



Sustainable Green Technologies

<https://www.youtube.com/watch?v=DZc3ttYNv8E>

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SGTech Vision

- Boost biogas productivity from livestock waste
- Reduce environmental pollution
- Enhance nutrient recovery from waste
- License SGTech technology to biogas developers across the globe



SAFE WATER

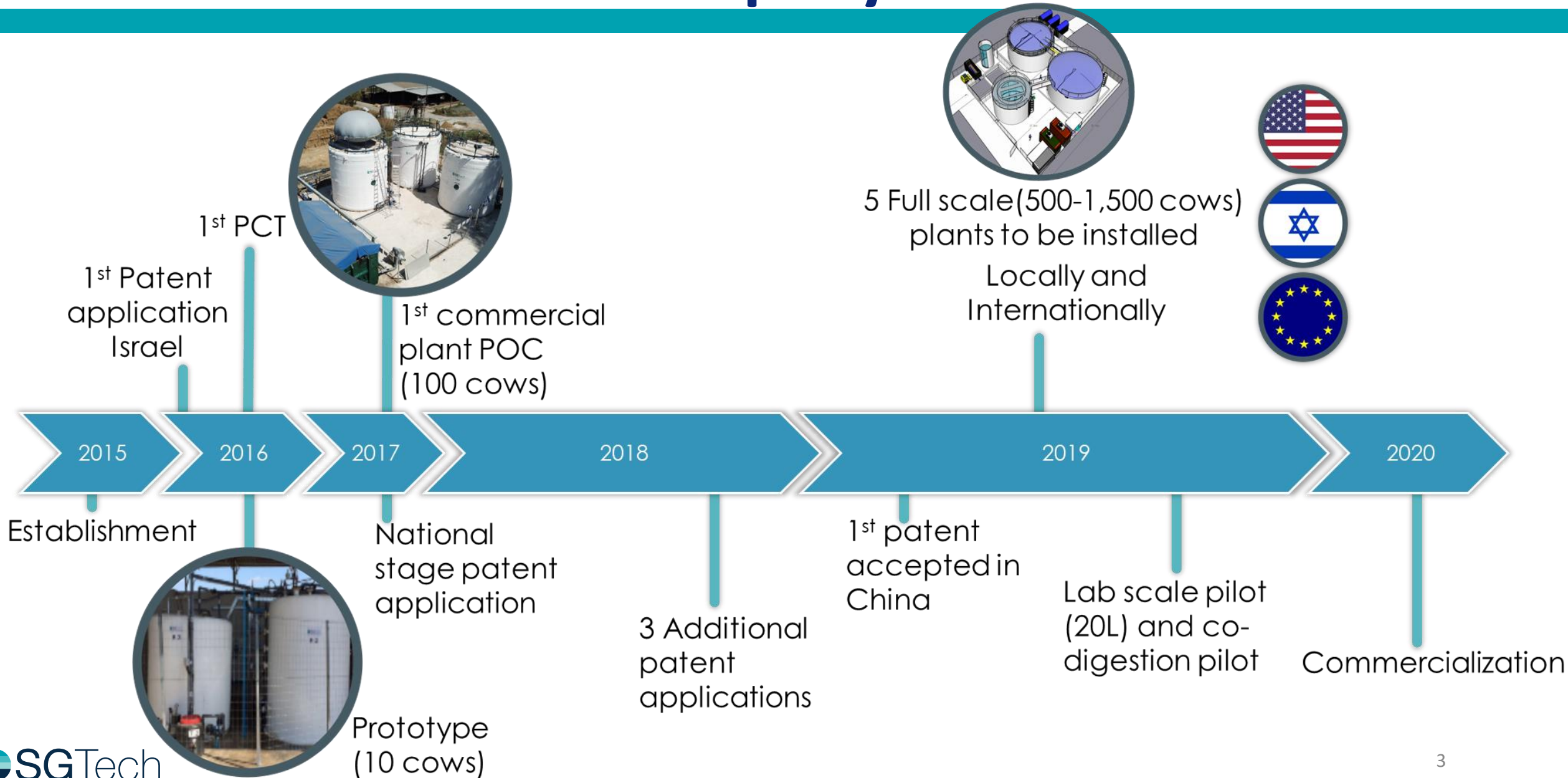


SAFE FERTILIZER



CLEAN ENERGY

SGTech Company Timeline



The Need

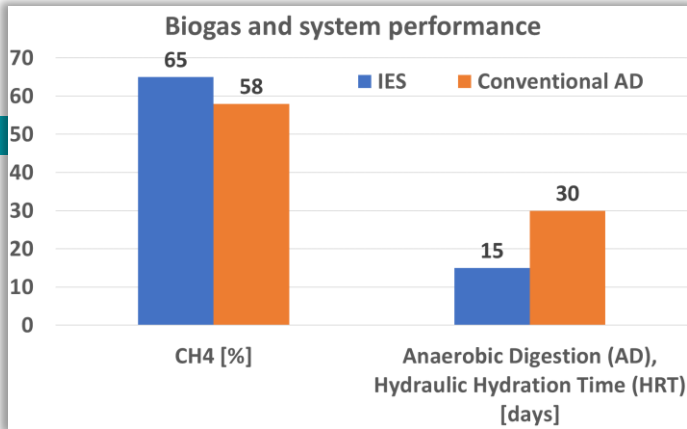
- Current Anaerobic Digestion (AD) technologies produce a high-nutrient byproduct called **liquid digestate**
- Digestate poses long-term risks to **soil, water, and air quality** due to high nutrient leaching and runoff
- Increasing environmental regulations → strict nutrient management + higher costs ≠ traditional AD technologies
- Smaller farms in particular are left without sustainable treatment solutions



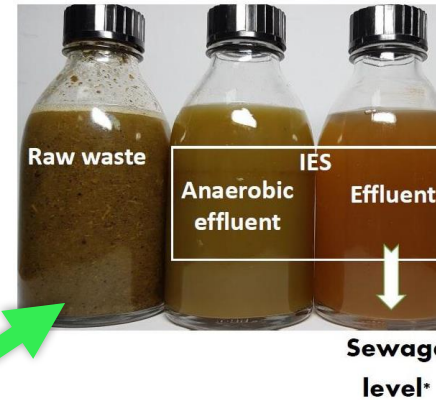
How do we maximize energy production while effectively mitigating existing environmental threats and attaining regulatory requirements, but in a cost-effective manner?



SGTech's solution

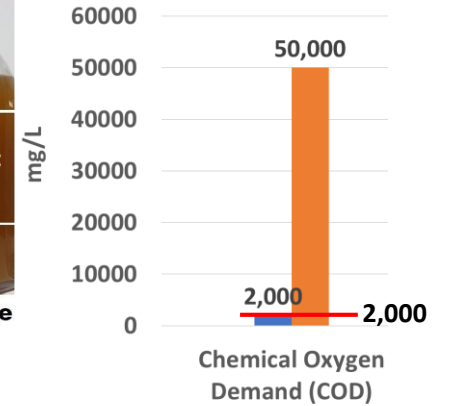


Treated water quality

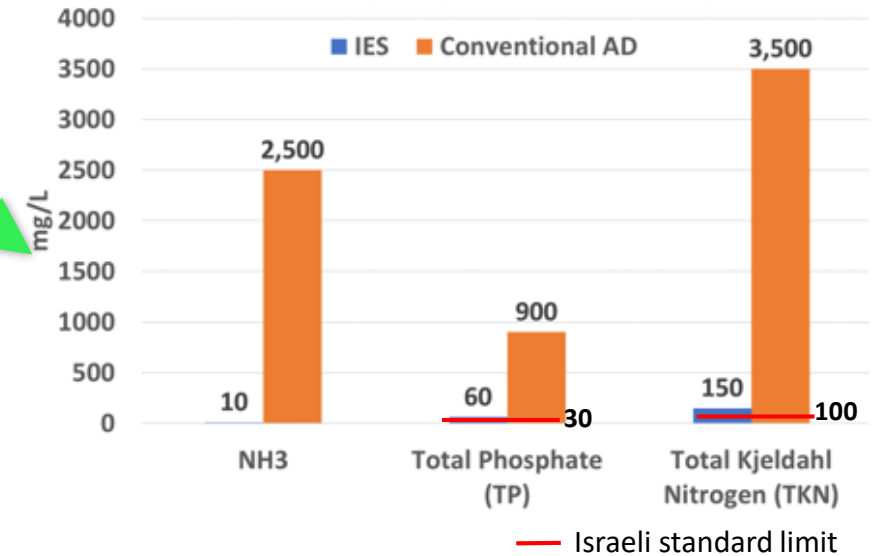


* According to the strict Israeli regulation

Treated water quality: organic load removal



Treated water quality: nutrient recovery



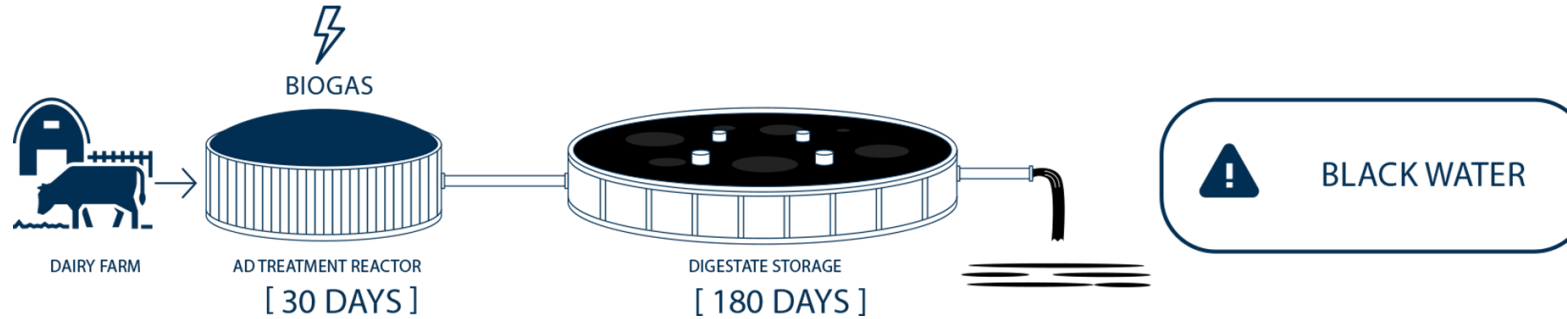
Cow manure
Milking parlor waste



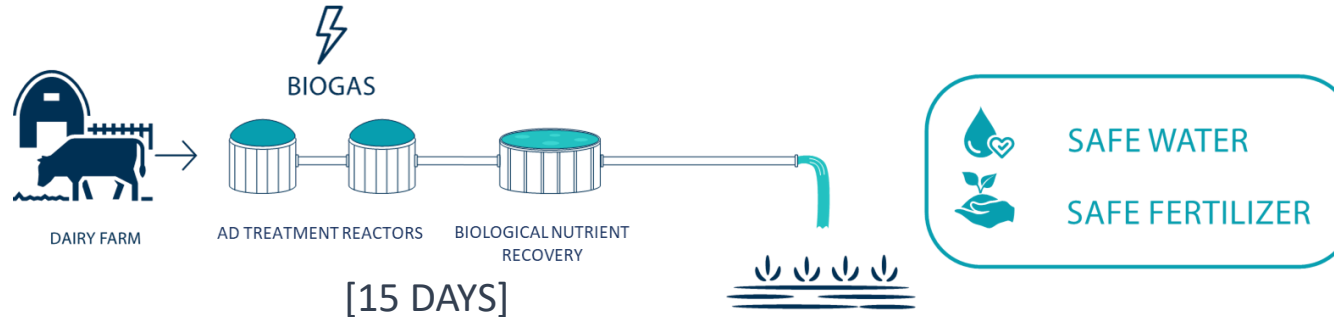
- C/N=13
- Undetected *E.coli* and *Salmonella*

SGTech- The innovation

Conventional biogas process:



SGTech advanced biogas process:



- **SGTech's Integrated Ecosystem Solution (IES)** —proprietary software driven process which enhances the digestion of organic livestock waste

- **Algorithmic Approach**— IES uses algorithms to simultaneously achieve AD and nutrient recovery

- **Accelerated Biology** — IES greatly accelerates the digestion process (60% faster than typical AD) using smaller facilities and smaller capital requirements

- **Smaller Dairy Solution**— SGTech's technological breakthrough provides the most economically viable solution for small and midsize dairies

SGTech solution- advantages

- ***Greater Environmental Impact than Traditional AD***

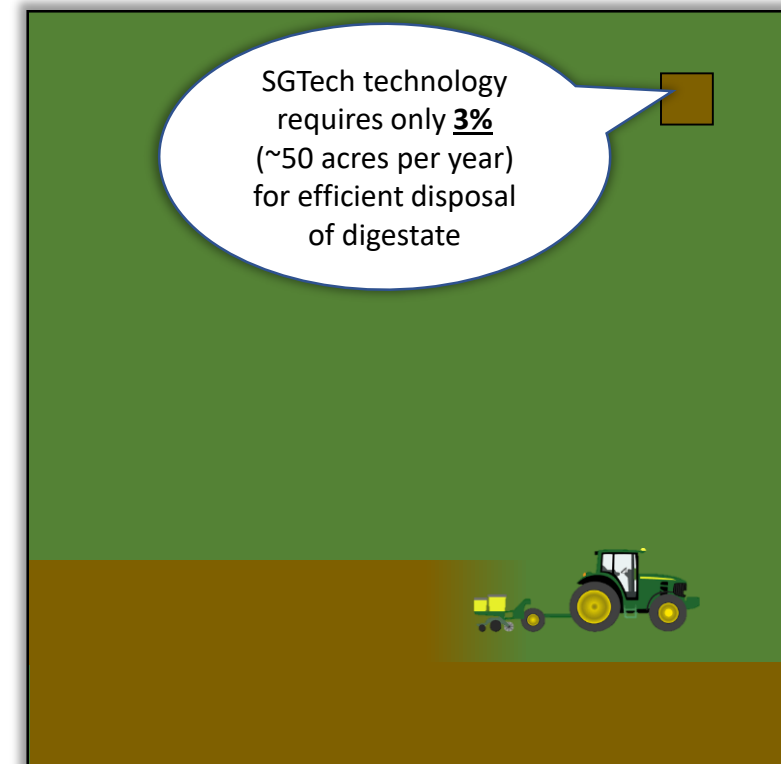
- Removal of nitrogen, phosphorus, and sodium from waste stream
- Reduction of organic load fit for sewage acceptable level
- Reduction of odor and air pollution
- The process does not produce separated liquor, which in turn allows more free land for agriculture and prevents soil salinity, leaching and runoff.

- ***Cost Effective***

- 10% greater methane concentration in biogas = more energy
- Less waste nutrient loads = less post-processing costs
- Less digestate management = less storage and transportation costs

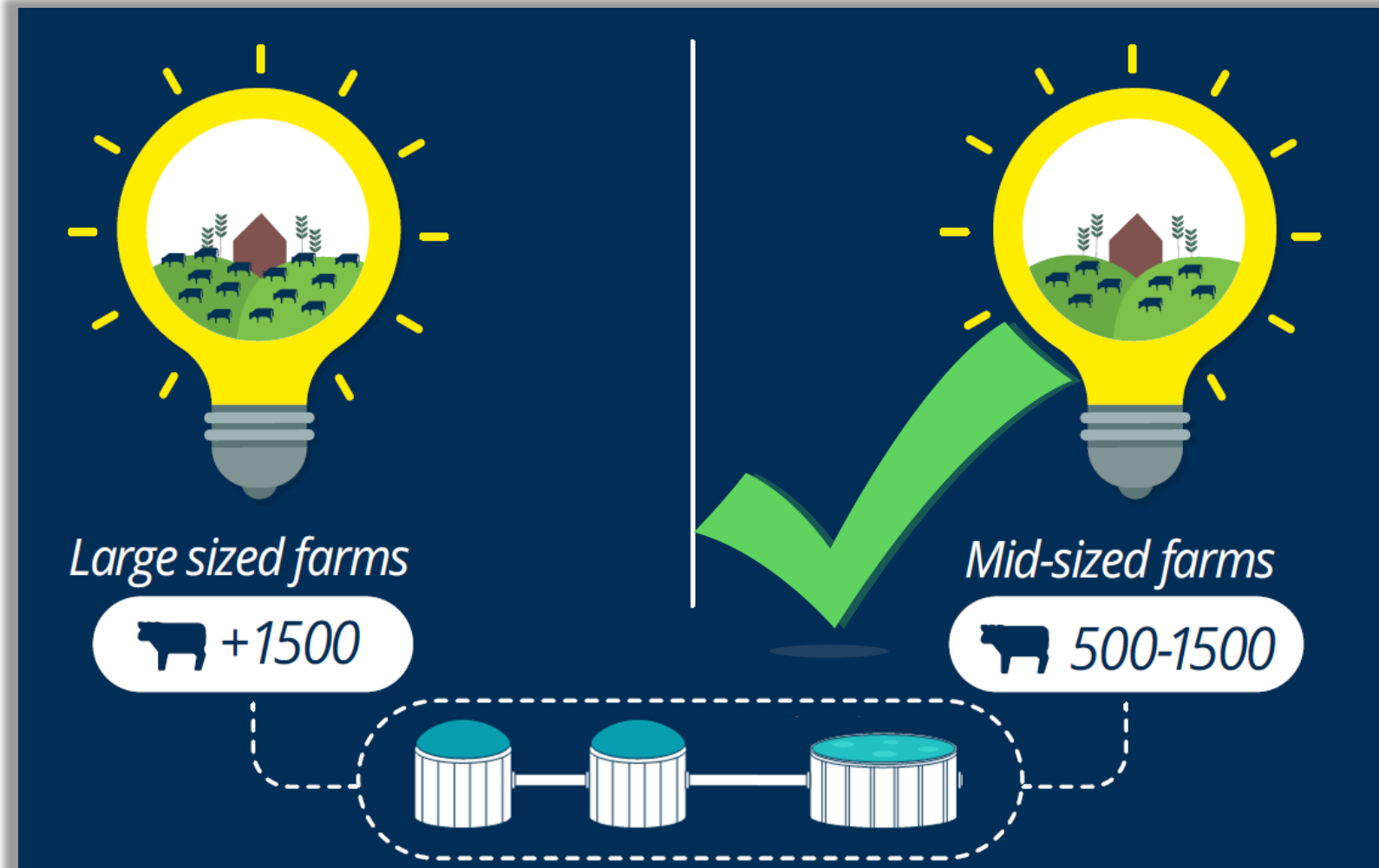
- ***Local, Simple Solution***

- No manure transportation costs
- Lower investment risk – smaller facility with single farm dependency



SGTech's economic solution

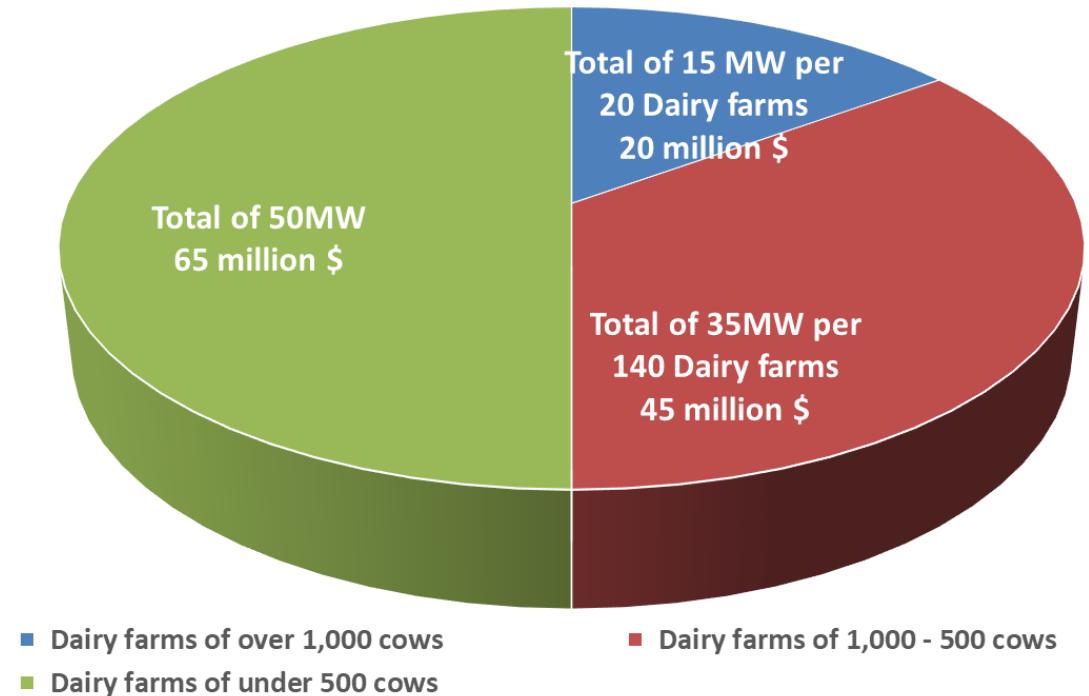
- Mid-sized dairy farms (500-1500 cows) currently **do not have any economical solution** for manure treatment.
- Mid-sized dairy farms are estimated to be at least 60% of the dairy farm industry in the US.
- Implementing SGTech's technology in the mid-size farms will open new market opportunities.



Market and marketing → Israel Market

- The Israeli government has set a goal of 20% reduction of use of fossil fuel till 2020. The government is indorsing and funding projects which show promise in renewable energy sources.
- The government has dedicated 100MW for electricity produced solely from biogas, however this potential is unexploited¹.
- At least 50MW can already be produced just by implementing SGTech's technology on mid-sized farms in Israel, making an annual income of 65 million \$.
- A new reform is about to take place for lowering milk costs, this with encourage small farms to collaborate which will result is an increase is the number of mid-sized farms, increasing SGTech's potential market.

Distribution of 100 MW-
Governmental target for electricity Production until 2020 (In Israel)



* Data according to the Israeli Dairy Board

Market- USA and Europe

Livestock AD represents a multi-billion dollar global energy market
US market saturation is currently <5%

250 existing A.D.
systems out of
8,000 potential
ones



USA

17,000 existing
systems out of **50,000**
potential ones



Europe

Livestock	# of potential farms	Energy Generating Potential		
		MW	MWh/year	\$/year
Swine	5,406	837	6,597,520	660M\$
Dairy	2,704	1,172	9,240,893	925M\$
Total	8,110	2,009	15,838,413	1.58B\$

USA: ABC Current and Potential Biogas Production, 2015

Europe: K. Hjort-Gergesen *et. al.* Market overview micro scale digesters, 2015

*US Market Analysis via 2018 EPA Report

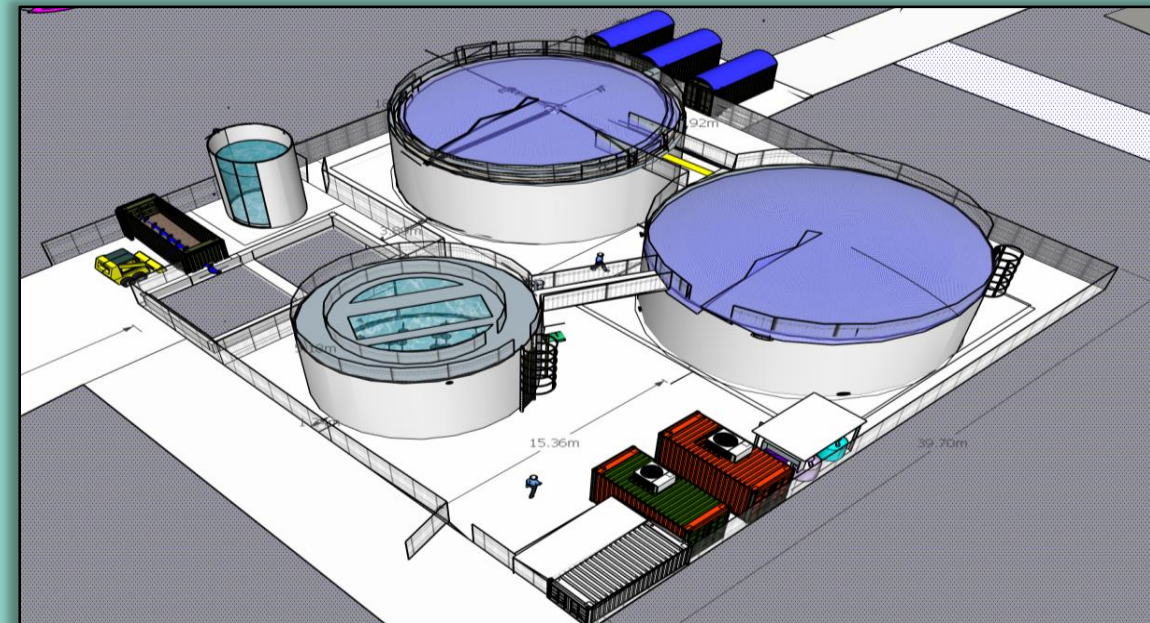
Future perspectives

- Pipe-line: 5 full-scale (~1,000 cows) projects in various stages of design for dairies in Israel
- Cooperation with well-known biogas companies in Europe and the US

Typical project of 1,000 cows

Total treated flow (m³/year): 50,000
Biogas production (m³/year): 1,700,000
CHP capacity (kW): 500
Electricity Production (kWh/year): 4,100,000
Facility size (acres): 0.42
Est. Project Cost (USD): \$2.7M
Est. Project Revenue (annual, USD): \$680,000

* The precise parameters will be provided upon request as each project is tailor-made per dairy-farm



R&D capabilities

- Facilities:

3 scale pilots: Enables developmental experiments

1. Lab scale (20L)
2. 10m³
3. 100m³

- In-house lab: Enables the continuous measurement of a variety of parameters

- R&D projects :

- Co-digestion with different agricultural wastes
- Improving the algorithm by machine learning techniques
- Academic collaborations:
 - Bar-Ilan- further improving the effluent treated water
 - BGU- Evaluation of the development of the microbial populations from starting inoculum until steady state, for further improvement and development.



SGTech Team

- Strong executive team with extensive wastewater industry experience, engineers, microbiologists, algorithm experts and technicians
- Privately owned company



Adam Schreiber
Business Development



Irena Solomon
Laboratory technician



Mark Kahan
Finance

Appendix

Digestate: EPA Opinion Related to New AD Plants

$$\begin{array}{l} 1,000 \text{ cows} = \sim 55,000 \text{ m}^3 \text{ waste/year}^1 \\ \hline \frac{55,000 \text{ m}^3 \text{ waste/year}}{5 \text{ m}^3 \text{ waste/dunam/year}} = 11,000 \text{ dunam} \end{array}$$

בהתאם למגבלה ליישום החנקן בקרקע ומניעת זיהום מי, נקבע מינון מרבי של כ-5 מ"ק/דונם/שנה. אציין כי מינון זה נקבע לתקופה זמנית ומוגבלת בלבד, זאת לאור בחינת ההשפעה כאמור של הפיזור על הקרקע, ולאור העובדה שאנו עדים לזיהום של מי תהום באזורים בהם יש פיזור של מי נטל לאורך זמן.

¹ 80 L/d/c manure & urine + 80 L/d/c parlor water

המשרד להגנת הסביבה
מדינת ישראל – המשרד להגנת הסביבה
אגף סביבה חקלאית

16-ינואר-19
י' שבט תשע"ט

לכבוד
ד"ר ראובן איתן
מנהל מו"פ וקניין רוחני
אס. גי. טי. טכנולוגיות ירוקות בע"מ.
שלום רב,

הנדון: בקשה להיתר פיזור דיג'סטאט (digestate) /או מי תסנין במתקן קצה לטיפול בשפכי רפת בקיבוץ גבעת חיים מאוחד

רקע:

מתקן לטיפול קדם בשפכי רפתות אמור להביא את איכות השפכים לכזו הניתנת להזרמה למערכת הביוב הציבורית. בתהליך הטיפול במתקן, נוצרים מספר זרמים וביניהם רכז של חומר מעוכל (דיג'סטאט) – נסחט או שאינו נסחט.

בהתאם למגבלה ליישום החנקן בקרקע ומניעת זיהום מקורות מים, נקבע מינון מ"ק/דונם/שנה. אציין כי מינון זה נקבע לתקופה זמנית ומוגבלת בלבד, זאת לאור זמן.

חשוב להדגיש כי ייתכן שמינון זה יופחת בעתיד על מנת להבטיח מניעת זיהום למציאת פתרונות הולמים לזרם זה שימנעו את המשך הזיהום.

בכל מקרה של יישום כאמור בקרקע, יש לוודא כי היישום תואם את הצגת הפיזור וההצנעה בפועל לא גורמים לזיהום מקורות מים בפועל ומפגעי ריח והפצת זבובים.

לעניין אצירת החומר, ניתנות הנחיות מחייבות תוך התייחסות פרטנית לפוטנציאל זיהום הסביבה (חלחול וגנירה) והפוטנציאל למפגעי ריחות וזבובים ממתקן האצירה.

בברכה,
אבי רדאע

מנהל אגף סביבה חקלאית.

העתקים:

מר אלון זסק, סמנכ"ל בכיר למשאבי טבע-כאן.
מר שמעון הורן, חברת אס. גי. טי. טכנולוגיות ירוקות בע"מ.
ד"ר אילן צדיקוב, ראש תחום פרויקטים.