

Cleantech Startup Growth Initiative Baseline Study

Final Report

Prepared for:

New York State Energy Research and Development Authority

Albany, New York

Patricia Gonzales
Project Manager

Prepared by:

Research Into Action, Inc.

Portland, Oregon

Mersiha McClaren
Zac Hathaway
Jun Suzuki

Notice

This report was prepared by Research Into Action (hereafter “contractor”), in the course of performing work contracted for and sponsored by the New York State Energy Research and Development Authority (hereafter “NYSERDA”). The opinions expressed in this report do not necessarily reflect those of NYSERDA or the State of New York, and reference to any specific product, service, process, or method does not constitute an implied or expressed recommendation or endorsement of it. Further, NYSERDA, the State of New York, and the contractor make no warranties or representations, expressed or implied, as to the fitness for particular purpose or merchantability of any product, apparatus, or service, or the usefulness, completeness, or accuracy of any processes, methods, or other information contained, described, disclosed, or referred to in this report. NYSERDA, the State of New York, and the contractor make no representation that the use of any product, apparatus, process, method, or other information will not infringe privately owned rights and will assume no liability for any loss, injury, or damage resulting from, or occurring in connection with, the use of information contained, described, disclosed, or referred to in this report.

NYSERDA makes every effort to provide accurate information about copyright owners and related matters in the reports we publish. Contractors are responsible for determining and satisfying copyright or other use restrictions regarding the content of reports that they write, in compliance with NYSERDA’s policies and federal law. If you are the copyright owner and believe a NYSERDA report has not properly attributed your work to you or has used it without permission, please email print@nyserda.ny.gov.

Information contained in this document, such as web page addresses, are current at the time of publication.

Table of Contents

NYSERDA RECORD OF REVISION	I
NOTICE	II
TABLE OF CONTENTS.....	I
List of Tables	ii
1 INTRODUCTION	1-1
1.1 The Cleantech Startup Growth Initiative.....	1-1
1.2 The Manufacturing Corps Initiative	1-1
1.3 Evaluation Objectives and Methods.....	1-2
2 INITIATIVE OUTCOMES AND PERFORMANCE INDICATORS.....	2-1
2.1 Incubator Participation	2-6
2.2 Cleantech Products, Revenue, and Investment	2-8
2.2.1 Products Commercialized and Manufactured	2-8
2.2.2 Cleantech Product Revenues	2-9
2.3 Types of Investment and Deals.....	2-10
2.3.1 Number of Cleantech Product Deals.....	2-10
2.3.2 Cleantech Product Investment Estimates	2-11
2.3.3 Cleantech Product Development and Commercialization Time	2-13
2.4 Incubator Resources and Sponsorship Leveraged.....	2-15
2.5 Client Resources Leveraged and Satisfaction.....	2-16
3 CONCLUSIONS AND RECOMMENDATIONS.....	3-1
4 METHODOLOGY	4-1
4.1 NYSERDA-Sponsored Startup Incubator Interviews	4-1
4.2 Participant Client Survey.....	4-1
4.3 Non-Participant Survey.....	4-3
4.4 Outcome Indicator Analysis Methods.....	4-5
4.4.1 Products Commercialized and Manufactured	4-5
4.4.2 Cleantech Product Revenues	4-6
4.4.3 Number of Cleantech Product Deals.....	4-6
4.4.4 Cleantech Product Investment Estimates	4-7
4.4.5 Cleantech Product Development and Commercialization Time	4-8
4.4.6 Incubator Resources and Sponsorship Leveraged	4-9
4.5 Limitations	4-9

List of Tables

Table 1. Evaluation Objectives and Main Research Questions.....	1-3
Table 2. Cleantech Startup Growth Outputs, Outcomes, and Indicators Summary.....	2-2
Table 3. M-Corps Outputs, Outcomes, and Indicators Summary.....	2-4
Table 4. Participant NYS Cleantech Startup Growth Incubators Summary.....	2-6
Table 5. Incubator Participation, by Participant Status.....	2-7
Table 6: Estimate of Total Number of Cleantech Startup Companies in NYS.....	2-7
Table 7. Baseline (2015-2016) Estimates for Cleantech Products Commercialized and Manufactured.....	2-9
Table 8. Baseline (2015-2016) Estimates for Cleantech Product Revenues.....	2-10
Table 9. Baseline (2015-2016) Estimates for Number of Cleantech Product Deals....	2-11
Table 10. Baseline (2015-2016) Estimates for Cleantech Product Investments.....	2-12
Table 11. Baseline (2015-2016) Estimates for Cleantech Product Development and Commercialization Time.....	2-14
Table 12. Baseline (2015-2016) Estimates for Incubator Resources and Sponsorship Leveraged.....	2-16
Table 13. Incubator Resources Leveraged and Satisfaction.....	2-16
Table 14. Participant Client Company Strata and Summary.....	4-1
Table 15. Participant Client Survey Disposition.....	4-2
Table 16. Final Non-Participant Population.....	4-4
Table 17. Non-Participant Survey Disposition.....	4-5

1 Introduction

The New York State Energy Research and Development Authority (NYSERDA) created the Cleantech Startup Growth and Manufacturing Corps (M-Corps) Initiatives to support the clean energy entrepreneurial ecosystem and accelerate the growth and scale of new businesses that serve the clean energy market in New York State. Cleantech Startup Growth and M-Corps are funded by the NYSERDA's Clean Energy Fund (CEF).

This report documents the baseline performance metrics for the two initiatives.

1.1 The Cleantech Startup Growth Initiative

In July 2017, five incubators in the New York State (NYS) received funding from NYSERDA through the Cleantech Startup Growth Initiative: 1) ACRE at New York University (NYU) Tandon School of Engineering; 2) Venture Creations at Rochester Institute of Technology (RIT); 3) Clean Energy Business Incubator Program (CEBIP) at Stony Brook University; 4) Clean Tech Center at The Tech Garden; and 5) Southern Tier Clean Energy Incubator at Binghamton University. NYSERDA will continue to sponsor two additional incubators in the Capital Region and Western New York regions as part of the Cleantech Startup Growth Round Two of Program Opportunity Notice (PON) 3413.

The Cleantech Startup Growth Initiative targets incubators to:

- Accelerate the time to market for cleantech startups enrolled in the incubator programs.
- Deploy lessons learned and best practices to help incubators quickly address the needs of the startups enrolled in the incubator programs.
- Increase the ability of startup companies to raise seed and follow-on capital from investors and secure commercialization assistance from development partners.

1.2 The Manufacturing Corps Initiative

The M-Corps Initiative aims to increase private capital investment in manufacturing build-out and scale-up activities through a series of offerings geared toward overcoming obstacles associated with the manufacturing of clean energy products. At the time of this study, NYSERDA has issued a PON for manufacturing companies to apply for the M-Corps Pilot Initiative targeting specific regions of NYS. Program staff noted the Pilot will likely end by 2020, and if successful would be rolled out statewide in 2021.

Any manufacturing startup company can apply to participate in the Pilot.

1.3 Evaluation Objectives and Methods

The primary objective of this study was to develop baseline indicators for the Cleantech Startup Growth Initiative. The secondary objective was to leverage the Cleantech Startup Growth Initiative data to capture baseline conditions for the M-Corps Initiative. To meet the evaluation objectives, the research team conducted:

- A telephone survey with cleantech startups who were enrolled in the incubator programs. (The team refers to this group as participants, participating incubator client companies, or client companies. It includes both current incubator clients and graduates.)
- A telephone survey with cleantech startups who were *not* enrolled in the incubator programs and had *not* received NYSERDA support in the past. (The team refers to this group as non-participants or non-participating cleantech companies.)
- In-depth telephone interviews with staff at each of the five NYSERDA-sponsored incubators.
- A thorough review of Cleantech Startup Growth program data and secondary data sources.

Table 1 summarizes the objectives of this study and research methods used to meet those objectives.

Table 1. Evaluation Objectives and Main Research Questions

Objectives – Assess	Primary Evaluation Question(s)	Data Sources
Cleantech Startup Growth		
Cleantech commercialization process	<ul style="list-style-type: none"> ▪ How many products developed by New York cleantech startup companies were commercialized? ▪ What is the revenue generated from the above mentioned commercialized products? 	Phone surveys of cleantech companies, program records
Private investment (private and follow-on capital and program funding) leveraged by the incubators through sponsors other than NYSERDA	<ul style="list-style-type: none"> ▪ What is the dollar amount of funding (private and follow-on capital and program funding) from other sponsors leveraged by the incubators? 	Interviews with cleantech Incubator staff, program records
Impact of support provided by the Incubator and/or Ignition grants programs to client companies and graduates including improved position for the client company and graduates	<ul style="list-style-type: none"> ▪ How many (number of) deals made/completed? ▪ What is the dollar value of investments raised by the incubator client companies and graduates? ▪ How long does it take (amount of time – in months?) for products developed by non-participant and client companies to get to the market? ▪ What is the dollar value of follow-on capital raised by client companies? ▪ How long does it take (amount of time – in months?) for products developed by non-participant and client companies to get to the first customer/end-user? 	Phone surveys of cleantech companies, program records
Incubator operations and performance	<ul style="list-style-type: none"> ▪ What is the dollar value of sponsorship funding leveraged by the incubators? ▪ How many (number of) valuable leads (e.g., high-value service providers, mentors, and other key stakeholders) are provided by incubators to their client companies? ▪ What are some in kind (non-Dollar) goods or services provided by sponsors to the incubators? 	Interviews with cleantech Incubator staff, program records
M-Corps		
Cleantech manufacturing process	<ul style="list-style-type: none"> ▪ How many Cleantech products were manufactured in total and in NYS? ▪ What is the revenue generated by Cleantech companies and manufacturing partners from the above mentioned cleantech products? 	Phone surveys of cleantech companies, program records
Value and impact of manufacturing services provided to cleantech companies (regarding when and how to engage with manufactures and begin the process of going through early manufacturing activities)	<ul style="list-style-type: none"> ▪ How many agreements between engaged cleantech startup companies and private capital investors and/or strategic corporate partnerships are signed? ▪ What is the dollar and non-dollar value of services and money provided by market actors? ▪ How long does it take (amount of time – in months?) for products developed by cleantech companies to get to the first customer/end-user? 	Phone surveys of cleantech companies, program records

2 Initiative Outcomes and Performance Indicators

Table 2 and Table 3 provide a summary of the team's estimates of the baseline outcome indicators for the Cleantech Startup Growth and M-Corps Initiatives. The team developed the baseline estimates from: 1) interviews with cleantech incubator staff; 2) participant (incubator client company) survey data; 3) non-participant cleantech company survey data; and 4) NYSERDA's Cleantech Startup Growth program data. The team considered the pre-CEF years 2015 and 2016 to constitute the baseline period. Details of the team's analysis methods can be found in the subsequent sections.

Note this research will be repeated in 2019 at which time the team will use the baseline and 2019 data (i.e., information from two time periods) to ascertain change in the indicators over time.

Table 2. Cleantech Startup Growth Outputs, Outcomes, and Indicators Summary

Outputs/Outcomes	Indicators	Data Source ^a	CEF Baseline ^b	Updated CEF Baseline ^a	
				Estimate by Group ^c	Baseline Estimate
Product commercialization	Number of products commercialized	1,2	0	Participants: 66 Non-participants: 214	280
Revenue (new commercial products and products that have been commercialized) ^d	Dollar revenue generated by participating clients	4	\$0	Participants: \$45 million <i>Note: Participant specific indicator</i>	\$45 million
Private investment (private and follow-on capital and program funding leveraged by the incubators through sponsors other than NYSERDA) ^e	Private Investment – participating client companies	2	\$0	Participants raised: \$103 - \$141 million <i>Note: Participant specific indicator</i>	\$103 - \$141 million
	Dollar of program funding from other sponsors leveraged by incubators	1	N/A	NYSERDA-sponsored incubators received \$1.3 million from other sponsors <i>Note: Participant specific indicator</i>	\$1.3 million from other sponsors
Continued investment in the incubator program will maintain the historical investment leverage levels of incubator client companies and graduates and improve the position of client companies and graduates	Increase in Dollar [private and follow-on capital] raised by the client companies & graduates	2,3,4	\$0	Participants raised \$82,000 - \$121,000 more than non-participants, on average, by product in development Participants raised: \$103 - \$141 million Non-participants raised: \$176 - \$225 million <i>Note: This includes private funding only</i>	Total capital raised: \$279 - \$366 million
	Increase in the Number of deals	2,3	N/A	Participants made 53-54 more deals than nonparticipants Participant deals: 90 – 91 Non-participant deals: 37	127 – 128 deals
	Decrease in Time to market for client companies	2,3	N/A	Participants were 2 times faster than nonparticipants to bring product to market Participants: 29 months, on average, to bring product to market Non-participants: 57 months, on average	36 months, on average to bring product to market
Highly targeted and timely infusions of capital through the ignition grants	Dollar value of capital provided by the ignition grants	2	N/A	Participants: \$0 <i>Note: Initiative was not launched during the baseline period</i>	\$0

Cleantech Startup Growth Initiative Baseline Study

Outputs/Outcomes	Indicators	Data Source ^a	CEF Baseline ^b	Updated CEF Baseline ^a	
				Estimate by Group ^c	Baseline Estimate
program will better position incubator client companies to attract follow-on capital from investors and/or secure commercialization support from development partners as well as improve the position of client companies	Dollar value of follow-on capital raised by client companies	2,3	N/A	Participants: \$22 - \$23 million Non-participants: \$49 million	\$71 - \$72 million
	Decrease in Time to first customer/end-user for qualified cleantech companies	2,3	N/A	Participants were 2.5 times faster than nonparticipants to land a first sale Participants: 30 months, on average Non-participants: 76 months, on average	Average time to first customer: 38 months
High-performing incubators will be able to attract funding from other sponsors to help sustain their operations and programs while retaining a focus on NYSERDA's clean energy goals	Dollar value of sponsorship funding leveraged by the incubators	1	N/A	NYSERDA-sponsored incubators received \$1.3 million from other sponsors <i>Note: Participant specific indicator</i>	\$1.3 million from other sponsors
	Number of participating high-value service providers, mentors, and other stakeholders in the programming that incubators provide to client companies	1	N/A	300 incubator-affiliated stakeholders provided assistance <i>Note: Participant specific indicator</i>	300 incubator-affiliated stakeholders provided assistance
	In kind (non-Dollar) goods or services provided by sponsors to the incubators	1,2	N/A	NYSERDA-sponsored incubators provide 6 goods/services per client company, on average <i>Note: Participant specific indicator</i>	6 goods/services per client company, on average

^a Sources include: (1) incubator interviews, (2) participant survey, (3) non-participant survey, and (4) program data. The team used these sources to estimate and update the original CEF baseline values.

^b NYSERDA program staff developed CEF baseline estimates based on program data at the time the CEF plan was developed.

^c The team identified an outlier in both participant and non-participant survey data. For each sample, the outlier company raised substantially more capital (approaching an order of magnitude difference) than the capital raised by the other companies in that sample. An investigation revealed that these two companies that raised large amounts of capital also had unexpected, atypical ownership structures. Consequently, the team estimated the investment and other indicators without and with the outlier in the samples, providing the lower and upper estimates of the ranges, with the exception of one metric. For the private investment raised by participants, the lower range estimate is obtained from the program data. When the outlier did not impact the estimate, the table provides a point estimate See the Methodology section for further discussion.

^d Revenue refers to revenue generated from new commercial products entering the market as well as products previously commercialized by incubator client companies and graduates.

^e Private Investment refers to private and follow-on capital raised by incubator client companies and graduates as well as the program funding leveraged by the incubators through sponsors other than NYSERDA.

Cleantech Startup Growth Initiative Baseline Study

The priority for this study was to gather information on the Cleantech Startup Growth Initiative. The secondary priority was to collect information, to the extent possible, on the baseline conditions for the M-Corps Initiative. The team leveraged survey data from manufacturers enrolled in the NYSERDA-sponsored incubator programs and non-participating cleantech manufacturers, to the extent possible, to estimate a few baseline metrics for the M-Corps Initiative. Limitations of this analysis are noted in Table 3.

Table 3. M-Corps Outputs, Outcomes, and Indicators Summary

Outputs/Outcomes	Indicators	Data Source ^a	CEF Baseline ^b	Updated CEF Baseline ^a	
				Estimate by Group ^c	Baseline Estimate
<p style="color: #00AEEF;">Limitations: M-Corps estimates derive from the surveyed manufacturers enrolled in the NYSERDA-sponsored incubator programs and surveyed program non-participants. Subsequent evaluations will update these estimates and obtain estimates for indicators not investigated in the first round of research.</p>					
Products manufactured in total	Number of products manufactured in total	2	0	Incubator participants: 23 Incubator non-participants: 198	221
Agreements signed to invest in cleantech startup companies	Number of agreements signed to invest in cleantech startup companies	2,3	0	Incubator participant deals: 48 Incubator non-participant deals: 22	70
Products manufactured in NYS	Number of products manufactured in NYS	2	N/A	Incubator participants: 12 Incubator non-participants: 117	129
Revenue generated by cleantech companies producing cleantech products	Dollar revenue generated by cleantech companies producing cleantech products	2,4	N/A	Incubator participants: \$7.9 million <i>Note: No data from non-participants due to the proprietary nature of this information</i>	At least 7.9 million
Revenue generated by manufacturing partners producing cleantech products	Dollar revenue generated by manufacturing partners producing cleantech products	<i>No data</i>	N/A	<i>No data, premature ^d</i>	Unknown
Accelerate time-to-market for cleantech products	Decrease in Time to market for cleantech products	2,3	N/A	Incubator participants were 2.5 times faster than nonparticipants to bring product to market Participants: 26 months, on average Non-participants: 68 months, on average	39 months, on average to bring product to market

Cleantech Startup Growth Initiative Baseline Study

Outputs/Outcomes	Indicators	Data Source ^a	CEF Baseline ^b	Updated CEF Baseline ^a	
				Estimate by Group ^c	Baseline Estimate
Cost share by market actors including services, equipment, machine time, as well as cash cost share	Dollar value provided by market actors to cleantech companies	2,3	N/A	Incubator participant deals: \$81.0 - \$81.1 million Incubator non-participant deals: \$236 - \$286 million <i>Note: This includes both private and public funding</i>	\$317- \$367 million
	Non-dollar value of services, equipment, and machine time provided by market actors to Cleantech companies	1	N/A	Incubators provide 6 in-kind (non-dollar) goods/services per participating client company, on average <i>Note: Respondents were unable to provide a valuation of these services</i>	Unknown

- ^a Sources include: (1) incubator interviews, (2) participant survey, (3) non-participant survey, and (4) program data. The team used these sources to estimate and update the original CEF baseline values.
- ^b NYSERDA program staff developed CEF baseline estimates based on program data at the time the CEF plan was developed.
- ^c The outlier records discussed in Table 2 did not manufacture products and, thus, did not impact the team's M-Corps indicator calculations.
- ^d Private manufacturing partners named by respondents are investors. Investors receive a return on investment when the product becomes profitable.

2.1 Incubator Participation

Per program documentation, an initial five clean energy incubators in New York State began receiving funding from NYSERDA on July 1, 2017. Table 4 shows that each incubator serves a specific region in NYS and offers varying services to their client companies.

Table 4. Participant NYS Cleantech Startup Growth Incubators Summary

NYSERDA- Sponsored Incubators	Region	Sites	Services
ACRE at NYU Tandon School of Engineering	New York City	1	Office/Lab space; Business plan, funding, and, accounting help; Mentoring; Legal services; Marketing and design services; Funded internships; Networking or Educational Events
Venture Creations at RIT	Finger Lakes	1	Office/Lab space; Business plan help; Funding connections (introductions); Access to student talent and RIT resources
CEBIP at Stony Brook University	Long Island	2	Office/Lab space; Business plan help; Mentoring; Funding connections (introductions); Training
Clean Tech Center at The Tech Garden	Central New York	1	Mentoring; Business plan, tech, or funding help; Funding connections (introductions); Networking or Educational Events; Training
Southern Tier Clean Energy Incubator at Binghamton University	Southern Tier	2 ^a	Office/Lab space; Business plan help; Internships; Educational events; Access to expertise at the University

Sources: *Innovation Capacity and Business Development (ICBD) BD Service Provider* list, program documentation, and incubator websites.

^a Although NYSERDA is sponsoring the Binghamton Southern Tier location, the Binghamton incubator staff noted their incubator services are the same for the Southern Tier (Downtown location) and Start-Up Suite (Campus location).

From program records and interviews with incubator staff, the research team identified 152 current, graduated, or terminated incubator client companies that have received services from one of the initial five NYSERDA-sponsored incubators (Table 5). The five NYSERDA-sponsored incubators exhibit different proportions of graduated and terminated client companies. This variability is expected because incubators function in different geographic regions and under different market and economic conditions.

One of the five NYSERDA-sponsored incubators, Binghamton Southern Tier Clean Energy Incubator, opened July 1, 2017. The team interviewed Binghamton incubator staff about their client companies and learned that three clean energy companies will be enrolled in that incubator. The team determined the population of client companies for this incubator is zero since these three companies were in the process of being enrolled.

Table 5. Incubator Participation, by Participant Status

NYSERDA-Sponsored Incubator	Client Company Status								Percent of Client Companies terminated
	Current Client		Graduated		Terminated		Total		
	#	%	#	%	#	%	#	%	
ACRE	19	37%	23	52%	4	7%	46	30%	9%
Venture Creations	11	21%	9	20%	12	21%	32	21%	38%
CEBIP	13	25%	3	7%	14	25%	30	20%	47%
Clean Tech Center	9	17%	9	20%	26	46%	44	29%	59%
Southern Tier	0	0%	0	0%	0	0%	0	0%	0%
Total	52	100%	44	100%	56	100%	152	100%	37%

Source: Program data as of Q1 2017 and staff at NYSEERDA-sponsored incubators.

Using the non-participant survey disposition information, program records, and 2017 market study data,¹ the team estimated the total number of cleantech startup companies in NYS and the proportion of cleantech startups NYSEERDA is supporting through the incubators (Table 6). The team estimated that there were 451 cleantech startup companies in NYS, of which 34% (152 companies) were client companies enrolled in NYSEERDA-sponsored incubators and 32% (143 companies) were non-participating companies.² The remaining companies were either attempting to enroll in NYSEERDA-sponsored incubators (prospective client companies) or had received NYSEERDA funding or assistance previously.

Table 6: Estimate of Total Number of Cleantech Startup Companies in NYS

Cleantech Startup Company Type	Count	Percent
Total participating cleantech companies	152	34%
Active participating client companies	96	21%
Terminated participating client companies	56	12%
Total non-participating cleantech companies	143	32%
Active non-participating companies	94	21%
Out of business non-participating companies	49	11%

¹ The team relied on 2017 market data compiled by Industrial Economics as part of the report *Characterizing New York State's Cleantech Ecosystem and the Role of NYSEERDA's ICBP Program*.

² The number of non-participating cleantech companies may be underestimated because the authors of the Industrial Economics study we relied on noted that their sources might have led to an underestimate of NYS cleantech companies of up to 20%..

Cleantech Startup Company Type	Count	Percent
Total other cleantech companies	156	35%
Companies enrolled in incubators previously sponsored by NYSERDA ^a	83	18%
Prospect client companies ^b	40	9%
Companies who have received other NYSERDA funding ^c	33	7%
Total cleantech startup companies in NYS	451	100%

Source: Non-participant survey disposition, program data, and staff at NYSERDA-sponsored incubators.

^a Includes companies from two non-NYSERDA-sponsored incubators (Directed Energy in Buffalo and iCLEAN in Albany). NYSERDA sponsored these two incubators prior to the Cleantech Startup Growth Initiative. The team did not consider these companies to be true non-participants because they likely received NYSERDA assistance.

^b Includes companies that were listed as “prospects” in program and incubator data.

^c The team initially classified these companies as non-participants but determined they received other types of NYSERDA funding (e.g., Entrepreneurs-In-Residence Program, 76West Clean Energy Competition, and other PON funding opportunities) for the products they were commercializing. Since these companies received NYSERDA funding the team did not consider them to be true non-participants.

2.2 Cleantech Products, Revenue, and Investment

This and subsequent sections document the analyses and estimated values for the baseline indicators. The team considered the pre-CEF years 2015 and 2016 to constitute the baseline period.

2.2.1 Products Commercialized and Manufactured

The team estimates that the 152 participating client companies commercialized 66 products in 2015 and 2016 (Table 7). During this same period, the team estimates that the 143 non-participating companies commercialized 214 products for a combined total of 280 products. On average, participating client companies commercialized less than one product per company, whereas non-participating companies commercialized about two products per company. During 2015 and 2016, the team estimates that 23 cleantech products were manufactured by the participating client companies affiliated with the NYSERDA-sponsored incubators and 198 by non-participating companies for a combined total of 221 products manufactured. Of those products, 12 and 117 products were manufactured in NYS by participating client companies and non-participating companies, respectively, for a combined total of 129 products manufactured in NYS. For a description of how the team estimated each of these indicators, see section 4.4.1.

Table 7. Baseline (2015-2016) Estimates for Cleantech Products Commercialized and Manufactured

Initiative	Outcome Indicator ^a	Source / Notes ^b	Baseline Estimate
Cleantech Startup Growth	Products Commercialized	Participant Survey (n=48), sample estimate extrapolated to the participant population	66
		Non-participant Survey (n=21), sample estimate extrapolated to the non-participant population	214
		Total number of products:	280
M-Corps	Cleantech products manufactured total	Participant Survey (n=25), sample estimate extrapolated to the participant population of manufacturing companies	23
		Participant Survey (n=15), sample estimate extrapolated to the participant population of manufacturing companies	198
		Total products manufactured:	221
	Cleantech products manufactured in NYS ^b	Participant Survey (<i>see table note "c" for sample size</i>), sample estimate extrapolated to the participant population of manufacturing companies	12
		Participant Survey (n=15), sample estimate extrapolated to the participant population of manufacturing companies	117
		Total products manufactured in NYS:	129

^a See section 4.4.1 for details on how each indicator was computed.

^b The team identified an outlier in both participant and nonparticipant survey data, whose values had no impact on the metrics reported above.

^c Among the 25 manufacturers in the participant sample, 11 reported their product was market ready, and of those, only four reported manufacturing a product in 2015 or 2016. The team used these responses to estimate this indicator.

2.2.2 Cleantech Product Revenues

Table 8 provides a summary of baseline revenues for participating client companies and the estimated revenues for the subset of participating client companies involved in manufacturing in 2015-2016. On average, each product commercialized generated about \$681,000 in revenue for participating client companies, for a total of \$45 million in revenues. The team estimates that client companies involved in manufacturing generated a total of \$7.9 million in revenues. For a description of how the team estimated each of these indicators see section 4.4.2.

Table 8. Baseline (2015-2016) Estimates for Cleantech Product Revenues

Initiative	Outcome Indicator ^a	Source / Notes	Baseline Estimate
Cleantech Startup Growth	Revenue generated by clients and graduates	Participant Program Data (N=152) (No revenue data from non-participants)	\$45.0 million
M-Corps	Revenue generated by companies producing cleantech products	Program Data (see Table Note “b”) and Participant Survey (see Table Note “b”) (No revenue data from non-participants) ^c	At least \$7.9 million

Note: “N” refers to the population and “n” refers to the sample.

^a See section 4.4.2 for details on how each indicator was computed.

^b The team relied on program revenue data from Q1 2015 through Q4 2016, excluding any quarters prior to a client company’s admission to the incubator, and the survey manufacturing data.

^c Revenue is a proprietary information that we did not collect through the surveys. We have revenue data only for participants, which NYSERDA obtained from the incubators.

2.3 Types of Investment and Deals

2.3.1 Number of Cleantech Product Deals

Table 9 provides a summary of baseline estimates for cleantech product deals made in 2015 and 2016 by the 152 participating client companies and 143 non-participating companies. The team included later stage private investment deals and partnerships that helped secure capital funding in the cleantech product deals or agreements. The team estimates that participating client companies made between 90 and 91 cleantech product deals (48 agreements among manufacturers) during this period. During the same period, the team estimates non-participating companies made 37 cleantech product deals (22 agreements among manufacturers). For a description of how the team estimated each of these indicators see section 4.4.3.

Table 9. Baseline (2015-2016) Estimates for Number of Cleantech Product Deals

Initiative	Outcome indicator ^a	Source / Notes	Baseline Estimate ^b
Cleantech Startup Growth	Increase in the Number of deals	Participant Survey (n=48), sample estimate extrapolated to the participant population	90-91
		Non-participant Survey (n=21), sample estimate extrapolated to the non-participant population	37
		Total deals:	127-128
		Compared to non-participants, participants made:	53-54 more deals
M-Corps	Agreements to invest in cleantech startup companies signed	Participant Survey (n=25), sample estimate extrapolated to the participant population of manufacturing companies	48
		Non-participant Survey (n=15), sample estimate extrapolated to the participant population of manufacturing companies	22
		Total deals:	70

^a See section 4.4.3 for details on how each indicator was computed.

^b The team identified an outlier in both participant and non-participant survey data. For each sample, the outlier company raised substantially more capital (approaching an order of magnitude difference) than the capital raised by the other companies in that sample. An investigation revealed that these two companies that raised large amounts of capital also had unexpected, atypical ownership structures. Consequently, the team estimated the above indicators without and with the outlier in the samples, providing the lower and upper estimates of the ranges. When the outlier did not impact the estimate, the table provides a point estimate See the Methodology section for further discussion.

2.3.2 Cleantech Product Investment Estimates

Table 10 provides a summary of baseline estimates for investments and follow-on capital received by participating client companies and non-participating companies.³ As part of the development and commercialization process, participating client companies have raised between \$103 to \$142 million in private investments during 2015 and 2016 compared to between \$176 and \$225 million raised by non-participating companies. During the same time period, the team estimates participating client companies raised between \$22 and \$23 million in follow-on capital compared to \$49 million raised by non-participating companies. Although non-participating companies raised more in private investment, participating client companies split that funding

³ Ignition grants are part of an initiative that, at the time of this study, had not yet been offered by NYSERDA. The grants are meant to be highly targeted and timely infusions of capital provided to client companies to help better position them in attracting follow-on capital from investors and securing commercialization support from development partners. The team asked client companies if they had received any ignition grants from incubators, of which two reported receiving a total of \$26,000. Since NYSERDA’s ignition grant initiative had not yet started, it is likely these two client companies confused funding they received through the incubator for NYSERDA’s ignition grants.

between fewer products allowing more investment per product – about \$607,000 - \$704,000 per product in development for participating companies compared to about \$486,000 - \$622,000 per product in development for non-participating companies.⁴ Although participating client companies are generally effective in securing private investment, about two-fifths (38%) report that identifying and securing investments is the most challenging aspect of the product development and commercialization process. Additionally, one-fifth (21%) of participating client companies report that securing funding is an area where they could have benefited from additional incubator assistance.

During 2015 and 2016, the team estimates that participating client companies involved in manufacturing raised between \$81.0 to \$81.1 million in investments during 2015 and 2016 compared to between \$236 and \$286 million raised by non-participating companies involved in manufacturing.⁵

Note the team has asked participating client companies to report the value of ignition grants they received from NYSERDA but opted not to use that information. The team determined that the dollar value of ignition grants is zero in the baseline period because NYSERDA has not yet launched that initiative. All but two client companies noted something other than zero when asked if they received ignition grant funding from NYSERDA., They were likely confusing the funding they received from the incubators with NYSERDA ignition grant funding. For a description of how the team estimated each of the indicators in the Table below, see section 4.4.4.

Table 10. Baseline (2015-2016) Estimates for Cleantech Product Investments

Initiative	Outcome Indicator ^a	Source / Notes ^b	Baseline Estimate
Cleantech Startup Growth	Private Investment – participating client companies and Increase in Dollar [private and follow-on capital] raised by the client companies & graduates	Participant Program Data (N=152) and Participant Survey (n=48), survey data extrapolated to the participant population	\$103 - \$141 million ^c
		Non-participant Survey (n=21), survey data extrapolated to the participant population	\$176 - \$225 million
		Total raised:	\$279 - \$366 million

⁴ The team learned from the survey data the number of commercialized products and the number of products in development by company. The team did not learn whether commercialized products were still in development. Thus, the team decided to use the number of products in development when estimating capital raised per product.

⁵ The team included both private and public investments as well as any follow-on capital raised by participating and non-participating client companies involved in manufacturing.

Cleantech Startup Growth Initiative Baseline Study

Initiative	Outcome Indicator ^a	Source / Notes ^b	Baseline Estimate
		Compared to non-participants, participants raised:	\$82,000 - \$121,000 more, on average, by product in development
	Private Investment - \$ leveraged by incubators through sponsors other than NYSERDA	Incubator staff interviews (N=5)	\$1.3 million
	Dollar value of follow-on capital raised	Participant Survey (n=48), extrapolated to the participant population	\$22 – \$23 million
		Non-participant Survey (n=21), extrapolated to the participant population	\$49 million
		Total follow-on capital:	\$72 - \$73 million
	Dollar value of capital provided by the ignition grants	NYSERDA has not yet launched the ignition grant initiative	\$0
M-Corps	Dollar value provided by market actors to cleantech companies	Participant Survey (n=25), sample estimate extrapolated to the participant population of manufacturing companies	\$81.0 - \$81.1 Million
		Non-participant Survey (n=15), sample estimate extrapolated to the participant population of manufacturing companies	\$236 - \$286 million
		Total raised:	\$317 - \$267.1 million

Note: “n” refers to the sample and “N” refers to the population.

^a See section 4.4.4 for details on how each indicator was computed.

^b The team identified an outlier in both participant and non-participant survey data. For each sample, the outlier company raised substantially more capital (approaching an order of magnitude difference) than the capital raised by the other companies in that sample. An investigation revealed that these two companies that raised large amounts of capital also had unexpected, atypical ownership structures. Consequently, the team estimated the investment and other indicators without and with the outlier in the samples, providing the lower and upper estimates of the ranges, with the exception of one metric. For the private investment raised by participants, the lower range estimate is obtained from the program data. See the Methodology section for further discussion.

^c The lower estimate of \$103 million is based on program data, while the higher estimate of \$141 million is based on survey data that included the outlier. All other ranges reported above are based on survey data analyzed with or without the outlier – see Table Note “b.”

2.3.3 Cleantech Product Development and Commercialization Time

Table 11 provides a summary of the length of time it took for participating client companies and non-participating companies to have their product ready for market. The team estimates that the average number of months it took to achieve market readiness was about 29 months for participating client companies (26 months for those involved in manufacturing) and 57 months among non-participating companies (68 months for those involved in manufacturing) – a

difference of 28 months. Participating client companies also reported the assistance they received from NYSERDA-sponsored incubators resulted in a 13-month reduction in product or service time to market, on average. Participating client companies involved in manufacturing reported an average decrease of 7 months in product or service time to market.⁶ Some of the estimates which rely on survey data are based on a small number of responses and, thus, should be interpreted with caution.

The team also estimated that it takes 30 months, on average, for products or services commercialized by participating client companies to reach end-users (that is, to land the first sale) compared to 76 months for non-participating companies – a difference of 46 months. Participating client companies also reported that, on average, participating in the incubator decreased the time it took for their product or service to reach end-users by 14 months. For a description of how the team estimated each of these indicators see section 4.4.5.

Table 11. Baseline (2015-2016) Estimates for Cleantech Product Development and Commercialization Time

Initiative	Outcome Indicator ^a	Source / Notes ^b	Baseline Estimate
Cleantech Startup Growth	Decrease in Time to market for client companies	Participant Survey (n=23), 23 of 48 participants had a product that was market ready and provided a valid response	29 months, on average
		Non-participant Survey (n=8), 8 of 21 non-participants had a product that was market ready and provided a valid response	57 months, on average
		Combined estimate	36 months, on average
		Compared to non-participants, participants were:	2 times faster to bring product to market
M-Corps	Decrease in Time to market for client companies	Participant Survey (n=9), 9 of 25 manufacturing participants had a product that was market ready and provided a valid response	26 months, on average
		Non-participant Survey (n=4), 4 of 15 manufacturing participants had a product that was market ready and provided a valid response	68 months, on average

⁶ The team asked survey respondents to estimate the amount of additional time it would have taken them to get to the current stage of commercialization had they not received assistance from the incubator using six response categories (time ranges; see Appendix D for question response options). The team then took the midpoint for each time range and averaged responses across those respondents who reported having a product or service that was market ready.

Initiative	Outcome Indicator ^a	Source / Notes ^b	Baseline Estimate
		Combined estimate:	39 months, on average
		Compared to non-participants, manufacturing participants were:	2.5 times faster to bring product to market
Cleantech Startup Growth	Decrease in Time to first customer/end-user for qualified client companies	Participant Survey (n=20), 20 of 48 participants had a product that was sold and provided a valid response	30 months, on average
		Non-participant Survey (n=5), 5 of 21 non-participants had a product that was sold and provided a valid response	76 months, on average

^a See section 4.4.5 for details on how each indicator was computed.

^b The team identified an outlier in both participant and nonparticipant survey data, whose values had no impact on the metrics reported above.

2.4 Incubator Resources and Sponsorship Leveraged

Table 12 provides baseline estimates of additional sponsorship leveraged by the NYSERDA-sponsored incubators. Since January of 2017 (just prior to the beginning of the CEF-funded Cleantech Startup Growth Initiative), incubators have leveraged \$1.3 million in public and private funding from sponsors other than NYSERDA. Incubators also have relied on approximately 300 service providers, mentors, and other stakeholders for product development and commercialization assistance to their client companies. On average, each client company reported using six unique services provided by its incubator. Top four services mentioned by the client companies included business plan or strategy assistance (85%), mentoring/training (79%), university resources (e.g., access to student/faculty talent, labs; 71%), and access to funders/investors (67%).

Incubator staff reported that coaching from incubator-affiliated advisors and mentors was the most beneficial service they provided to their client companies. Specific coaching mentioned by staff included business consulting, intellectual property consulting, and investment pitch coaching, all of which are generally provided either in-kind or at a reduced rate. Incubator staff reported difficulties in identifying suitable coaching professionals – that is, those who can add value when working with entrepreneurs and those who have a broad skill set that allows for effective client coaching. Additionally, incubator staff report finding it difficult to attract advisors and mentors who are willing to provide their services at low or no cost. For a description of how the team estimated each of these indicators see section 4.4.6.

Table 12. Baseline (2015-2016) Estimates for Incubator Resources and Sponsorship Leveraged

Outcome Indicator ^a	Source	Baseline Estimate
Dollar value of program funding from other sponsors leveraged by incubators	Incubator staff interviews (N=5)	\$1.3 million
Number of participating high-value service providers, mentors, and other key stakeholders in the program that incubators provide to client companies	Incubator staff interviews (N=5)	300
In kind (non-dollar) goods or services provided by sponsors to the incubators	Participant Survey (n=48)	6 services provided per client company, on average

^a See section 4.4.6 for details on how each indicator was computed.

2.5 Client Resources Leveraged and Satisfaction

Table 13 summarizes which incubator services the client companies leveraged and their satisfaction with each service they received. More than half of the client companies accessed business plan or strategy assistance, mentoring or training, utilization of university resources, office or lab space, access to investors, access to strategic partners, and/or legal, accounting, or administrative services. Those who leveraged these resources generally reported satisfaction with the services. Less utilized services (e.g., product validation) tended to receive lower levels of satisfaction except for business, marketing, and design services. Fewer participating client companies reported using these types of services but those who did reported high satisfaction, suggesting others may find value in these types of services.

Table 13. Incubator Resources Leveraged and Satisfaction

Service	Service Received	Satisfaction ^a		
		Satisfied	Neutral	Dissatisfied
Business plan or strategy assistance	85%	88%	12%	0%
Mentoring/Training	79%	92%	8%	0%
University resources	71%	88%	9%	3%
Office or lab space	67%	94%	6%	0%
Providing access to funders/investors	67%	84%	9%	6%
Providing access to corporate/strategic partners	58%	82%	11%	7%
Business services (e.g., legal, accounting, administrative support)	54%	96%	4%	0%
Providing access to customers/end-users	50%	71%	29%	0%
Technical assistance	44%	84%	16%	0%
Direct funding	27%	77%	15%	8%

Cleantech Startup Growth Initiative Baseline Study

Service	Service Received	Satisfaction ^a		
		Satisfied	Neutral	Dissatisfied
Product validation	27%	67%	33%	0%
Marketing and design services	23%	91%	9%	0%

^a Respondents rated each service using an 11-point scale where 0 is 'not at all satisfied' and 10 is 'extremely satisfied'. The team recoded the responses to: dissatisfied (0-3), neutral (4-6), and satisfied (7-10). No weight was applied.

3 Conclusions and Recommendations

Conclusion 1: NYSERDA’s incubator strategy has helped accelerate the growth of cleantech startups in NYS. The Cleantech Startup Growth Initiative is a continuation of NYSERDA’s cleantech incubator strategy (which the team refers to as the “legacy program”). The baseline indicators documented in this report capture the effect of the legacy program since the baseline represents a time-period prior to the Cleantech Startup Growth Initiative (when the legacy program was ongoing). During the baseline period, NYSERDA’s efforts reached a notable share (34%) of cleantech startups in the NYS market. The participating cleantech companies reported raising a substantial amount of capital, more than \$100 million, and they noted that incubator participation helped them accelerate the time to commercialize their products. Additionally, findings show a considerable decrease in commercialization time for participating client companies when compared to non-participating companies. Collectively, these findings suggest that NYSERDA’s incubator support via the legacy program has accelerated the growth of cleantech startups in NYS.

Conclusion 2: Many participating cleantech firms are still far from being profitable and can benefit from additional support. About 63% (96 of 152) of participating cleantech companies reported no revenues during the baseline period. Most have raised capital allowing them to continue with their product commercialization. However, nearly 40% noted securing financial capital or funding was their number one challenge. When asked what additional assistance would have been beneficial, the top response was support in securing funding followed by help with securing strategic partners. These findings point to the importance of NYSERDA’s ignition grant strategy – that is, infusion of capital to cleantech companies to help them attract follow-on capital and secure commercialization support from development partners.

Recommendation: Together with the incubator staff, investigate which participating cleantech companies are exceptionally successful in raising capital and why. Share any lessons learned from this investigation to help incubator staff more effectively respond to those struggling with securing funding.

Conclusion 3: Finding suitable mentors or coaches can be a challenge. Although incubator staff noted that mentors and coaches were plentiful, some had difficulties recruiting mentors or

coaches who are effective in leading companies to succeed. Some also noted issues in attracting mentors or coaches who are willing to devote the time for effective coaching at no or low cost.

Recommendation: Investigate incubator needs as they relate to professional staff coaching and mentoring and assess monetary requirements needed by current coaches and mentors to devote additional time to incubator client companies. This investigation will inform NYSERDA as to the best offerings to help incubators find effective coaches or mentors.

Conclusion 4: Information on the company ownership structure is needed to ensure that the sampling and analysis fully represents the population. The surveys implemented in this study did not explore the ownership structure of the companies. The team found an outlier in both participant and non-participant survey datasets. These outlier companies raised the most amount of capital, amounts substantially outside of the distribution of capital raised by other companies in the sample. The team believes, but could not fully verify, that the ownership structures of these companies make them unique and thus not representative of the larger population. For example, based on the online search, the outlier in the non-participant sample was a subsidiary of a larger company, relying on parent company funds to operate. The team, however, had insufficient information to assess whether any other companies in the non-participant and participant samples, as well as in the population, were subsidiaries of larger companies from which they could draw capital or resources. Knowing such information would enable the team to determine whether companies tapping the resources of a parent company are represented in the larger population of start-up companies.

Recommendation: Consider tracking the company ownership structure in program data and survey data in the next iteration of this study. This could be achieved through a secondary data analysis – that is, by tracking company information in commercial databases, such as Dun & Bradstreet.

4 Methodology

4.1 NYSERDA-Sponsored Startup Incubator Interviews

NYSERDA staff provided the research team with contact information for incubator staff. After an introductory email from NYSERDA staff, the team was able to schedule interviews with one to two contacts at each of the five incubators. The interviews took place in August 2017 and lasted approximately one-hour each. The team followed up with incubator staff via email with clarifying questions.

4.2 Participant Client Survey

To determine the sampling approach for the participating incubator client company survey, the research team first compiled a list of current, graduated, and terminated client companies for each incubator using Cleantech Startup Growth program data. The team then established quotas per each incubator group to ensure 80%/15% confidence/precision per incubator group was achieved (see Table 14). The team also monitored the sample to ensure it was representative of geography and to ensure enough survey completes were from client companies generating revenue. The incubator quotas helped ensure the team targeted startup firms in different regions of NYS.⁷

Note the team interviewed Binghamton incubator staff and learned that three clean energy companies will be enrolled in the NYSERDA-sponsored Southern Tier Clean Energy Incubator subprogram, which opened July 1, 2017. The team determined the population of client companies for this incubator is zero since these three companies were in the process of being enrolled.

Table 14. Participant Client Company Strata and Summary

Incubator (Strata)	Client Company Population at the end of Quarter 1 2017 ^a	Quota	Conf./ Prec.
ACRE	N=42 (15 current, 23 graduated, 4 terminated)	13	80/15
Venture Creations	N= 31 (10 current, 9 graduated, 12 terminated)	11	80/15
CEBIP	N=30 (13 current, 3 graduated, 14 terminated)	11	80/15
Clean Tech Center	N=44 (11 current, 9 graduated, 24 terminated)	13	80/15
Southern Tier	N=0 (0 current, 0 graduated, 0 terminated)	0	N / A

^a Source: Program data

⁷ Economic conditions of different regions served by incubators is an important consideration for this survey. The team used geography as a proxy for capturing information from firms operating under different economic conditions.

Incubator staff provided contact names, phone numbers, and email addresses for a majority of participating incubator client companies. For client companies the team did not have contact information for (primarily graduated and terminated companies), the team conducted internet search to locate phone numbers and/or email addresses. During survey fielding, the team made up to five attempts to contact client companies by phone and/or email, depending on available contact information. The team completed 51 surveys. Out of 51 surveys, one graduated client company from ACRE noted they are consultants and had not developed any products, reporting not applicable on most questions in the survey, and two graduated client companies from the Clean Tech Center left the incubator prior to 2015. The team excluded these responses from the analysis. That is, the team used a total of 48 surveys for the analysis.

The team conducted the surveys during September 2017 and with founders or senior staff at the companies who were enrolled (32), had graduated (12), or had been terminated (7) from one of the five NYSERDA-sponsored startup incubators in NYS (Table 15). Overall, the team surveyed a sufficient number of client companies across the five incubators to achieve 90% confidence and 10% precision. The number of completed surveys also provides 80%/15% confidence/precision per incubator group.

Table 15. Participant Client Survey Disposition

NYSERDA-Sponsored Incubators	Population of Client Companies	Quota	Total Completed ^a	Total Completed by Client Status		
				Current Client	Graduated	Terminated
ACRE	46	13	13	9	4	0
Venture Creations	32	11	11	8	3	0
CEBIP	30	11	11	9	0	2
Clean Tech Center	44	13	13	6	2	5
Southern Tier	0	0	0	0	0	0
Total	152	48	48	32	12	7

4.3 Non-Participant Survey

For the non-participating company survey, the team first examined two sources of data to identify an appropriate comparison group for the incubator client companies:

- The Innovation Capacity and Business Development (ICBD) master list of cleantech companies in NYS, developed by the authors of the ICBD cleantech market assessment study.⁸
- The NYSERDA Startup Growth Initiative program data, which included a list of 2016 and 2017 participants or those enrolled in the incubator programs that the team used to identify participant client companies from the ICBD master list.

The authors of the ICBD master list used eight data sources⁹ and targeted web searches to identify the population of NYS cleantech startup companies. The list included:

- 406 cleantech companies who were never enrolled in current or prior NYSERDA-sponsored incubators. (*Note the team eliminated more than half of these companies from the contact list because they were either not working on cleantech products, were not in NYS, or have received NYSERDA funding previously.*)
- 126 of 147 Q1 2017 participating cleantech companies.¹⁰

Survey fielding occurred in two waves: one in August/October 2017 and the other in January/February 2018. The team conducted internet search to find phone numbers and/or email addresses for all 406 non-participating cleantech companies. To reach the desired number of completes, the team attempted to contact all non-participating companies up to five times. To increase the response rate the team also offered respondents \$25 Amazon gift card for completing the survey. During survey fielding the team called all 406 cleantech companies referenced above and identified 191 companies who were not involved in the production or commercialization of a cleantech product or service (Table 16). An additional 33 companies (8%) reported receiving

⁸ Industrial Economics (2017). Characterizing New York State’s Cleantech Ecosystem and the Role of NYSERDA’s ICBD Program. Received study and supporting documentation from NYSERDA July 2017. The study report can be accessed at www.nyserda.ny.gov.

⁹ The data sources included: the Clean Energy Inventory (CEI) Database (produced by Meister Consulting Group for NYSERDA in 2016); 2) CBI Insights; 3) Cleantech i3; 4) Entrepreneurs in Residence (EIR) client data; 5) lists of companies participating in five of the six NYSERDA-sponsored incubators (provided by incubator managers in July 2016); 6) relevant companies that received R&D demonstration project funding from NYSERDA; 7) contacts provided by NYSERDA; and 8) relevant contacts suggested by Stage One participants of the IEc survey.

¹⁰ The team matched the participating firms in the program database to those in the ICBD master list.

some type of funding from NYSERDA in the past. The team also identified two duplicate records and one “mature” company that was founded in 1890. The team completed a survey with the mature company but after reviewing responses decided that the firm is not a start-up company and should not be included in the non-participant start-up company population. Excluding these companies from the original population of 406 decreases the total population of non-participating cleantech companies in NYS to 143 companies.

Table 16. Final Non-Participant Population

Region	Original N	Companies Excluded from Population					Revised N
		Non-Cleantech Co.	Non-NYS Co.	Received NYSERDA funding	Mature Company	Duplicate Record	
New York City	152	84	12	5	0	1	50
Central New York	45	20	1	5	0	0	19
Western Finger Lakes	48	12	4	7	0	0	25
Long Island	35	11	4	2	0	1	17
Other region	126	64	15	14	1	0	32
Total	406	191	36	33	1	2	143

The team also reclassified 32 records noted in the “other region” in the above Table into the closest region served by one of the five NYSERDA-sponsored incubators. The team reclassified:

- 12 records into the New York City (NYC) region (The NYC region is served by ACRE.)
- 11 records into the Central New York region (This Central New York is served by Clean Tech Center and Southern Tier Binghamton Incubator.)
- 9 records into the Western Finger Lakes region (This region is served by Venture Creations).

Table 17 provides a disposition summary from the non-participant survey. Out of 143 contacted non-participating cleantech companies, the team was able to complete 21 surveys to achieve a 15% response rate. The team determined that about one-third of companies (34%) in the revised population were likely cleantech companies but were out of business. Overall, the team surveyed a sufficient number of non-participating companies to achieve 85% confidence and 15% precision.

Table 17. Non-Participant Survey Disposition

Region	Revised Population N	Total Completed	Disposition		
			Out of Business ^a	Refusal	Called not Reached
New York City	60	10	22	2	23
Central New York	32	4	9	0	19
Western Finger Lakes	34	4	9	3	17
Long Island	17	3	9	1	4
Total	143	21	49	6	63

^a Includes 32 records that were confirmed to be out of business and 17 records that had bad phone numbers and no alternative number was available when the team looked up their information online. The team assumed that these 17 records are out of business.

4.4 Outcome Indicator Analysis Methods

The following section provides details of the research team’s analysis methods for each outcome indicator described in Chapter 2.

4.4.1 Products Commercialized and Manufactured

Products Commercialized

The team summed the weighted number of commercialized products that the 48 participating client companies and 21 non-participating companies reported in 2015 and 2016 to obtain a relevant population estimate. Table 1 and Table 2 in Appendix A provide details on the weighting approach.

Cleantech products manufactured total

The team summed the number of cleantech products that the 25 participating client companies and 15 non-participating companies involved in manufacturing reported manufacturing in 2015 and 2016. The team also estimated the number of manufacturing firms in the participant population (that is, the population of manufacturing firms affiliated with the NYSERDA-sponsored incubators) and in the non-participant population based on the proportion of manufacturing firms in the samples. Tables 3 and 4 in Appendix A provides details on the weighting approaches used for these analyses to extrapolate from the sample to the subpopulation.

Cleantech products manufactured in NYS

Among the 25 manufacturers in the participant sample, 11 reported their product was market ready, and of those, four reported manufacturing a product in 2015 or 2016. These four noted

50% of their commercialized products in the baseline period were manufactured in NYS. Similarly, the team found that among the 15 manufacturers in the non-participant sample, seven reported manufacturing their product in 2015 or 2016. Those seven noted that 61% of their products in the baseline period were manufactured in NYS. The team applied these proportions to the total number of products manufactured in the participant and non-participant populations to estimate the number manufactured products in NYS.

4.4.2 Cleantech Product Revenues

Revenue generated by clients and graduates

For this indicator, the team relied on program revenue data for Q1 2015 through Q4 2016, excluding any quarters prior to a client company's admission to the incubator.

Revenue generated by companies producing cleantech products

After matching program revenue data to surveyed participating client companies, the team divided the total revenue reported by surveyed manufacturing companies by the total revenue reported by all surveyed companies and applied that proportion to the total revenue reported in the program data for Q1 2015 through Q4 2016 to estimate revenue of the manufacturing firms in the participant population.

4.4.3 Number of Cleantech Product Deals

Number of deals

Surveyed participating client and non-participating companies reported the number and amount of capital investment they secured from the following sources: Corporate investors, angel investors, later-stage venture capital investors, public equity, and private equity. They also reported receiving capital investments from founder's own funds, friends or family, grants, funding from incubators, seed/early stage venture capital, or competition/awards, which the team excluded from this analysis. That is, the team counted later stage private investment deals only. Surveyed participating client and non-participating companies also reported developing partnerships to secure capital funding, receive help with distribution resources, and receive assistance with marketing/business development and manufacturing, which the team also included in its estimates of the number of agreements. The reported information reflected investment or partnership agreements in 2017 and preceding years. The team normalized this data to the baseline period by multiplying the number of deals reported by 63% or 70% (the proportion of products commercialized between 2015 and 2016 among participants and non-participants,

respectively). The team then applied the weights to extrapolate from the sample to the population (see Table 1 and Table 2 in Appendix A).

Agreements to invest in cleantech startup companies signed

The team developed the estimate using the same methodology as above using responses from surveyed participating client companies and non-participating companies. The team normalized the data to the baseline period by multiplying the number of agreements reported by 62% or 70% (the proportion of products commercialized in 2015 and 2016 among those participants and non-participants involved in manufacturing, respectively). The team then applied the weights to extrapolate from the sample to the population (see Table 3 and Table 4 in Appendix A).

4.4.4 Cleantech Product Investment Estimates

Private Investment – client companies

Surveyed participating client and non-participating companies reported the amount of private investment raised, including both initial and follow-on capital from the following sources: founder's own funds, friends and family, angel investors, seed/early stage venture capital, later stage venture capital, public equity, private equity, project finance, and other sources of investment. Surveyed companies also reported grant and award funds (public investment) as well as incubator funds, all of which the team excluded from this analysis. Surveyed participant client companies reported total amounts, by source, of private investment they received between Q1 2015 and the time of the survey in late Q3 2017. Surveyed non-participating companies did not specify funding amounts by source but instead provide the total amount of funding. For non-participants, the team excluded funding amounts from those companies who received funding from public sources only (five companies) or who reported receiving both public and private funding (one company). The team normalized these total amounts to the 2015-2016 baseline period by multiplying dollars reported by the proportion of products commercialized in 2015 and 2016 versus products commercialized in 2017 (63% for participants and 70% for non-participants). The team then applied the weights to extrapolate from the sample to the population (see Table 1 and Table 2 in Appendix A).

Private Investment - \$ leveraged by incubators through sponsors other than NYSERDA

The team summed up all funding (whether public or private) from incubator sponsors other than NYSERDA as reported by incubator staff. Incubators also reported the amount received in rent from their client companies, which the team excluded from this analysis.

Dollar value of follow-on capital raised by client companies

The team summed up the follow-on capital investments participating client and non-participating companies reported receiving. The team normalized these total amounts to the 2015-2016 baseline period by multiplying dollars reported by the proportion of products reported to be commercialized in 2015 and 2016 versus products commercialized in 2017 (63% for participants and 70% for non-participants). The team then weighted the survey respondent values to extrapolate to the population (see Table 1 and Table 2 in Appendix A).

Dollar value of capital provided by the ignition grants

Three participating client companies reported receiving ignition grants totaling \$26,000. Since, at the time of this study, NYSERDA had not yet offered ignition grants the team hypothesizes that these three client companies confused funding received through the incubator for NYSERDA ignition grants. The team estimates the value for the ignition grants to be \$0 in the baseline period.

4.4.5 Cleantech Product Development and Commercialization Time

Time to market for client companies

For this analysis, the team used responses from 23 surveyed participating client companies and eight surveyed non-participating companies who reported having a product that was ready for market and provided valid response. The team then computed the average number of months between the time participating and non-participating companies reported beginning working on developing or commercializing the product and the time they reported completing the validation of the product in a commercial environment.

Time to market for client companies

For this analysis, the team used responses from nine surveyed participating client companies and four non-participating companies involved in manufacturing who reported having a product that was ready for market and provided valid response. The team then computed the average number of months between the time participating and non-participating companies involved in manufacturing reported beginning working on developing or commercializing the product and the time they reported completing the validation of the product in a commercial environment.

Time to first customer/end-user for qualified client companies

For this analysis, the team used responses from 20 surveyed participating client companies and five non-participating companies who reported having a product that was at the initial sales stage

and provided valid response. The team computed the average number of months between the time participating and non-participating companies began working on developing or commercializing the product and the time their product was first purchased by customers or other end-users.

4.4.6 Incubator Resources and Sponsorship Leveraged

Dollar value of program funding from other sponsors leveraged by incubators

The team summed all funding (whether public or private) from incubator sponsors other than NYSERDA. Incubators also reported the amount received in rent from their client companies, which the team excluded from this analysis.

Number of participating high-value service providers, mentors, and other key stakeholders in the program that incubators provide to client companies

The team asked incubator staff how many mentors, advisors, and other stakeholders were affiliated with their incubator. The team counted all these mentors, advisors, and other stakeholders as high-value service providers.

In kind (non-dollar) goods or services provided by sponsors to the incubators

Although incubator staff reported a large proportion of services they provide are in-kind, they were unable to provide sufficient detail about in-kind services. Thus, the team relied on the data from the participant survey to estimate the average number of unique and in-kind incubator services used by client companies. Surveyed participating client companies were asked to report the way in which the incubator supported their product development or commercialization and were given the following response options: office or lab space, mentoring/training, technical assistance, business plan or strategy assistance, university resources, business services, marketing and design services, product validation, direct funding, and providing access to funders/investors, corporate/strategic partners, and customers/end users. The team excluded office and lab space and direct funding by the incubator from this analysis because those services were not provided in-kind to the companies.

4.5 Limitations

Limitation 1 – Gaps in the data: The team found an outlier in both participant and non-participant survey data. The outlier company in each dataset raised the most amount of capital and the amount raised was substantially outside of the distribution of capital raised by other companies in the sample. This is concerning since the team could not determine whether the outlier in the sample had any correlates in the larger population and thus would be appropriate to

include for representativeness. For example, based on the online search, the outlier in the non-participant sample was a subsidiary of a larger publicly traded company. That outlier reported relying on funds from the parent company to operate. The team, however, had insufficient information on whether any other company in the non-participant and participant samples, as well as in the population, were subsidiary of a larger publicly traded company or parent company. Such information is needed to ascertain whether the subsidiary companies are representative of the population of cleantech start-ups and, therefore, should be included in the analysis.

Note since the team could not determine whether to exclude the outliers from the analyses, the team calculated and reported the indicator values with and without the outliers.

Limitation 2 – Self-reported data: Survey, interview, and program data in this study are self-report data. Self-report data may suffer from multiple limitations, such as respondents may have exaggerated their answers or respondents may have forgotten to report a key detail.