,977,029
less tax book value	4,819,590	4,707,956	4,596,322	4,484,633	4,373,054	4,261,420	4,149,786	4,038,152	3,926,518	3,818,885
UNTAXED SALES GAIN	**205,275**	**416,368**	**629,033**	**843,265**	**1,059,102**	**1,276,518**	**1,495,528**	**1,716,135**	**1,938,340**	**2,158,144**
less capital gains tax	69,794	141,565	213,871	286,714	360,095	434,016	508,480	583,486	659,036	733,769
AFTER TAX SALE PROCEEDS	**1,099,486**	**1,203,357**	**1,314,384**	**1,433,063**	**1,559,927**	**1,695,555**	**1,840,569**	**1,995,640**	**2,161,492**	**2,340,268**
AFTER TAX NET INCOME	**73,840**	**77,927**	**81,944**	**85,877**	**89,712**	**93,434**	**97,026**	**100,469**	**103,745**	
IRR IF SOLD IN YEAR 10:	**14.86**									
IRR IF SOLD IN YEAR 5:	**15.70**									

Some caution needs to be taken in using the above pro-forma. The analysis shown in Table 1 is based on highly aggregated information that could vary from situation to situation. The analysis is also not based on specific engineering/architectural considerations that would need to be considered for the construction and operation of specific facilities.

V. SUMMARY AND CONCLUSIONS

This report has attempted to characterize a prototypical agri-science-based incubator facility that could be constructed and operated in various locations throughout Wisconsin. Such facilities will play increasingly important roles as the state's economy makes the transition to the "new uses" carbohydrate economy of the 21st century.

Agri-science-based incubator facilities are a new dimension within the traditional economic development strategy of providing facilities and services for new start-up companies. Recognizing this "newness," the study has evaluated previous technology incubator facilities and research in an effort to characterize what a agri-science incubator facility should contain in Wisconsin. This report presents both general characteristics and specific design considerations in developing a prototypical agri-science incubator for Wisconsin.

Based on the prototypical incubator identified in this report, preliminary economic feasibility analysis suggests that such a facility would produce rates of return to private investors of approximately 15 percent. Although caution needs to be employed in using the preliminary results in reference to specific projects, it appears that agri-science-based incubator facilities would be economically feasible within the context of Wisconsin conditions.

Function/Space Needs Form

_____
Project

_____ _____ _____
Manager or Supervisor Department Date

_____
Phone

Department Function	Relationship Criteria
Observations/Deficiencies:	Special Needs

Personnel and Space Projections		***Current*** Year			***Projected*** Year			
Name or Room	Rm. Type	Staff	SNF	Rm.#	Staff	Module	NSF	Comments
OFFICE	**Approx. 10,000 sq. ft**							
Executive								
Admin Assistants								
I.S.								
Research								
General								
LABORATORY	**Approx. 10,000 sq. ft**							
LABORATORY SUPPORT	**Approx. 5,000 sq. ft**							
Staging Area								
Cylinders Manifolding & Staging								
Storage Room - Lab Supplies								
GENERAL	**Approx. 10,000 sq. ft**							
Lobby/Reception								
Lunch Room								
Small Copy Center/Mail/Fax								
Large Conference Room								
Medium Conference Room								
Library								
Recycling Area								
Locker Room								
Storage								
Greeting Area/Coat								
Halls								
OPERATIONS	**Approx. 5,000 sq. ft**							
Electrical Room								
Hazardous Waste Area								
Loading Dock								
IS Room								
Voice & Data Equip Room								
Department Totals								

PROGRAMING AREAS

Space Projections	Staff #	Sq.Ft.	Comments
OFFICE			
♦ Executive			
♦ Admin Assistants			
♦ I.S.			
♦ Research			
♦ General			
Module			
LABORATORY			
LABORATORY SUPPORT			
♦ Staging Area			
♦ Cylinders Manifolding & Staging			
♦ Storage Room - Lab Supplies			
♦ Scale up			
♦ Cold Rooms			
♦ Incubators			
♦ Fume Hoods			
♦ Freezers			
♦ Ice Machines			
GENERAL			
♦ Lobby/Reception			
♦ Lunch Room			
♦ Large Conference Room			
♦ Medium Conference Room			
♦ Small Copy Center/Mail/fax			
♦ Greeting Area/Coat			
♦ Recycling Area			
♦ Halls			
♦ Locker Room			
♦ File Area			
♦ Storage (everyday)			
♦ Janitor Closet			
OPERATIONS			
♦ Storage (files, supplies)			
♦ Electrical Room			
♦ Library			
♦ IS Room			
♦ Voice & Data Equip Room			
♦ Delivery/Loading dock			
♦ Hazardous Waste Area			
♦ Maintenance			