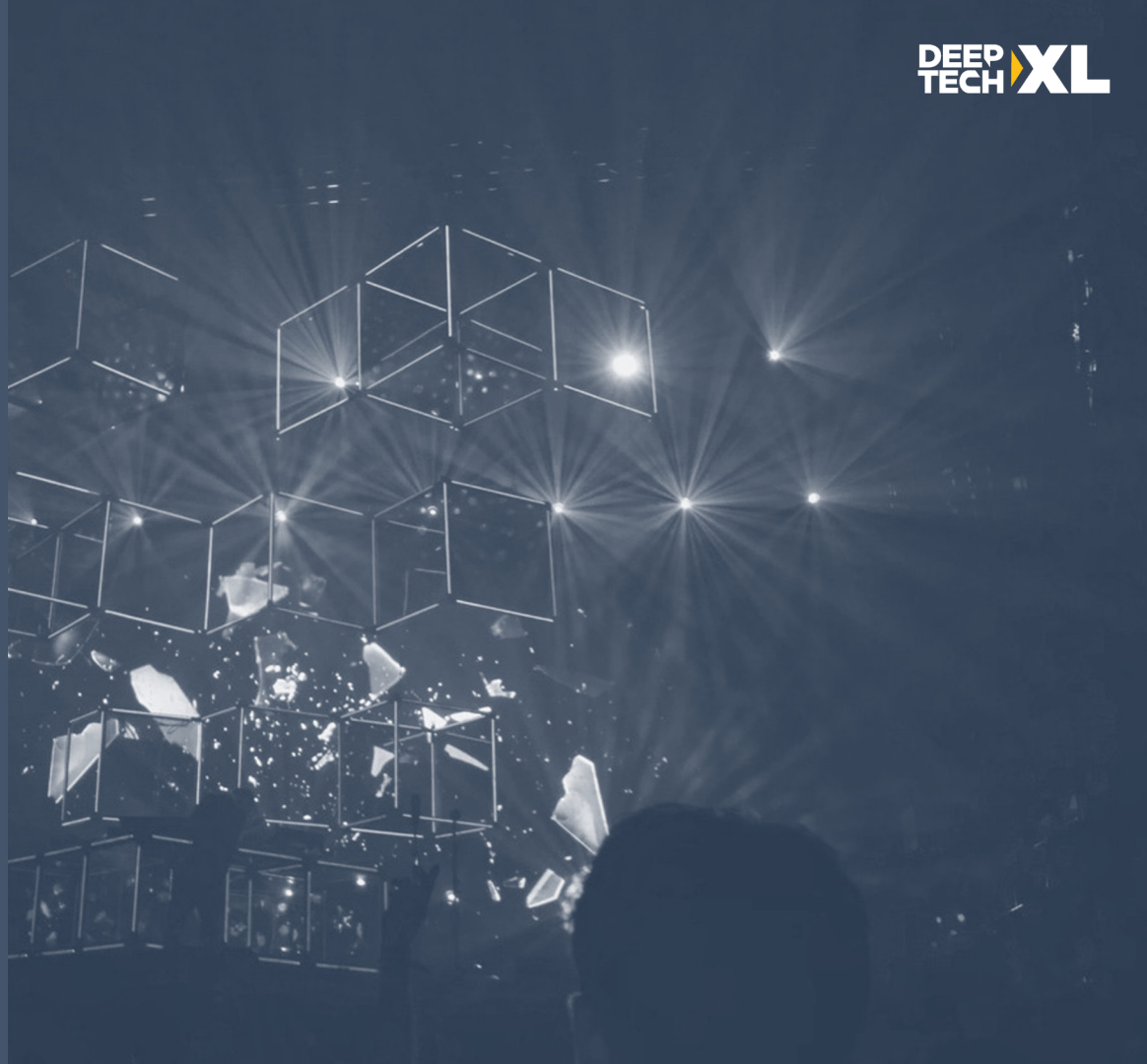
IMPACT REPORT 2023







“We believe that the most pressing global environmental and social challenges can only be solved by new ventures through disruptive technologies.”

Teska van Vuren
Managing Partner DeepTechXL

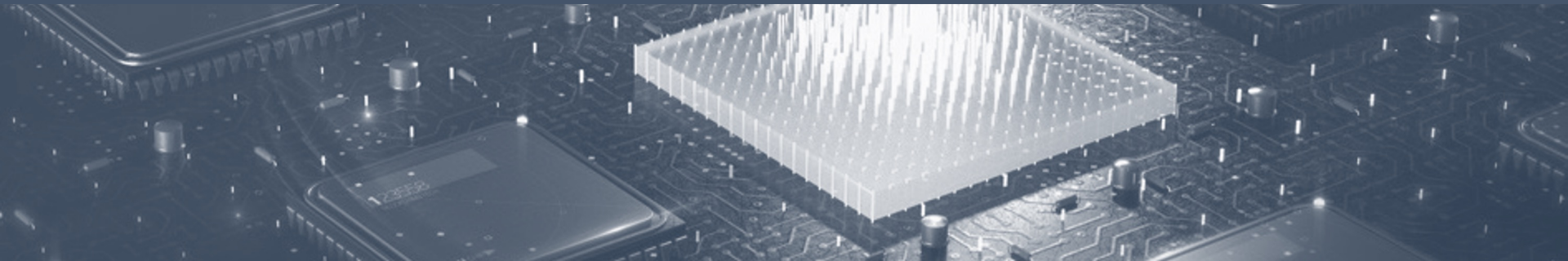


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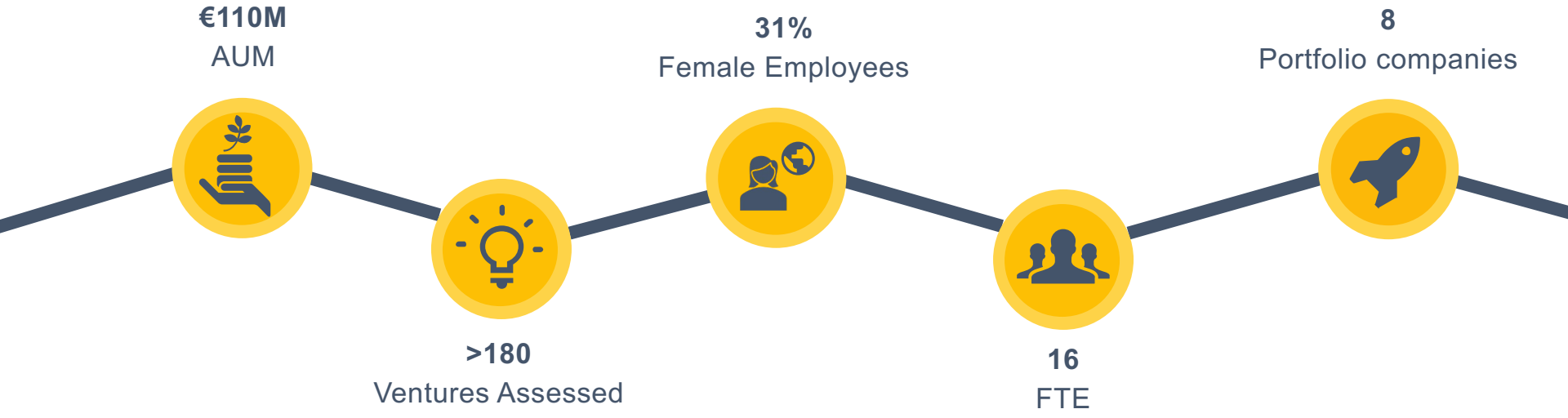
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About DeepTechXL



DEEPTECHXL IN A NUTSHELL

2023



Signatory of:

PRI Principles for Responsible Investment

Member of:

#fundright

ESG _VC

2023 HIGHLIGHTS

2023 marked the first full calendar year of DeepTechXL. In 2022 we started living our dream as we were overwhelmed with investment proposals and made our first investments. In 2023, we continued this journey by assessing over 180 promising deep-tech ventures and making 5 new investments: Keiron Printing Technologies, Sandgrain, Delft Circuits, Superlight Photonics, and Senergetics. Great companies with bold ambitions to make a significant impact on the world's grand societal challenges.

"We are convinced that with our fund and the strong support of our partners, we are going to make a positive impact on the creation of new fast growing deep-tech companies."

GUUS FRERICKS
FOUNDER & MANAGING PARTNER



2023 SUSTAINABILITY & IMPACT HIGHLIGHTS

2023 also marked the year that we created a solid foundation of our sustainability and impact strategy and methodologies. We have finished our sustainability policy, created our SFDR Article related documents, created our assessment tool, fully embedded the impact game plan in our standard way of venture support, and filed the UN PRI report for the first time.



DEEPTECHXL: MISSION, VISION, STRATEGY, VALUES AND CULTURE



Our vision

Disruptive entrepreneurial ventures developing and commercializing disruptive 'deep-tech' innovations solving the global grand challenges societies are facing

Our mission

We provide disruptive deep-tech ventures with access to capital, knowledge and network to help them realizing their venture dream and whilst doing so, deliver superior return-on-investment and make positive impact

Our strategy

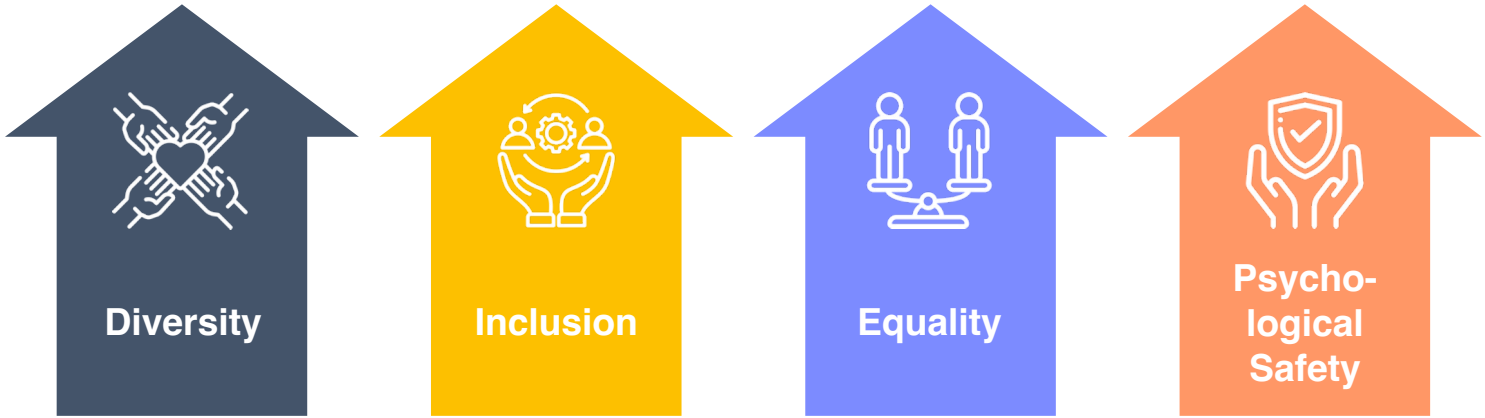
We invest in early stage financially lucrative and impactful projects related to key social themes:

- Health and care
- Energy transition and sustainability
- Security
- Agriculture, water, and food

DEEPTECHXL: OUR BELIEVES, VALUES AND CULTURE

Our believes

We believe in **THE DREAM** of making a positive impact on the grand challenges society is facing. We aim to make a real difference as a diverse fund team, being very well connected to the Dutch deep-tech industry and rooted within the Brainport ecosystem.



DEEPTECHXL PORTFOLIO IMPACT

2023

29%
Non-Dutch FTE

108
Total FTE Created



24%
of Workforce
is Female

38%
Of our ventures
have Female
Co-Founder(s)

The Dutch Tech Sector is Still Dominated by Male Founders & Employees

In 2021 only 1.1% of VC capital in Europe went to female teams. In the Netherlands only 16% of VC firms invest in mixed or female start-up teams. Moreover, 90% of Dutch founders in the startup ecosystem are male, making it less gender diverse than Germany (87%), Sweden (89%), and the UK (87%). In addition, only 10% of all (co-) founders in the Dutch startup ecosystem are female, while women make up 18% of the total Dutch digital industry. Moreover, in March 2024, the Economist stated that the Netherlands is ranked #23 in their annual glass-ceiling index, below the OECD average. Overall, there is clearly much untapped potential in the Netherlands when it comes to female entrepreneurship.

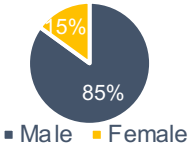
We Walk The Talk

We believe that truly diverse and inclusive teams perform better, because more perspectives are brought to the table when discussing challenges, solutions and impact. As such we consider team (and community) diversity and inclusion differentiating business assets. DeepTechXL strives to invest in companies that are consciously focused on a diverse leadership team. One that is inclusive across gender, ethnicity, age, sexual orientation, disabilities and national origins. We are very proud members of a diverse team and nurture our 'The Dream' culture and values. In 2023, we invested in 2 female co-founder teams (40% of our investments), compared to 33% in 2022. We want to improve further. We need to move the needle faster if we want to achieve our common goal and that is to achieve the best performance on impact and growth in a more diverse ecosystem.

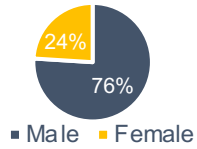
Diversity and Inclusion are Key Business Assets

Portfolio Company Diversity Metrics:

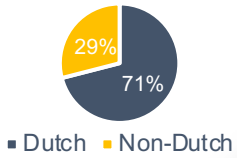
Gender diversity Founders



Gender diversity Team

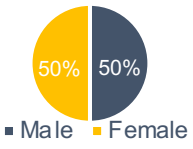


Cultural Diversity

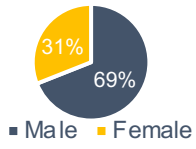


DeepTechXL Fund Team Diversity Metrics:

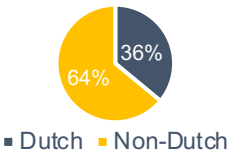
Fund Leadership



Gender diversity Team



Cultural Diversity





2

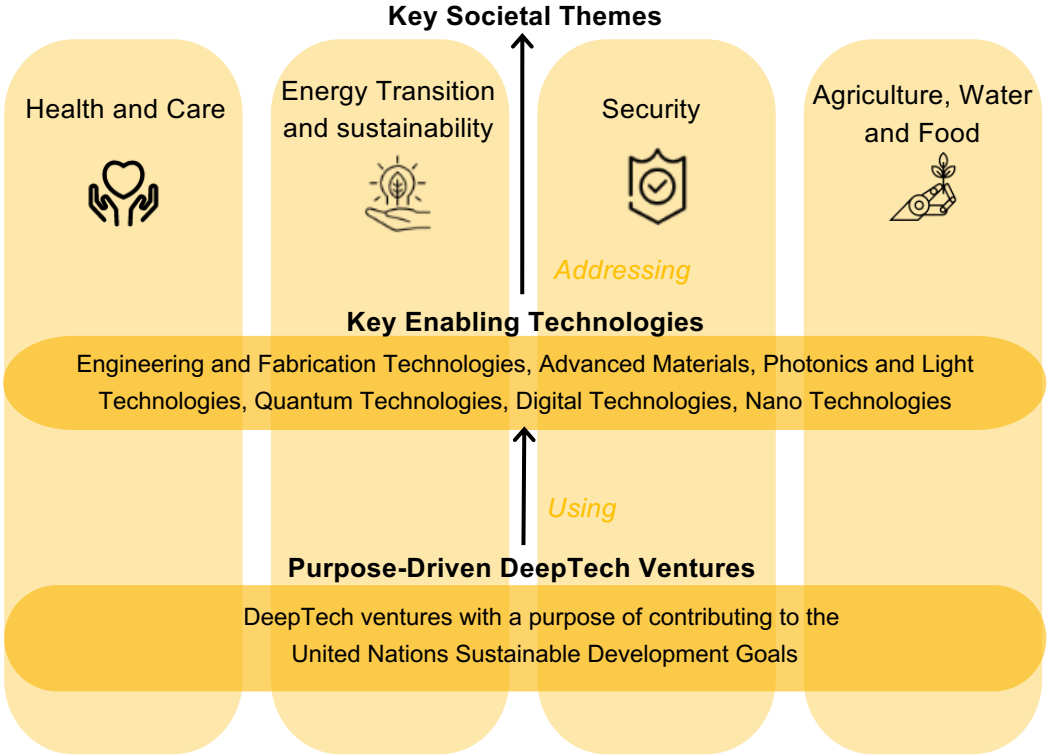
DeepTechXL Sustainability Strategy



Our Investment Strategy

We are committed to invest in game-changing deep-tech ventures in the areas of Health & care, Energy transition & sustainability, Security and Agriculture, water & food. We chose these themes for two key reasons:

- We believe that in these areas considerable impact can be made through deep-tech innovations and entrepreneurship.
- We believe that we have the required industry know-how and network to make a real difference. Our ability to tap into the unique knowledge base that surrounds us in the Brainport Region, provides us a sustainable competitive edge.



The whole portfolio has impact through:

5 GENDER EQUALITY

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

In each societal theme our portfolio makes impact through:



Energy transition & sustainability
We invest in companies that actively contribute to the energy transition and transition to a more sustainable supply chain.

7 AFFORDABLE AND CLEAN ENERGY
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION



Agriculture, food & Water
We invest in ventures that use innovative hardware technologies to make the agri-sector more sustainable and robust.

6 CLEAN WATER AND SANITATION
12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Security
We fund ventures that contribute actively contribute to increased (cyber)security through hardware-focused propositions.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



Health & Care
We fund medical technology ventures that actively contribute to better care at lower cost. We predominantly focus on med-tech ventures that use hardware technologies, such as a smart precision inhaler.

3 GOOD HEALTH AND WELL-BEING

DEEP TECH XL

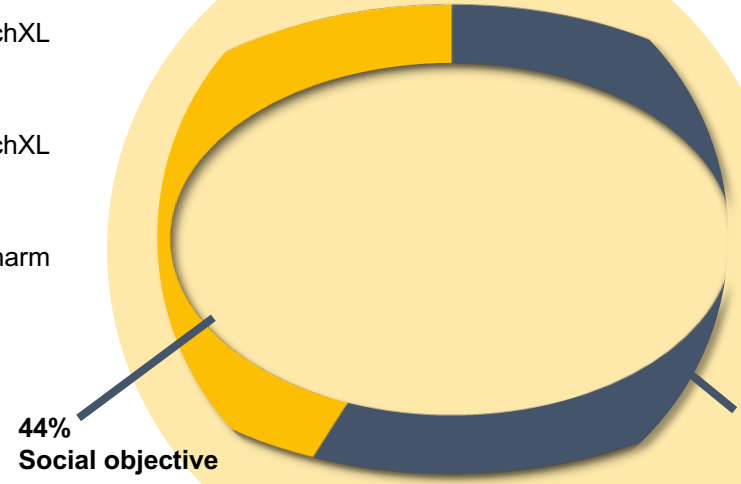
SFDR-Related Sustainable Investment Objective

All DeepTechXL funds have a sustainable investment objective, and thus comply to SFDR Article 9. DeepTechXL allocates at least 30% of its sustainable investments toward social initiatives and a further 30% towards environmental causes. The Fund invests 100% in sustainable investments.

DeepTechXL has created a set of sustainability-focused selection criteria that are binding. These binding selection criteria are:

- The target company adheres to the DeepTechXL exclusion criteria.
- The target company adheres to the DeepTechXL investment guidelines.
- The target company does not do significant harm and is not active in sectors that we consider inherently unsustainable.





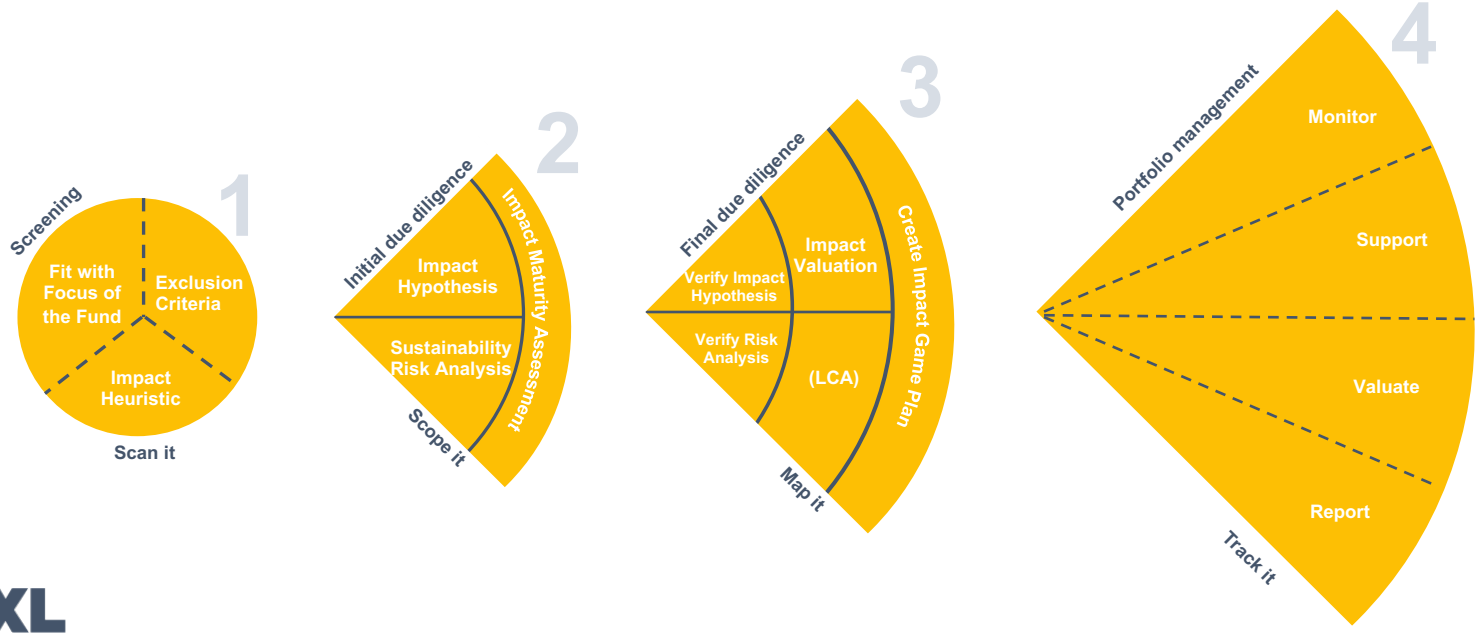
DEEPTECHXL SUSTAINABILITY IMPACT & RISK ASSESSMENT PROCESS

DeepTechXL has developed a science- and evidence-based impact investment process in collaboration with the University of Technology Eindhoven to ensure the implementation of the sustainable investment objective of the Fund.

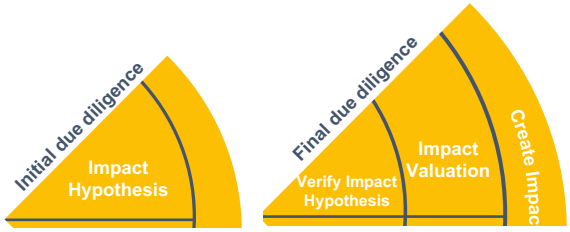
This impact investment process consists of four phases. Each of these phases consists of multiple assessment activities.

The impact investment process rests on two key pillars: positive sustainability impact and sustainability risks.

The following two pages describe the 10 most important activities of our impact process.



SYSTEMATIC METHODOLOGY TO *IMPACT MEASUREMENT*



Problem

PROBLEM:

Which pressing societal problem do you aim to address and how is this linked to the SDG's defined by the UN?

What

CONTEXT & INPUT:

What effects do you aim to achieve with your solution, what is the situation, where it takes place and what resources are used?

Who

ACTIVITIES & WHO:

What are your activities and who will benefit from your solution and how will they implement your solution?

Quantify Impact

OUTPUT & OUTCOME:

What tangible things do you produce via your activities and what do you achieve with this, quantified in 1-3 impact KPIs to measure your impact?

Additionality

ADDITIONALITY:

What is most likely going to happen, if your solution does not get accepted by the market?

Systematic Impact

SYSTEMATIC IMPACT:

Why do you do this and what does your venture aim to structurally change the system on macro level?

SYSTEMATIC METHODOLOGY TO *IMPACT MAKING*

STRATEGY AND RISK ANALYSIS

7

ALIGNED IMPACT STRATEGY:
We always seek alignment on the impact strategy with the ventures we invest in.

8

ALIGNED RISK ANALYSIS:
We always seek alignment on the key risk associated with ventures business plan in the categories:

- Team
- Market and customers
- Competition
- Financials
- Sustainability & impact
- Legal & compliance

The key risks are assed on:

1. Impact of risk
2. Likelihood of occurrence
3. Level of control

Per RISK item 1-3 mitigation actions are being formulated and agreed upon with the venture pre closing.

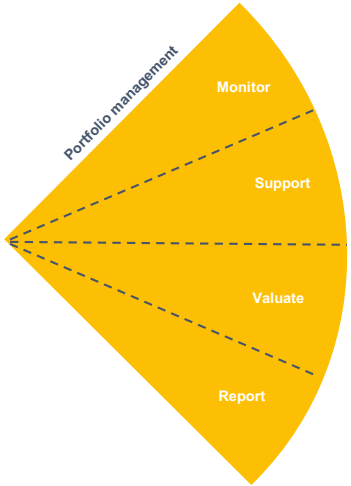
EXECUTION AND CONTROL

9

6Q-ACTION PLAN:
We help our portfolio companies to implement a '6Q-action plan' in which strategic initiatives (including sustainability) are translated into actionable milestones and targets 6 quarters ahead. Each quarter the venture is supposed to review the quarter behind (actuals vs targets) and add another quarter to the plan.

10

COACH, MONITOR AND CONTROL:
We see early stage deep-tech ventures struggling with implementing a rigorous and professional management control system based on Plan-Do-Check-Act (PDCA) continuous improvement principles. We provide hands-on support and tools to implement this. During this journey we sit down with our ventures on a weekly basis to provide coaching and monthly and quarterly we monitor performance (actual vs targets).





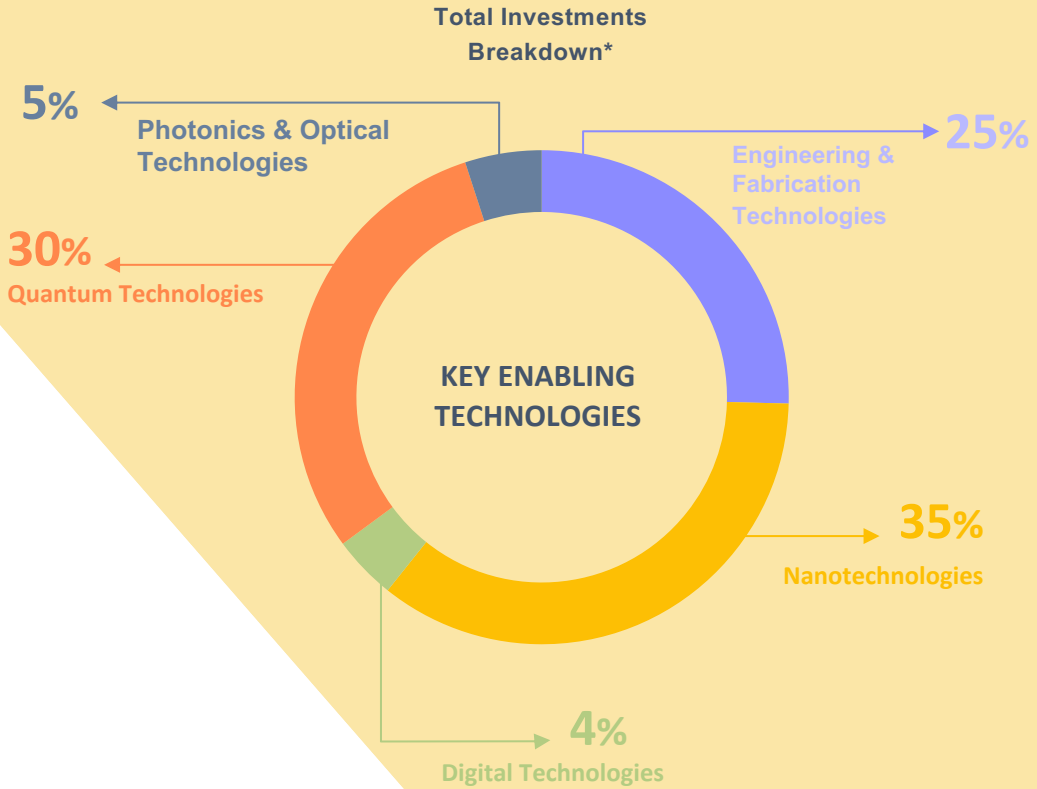
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DeepTechXL's Portfolio Level Performance

SFDR-RELATED SUSTAINABLE INVESTMENT MEASUREMENT

DeepTechXL has created a set of sustainability-focused selection criteria that are binding and three key indicators to measure its performance on the sustainable investment objective:

- A minimum of 80% of its portfolio companies use a key enabling technology, split per KET
- A 100% of its portfolio companies target a global environmental or societal problem, split per key societal theme
- A 100% of its portfolio companies are aligned with the United Nations Sustainable Development Goals, split per SDG



*Based on EUR investments

*Based on EUR investments

DEEPTECHXL SUSTAINABILITY IMPACT DISTRIBUTION PER COMPANY

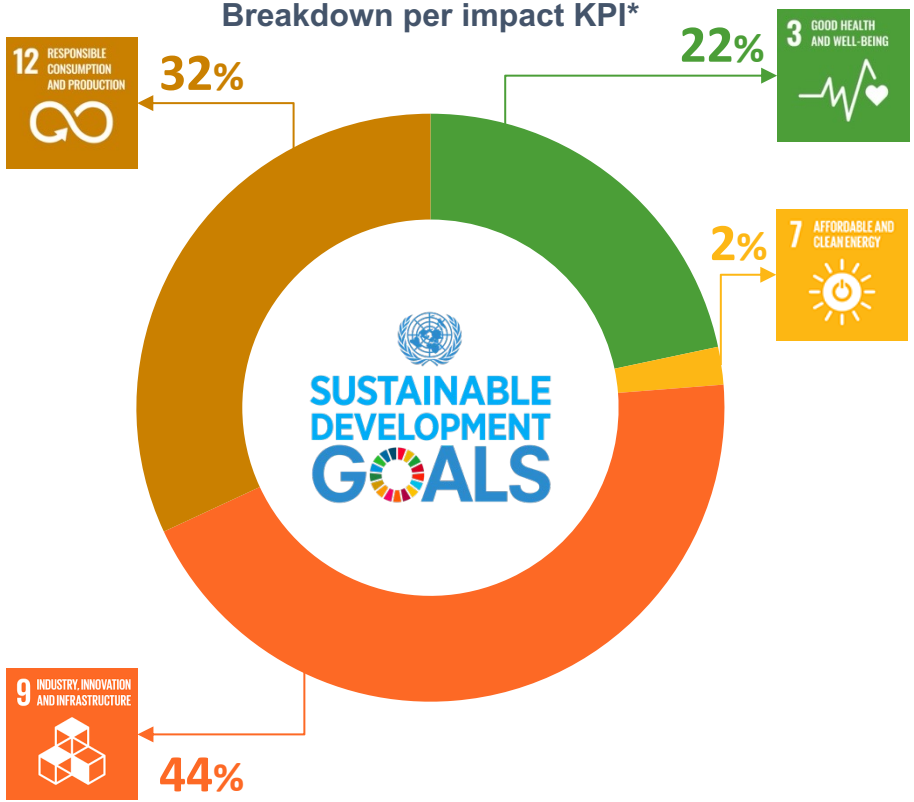
Gilbert TECHNOLOGIES
alphabeats
Health & Care

KEIRON
Delft Circuits Hardware for quantum engineers
SUPERLIGHT PHOTONICS
SENERGETICS SENSE IN DATA
Energy Transition & Sustainailbity

SandGrain
Security

inphocal
Agriculture, Water & Food

Breakdown per impact KPI*



PORTFOLIO-LEVEL ESG ANALYSIS

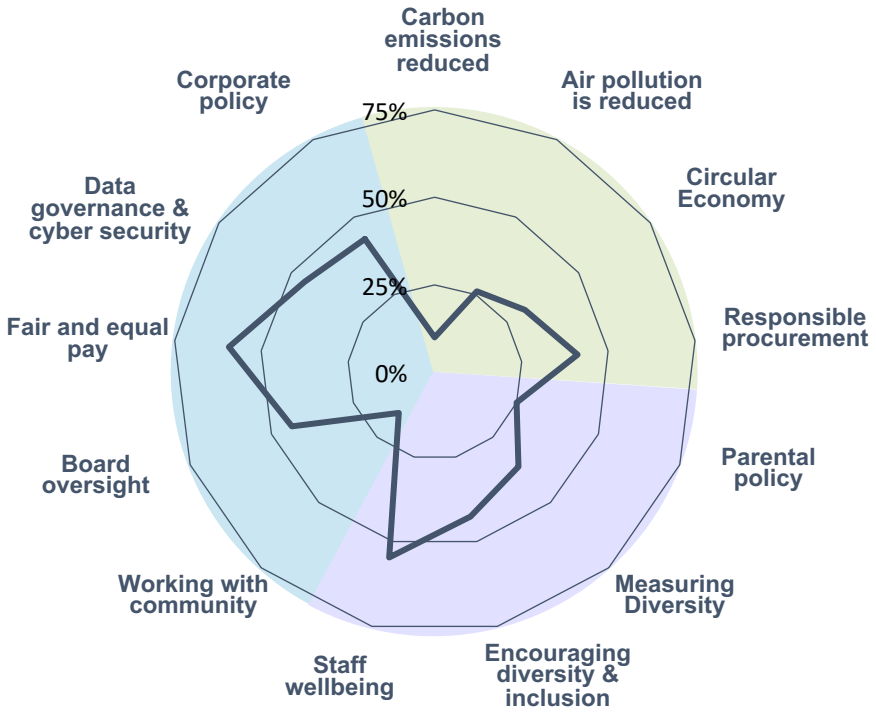
ESG analysis as of 2023

In 2023 we started with the implementation of our sustainability questionnaire. The ESG part of this questionnaire consists of 33 questions dedicated to environment, social, and governance.

The questionnaire serves to report on key sustainability data and to serve as ***roadmap for the annual impact game plans*** of the portfolio companies. During the (pre-)seed stage, it is not expected that companies have a significant performance on ***reporting*** yet, however, it is about how the portfolio companies will progress throughout the years.

The 2023 analysis, provided the following insights:

- **Environmental:** Companies in the seed-stage are not yet able to report on environmental metrics.
- **Social:** Companies are prioritising the mental health agenda. Our portfolio companies show good level of support for the mental health and well- being of their employees.
- **Governance:** Governance is the backbone of ESG and offers a quick win and strong foundation for subsequent growth and impact.



4

Our Portfolio Companies



DEEP TECH XL

2023: IMPACT INVESTMENT CASE 1

Theme: Agriculture, water and food

inPhocal

IMPACT POTENTIAL:
By replacing inkjet-based printers with laser-based printers, inPhocal can potentially eliminate ink from the Food & Beverage industry, and thereby significantly reducing the industry's environmental footprint.



KPI 1:
Amount of liters ink and toners reduced



KPI 2:
Amount of electricity reduced



WHY WE ARE EXCITED ABOUT INPHOCAL (1/2)

Impact Framework: InPhocal

About Inphocal:

In 2020, a group of enthusiastic founders set course on a journey to start inPhocal, a deep-tech company based on an optical technology that originated from the CERN institute, where it was originally developed for long- distance alignment of equipment in their Large Hadron Collider (LHC) experiment.

InPhocal participated in the nine-months HighTechXL venture building program, supported by top-class institutes and companies, such as ASML, the European Space Agency, Philips and TNO, and to develop themselves into a mature company.

InPhocal sells laser-based printers to the Food & Beverage industry, which enables their customers to eliminate pollutive ink from the industry.

InPhocal has been mentioned in the ASML annual report of 2022.

(1) Problem

Ink can be a complex mixture, containing a variety of substances such as solvents, carbon, dyes, pigments, glycerine, alcohol, resins, and other materials. One 30 milliliter pen has the equivalent environmental footprint of 45 minutes of diesel pollution. Currently, the Food & Beverage industry is estimated to use ±160M liters of ink annually to print i.e. expiry dates and SKU codes. This has a significant footprint on the environment, while being a suboptimal solution for its use case. Some companies print ink on plastic, while ink and plastic cannot be split for recycling anymore. Hence, the combination might end up in landfill or polluting thermal recycling. Until now, other technologies have not been competitive with ink technology in terms of printing speed and costs.

Additionally, regulation is pushing the Food & Beverage industry into reducing its environmental footprint as well as increasing the traceability of single-item cans and bottles. Existing inkjet printers are not suited to fulfil this regulatory demand.

(2) What/Technology Solution

InPhocal's proprietary and patented laser technology turns a standard laser beam into a concentric beam with a central spot. The novel laser beam characteristics make a longer focal depth and longer focal length possible, resulting in larger print areas at speeds more than double that of conventional laser beams. When this technology is applied for laser marking, inPhocal's laser beam can mark on curved surfaces at high speed, including fresh produce and cans and bottles, something current laser beams cannot do. InPhocal's laser has the potential of consuming up to 50x less energy compared to conventional inkjet technologies.

(3) Who benefits

Society as a whole from an environmental perspective. Moreover, local less developed communities will likely benefit as well.

(4) Quantifying impact

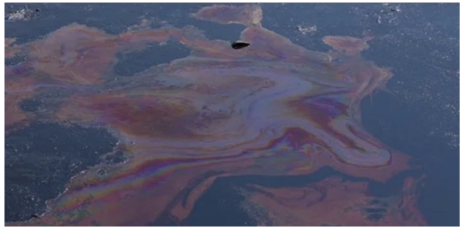
By replacing inkjet-based printers with laser-based printers, inPhocal can potentially completely eliminate ink from the Food & Beverage industry, and thereby significantly reducing the industry's environmental footprint.



KPI 1:
Amount of liters ink and toners reduced



KPI 2:
Amount of electricity reduced



WHY WE ARE EXCITED ABOUT INPHOCAL (2/2)



"By using our innovative optical technology, we enable food producers and packagers to replace polluting ink technology with a sustainable alternative. Our technology is capable of making existing laser processes more efficient, and for applications that were previously not possible. For example, think of marking curved surfaces in production lines without loss of speed."

- Kathy Vredeveldt, co-founder and CFO inPhocal

(5) Additionality

InPhocal offers a solution that is currently not available. Existing laser-based printers are too slow and too expensive. As local factories have relatively small profit margins, they have no incentive yet to replace inkjet printers with laser printers. Incumbent technologies do not match inPhocal's capabilites of focus depth, round-surface printing, and costs.

(6) Systematic impact

InPhocal aims to create systemic change to eliminate ink from the Food & Beverage industry. InPhocal aims to achieve this goal by providing a cost-effective solution for inkjet printers without sacrificing on performance.

SDG Alignment

SDG 12: Responsible consumption and production

By 2030, substantially reduce waste generation through reduced ink and inkjet toners.

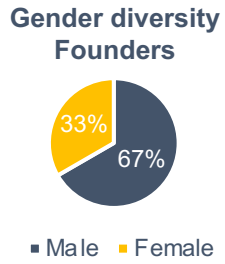
SDG 9.4: upgrade all industries and infrastructures for sustainability

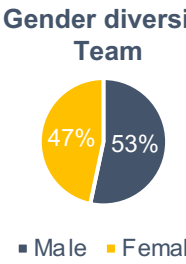
By 2030, substantially reduce amount of electricity consumed for marking.

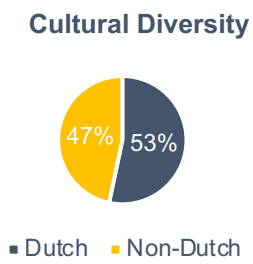
Key risks

1) InPhocal laser technology is unable to meet required specifications to replace inkjet fully

2) Rising energy costs might harm uptake of laser solutions







2023: IMPACT INVESTMENT CASE 2

Theme: Health and Care

IMPACT POTENTIAL:
AlphaBeats aims to increase the mental health and well-being through real time neurofeedback , reducing stress and leading to next level mental performance and reducing stress



KPI:
Number of Monthly active users

alphabeats



WHY WE ARE EXCITED ABOUT ALPHABEATS (1/2)

Impact Framework: AlphaBeats

About:
In 2019, Philips decided to spin-out a brainwave-focused digital technology, which was researched for >10 years within the Philips R&D department.

Through the nine-month HighTechXL venture building program, AlphaBeats was founded to further develop the technology and thereby making an impact on society's health.

AlphaBeats intends to sell its patented neurofeedback Artificial Intelligence solution to increase mental health and well-being (focus: Performance enhancement & stress management). AlphaBeats won the CES Top Innovator award 2023 and has been selected for the Apple Foundation program.

(1) Problem
According to the American institute of Stress, 73% of people have stress that impacts their mental health. The WHO states that this group is only increasing due to the pandemic and the subsequent geopolitical tension.

AlphaBeats initially focuses on top athletes' market, followed by the amateur athletes' market and eventually the consumer well-being market.

(2) What: Technology Solution
AlphaBeats' proprietary and patented neurofeedback technology uses data from an Electroencephalography ('EEG') headset to measure alpha (relaxation) and beta (stress) waves in the brains. AlphaBeats' AI uses this data real-time to dynamically adjust music by its patented algorithm, in such a way that the alpha brainwave activity is rewarded. The training is implicit; thus, the listener doesn't have to do anything but to listen to their music while wearing the headset.

Mental performance/health is improved by increasing the alpha control (scientifically validated). AlphaBeats technology will train the user in controlling alpha waves. The solution is currently being scientifically validated in collaboration with a neuroscientist professor and its team from the Tilburg University.

(3) Who benefits
Society as a whole, from a mental health perspective. Within the beachhead market, athletes will initially benefit from the solution through increasing mental performance and well-being. Consumers will benefit from the solution through increased well-being and reduced stress.

(4) Quantifying impact
AlphaBeats aims to increase the mental health and well-being. This is done via two pillars:

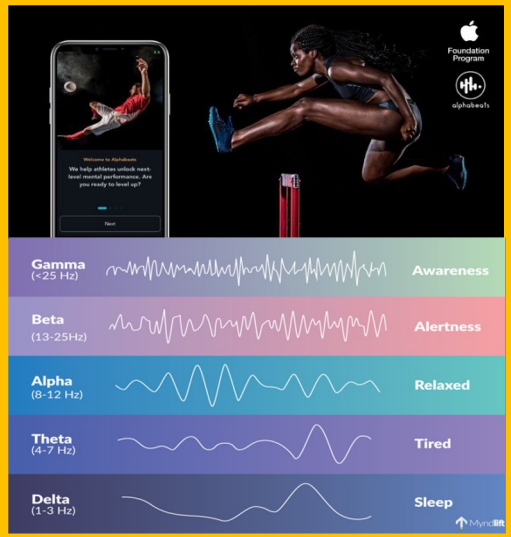
1) Unlocking next level mental performance; Increasing alpha control has a scientifically proven effect on improving (mental) recovery and player readiness, and 2) reducing stress and thereby increasing well-being; Providing real time neurofeedback to reduce stress and increase relaxation has a scientifically proven effect on the Perceived Stress Score.



KPI:
Number of Monthly active users



WHY WE ARE EXCITED ABOUT ALPHABEATS (2/2)



"As a company, we have great ambitions and for that you need great partners. We all share the same big vision and are excited to combine forces to make a global impact in mental performance and well-being"

- Han Dirkx, CEO AlphaBeats

(5) Additionality

AlphaBeats offers a solution that is currently not available. There is not yet any solution that uses EEG data to real-time and dynamically adjust music via a neurofeedback algorithm. Hence, it is the only solution that actually measures its impact and immediately adjusts based on its measurements.

(6) Systematic impact

AlphaBeats aims to create systemic change to improve mental performance and well-being. AlphaBeats aims to achieve this goal by providing an implicit, hardware agnostic solution that has a scientifically proven effect on alpha control and stress.

SDG Alignment

SDG 3.4: Good Health and Well-being

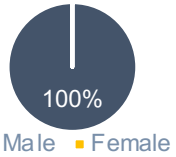
By 2030, significantly improve mental health and well-being.

Key risks

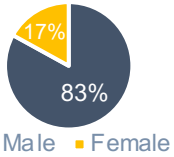
1) AlphaBeats is unable to use EEG data from hardware providers

2) Scientific proof on alpha control is limited and does not sufficiently underpin its effect

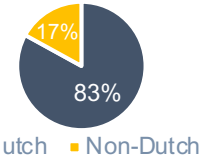
Gender diversity Founders



Gender diversity Team



Cultural Diversity



2023: IMPACT INVESTMENT CASE 3

Theme: Health and Care

IMPACT POTENTIAL:
By replacing incumbent inhalers, Gilbert can improve quality of life by increasing the efficacy of respiratory drug delivery for multiple (lung) diseases.

3 GOOD HEALTH AND WELL-BEING

KPI:
Total number of patients reached

Gilbert TECHNOLOGIES



DEEP TECH XL

WHY WE ARE EXCITED ABOUT GILBERT (1/2)

Impact Framework: Gilbert

About Gilbert:

In 2013, Delft University of Technology decided to spin-out a respiratory technology, which was researched for >10 years.

It's Gilbert's mission to make medical treatments easier and more effective for lung patients to save lives and reduce the burden on the healthcare systems. Gilbert has the ambition to bring a paradigm shift in the inhaled pharmaceutical market and new pulmonary drug formulation strategy with a new generation soft mist inhaler technology, based on its proprietary Electro Hydrodynamic Atomization (EHDA – 'Electrospray') technology.

Gilbert develops and will sell handheld soft mist inhalers.

Gilbert is a showcase collaboration for Philips Engineering Solutions.

(1) Problem

Chronic lung diseases remain the third leading cause of death and disability worldwide. The treatment of more severe lung diseases is accompanied by therapy with complex expensive pharmaceuticals, for example, biologicals, oncological or antifibrotic drugs, which are administered in hospital to the patient currently either orally, intravenously or subcutaneously. The drug is delivered via the blood circulation to the pulmonary system, because of the high density of blood vessels in the lungs. However, the drug needs to be transferred through large parts of the body, which is a high burden for the patient, and requires a relative high dose of the medicine. It is well acknowledged that the administration of pharmaceuticals directly to the lung is more effective.

Ease of use is one reason why inhalers have been historically popular. However, when it comes to treating severe lung conditions like Cystic Fibrosis, severe asthma, or lung cancer, current commercially available dry powder inhalers (DPIs), metered dose inhalers (MDIs) and Nebulizers (NEBs) have limited capabilities. This is related to:

(i) A relative limited lung deposition (5-20% effective regional deposition)

(ii) A heterogeneous lung deposition pattern in large, intermediate and small airways; and

(iii) Shear stress exposition to sensitive pharmaceutical compounds

(2) What/Technology Solution

Electro Hydro Dynamic Atomization (EHDA) or 'electrospray' features controllable aerosol particle size, which enables the medication to target the bronchial tree. The underlying technology breaks up the liquid jet drug formulation into droplets under the influence of electric forces. Depending on the condition and medication dosage, the droplet size can be varied within a narrow interval creating an uniform and monodisperse aerosol. The controlled droplet size enables the deposition of medication at the right (diseased) place in the lungs. Since the generated aerosol is a soft mist, it is more comfortable and more convenient for patients to inhale with a higher deposition in the lung (up to 80%).

(3) Who benefits

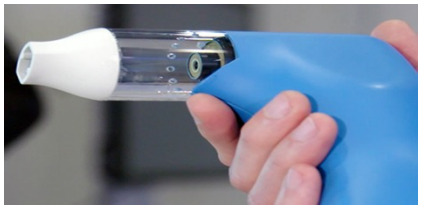
Society as a whole from an health perspective. The efficacy of the drugs increases, reducing the dose required, and reducing the resistance on antibiotics. Hence, the quality of life increases.

(4) Quantifying impact

By replacing incumbent inhalers, Gilbert can improve quality of life by increasing the efficacy of respiratory drug delivery.



KPI:
Total number of patients reached



WHY WE ARE EXCITED ABOUT GILBERT (2/2)



"It's our mission to make medical treatment easier and more effective for lung patients to save lives and help them live the life they want, while reducing the burden of care on the health systems"

- Maurits Huigen, CEO Gilbert Technologies

(5) Additionality

Gilbert offers a solution that is currently not available. Existing inhalers have a lower efficacy and are more prone to patient errors. Gilbert offers a solution that includes: (i) soft mist aerosol (leading to a higher efficacy and fewer mistakes by patients), (ii) a narrow distribution in particle sizes of the generated aerosol (leading to higher lung deposition, lower dose of the drug and ability to regionally target medicines in the diseased area of the lungs); and (iii) breath-activated device (reduce # of errors by patient and enable patient's home care).

(6) Systematic impact

Gilbert aims to create systemic change to improve respiratory drug delivery. Gilbert aims to achieve this goal by providing a cost-effective solution that increases efficacy and reduces the amount of patient errors during usage.

SDG Alignment

SDG 3: Good Health and Well-being

By 2030, significantly improve the inhaled pharmaceutical market and its efficacy to treating diseases.

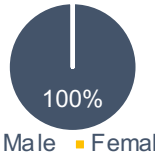
Key risks

1) Re-use and recycling patient behavior; Limited patients offer used container and cannisters for re-use and recycling

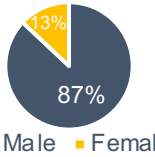
2) Pharmaceutical companies slow to adopt to co-formulate medication via next gen soft mist smart inhaler

3) Engineering issues in the process from proof of concept to minimum viable product

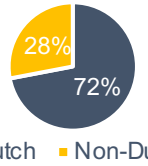
Gender diversity Founders



Gender diversity Team



Cultural Diversity



2023: IMPACT INVESTMENT CASE 4

Theme: Energy transition and Sustainability

IMPACT POTENTIAL:
By replacing screen printers, Keiron can improve PCB e-waste by improving the placement of solder paste during PCB Assembly.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

KPI 1:
KG solder paste reduced

KPI 2:
Liters of chemicals reduced

KPI 3:
KG high-end stainless steel reduced

KEIRON



WHY WE ARE EXCITED ABOUT KEIRON (1/2)

Impact Framework: Keiron Technologies

In 2019, TNO decided to spin-out a Laser-Induced Forward Transfer technology ('LIFT'), which was researched for >10 years within the TNO Printed Electronics department.

Through the nine-month HighTechXL venture building program, Keiron was founded to further develop the technology. Through the HighTechXL program, Keiron was supported by top-class institutes and companies, such as ASML, the European Space Agency, Philips and TNO.

Keiron intents to sell its patented LIFT solution to eliminate inkjet printers from the Printed Circuit Board ('PCB') Assembly lines and thereby significantly reduce PCB e-waste.

(1) Problem

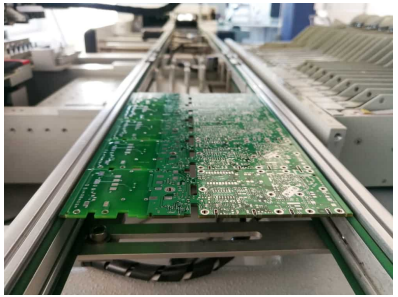
The first step in the PCB Assembly line is placing solder paste dots on a 'clean' PCB. Although that this is a critical process step, the past 20 years only incremental improvement steps have been realized. As a result, Existing technologies to place solder paste on a PCB (dispensing- & jet-based) are unable to meet the exceeding push for added complexity PCB topographies. For example, small- and large dots on the same PCB cause serious issues. Hence, current First Pass Yield of low volume-high mix assembly lines is ±50%.

Currently, PCBA manufacturers try to solve this issue with software, albeit a suboptimal solution. Faulty PCBs are thrown in the bin and cause a serious e-waste stream. Other waste streams created with existing method are screens, stencils, and solder paste.

(2) What/Technology Solution

Laser-induced forward transfer (LIFT) is a digital printing technique that uses a pulsed laser beam as the driving force to project material from a donor thin film toward the receiving substrate whereon that material will be finally deposited as a voxel. This working principle allows LIFT to operate with both solid and liquid donor films, which provides the technique with an unprecedented broad spectrum of printable materials, and thus makes it very competitive over other technologies, like inkjet printing. It is not only that LIFT can access a much wider range of ink viscosities and loading particle sizes; the possibility of printing from solid films allows the single-step printing of multilayers and entire devices, and even makes 3D printing possible.

Short laser impulses are used to locally heat up and vaporize the donor layer, thereby creating a tiny gas pocket which ejects a droplet of donor material towards the opposite direction of the incident laser beam (i.e. towards the bottom if laser beam comes from the top of a plate). The droplet of material can then be deposited to a substrate placed nearby the donor layer. This process enables printing both small and large dots on the same PCB with much higher precision.



(3) Who benefits

Society as a whole from an environmental perspective. The reduction of E-waste causes that valuable materials and toxic chemicals are more effectively used.

(4) Quantifying impact

By replacing incumbent solder paste printers, Keiron can improve the yield of PCB assembly, reducing the amount of e-waste created, and reduce use of materials, such as solder paste, chemicals, and stainless steel.



KPI 1:
KG solder paste reduced
KPI 2:
Liters of chemicals reduced
KPI 3:
KG high-end stainless steel reduced

WHY WE ARE EXCITED ABOUT KEIRON (2/2)



"By using our innovative laser technology, we enable PCB Assembly manufacturers to replace screen- and jet-printers with a sustainable alternative. We can significantly reduce the amount of plastic, steel, ink, and other chemicals with our fault-tolerant digital process."
- Paul Rooimans, CEO Keiron

(5) Additionality

Keiron offers a solution that is currently not available. Existing dispensing- and jet-based solder paste printers have a lower yield and have a larger waste stream of consumables. Keiron offers a solution that (i) eliminating solder placement issues of screen printing & dispensing (leading to higher yield), (ii) eliminates stencils from production process (leading to faster changeovers and fewer operators required), and (iii) digitalizes the process step (leading to faster changeovers and fewer operators required).

(6) Systematic impact

Keiron aims to create systemic change to reduce E-waste. Keiron aims to achieve this goal by providing a **cost-effective solution that increases yield and digitalizes the process.**

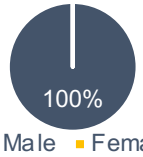
SDG Alignment

SDG 12.5: Ensure sustainable consumption and production patterns
By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse by reducing e-waste in PCB assembly.

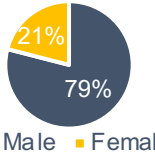
Key risks

1) **Engineering issues** in the process from proof of concept to minimum viable product

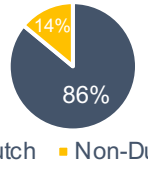
Gender diversity Founders



Gender diversity Team



Cultural Diversity



2023: IMPACT INVESTMENT CASE 5

Theme: Security

SandGrain

IMPACT POTENTIAL:
By hard-coding an identifier on chip-level, Sandgrain improves traceability of chips and security of assets.



KPI 1:
# of PCB e-waste reduced



KPI 2:
# of assets securely tagged



WHY WE ARE EXCITED ABOUT SANDGRAIN (1/2)

Impact Framework: Sandgrain

In 2019 a group of seasoned semiconductor professionals started the company Sandgrain, a deep-tech company based on unique identification IP from Irdeto. Irdeto had developed the technology to in a joint venture develop a unique identification method for the hardware supply chain.

Sandgrain has focused in the early years to create awareness and create a top-class team to develop a very cheap and reliable solution.

Sandgrain sells an IC and software suite to the high-tech equipment market, which enables their customers to keep track of their assets and create a material/asset passport.

(1) Problem

High-tech equipment will be used in the field for many years, sometimes decades. When used maintained and serviced the original equipment manufacturer or the asset owner get loose track of the parts and materials within this complex equipment. Thus, do not have the right information for re-use, or recycle.

Currently the high-tech equipment industry is working with traditional asset tracking solutions (bar/QR codes) this is highly depended on human interactions to keep track of the changed made.
These current solutions do not provide a 100% real time, non-error track and trace system where data about the equipment can be stored and used.

Additionally, new regulation in extended producer responsibility in for example the manufacturing of batteries require the battery producer (Electric car manufacturers) to keep track of their batteries and provide a second life alternative.

(2) What/Technology Solution

Sandgrain its proprietary and patented unique identification and authorization technology is able to produce in high volume IC with a hard written unique identification code. Combined with the Cyber-rock software suit authorization can be done to ensure that each unique code is who it claims to be. The Sandgrain solution can do this unique identification with a very cheap IC without the need for complex error corrections etc making this solution suitable for almost all PCB equipment.
When the solution is used in for instance a Phillips MRI scanner a PCB can be tagged, a material passport can be attached to each PCB and at the end of life of the MRI the OEM can determine what can be re-used, or the recycler knows exactly what kind of materials have been used on that specific PCB.

(3) Who benefits

Society benefits by recycling and re-using PCB's and extending lifetime of High-Tech equipment.

(4) Quantifying impact

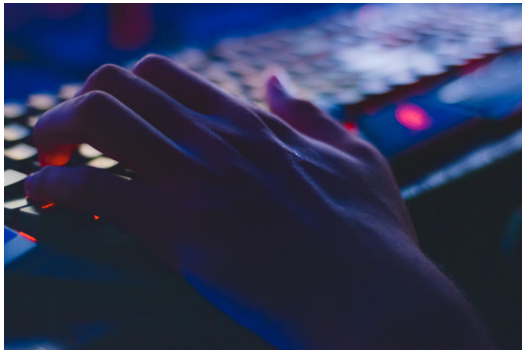
By tracking and tracing pf equipment Sandgrain is enabling OEM's to extend the lifetime of equipment and enable a more educated recycle process for PCB's.



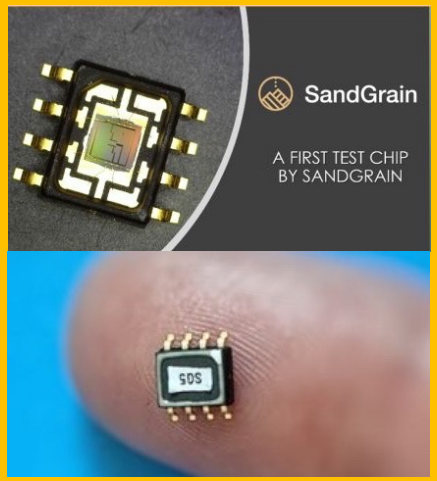
KPI 1:
# of PCB e-waste reduced



KPI 2:
# of assets securely tagged



WHY WE ARE EXCITED ABOUT SANDGRAIN (2/2)



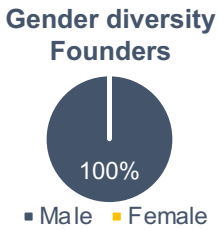
By making supply chains transparent again, we can contribute to effective recycling programs for electronic products that have reached end-of-life.
- Rene Claessen, Co-founder & CEO Sandgrain

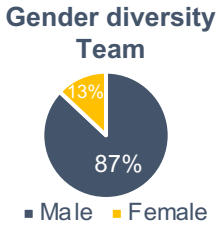
(5) Additionality
Sandgrain is offering a solution which is currently unmet in cost and easy of use. Current solutions require complex error correction. By offering the unique identification and authorisation technology asset and supply security will grow and counterfeit of sensitive technologies can be fought.

(6) Systematic impact
Sandgrain aims to create systematic change by securing and identify high-tech equipment and thus offer a reliable source of information for future re-use and recycle. Sandgrain aims to achieve this goal by proving the IC for a very low cost and with this roll-out in a significant part of the high-tech supply chain.

SDG Alignment
SDG 12: Responsible consumption and production
By 2030, substantially reduce waste generation through re-use and recycle of equipment parts
SDG 9.1: Industries, Innovation, and Infrastructure
Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all by providing enhanced security.

Key risks
1) **Sandgrain its technology is unable to meet industry specification** and is not utilized in the high-tech markets







2023: IMPACT INVESTMENT CASE 6

Theme: Energy transition and Sustainability

IMPACT POTENTIAL:

By providing i/o cables to the quantum industry, Delft Circuits enables quantum computers to increase their number of qubits, and hence, provide faster simulations for a plethora of applications (such as drug discovery).

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

KPI:

Amount of energy/ electricity reduced in Cryogenic Systems

Delft Circuits
Hardware for quantum engineers



WHY WE ARE EXCITED ABOUT DELFT CIRCUITS (1/2)

Impact Framework: Delft Circuits

The idea of Delft Circuits sprung from the PhD research that Sal Bosman, CEO and cofounder of Delft Circuits, performed. During his PhD, he realized the performance and scaling limits of coaxial cables used in building quantum computers. In October 2017, Delft Circuits was founded.

Delft Circuits sells microwave cables to quantum computer researchers, designers and builders which enables these players to efficiently connect room temperature control electronics to qubits operating at 20 millikelvin. It incorporates particles, such as filters and other electronics.

Current coaxial cables used in the quantum computing industry are bulky, introduce signal loss and noise and can generate thermal noise which can contribute to errors and inefficiency in quantum operations.

(1) Problem

The promise of quantum computing technology: a problem that takes the most powerful classical computer today hundreds of thousands of years to solve, a universal, fault-tolerant quantum computer would be able to solve within a matter of hours or days.

Quantum computers follow the laws of quantum mechanics. The possibility of what can be considered calculable exponentially expands. Conventional computers use binary bits, which can only consider two positions: on/off or zero/one. With quantum computers' ability to encode information as quantum bits or qubits, they have the capacity to deal with big, messy data sets, at exponentially high speeds, more quickly than conventional computers.

Quantum computers require extremely low temperatures, fast signals and several interconnects in limited space. Currently Coaxial cables are used to connect room temperature electronics to cryogenic quantum systems. Coaxial cables can experience signal loss, particularly at higher frequencies and signal reflections which can distort signals and introduce noise into the system.

Coaxial cables can be susceptible to electromagnetic interference from external sources, which can introduce noise into the system and affect the reliability of signal transmission.
Moreover, coaxial cables can be relatively bulky and less flexible compared to other types of cables, which may limit their suitability for certain quantum computing setups.

(2) What/Technology Solution

The patented flat cables designed by DC are based on microstrip lines, have a very small footprint and can scale to carry multiple channels next to each other. They significantly improve channel density for the same footprint. DC also simplifies the cabling process by reducing the number of connectors and are a lot easier to handle compared to semi-rigid coaxial cables. The small footprint and material selection help in reducing thermal conductivity along the cable.

(3) Who benefits

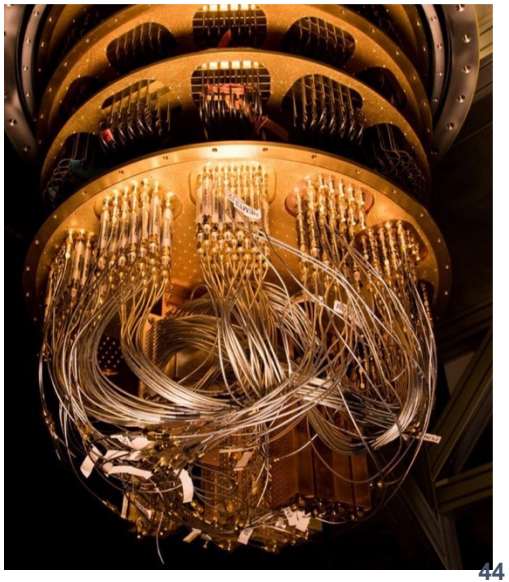
Delft Circuits products will act as an enabler for the development of quantum computers. With lower thermal noise, the use of the cables of Delft Circuits will allow for a reduction in the energy used to cool cryogenic systems.

(4) Quantifying impact

By replacing coaxial cables, Delft Circuits has a potential to improve the performance of the quantum computing cryogenic systems and help reduce noise and thermal waste.



KPI:
Amount of energy/ electricity reduced in Cryogenic Systems



WHY WE ARE EXCITED ABOUT DELFT CIRCUITS (2/2)



"My motivation is to become a great employer adding value to society and the high-tech industry in the Netherlands (Delft/ Eindhoven Region) and beyond.
- Sal Bosman, CEO Delft Circuits

(5) Additionality

The additionality is mainly in terms of enabling customers to build better quantum systems. In terms of a comparison to inaction: It will take longer for other parties to provide real scaling i/o technologies, slowing down the development of quantum technologies, especially in terms of scaling.

(6) Systematic impact

Delft Circuits works as an enabler of quantum computing and helping in improving the performance of quantum computing systems. Customers will be able to build quantum systems with more quantum devices (qubits for computing, photon detectors for quantum communication).
These systems will be more powerful and lead to a faster realization of the impact of quantum.

SDG Alignment

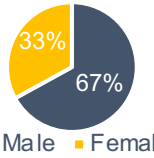
SDG 9.5: "Enhance scientific research, upgrade the technological capabilities of industrial sectors." Delft Circuits is able to support in the development of i/o connectors and cables for quantum computers.

SDG 12.2: "By 2030, achieve the sustainable management and efficient use of natural resources"
By 2030, substantially reduce the number of inefficient cables used for connecting quantum computers.

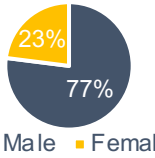
Key risks

1) **Delft Circuits cables** are unable to meet required specifications to replace existing cables.
2) **Delay in the uptake of quantum computers** might harm scaling up of Delft Circuits cables.

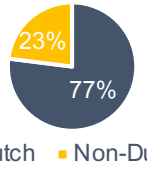
Gender diversity Founders



Gender diversity Team



Cultural Diversity



2023: IMPACT INVESTMENT CASE 7

Theme: Energy transition and Sustainability

IMPACT POTENTIAL:

By replacing white light lasers, they can reduce the power consumption significantly in several application areas. Within data centers, Superlight Photonics can increase the bandwidth while reducing the power consumption for data network equipment. Hence, they can significantly reduce the industry's environmental footprint.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

KPI:

Amount of electricity reduced

SUPERLIGHT PHOTONICS



WHY WE ARE EXCITED ABOUT SUPERLIGHT PHOTONICS (1/2)

Impact Framework: Superlight Photonics

About Superlight Photonics:

In 2022, a post-doctoral researcher set course to start Superlight Photonics, a deep-tech company based on a photonics technology of supercontinuum generation laser. This technology originated from his own 12-years of research, first at University of Hamburg and later at the University of Twente.

Superlight Photonics received initial support from Novel-T, the incubator of the Twente University.

Superlight Photonics sells a laser sub-system performing super continuum laser generation, generating a wide spectrum laser beam in the sub infra-red area. This solution can be incorporated as a subsystem for imaging applications (increased image quality, reduced energy consumption, less bulky and more stable), or for data center networking (increased bandwidth and reduced energy consumption).

(1) Problem

Data centers face the arduous problem that the demand for compute and storage is exponentially increasing due to video streaming, cloud services, social media, and big data/AI/ML applications. The (mainly) electrical equipment in data center networking is reaching its limits in terms of bandwidth. Moreover, data centers are expected to require more than 10% of the global energy production within 2 years.

While significant innovations are taking place to reduce energy consumption and increase compute on server-level, the networking architecture of data centers are lacking behind. Nonetheless, electrical interconnects cannot keep track of Moore's law indefinitely, with increasing bandwidth and energy efficiency requirements. The required bandwidth of interconnects and switches is expected to grow tenfold per decade, while the energy efficiency must follow the same trend.

Additionally, regulators are limiting the amount of energy towards data centers.

(2) What/Technology Solution

Superlight Photonics' proprietary and patented supercontinuum generation technology turns a laser source into a very broad spectral bandwidth. The novel chip-level laser enables a significantly higher bandwidth while reducing power consumption.

When this technology is applied for transmitting data, Superlight Photonics' SCG can significantly increase the bandwidth of data center networks, while limiting its environmental footprint in terms of energy consumption, something current optical interconnects cannot do.

(3) Who benefits

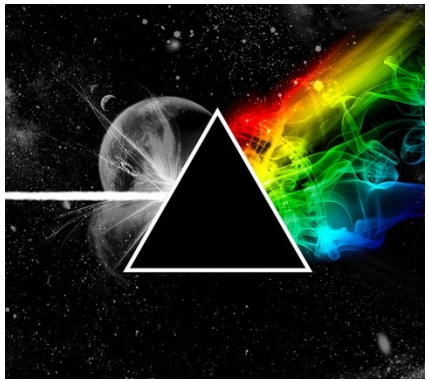
Society as a whole from an environmental perspective. Moreover, society as a whole by enabling the progression in AI/ML applications without significantly increasing society's total energy consumption.

(4) Quantifying impact

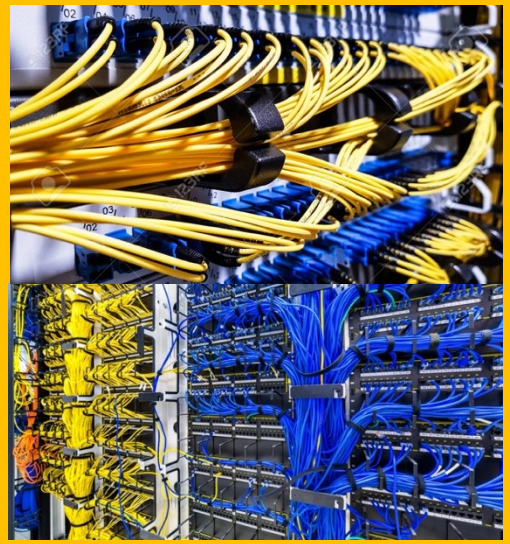
By replacing electronic interconnects with optical interconnects, Superlight Photonics can potentially reduce the energy consumption and thereby significantly reducing the industry's environmental footprint, while increasing the bandwidth.



KPI:
Amount of electricity reduced



WHY WE ARE EXCITED ABOUT SUPERLIGHT PHOTONICS (2/2)



With better light, more insight!

At our core, we're driven by the belief that better light leads to deeper understanding. Through our work in photonics technology, we aim to enhance insights across various fields, including healthcare, industry, agriculture, and research by addressing accuracy, efficiency, process control and quality management. We do this by providing superior laser lighting solutions, that reduce environmental impact and thereby contribute to sustainability. Our commitment to sustainability guides us in developing environmentally friendly solutions for a brighter future." **- Cees Links, CEO Superlight Photonics**

(5) Additionality

Superlight Photonics offers a solution that is currently not available. Existing copper interconnects have too low bandwidth and require significant energy consumption. Existing optical interconnects are unable to scale to Tbits/s. As hyperscale data centers face the issue of increasing demand for AI/ML compute, and interconnecting servers, the demand for bandwidth in data center networks is significantly increasing. Moreover, data centers face regulatory limitations of the amount of energy consumed, further limiting the compute per square meter, given the energy limit received.

(6) Systematic impact

Superlight Photonics aims to create systemic change to radically change the data center network infrastructure from electronic to optical, via SCG-generated lasers.

SDG Alignment

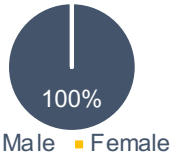
SDG 9.4: upgrade all industries and infrastructures for sustainability

By 2030, substantially reduce amount of electricity consumed for data center networks.

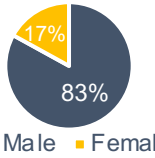
Key risks

1) Superlight Photonics' supercontinuum generation is unable to meet required specifications to replace interconnects.
2) Global standards might harm the offtake potential for innovative data center network solutions

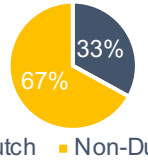
Gender diversity Founders



Gender diversity Team



Cultural Diversity



2023: IMPACT INVESTMENT CASE 8

Theme: Energy transition and Sustainability

IMPACT POTENTIAL:

By measuring temperature differences potential Corrosion under Isolation is detected, and by doing so Senergetics is preventing energy loss.

7 AFFORDABLE AND CLEAN ENERGY

KPI:

Enhance energy efficiency on industrial level (7.3)

SENERGETICS
SENSE IN DATA



DEEP TECH XL

WHY WE ARE EXCITED ABOUT SENERGETICS (1/2)

Impact Framework: Senergetics

In 2022 Frank an Anitha (founders of Senergetics) started in the HightTechXL (HTXL) cohort. Based on technology developed by the HTXL partner Photon First Frank and Anitha saw potential in the Corrosion Under Insulation (CUI) market.

Frank has knowledge off the industrial insulation market from previous working life, and Anitha is technology focused. Senergetics started to valid from day the potential and found that there was a lot of interest from the market.

Senergetics sells an end-to-end solution fiber optic-cable, sensors, interrogator and a software suit to monitor asset health with a focus on CUI and energy management.

(1) Problem

Piping used in the process industry is often insulated to keep the material flowing through the pipes on processing temperature (can be hot above 100 Celsius or cold below 0 Celsius) because of aging or other influences pipe can start to corrode. This corrosion is hard to detect because the pipe is wrapped in insulation and cladding, and this will cause loose of energy and a dangerous situation (leakage or even explosion danger)

Current used technology are based on maintenance schedules and inspection of the piping, this is done visual or with the help of x-ray or laser technology. These methods al are not continues.

Additionally corroded piping is causing energy leaks because the insulation is getting wet and there for is not working correctly. Thus creating energy losses which can have significant impact on the whole energy usage of the processing plant. By correct monitoring and predictive action this energy loss can be prevented

(2) What/Technology Solution

Senergetics is using the FBG (fiber bragg grading) technology of Photon first, and the interrogator of photon first.
Combined with an AI data and software suite this gives an end-to-end solution for the customers of Senergetics
When the technology is used for instance at the Shell Pernis plant the operators of the plant know exactly the condition of the piping (160.000 Kilometers in total in the Shell Perniss plant) and also know potential energy leakage. Knowing the condition of the piping makes maintenance more predictive and manageable. And by knowing and fixing heat loss locations the asset owner can save energy equivalent of 25 households per kilometer per year of pipe. For Shell perniss plant that is equal to 4Million households. (taking first initial test results as input)

(3) Who benefits

The asset owner benefits because he can have predictive maintenance scheduled and by doing so prevent unmanaged stops of the plant. Society benefits because preventing CUI will reduce leakage which can cause environmental harm, and by reducing energy losses energy can be saved (as mentioned above)

(4) Quantifying impact

By knowing the exact spots of CUI Senergetics enables the asset owners to predictive maintenance and timely action and thus preventing danger. And per kilometer of Senergetics solution installed the equivalent of 25 households of energy loss can be saved per year (according to initial calculations)



KPI:
Enhance energy efficiency on industrial level (7.3)

Wet pipe



Dry pipe



WHY WE ARE EXCITED ABOUT SENERGETICS (2/2)



Let's make impact today by reducing energy consumption – don't wait for tomorrow we empower the process industry to start changing now
- Frank Jacobs, co-founder and CEO Senergetics

(5) Additionality
Senergetics is aiming to offer a solution which offers an attractive return on investment for the customers (max of 2 years) and offers additional benefits (increase safety, increase maintenance efficacy, increase energy efficiency)

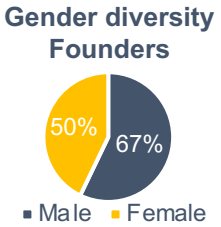
(6) Systematic impact
Senergetics aims to create systematic change by offer its customers a technology needed to battle the CUI problem, and simultaneously give them insight in energy loss locations. Senergetics aims to achieve this goal by proving both solutions as one offering.

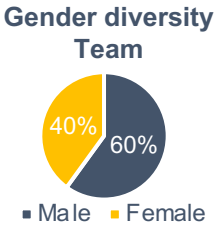
SDG Alignment

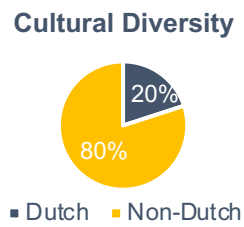
SDG 7.3: Ensure access to affordable, reliable, sustainable and modern energy for all
By 2030, double the global rate of improvement in energy efficiency

SDG 9.4: upgrade all industries and infrastructures for sustainability
By 2030, substantially reduce energy usage

Key risks
Senergetics its technology is unable to meet industry specification and therefor the Senergetics technology is not adopted by the industry







5

We Are DeepTechXL



UNIQUE DNA CAPTURED IN OUR VALUES

The team united on THE DREAM…



Teska van Vuren
Managing Partner (NL)



Stephane Mutz
Tech Officer (FR)



Toam Jaber
IM (JD)



Ronald Meersschaert
Controller (NL)



Mihai-Ioan Mihut
Analyst (RO)



Ronald Maurer
Partner (NL)



Matthieu Mutz
Tech Officer (FR)



Hugo Suidgeest
IM (NL)



Jasper Wennink
Intern (NL)



Soukaina Adnane-Murphy
IM (MR)



Wouter Folkers
Head Legal (NL)



Larissa Cool
Graduate intern (NL)



Bart Lugard
IM (NL)



Guus Frericks
Managing Partner (NL)



Hessel Mittelmeijer
IM & Sustainability Officer (NL)



Marlien Blaauw
Chief Compliance officer (NL)

DEEP TECH XL

THE DREAM

TEAMWORK — We believe that **Teamwork**, makes the dream work

HAPPINESS — We strive for **Happiness,** radiate positive energy and enjoy what we do

ENTREPRENEURSHIP — We cultivate **Entrepreneurship** to make the world a better place

DIVERSITY — We actively promote **Diversity**: for we believe it truly is a crucial business asset

RESPONSIBILITY — We take full **Responsibility** for everything we do individually and as a team

EXCELLENCE — We strive for **Excellence**: we go for gold!

AUTHENTIC — We dare to be **Authentic** leaders and we feel safe to show our true colors

MOVEMENT — We create and inspire a **Movement**; because we need others to realize our dream

IMPACT DECISION MAKING

These are the people who help us make the most impact:
We have established a strong network of experienced professionals in venture capital, deep-tech entrepreneurship, impact investing and academia to support the impact assessment and management of our investment process. We have 2 bodies that provide input and decision-making in this process.

The Investment Committee (IC): full team (also full team co-invests)

Takes the decision to progress with a prospective investment into the due diligence phase and makes the final investment (divestment) decision. The Investment Committee consists of all current partners, Tech Officers and Investment Managers of the fund manager. Everybody has an equal vote and skin in the game.

External support to (IC):



PATRICK DE JAGER
ASML
SENIOR RESEARCH DIRECTOR



SAHAR NEJADHOSSEIN SOUDANI
IMPACT-X
IMPACT CONSULTANT

Independent Impact Advisory Committee:

Reviews and approves the setting of impact targets for each venture considered for investment. In addition, it provides access to its network and acts as a sounding board to the fund team.



ESTHER KERSTENS
IMPACT-X
FOUNDER & CEO



BARTOUT GIEBEN
VERENIGD BEHEER
P/E & VC PORTFOLIO MANAGER



SIMON BRAAKSMA
PHILIPS
SENIOR DIRECTOR SUSTAINABILITY

6

Outlook For 2024





2023 – FOUNDATION FOR IMPACT

A solid foundation was created in 2023
In 2023, our team created a solid foundation for assessing, managing, and reporting on impact and sustainability for the years to come:

- Research collaboration with the University of Technology Eindhoven resulted in creating an evidence-based sustainability & impact due diligence process;
- Sustainability Officer has been assigned;
- Implementation and execution of our upgraded Impact processes and procedures and rolled out to all 8 portfolio companies;
- Implementation in alignment with the Impact Advisory Committee;
- Updated SFDR documentation;
- First UN PRI filing performed.

OUTLOOK 2024: KEY INITIATIVES TO STRENGTHEN OUR IMPACT APPROACH

Goals for 2024
For 2024, we have created the following goals regarding our sustainability strategy:

- Improve our impact game plan methodology by advancing on our sustainability impact maturity grid.
- Continue upgrading our sustainability impact assessment methodology with state-of-the-art knowledge and insights.
- Continue upgrading our sustainability risk assessment with state-of-the-art knowledge and insights.
- Following the implementation of the upgraded impact processes and procedures, additional focus is put towards monitoring and reporting on impact across our portfolio.
- Increase the added value of our impact and sustainability vision by creating, for example portfolio-level sustainability workshops.





Impact Report 2023

DEEP TECH XL