

Solving for Humanity 2023

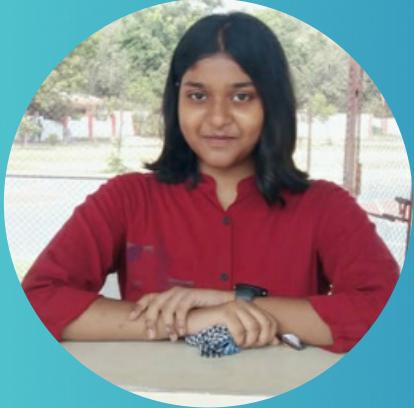
Vikyno to Victory:

Transitioning from Vikyno Diesel Engines to Sustainable Alternatives

**Hassan Jubair, Tejaswini Samanta,
Ahmad Hossain, Mithela Mehenaz**

This proposal was submitted as part of Solving for Humanity, the first innovation challenge for human development by and for youth, organized by global youth-led knowledge network South-North Scholars (southnorthscholars.org) with guidance from the UNDP Human Development Report Office. HDRO does not review or endorse the contents or arguments expressed by any specific proposal or its authors.

Team biographies



Tejaswini Samanta, a 17-year-old high school senior currently residing in New Delhi, India, is passionate about Geological Sciences and aspires to pursue higher education in this field. She loves to code and expresses herself through writing, capturing the beauty of nature and joy of travel. Tejaswini is a dedicated advocate for environmental sustainability and 3Rs (Reuse, Reduce, Recycle). She actively contributes to this cause by collaborating with a nonprofit organization that repurposes waste materials to generate funds for supporting the differently-abled and under-resourced individuals. Tejaswini's diverse background includes academic research in energy transition systems and reducing environmental pollution. She actively engages with underprivileged communities in her locality, working on gender empowerment programs with GirlUp.



Mithela Mehenaz, 18 years old, is originally from Bangladesh. She wrapped up her senior high school journey at Jahangirpur Govt. College, Bangladesh in February 2023. Right now, she is gearing up to seek admission at a U.S. university this year. Recently, she worked as a co-author in a research paper and hopes it will be published in a Q1 journal this November. She is deeply driven by a fervent passion for research, and she has recently begun actively working on it. Her research interests are nanotechnology devices, robotics, climatologists and mental health.

Team biographies



Hassan Jubair is a 12th-grade high school student from Kushtia, Bangladesh and a dedicated learner with a passion for Research, Robotics, Engineering, Sustainability, and Public Speaking. He is 17 and has established the nation's largest youth publication and a global research institute, focusing on empowering aspiring researchers. His research projects span mental health, psychology, and social sciences, reflecting his deep commitment to learning and self-improvement. Life's challenges ignited his belief in the transformative power of hard work and determination. He is actively involved in public speaking, debate, and leadership training, alongside volunteering as a teacher to uplift street children through education. He is also a senior trainer and event manager in a robotics and programming association. Hassan is driven by a profound desire to make a positive impact on his community and the world. His ultimate goal is to inspire everyone to dream big and contribute to a brighter future.

Ahmad Hossain (biography pending)



Vikyno to Victory: Transitioning from Vikyno Diesel Engines to Sustainable Alternatives

Theme:
Systems

Team Name:
Vikyno Crusaders

Hassan Jubair, Tejaswini Samanta, Ahmad Hossain, Mithela Mehenaz

Section 1. Our top priority.

We think the widespread use of outdated Vikyno diesel engines contributing to environmental degradation and health risks in the South and Southeast Asian developing countries is the top priority obstacle to successful human development.

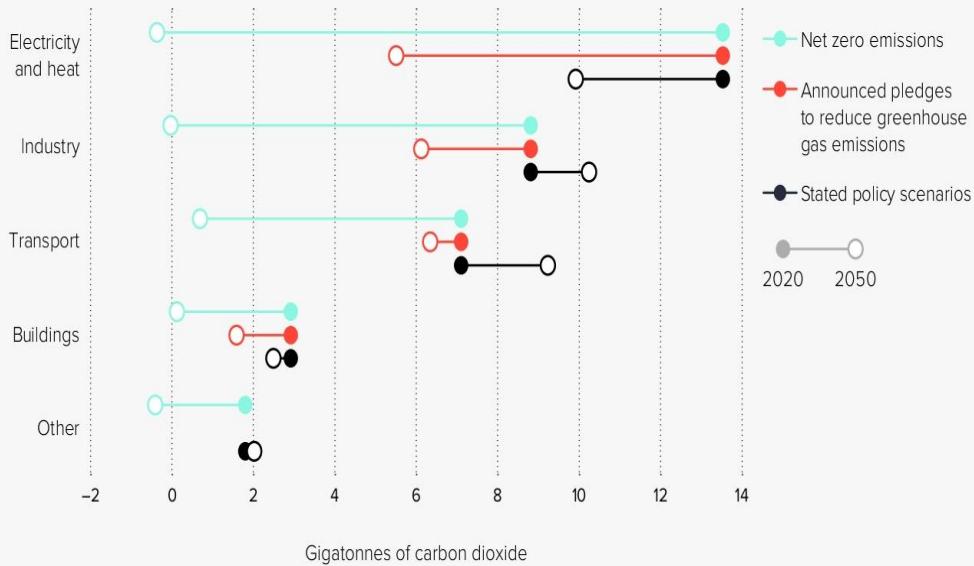
The Vikyno diesel engines have come to represent concern for the environment and the general welfare in South and Southeast Asian developing countries' bustling thoroughfares for the past few decades.

These outdated engines, used in various sectors, particularly in agriculture and construction-transportation, pose significant environmental challenges and endangering public health and safety. These aging engines are a type of **diesel engines** that contribute to:

- Emit billowing black smoke and carbon dioxide gas contributing in air contamination,
- Consume excessive quantities of diesel fuel
- Noise pollution,
- Poor control systems in the vehicles used contributed to more accidents.
- Low efficiency.

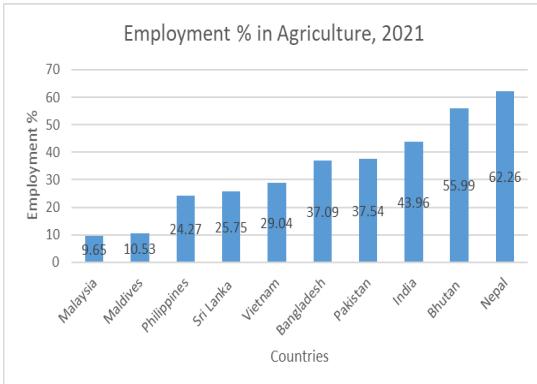
USAGE: The **Vikyno diesel engines** are widely used in – small four-wheel tractors, power tillers, water pumps, engineering machinery, propulsion of small boats, small generators, industrial machineries, air compressors for irrigation & drainage equipment and processing machinery for agriculture sideline products, such as thresher, rice mill, grinder, forage pulverizer etc.

Figure 1.10 Energy transitions towards renewables can unfold in different ways for different sectors



Source: IRENA 2021

Taken from the UNDP HDRO 2021/2022 Human Development Report.



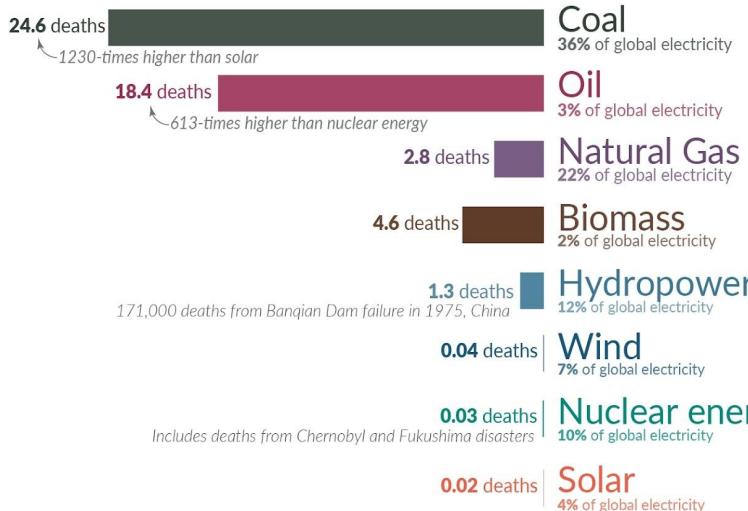
Data Source: The World Bank

EFFECT: It primarily impacts the agricultural sector where more than average of 33% of the South and Southeast Asian population is involved, which is approximately more than 800 million people in countries like Bangladesh, Bhutan, Nepal, Pakistan, Sri Lanka, India, Malaysia, Myanmar, Chile, Philippines, etc.

What are the safest and cleanest sources of energy?

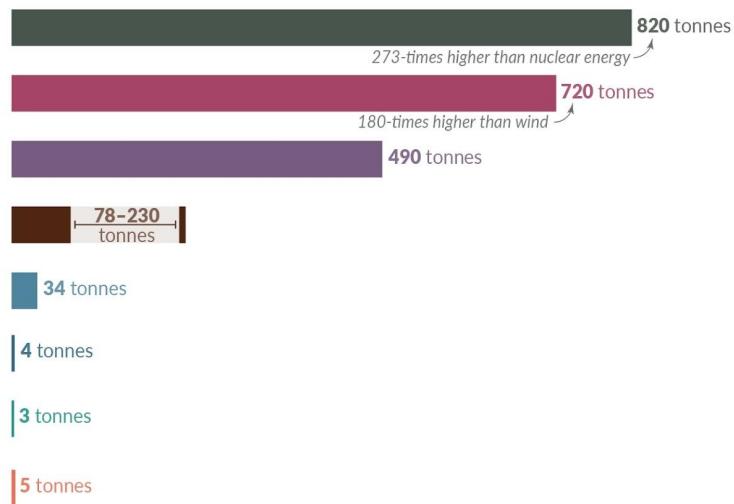
Death rate from accidents and air pollution

Measured as deaths per terawatt-hour of electricity production.
1 terawatt-hour is the annual electricity consumption of 150,000 people in the EU.



Greenhouse gas emissions

Measured in emissions of CO₂-equivalents per gigawatt-hour of electricity over the lifecycle of the power plant.
1 gigawatt-hour is the annual electricity consumption of 150 people in the EU.



Death rates from fossil fuels and biomass are based on state-of-the art plants with pollution controls in Europe, and are based on older models of the impacts of air pollution on health. This means these death rates are likely to be very conservative.

Data sources: Markandya & Wilkinson (2007); UNSCEAR (2008; 2018); Sovacool et al. (2016); IPCC AR5 (2014); Pehl et al. (2017); Ember Energy (2021).

Source: Taken from ourworldindata.org

Excessive use of fossil fuels and greenhouse gas emissions will cause huge effects on the environment like:

- (i) an increase in average global temperatures,
- (ii) change in precipitation, such as rain and snow,
- (iii) and the obvious faster melting of glaciers and ice sheets causing sea levels to rise resulting in flooding in coastal cities displacing millions of people in low-lying areas such as Bangladesh, parts of India and Pakistan, the U.S. state of Florida, and the Netherlands.
- (iv) It would devastate countries like Bolivia, Peru and India that depend on glacier meltwater for drinking, irrigation and hydroelectric power.
- (v) As climate change, animals adapted to a certain climate may become threatened.
- (vi) Tropical diseases will expand their ranges
- (vii) and people may no longer be able to grow crops that they depend on for survival.

It is imperative to address the problems associated with diesel engines and transition to cleaner and more sustainable energy sources to mitigate noise and air pollution, resource depletion, and improve road safety for the well-being of the people.

It is clear that a radical sustainable energy transition is required, necessitating creative solutions to replace the antiquated diesel engines with more efficient and sustainable options. To address these pressing issues and embrace our responsibility towards the planet.

Section 2. Our vision for success.

To successfully address this problem, we think it is most important to implement a better alternative that is high power efficient, cost effective, and environment friendly. In our project “Vikyno to Victory”, we represent Hydrogen IC engines as a potential alternative that meets the required criteria. In addition, we attest to the users and stakeholders about its benefits and capabilities.

Benefits

Feasibility	Hydrogen IC engines are proven technology and are technically feasible.
Impact	<ul style="list-style-type: none"> Enhanced fuel efficiency and reduced resource consumption. It emits water which can be used to water small trees, plants and saplings on roadside.

Diesel powered engines vs Hydrogen IC engines.

Diesel powered engines	Hydrogen IC engines
Abundant carbon/greenhouse gas emissions negatively affect the environment.	No carbon emission as it uses hydrogen fuel.
Lower mileage: Can drive max 25 miles/Liter	Higher mileage: Can drive max 86 miles/Liter
Max 15-20 minutes to reserve.	Max 3 to 5 minutes to reserve.
Creates noise pollution.	Comparatively quieter resulting in reduced noise.
Very expensive as it uses diesel .	Use hydrogen fuel and is very cheap comparatively; cost effective.

Conclusion

Our solution aims to address the environmental, health, and safety concerns associated with diesel-powered Vikyno engines & achieve a successful transition to cleaner and sustainable energy.

References

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Vikyno to Victory: Transitioning from Vikyno Diesel Engines to Sustainable Alternatives



Team *Vikyno to Victory*

Tejaswini Samanta, Hassan Jubair,
Ahmad Hossain, Mithela Mehenaz

The problem



(click here)

The problem

We think **the widespread use of outdated technologies**, such as Vikyno diesel engines, contributing to significant environmental challenges and endangering public health and safety in South and Southeast Asian developing countries is the top priority obstacle to successful human development.

In our region, Vikyno diesel engines have come to represent concern for the environment and the general welfare in South and Southeast Asian developing countries' bustling thoroughfares for the past few decades.

VEHICLES POWERED
BY VIKYNO ENGINE



IMAGES OF THE USEAGE OF VIKYNO DIESEL ENGINE

VIKYNO ENGINE IN CONSTRUCTION AND IN GENERATOR



VIKYNO ENGINE IN AGRICULTURAL SECTORS



BOATS POWERED BY VIKYNO ENGINE



The problem

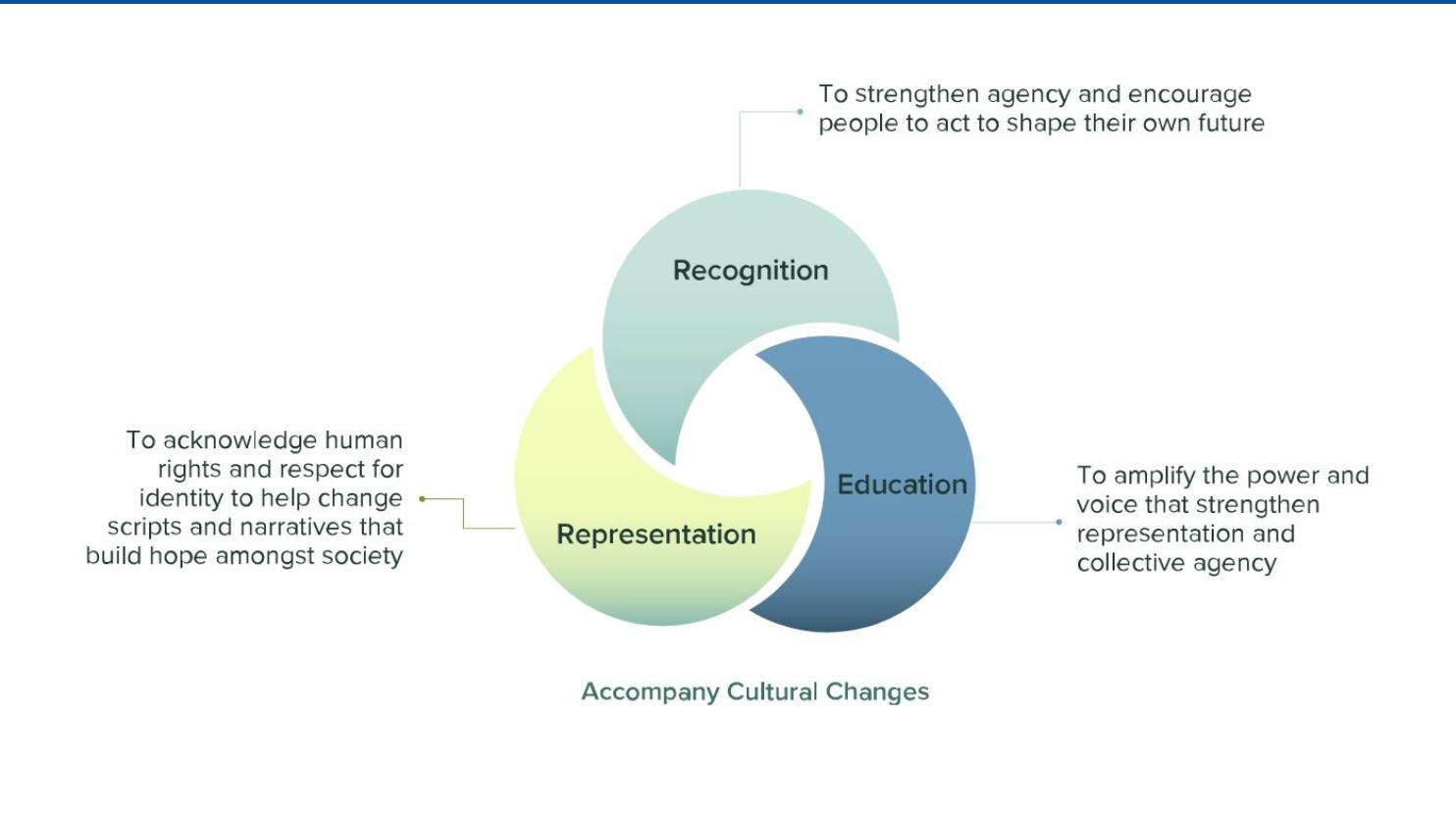
Here are how the problems have affected our community:

- Smoke & CO₂
- Excessive consumption
- Noise pollution – it is very hard for families to sleep if they live by the side of the road
- Rise in accidents
- Low efficiency

Cultural change to promote collective action is necessary



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To successfully address this problem

In our research we developed our own framework of 5 dimensions in addition to cultural change to make the solution possible:

- **Policy** – bring the issue to political leaders
- **Planning** – build infrastructure for alternative engines
- **Privatization** – most India farmers buy/sell to the government; boosting private agri sector helps farmers afford new technology
- **Procurement** – supply chains for hydrogen engines
- **Pricing** – making engine prices reasonable; reduce government's role

What success looks like to us

We think it is most important to implement a better alternative that is:

- Cost effective
- High efficiency and durable
- Simple to install and easy to manage
- Suitable for small machines/vehicles, as most farmers have small lands

In our project “Vikyno to Victory”, we represent **Hydrogen IC engines** as a potential alternative that meets these criteria

Diesel powered engines vs Hydrogen IC engines

Benefits

Feasibility: Despite the lack of a hydrogen supply chain, the hydrogen IC engines themselves are proven technology (technically feasible)

Impact:

- Enhanced fuel efficiency and reduced resource consumption
- Does not endanger public health due to excessive noise pollution, air pollution, or poor controls

Diesel Powered engines	Hydrogen IC engines
Abundant carbon/greenhouse gas emissions negatively affect the environment.	No Scope 1 carbon emission as it uses hydrogen fuel.
Lower mileage: Can drive max 25 miles/Liter.	Higher mileage: Can drive max 86 miles/Liter.
Max 15-20 minutes to reserve.	Max 3-5 minutes to reserve.
Creates noise pollution.	Comparatively quieter resulting in reduced noise.
Very expensive as it uses diesel.	Use hydrogen fuel and is very cheap comparatively; cost effective.

Why collective action matters to achieve success

- We think these forms of collective action are necessary to adopt hydrogen IC engines:
 - **Build infrastructure:** hydrogen supply chain and fuel stations
 - **Educate farmers & workers:** 60% of Indian workers are in agriculture and they are not aware of environmental impacts, cultural change is needed
 - **Collaborate & work with organizations and government:** Indian farmers face a lack of representation to participate in policy-making, and there must be collaboration between state governments and with UN agencies (for example: Punjab/Haryana water program led to cultural change among farmers)
- We think young people can contribute effectively to this collective action by:
 - **Raising awareness** about the environmental and public health risks
 - **Advocating** by signing petitions & writing letters to authorities
- The UN can support by **listening to youth perspectives on local obstacles** to change

CERTIFICATE OF SPECIAL RECOGNITION

South-North Scholars congratulates

TEJASWINI SAMANTA

for collaborating in a team of young leaders to submit an innovative
proposal entitled [Vikyno to Victory](#)

ranked by our Global Judging Committee and a vote of 2,800 peers as

4th

of 43 global finalist proposals

during Solving for Humanity,
the first youth-led challenge
for human development,
supported by experts at the
United Nations and beyond
solvingforhumanity.org

