



CLIMATE IMPACT AND SUSTAINABLE DEVELOPMENT GOALS ASSESSMENT REPORT

Prolymer - Eco-Friendly Thermal Solutions

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Prolymer - Eco-Friendly Thermal Solutions

Impact Overview

Prolymer Costa Rica is an innovative enterprise that applies a special coating of insulation that vastly improves thermal efficiency and prevents buildings from absorbing so much of the sun's heat, which reduces the need for air-conditioning. In many places air-conditioning is not financially sustainable or affordable, so people are forced to suffer from heat stress. This eco-friendly, simple and low-cost solution tackles the impacts of global warming head-on and services a wide range of beneficiaries, from businesses and industry, to hospitals, schools and homes.

The social enterprise Prolymer is focusing research on reducing heat stress for the most vulnerable and offering thermal solutions for public education centers, rural clinics, care and feeding centers for poor children, care centers for the elderly, prisons, social housing, non-profit organizations. The insulation solutions also create economic benefits for industries while improving the working conditions of employees. Research for new applications is currently targeting agricultural solutions for farm workers and animals and emergency heat reduction in refugee camps.



11 SDGs significantly impacted

TOP QUANTITATIVE SDG IMPACTS



1,000,000 USD to implement programmes and policies for poverty reduction



80,000 USD invested in industrial activity under the action (large)



30 new jobs created



ACRONYMS

CAIT	Climate Action Impact Tool
GHG	Greenhouse Gas
MTCO2e	Million tonnes of Carbon dioxide equivalent
NDC	Nationally Determined Contributions
SDG	Sustainable Development Goals
tCO2e	Tonnes of Carbon dioxide equivalent
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change



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BACKGROUND

Costa Rica has 200,000 students at risk of heat stress and many of these children do not return to classes, impacting the progress of education in the country. Costa Rica also has 50,000 people at risk of heat in prisons, in elderly homes and in care centres for children under 6 years. Prolymer's technology improves the daily working and studying environments of vulnerable parts of the population and reduces heat stress of students, factory workers, prisoners and refugees.

It does this through using a water-based, non-toxic, ultra-thin polyethylene coating which can be applied like paint.

Application in buildings: In this niche application, Prolymer seeks to reduce the heat produced by the sun, within any structure that has a roof and walls, regardless of the use and size of the structure, in a temperature range up to 125 ° C. The application of the eco-friendly and economic insulation eliminates the need to install costly air-conditioning systems and has a life expectancy of at least 10 years based on recent research. It also extends the productive life of buildings as it prevents corrosion and waterproofs the structure. Due to reduced heat stress in buildings, Prolymer improves everyday conditions for studying, work, and leisure.

Industrial application: The industrial application reduces energy losses, retaining heat in industrial processes, with a working range of up to 500 ° C. Prolymer offers solutions for 90 percent of the industry such as petrochemical, food and beverages, maritime and land transport, energy through an eco-friendly, water-based coating and easy application. Industrial applications reduce the costs of the operations through improved energy efficiency and reduced maintenance costs by avoiding corrosion under the applied insulation. It further improves the working environment and productivity of employees through reduced heat exposure but also reduces accidents due to skin burns.

As a social enterprise, it's important for Prolymer to focus on reducing the risks of heat stress of the vulnerable, highly exposed populations in public education centers, rural clinics, care and feeding centers for poor children, care centers for the elderly, prisons, social housing, non-profit organizations supporting young and indigenous people and empowerment of women.

Prolymer sees its responsibility as getting to the heart of the infrastructure problem, assess the construction of buildings and develop the most cost-effective solution for each target group. In collaboration with donor agencies such as USAID, Prolymer is currently expanding the application to schools that cannot afford its application but are in urgent need of thermal solutions.

With its own funds, Prolymer is conducting research for new applications in the agricultural sector for farm workers as well as animals and in refugee camps.

Prolymer is also partnering with education institutions in Costa Rica and co-developing a technical curriculum for young people to learn about technical solutions and offers trainings for teachers to teach the new curriculum across vocational training schools.

There is significant potential for the replication of the work of Prolymer in Costa Rica and across the region and with additional funds, Prolymer is already planning to support new start-ups in El Salvador, Honduras, and Panama and beyond.



ASSESSMENT APPROACH

The year 2015 saw the introduction of two important frameworks that are expected to drive the pathway towards a greener and sustainable future, namely the Paris Climate Agreement and the Sustainable Development Goals. The Paris Agreement is built on individual, self-defined national commitments that will amount to the mitigation and adaptation actions needed, these are called the 'Nationally Determined Contributions' (NDCs). These actions contribute towards limiting the effects of global warming, adapting to expected climate-related impacts, and ultimately contributing to sustainable development.



Sustainable Development Goals (SDGs) outline 17 globally defined goals, with 169 targets which have been agreed by all countries to be universally achieved. Each country is expected to establish national frameworks to achieve these goals, and define them in their national context. SDG 13 defines targets to tackle climate change.

However, most climate actions contribute significantly to other SDGs, such as affordable and clean energy (7), gender equality (5), clean water and sanitation (6), industry, innovation and infrastructure (9), sustainable cities and communities (11), among others. Therefore, identifying the contributions of climate actions implemented through NDCs that also achieve the SDGs, and vice versa, will be critical for government as well as the private sector in the years ahead.

To consistently capture the additional SDG impact of climate actions, UNDP has developed the [Climate Action Impact Tool \(CAIT\)](#) which is used by UNDP as well a number of crowd funding platforms. More than assessing impacts ex-post, the tool is designed to help stakeholders considering and integrating sustainability impacts into design, development and implementation of climate change projects.

The CAIT tool assesses and visualizes impacts of climate actions at three levels:

- i) Descriptive impacts can be collated into a single summary report that provides an overview of the planned actions.
- ii) Qualitative impacts provide a graphic visualization of contributions
- iii) Quantitative impacts are assessed in the MRV section of the tool and are updated over time.

All mitigation and/or adaptation actions that are assessed through the tool have impacts on SDG 13 and SDG 17 by default: SDG 13 Climate Action is directly significantly impacted since the tool targets climate actions. SDG 17 is automatically impacted by all climate actions assessed by the tool because of UNDP's commitment to ensure global partnerships and national, regional and global cooperation and support to access more financial resources and aid.

The analysis in this report was generated by applying the CAIT tool. 1) For methodological details visit: <https://climateimpact.undp.org> and click Learn more

ACTION SUMMARY

TITLE

Prolymer - Eco-Friendly Thermal Solutions

LOCATION

Costa Rica

ACTION DESCRIPTION

Prolymer is a private enterprise that is proposing the use of a new thermal insulation coating in areas where thermal efficiency is poor. Prolymer's technology solutions can be implemented from micro-scale to industrial scale. Prolymer offers a technological solution to improve thermal efficiency and reduce the impacts of heat in areas where air-conditioning is too costly. Prolymer is promoting solutions for the vulnerable population, for businesses and industries, that are sensitive to the effects of heat and impacted by global warming. All the solutions offered are eco-friendly, low cost, easy applied and generate also work for unskilled people such as immigrants. Prolymer assess each project carefully before offering application solutions to their clients.

NUMBER OF AFFECTED PEOPLE

2,500

ACTION TIMELINE

2019 - 2021

LINKAGE TO NATIONAL POLICIES

Costa Rica's transition into a resilient and low emissions economy will require an integrated focus on energy and climate policy. The mitigation options proposed in Costa Rica's Nationally Determined Contribution are: Reducing energy demand and GHG emissions through energy efficiency & conservation, low emissions development pathways and decarbonizing of energy supply through electricity, liquids, gases as well as fuel switching in end-uses.

Costa Rica's National Energy Plan VII, 2015-2030, sets a clear path towards a low emission development pathway by strengthening policies on energy efficiency and the promotion of renewable energies. The National Energy Plan confirms the country's commitment to accomplish better energy efficiency, both in energy use and fuel end-use.

The Ministry of Energy and Environment has also launched its Biodiversity National Strategy, which will have important components and relevant action to contribute to the country's mitigation and adaptation goals. The National Action Plan was also used to fight land degradation, which will have significant contributions to rural environment management in mitigation and adaptation in the agricultural sector.

STAKEHOLDER ENGAGEMENT

UNDP has conducted consultations with key stakeholders during a site visit to San Jose from 19th to 20th December to assess the need and interest of stakeholders in the technology solution and verify the promised impacts of the Prolymer technology applications.

GOVERNMENT ORGANIZATIONS

The Ministry of Education confirmed that technology solutions such as Prolymer in Costa Rica is important as it has good impacts on the well-being of students due to improved indoor climate. In existing infrastructure, a polyethylene foam is currently used which is no solution against heat exposure.

A test application of the Prolymer technology has been conducted in a High School in San Jose to evaluate the impact of the technology. After a pilot test, the application on the library roof has been approved. The Ministry of Education representative from the infrastructure department confirmed that they were satisfied with the results and their strategy currently is to identify more schools to proof the concept and after successful completion of the expanded testing phase, put the costs of the technology into the budget for the next years. The expanded testing in the most heat-exposed schools of Costa Rica's will be funded by USAID.

The technology solution shall then be applied in existing school buildings and included as standard technology for all newly approved school infrastructure to replace the foam which is has proven to be not effective.

The Ministry of Education also confirmed that they are collaborating with the University of Costa Rica to analyze the impacts of high temperatures in classrooms and study technology solutions and are interested in the application of pre-made material such as Prolymer to cost-effectively improve the situation.

AFFECTED POPULATION / PARTY

The high School Principle confirmed that their school is using an old, inefficient foam technology that doesn't sufficiently reduce the impact of rising temperatures. Students feel not sufficiently motivated to learn or even attend school due to high temperatures in class rooms.

The Principle of the high school in San Jose and the staff of the library explained that the technology solution Prolymer had immediate positive impacts on the learning behavior of students. The application showed that heat exposure was reduced and the studying environment for students improved. The principle could clearly see a positive impact on educational behavior and is very satisfied with the results. Students are now increasingly using the room as refugee to relax inside. Students also do more research and learn in the library or attend workshops. The reading abilities of students are improving and they are overall more engaged in learning.

Also, parents were highly satisfied and are willing to co-fund a new application in the lunch room which is used by 700 students within 1 hour and exposes the students to significant heat stress. Parents and Principle are together exploring quick solutions to improve the temperatures in the school rooms.

PRIVATE SECTOR

Pozuelo, the oldest cake company of Costa Rica and largest factory of Costa Rica with more than 1,000 employees has tested the technology in their Head Quarters in San Jose. The test results were carefully evaluated by the company's engineers and showed so promising results that an energy committee engaged people from different units and presented the results which were consequently approved for expanded application in 2020.

To reduce energy consumption, Prolymer will be applied over a 1,300 m² roof area. It was also important for the company that the technology is waterproof and non-toxic. Currently, additional applications in other factories in Texas, USA and in Colombia are under evaluation.

Prolymer technology has measurably reduced the indoor heat in the factory and will avoid new installations of air-conditioning in the factory hall. This will not only significantly reduce investment costs replacing the investment need of USD 400,000 for air-conditioning and high energy costs for operating the air-conditioning systems with a Prolymer application investment of USD 50,000 but also improve the working environment of factory employees by reducing the indoor air temperature by 10C, and eliminated the air conditioning need.

Pozuelo is also interested in looking at other solutions for ovens and pipelines where heat can be reduced by 45 percent and reduce indoor heat production and skin burns of employees.



SOCIAL AND ENVIRONMENTAL RISK SCREENING

The action has been screened for social and environmental risks. The following risk area with high significance was identified and a risk management strategy is presented:

POLLUTION PREVENTION AND RESOURCES EFFICIENCY

RISK AREA	MITIGATION APPROACH
Would the proposed action potentially result in the generation of waste (both hazardous and non - hazardous)?	In Costa Rica, there is a good recycle treatment of plastics. As a company they are first reusing the containers where the material was stored and then the ones that they cannot reuse, they are selling to recycling companies.



IMPACT SUMMARY

The application of Prolymer technology in infrastructure in Costa Rica has significant quantitative impacts on **SDG 1 Poverty and Inequality** by working with the Ministry of Education to improve policy frameworks to apply better heat insulation technologies in existing and new educational infrastructure. The application of Prolymer also empowers vulnerable groups such as prisoners and in collaboration with the Ministry of Justice, Prolymer application is currently tested in prisons to reduce heat emergency of prisoners.

The social innovators at Prolymer headquarters in Spain and in Costa Rica are proactively **employing women** for different positions and directly contribute to **SDG 5**.

The most significant impacts are on **SDG 6, 7, 9, 11, 13 and 17 through infrastructure improvement, innovation and industry solutions**. Prolymer is working with a factory to reduce the heat exposure of employees, partners with a local church to provide improved housing for vulnerable population and elderly. Prolymer is also investing continuously in research to identify new areas of application of the technology to further enhance the positive impacts of the technology and invests own funds in pilot research in refugee camps and on farms.

Since its establishment in Costa Rica in August 2018, Prolymer has created specialized jobs as well as in collaboration with companies that apply their technology solutions also in low-skilled workers such as immigrants from neighbouring countries to improve their living conditions. This engagement across different employment levels has directly contributed to **SDG 8**.

Finally, Prolymer, through its work in areas that have high impacts on vulnerable parts of the population has contributed directly to **SDG 3 and 4**. The most relevant achievement under this SDG are the company's engagement with the Ministry of Education to improve learning conditions of students as well as with the Ministry of Justice to reduce health emergency of prisoners caused by heat and over population.

SDG IMPACTS

IMPACT DESCRIPTIONS



Poverty and Inequality Reduction

- 1,000,000 USD to implement programmes and policies for poverty reduction
- 1 policy frameworks at regional and national level to reduce inequality and empower vulnerable groups



Gender Parity

- 5 women employed under the action.



Infrastructure, Innovation, and Industry

- 80,000 USD invested in industrial activity under the action (large)
- 10,000 USD invested in micro and one - person enterprises
- 300,000 USD invested in research and development
- 2,000 USD invested in intellectual property rights
- 3,000 USD invested in pilot research projects

 Employment

- 30 new jobs created
- 22 new jobs created – poor and vulnerable sections
- 3 new jobs created – specialized skills
- 1 new jobs created – senior positions

 Social

- 2,000 USD invested towards research and development
- 5,000 people provided with access to health services
- 1 government health programmes organized



DETAILED SDG IMPACT ANALYSIS



The following significant qualitative impacts were identified:

Poverty and Inequality Reduction



The action leads to increased spending by the national government into sectors that accelerate poverty eradication. (SDG 1.b)

Explanation: It will promote the investment of the public sector to allocate resources in schools that face heating problems.



The action empowers and/or improves the quality of life and income generation of the bottom 40 percent of the population (at a rate higher than the national average). (SDG 10.1)

Explanation: Improves life quality of students and also improve quality of life.



The action promotes greater parity in wages and social protection towards greater equality. (SDG 10.4)

Explanation: It reduces the inequalities between private and public education. It also improves working conditions of the lower income levels such as factory employees which benefit from an improved working environment.

Gender Parity

Infrastructure, Innovation, and Industry



The action promotes access to affordable, reliable and modern clean technology / services. (SDG 7.1)

Explanation: Polymer technology is a material that reduces the temperature in buildings such as public buildings (schools), private houses and factories. The technology also offers long-lasting solutions as the paint does only need to be re-applied after 10 years.



The action enables industries to pursue resource efficient business practice and greater adoption of clean technologies. (SDG 9.3)

Explanation: The Polymer technology offers cost-effective solutions to reduce energy consumption and energy costs thereby reducing the negative impact of the carbon emissions from fossil fuel-based energy that would otherwise have been used for energy generation.



The action facilitates the development of sustainable and resilient infrastructure through enhanced financial, technological and technical support. (SDG 9.4)

Explanation: The material increases the lifetime of the infrastructure over which it is applied through its waterproof technology and it prevents corrosion, thereby also reducing the maintenance costs of infrastructure.



The action promotes a culture for innovation through enhanced scientific research and development and investments in new thinking, models and ways of doing business and value addition. (SDG 9.5)

Explanation: Prolymer is pure innovation and has created a unique material that reduces temperature transfer from outside into buildings of all construction materials by 10,000 times. This innovation is a result of intensive research and is now being promoted across the world with the goal to find innovative applications of the technology solution.



The action promotes the development, transfer, dissemination and diffusion of environmentally sound technologies. (SDG 17)

Explanation: The technology promotes eco-friendly thermal insulation innovation that can be offered to many businesses and organizations in any given country or region.



The action promotes access to adequate, safe and affordable housing. (SDG 11)

Explanation: The technology improves the safety of the indoor environment of buildings because of lower heat exposure and reduced heat stress.

Environmental



The action leads to reduction in air pollution beyond greenhouse gas emissions reduction. (SDG 3.9)

Explanation: Prolymer reduces energy consumption of air-conditioning as a result of insulation and reduced energy consumption, fossil fuel consumption and carbon emission with a direct positive impact on climate change.



The action is part of a long term framework programme / policy (international, national, sectoral etc.) to promote sustainable consumption / production. (SDG 12.1)

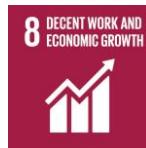
Explanation: Improved insulation of infrastructure leads to reduced energy consumption and promotes sustainable production in factories.



The action promotes a culture for innovation through enhanced scientific research and development and investments in new thinking, models and ways of doing business and value addition. (SDG 9.5)

Explanation: The Prolymer technology is a result of enhanced international research and promotes further research in new, innovative applications of the technology across the world.

Employment



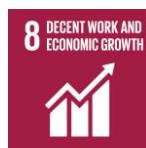
The action contributes to creating new employment opportunities including for women, youth and members of poor and vulnerable sections of the society. (SDG 8.5)

Explanation: Prolymer creates jobs for all members of the society, including women and poor. Through trainings, and in collaboration with the National Institute of Learning, Prolymer co-develops a curriculum for new professionals to apply the innovative technology.



The action promotes economic growth in the community/country and/or in higher levels of economic productivity. (SDG 8.1/8.2)

Explanation: Prolymer creates new jobs for non-specialist people, including immigrants and builds their capacity to apply the new technology.



The action promotes innovation, entrepreneurship and growth of SMEs and micro enterprises. (SDG 8.3)

Explanation: Prolymer promotes the creation of new businesses across the Latin American region and creates opportunities for young entrepreneurs to become innovative business owners.



CONCLUSION

Polymer offers frugal innovation to find solutions for the most vulnerable parts of the society. It is increasingly known that the highest impacts in developing countries are achieved with technology solutions that are easy to use and widely accessible and the simple, non-toxic insulation technology solution Polymer is first and foremost simple to use and thus easily accepted by a wide group of stakeholders.

The evaluation site visit and interviews conducted with Polymer Costa Rica as well as the Polymer headquarters in Spain and stakeholders working and benefitting from the technology solution provided by Polymer, confirmed that the company can be considered a social and innovative start-up.

As a young, social enterprise founded in 2018 in Costa Rica, it is well rooted in its society and aware of the social, environmental and economic needs of the population of Costa Rica. Polymer has a strong desire to improve livelihoods of people, communities, in particular the most vulnerable parts of the society that are least resilient to environmental stress. Solutions shall not be limited to large factories but also be accessible to scholars, farmers and prisoners that don't have the means to access such solutions alone. However, the company also acts as think tank for innovative research to increase the application of the technology in new sectors and for new users. This is best recognized through the invitation to participate in the internationally recognized Energy Globe Award. The Energy Globe Award is today's most prestigious environmental award for innovative solutions in energy efficiency, renewable energies and conservation of resources.

The company head quarter in Spain is committed to research and development started the development of the product in 2014 but continues to work on new, simple and cost-effective solutions for all regions of the world with the goal to create solutions that are born out of necessity in the Global South where resource constraints force people to do more with less.

UNDP's team that undertook the site visit from 19th to 20th December 2019 was impressed by the wealth of innovation and social awareness of the young enterprise and looks forward to see its expansion to other countries to the region.