ReduX TECHNOLOGIES

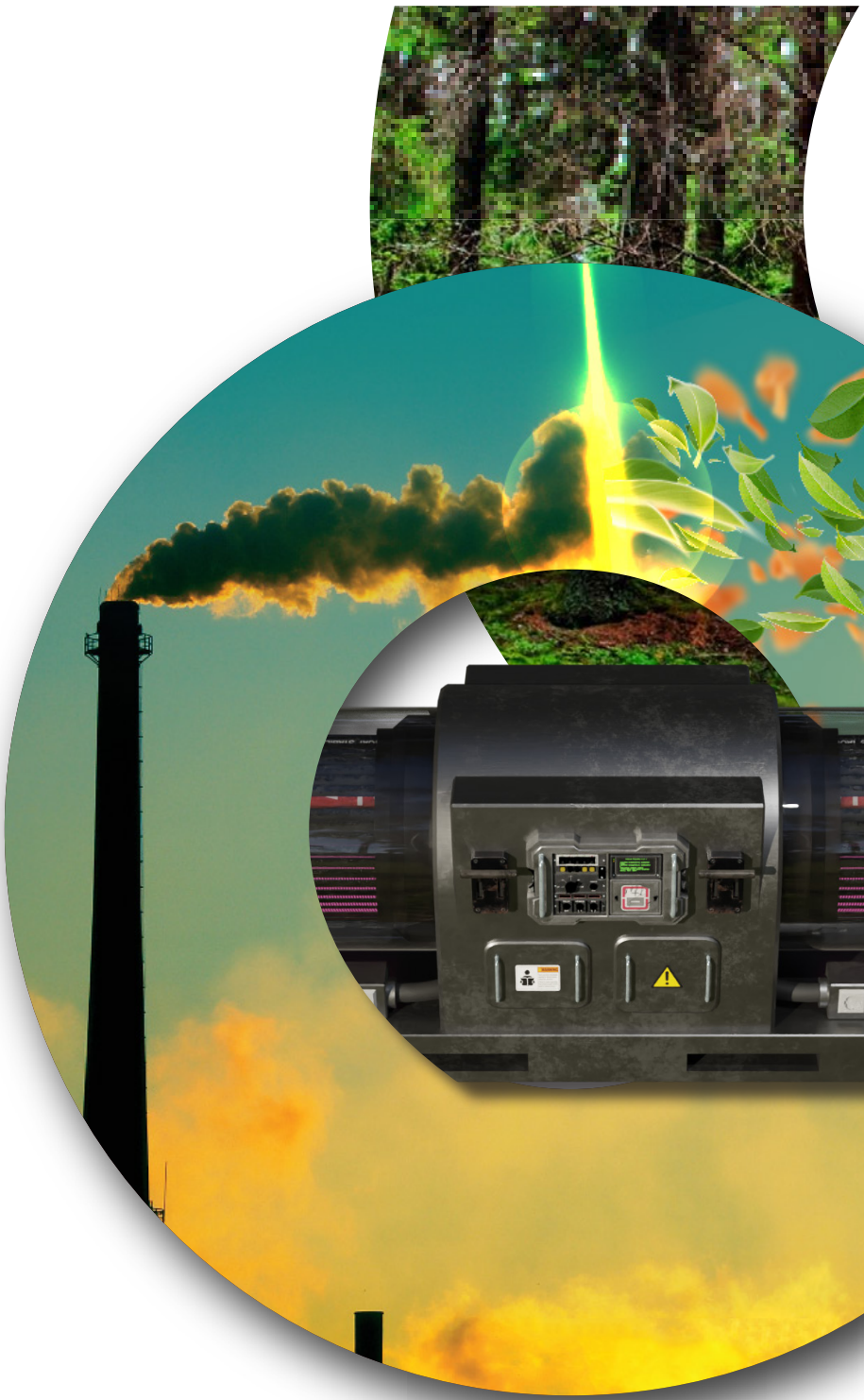
Future technologies in the energy sector

ReduX presents:
ReduX converter for all combustion systems

Reduces fuel consumption, CO_2 and emissions.

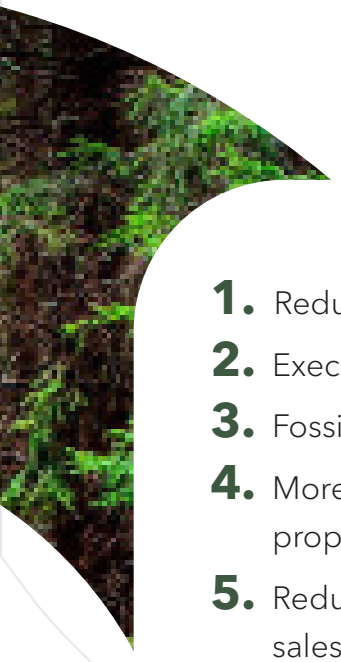
Whitepaper

content



ReduX

economical
environmentally &
climate-friendly



ReduX - Technology Abstract

The ReduX technologies includes, among other things, a converter for the treatment of fuels - has been fully developed, tested many times and over long periods of time, and can be used immediately today for all fossil combustion engines. ReduX can immediately improve the ecological and economic balance of all combustion systems in use today. Applications in the field of cars, trucks, locomotives, ships, aircraft, generators, etc. have already been successfully tested for several years on engines available on the market as part of the development of ReduX technologies.

As a result, ReduX represents a quick, easy, and cost-effective option for optimising the exhaust gas and consumption behaviour of currently available engine technology.

It is fairly simple (plug and play) to retrofit or upgrade today's combustion engines to make them more environmentally friendly and efficient. As a result, a technical solution to climate protection can be implemented immediately and today. At most, this might even help to enhance today's combustion systems' diminishing acceptance. This could also help manufacturers and users project a positive image. This could also help to speed up the transition to new technologies and alternative systems, as well as lower or even eliminate taxes and charges on emissions and fuels, depending on the legal circumstances

ReduX is the solution to IMMEDIATELY

- lower CO_2 emissions
- reduce fossil fuel consumption

A future technology that is HERE & NOW!

2. Executive Summary

Sustainability, global warming, and climate preservation are the talk of the town, and purchase decisions are no exception. This is particularly true in the ever-increasing, **challenges with fossil fuels:**

- **climate change has accelerated as a result of the discharge of greenhouse gases.**
- **particulate matter production and hazardous emissions**
- **resources are running out, resulting in higher pricing**
- **due to geopolitical disputes, supply and price risks exist**

Nonetheless, fossil fuels constitute a cornerstone of the global economy, and phasing them out quickly is impossible for a variety of reasons, including economic and technological ones. Hundreds of millions of combustion systems are still in use around the world. As a result, technologies that make existing fossil fuel systems more efficient and climate-friendly are urgently required.

This white paper introduces a new and market-comparable optimum technology for this goal, with a price-effort-performance ratio that is otherwise unmatched. ReduX is a converter that improves the quality of liquid fossil fuels before they are burned, achieving the following results:

- **emissions reduction (CO, CO_2, NOx, and particulate matter)**
- **reduce the use of fossil fuels through increasing efficiency so that less fuel is required per unit of output.**
- **performance of combustion systems is being improved (including improved thermodynamics, reduced vibration, and reduced noise emission)**

ReduX converters are technically mature components that have now entered industrial production after many years of testing in series production. The cost per unit is usually fully amortised by the fuel savings within the first year of use in most applications. As a result, ReduX is ready to use right away, with a manageable expenditure per application. Existing engines, regardless of size or design, can be quickly and cost-effectively modified and retrofitted (plug & play). From the first hour of operation, this considerably enhances efficiency (economics) and environmental friendliness (ecology).

ReduX was developed for the mass market and is industrialised through ReduX Technology AG. A global sales market of more than 3 billion systems is targeted.

Market & Promotion

The market potential of ReduX converters is enormous. It basically covers all combustion systems. The converter can be retrofitted (on all existing) and future systems/engines

Even with the first focus on German, Austrian, and Swiss consumers, this results in a sales potential of over 1.2 billion Euro and an EBIT of 700 million Euro. A customer's ReduX installation pays for itself in less than a year in most circumstances. Potential tax savings, CO_2 credits and certificates, penalty avoidance, and other comparable effects are not yet included in. As more countries enforce strict CO_2 emission laws, they are becoming increasingly essential, with one ton of CO_2 resulting in large charges to the generator or responsible authority, which can exceed 100 Euro.

The details of the ReduX technologies and the planned phases of market entry are outlined below, and data and illustrations from long-term applications in various fields, in particular mobility as well as power generation, are presented.

Redux is applicable in over 3 billion combustion systems worldwide

3. Fossil energy sources: Indispensable until today

Fossil fuels are still the most important source of energy on the planet. However, it is widely accepted that their use is problematic. The use of fossil fuels presents us with various challenges:

- **supplies are limited, and coal, oil, and gas formation takes millions of years**
- **because fossil fuels play such a large role in the global economy, their extraction and trade appear to be frequent sources of geopolitical conflict, affecting supply and prices (usually negatively)**
- **mining and combustion of fossil fuels hastens climate change by releasing greenhouse gases. Methane is emitted mostly by mining, whereas carbon dioxide and other greenhouse gases are emitted predominantly through burning**
- **fossil fuel combustion produces particulate matter, which is extremely harmful to people's health, especially children's**

ReduX helps with alternative energy technologies

ReduX helps with alternative energy technologies Renewable energies are an important research topic and have some initial successes. ReduX is at the forefront of research and development. On the one hand with the ReduX converter, on the other hand in the production of bioreactors for the sustainable production of synthetic fuels, which can also be used as kerosene, gasoline or diesel.

A hasty phase-out of fossil energy sources would have fatal economic consequences and would endanger the continued existence of entire economic sectors and thus the existence of millions of people. Therefore, the further development of efficient and innovative processes for the use of fossil fuels is urgently needed until the sustainable switch to renewable energy sources can be successfully mastered in the coming decades.

4

More economical and environmentally friendly use of fossil propellant with ReduX

The ReduX converter offers an innovative, easy-to-implement and efficient solution. **ReduX is a technology that:**

- **significantly reduces emissions from the combustion of liquid fossil fuels (such as CO, CO_2, NOx and particulate matter) and**
- **have improved their efficiency, which means they're using less fuel per output**

In more detail, ReduX technologies is based on a converter that processes liquid fossil fuels prior to combustion.

This treatment is compatible with fuel oil, diesel, gasoline, and kerosene, thus it can be used in cars, trucks, trains, ships, planes, generators, and other transportation and industrial applications.

The ReduX converters are technically mature devices that have already been tested on numerous commercially available engines over a long period of time. ReduX is therefore immediately ready for practical use.

Existing engines can be adapted and modified in a simple plug-and-play fashion. Efficiencies and environmental friendliness improve rapidly.

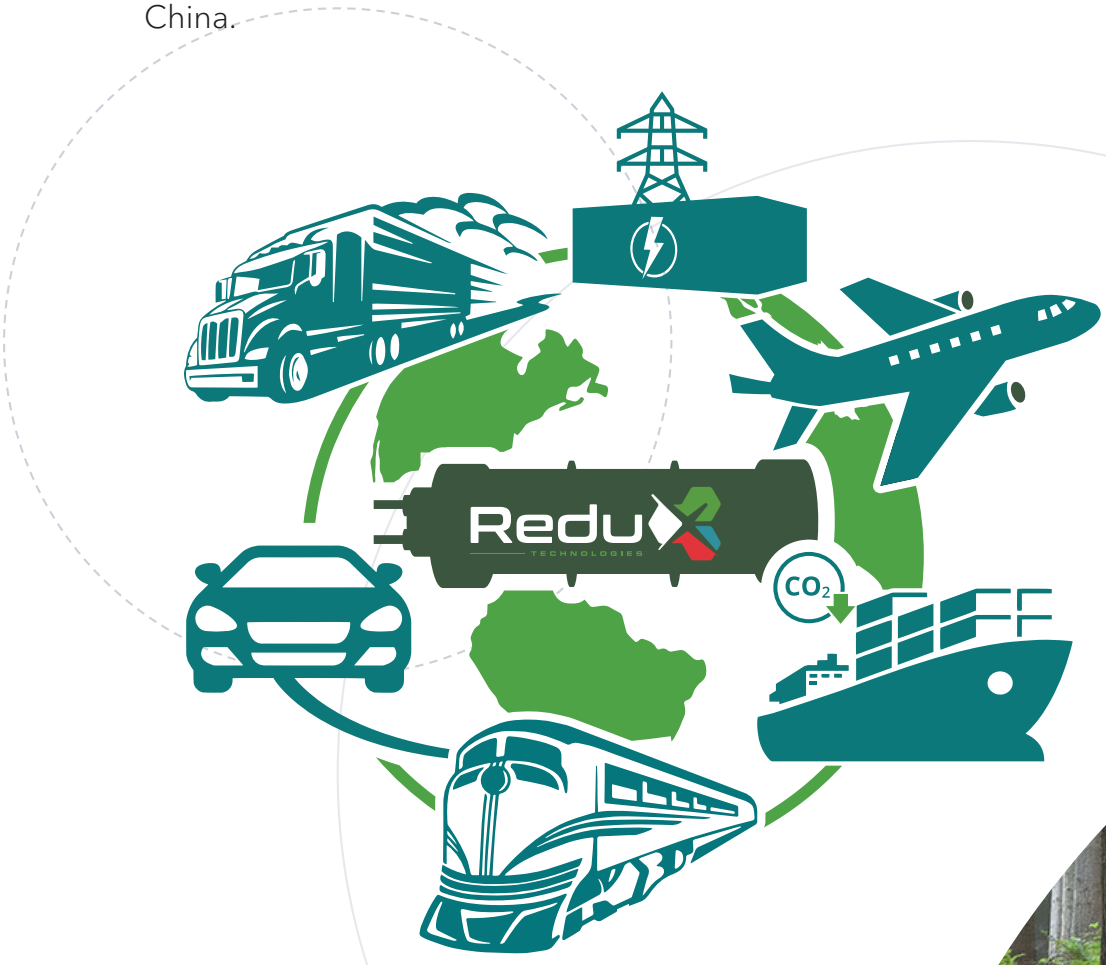
5. ReduX technology is targeting one of the largest sales markets worldwide

Worldwide, there are over 3 billion (!) systems in use that generate energy through the generate energy through the combustion of fossil fuels.

In this gigantic market, ReduX is almost universally applicable, especially in the areas of mobility–which includes automobiles and trucks, buses, ships, all the way to aircraft and drones–and energy and heat–oil-fired heating systems, generators, combined heat and power plants (CHP) and other power plants, and construction machinery.

Thus, in the DACH countries alone, the number of viable use cases or clients approaches 100 million. With a market penetration of only 0.1% to 0.5% the sales potential is above 1.2 billion Euro, with an EBIT of around 500 million Euro.

As a result, ReduX's initial market entry will be focused on the DACH countries. Once ReduX has established a market presence within this country, the company can turn its focus to other EU countries as well as markets in North America and Asia, particularly China.



PHASE I - ROLL-OUT IN THE DACH COUNTRIES (2022 to 2024)

The initial target customers are addressed in a compact and targeted information campaign. The larger among the target customers (list on request) directly enable the push into the profit zone. The model calculations (also available on request) show possible sales of 97.2 million Euro by mid-2023 with EBIT of 46.5 million Euro. With a system price of - depending on size - several thousand Euro, this results in an average payback period of less than 12 months for customers.

PHASE II - ESTABLISHMENT IN THE DACH REGION, EU GROWTH, AND SPECIFIC IMPORTANT ACCOUNTS (2023 to 2024)

Phase II begins at the same time as Phase I. The campaign will get off with the participation of the first technological companies, primarily from Japan and China, but maybe also from South Korea. Additional EU partners will be attracted based on the DACH countries' stable market position, with a particular focus on automobile companies and political communication in this sector. Forecasts predict that sales could approach 2 billion Euro, with an EBIT of 860 million Euro in this case.

PHASE III - GLOBAL MARKET WITH A FOCUS ON THE EU, CHINA, USA (2023 to 2026)

The remaining market opportunities will be pursued with the help of local nation partners or joint ventures. A licencing system is also being developed. Sales of 20.6 billion Euro with an EBIT of 7.3 billion Euro are conceivable, according to model forecasts. Projections are predicated on a conservative market penetration of 0.1 to 0.5%. Furthermore, the positive contributions from CO_2 credits and certificates have yet to be factored into any of the model calculations.

SWOT Analysis

As a developer and producer, ReduX Technologie AG attaches great importance to clear and transparent communication with all interested parties and partners. It goes without saying that an innovative product such as ReduX also involves risks. The strengths and weaknesses as well as opportunities and risks are compared in the following SWOT diagram and allow anyone interested in the technology to weigh them up independently.

S Strengths

- original, one-of-a-kind product with USP
- effective problem solver (CO_2, emissions)
- low investment with a quick payback
- easy application and immediate usage possible
- due to scalable production, rapid expansion is possible

W Weaknesses

- ReduX is currently under construction; delivery may be delayed if market demand is high
- more staff is needed because the needs are "engineer-heavy"
- although well-positioned in research, marketing and sales specialists are still in short supply
- sales and service must be quickly ramped up

O Opportunities

- problem of CO_2 must be addressed right away
- emissions-related constraints can be quickly resolved
- currently, there is no competition in the market
- possible to enter the market right away

T Threats

- travel restrictions may continue to limit growth for another 10 to 12 months (pandemic)
- because ReduX is not the outcome of in-house research and development, it may be limited by system providers
- global economy is under attack from a variety of sources

6. ReduX - Technology Insights

The underlying technology is detailed in the following in highly abbreviated form, with no specifics important to patent law or technology.

Many steps of the ReduX converter bring the fuel to the required vaporisation temperature in the fuel supply line of the internal combustion engine or the fuel supply line of the solid combustion point. So that the fuel does not outgas, this reaction heat process must be carried out through the converter stages. Each of the ReduX unit's different response steps is measured and controlled by the control electronics.

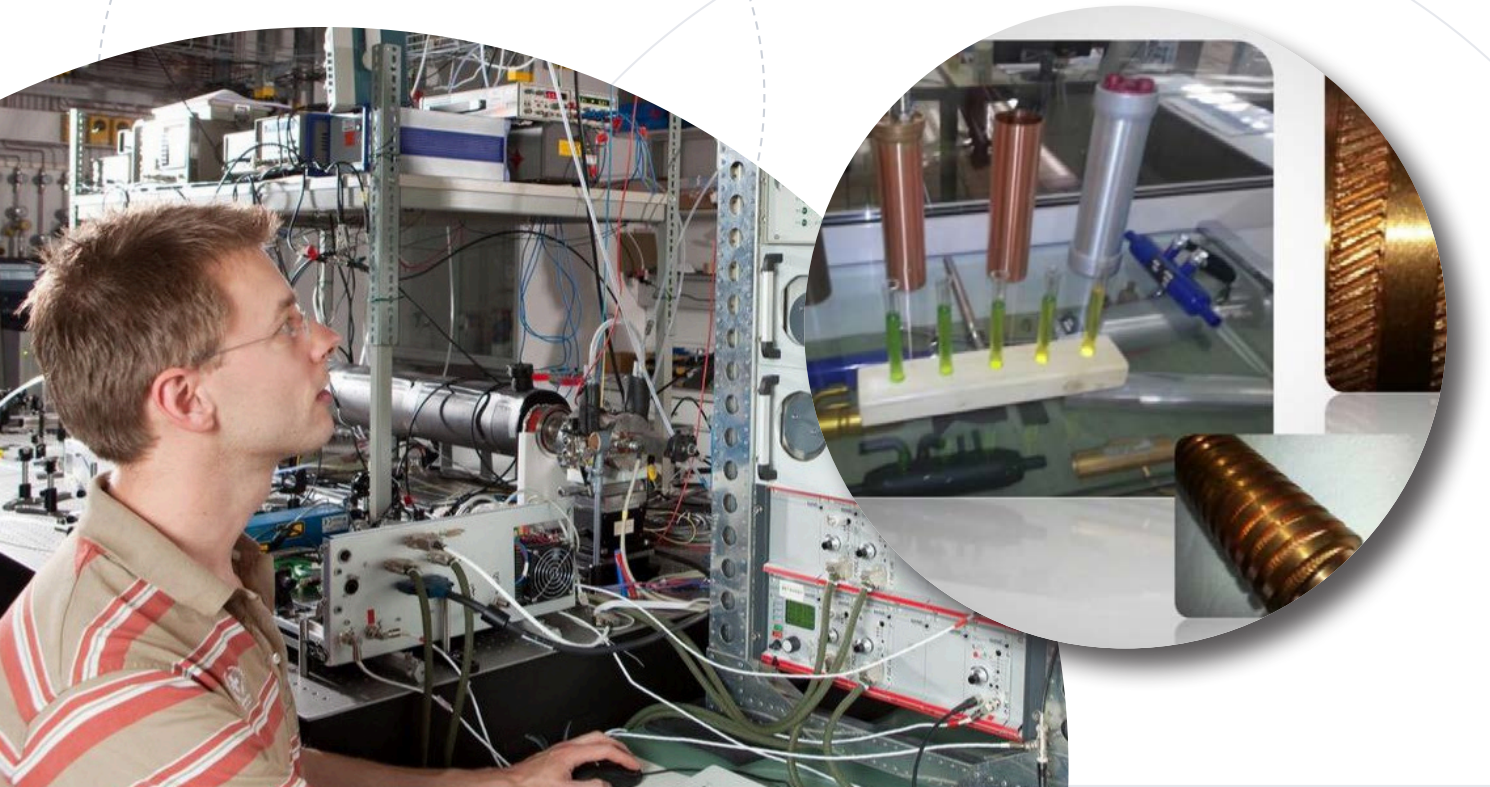
Through a thermally isolated pressure line monitored by integrated sensors, the processed medium enters the injection system or other engine- or burner-side input systems such as the injection pump or carburetor. The fuel expands as a result of the heating, but the energy density per volume remains unchanged, therefore no power is wasted.

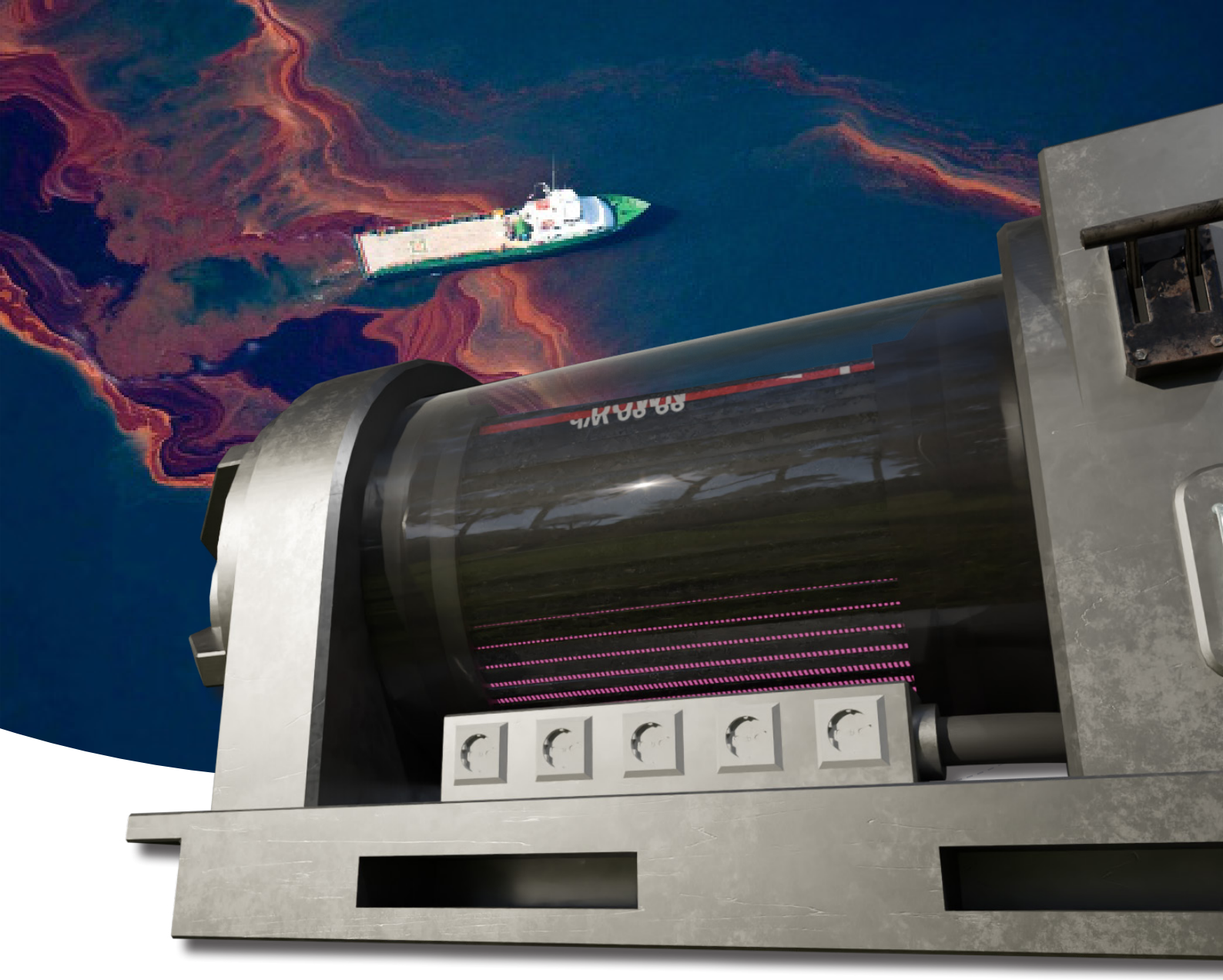
The spatial expansion of a liquid or gaseous substance is described by the following equation: Vt = Vo (1 + **β**), where V is the volume of the substance at t° Celsius, V is the volume of the substance at 0° Celsius, t is the temperature in degrees Celsius, and ß is the coefficient of spatial expansion, or the increase in the unit of space for a 1° Celsius increase in temperature. Regular gasoline has a spatial expansion coefficient of **β** = 0.00110, premium gasoline has a spatial expansion coefficient of **β** = 0.00114, and diesel fuel has a spatial expansion coefficient of **β** = 0.00083.

As a result of the expansion step, the power delivered to the combustion system and the fuel volume remain unchanged. The amount of power or fuel supplied to the combustion system does not vary as a result of the addition of thermal energy in the expansion stage

Because most medium- and long-distance flights are flown at altitudes of 10,000 metres or higher, fuel filled at higher ground temperatures can always cool down to match the prevailing outside temperature, an even greater increase in volume for aircraft is possible due to prevailing outside temperatures of around minus 45 °C. With an expansion stage, temperature variations of more than 100 °C may be overcome, resulting in savings that are more than double those measured for motor vehicles (already 10% or more).

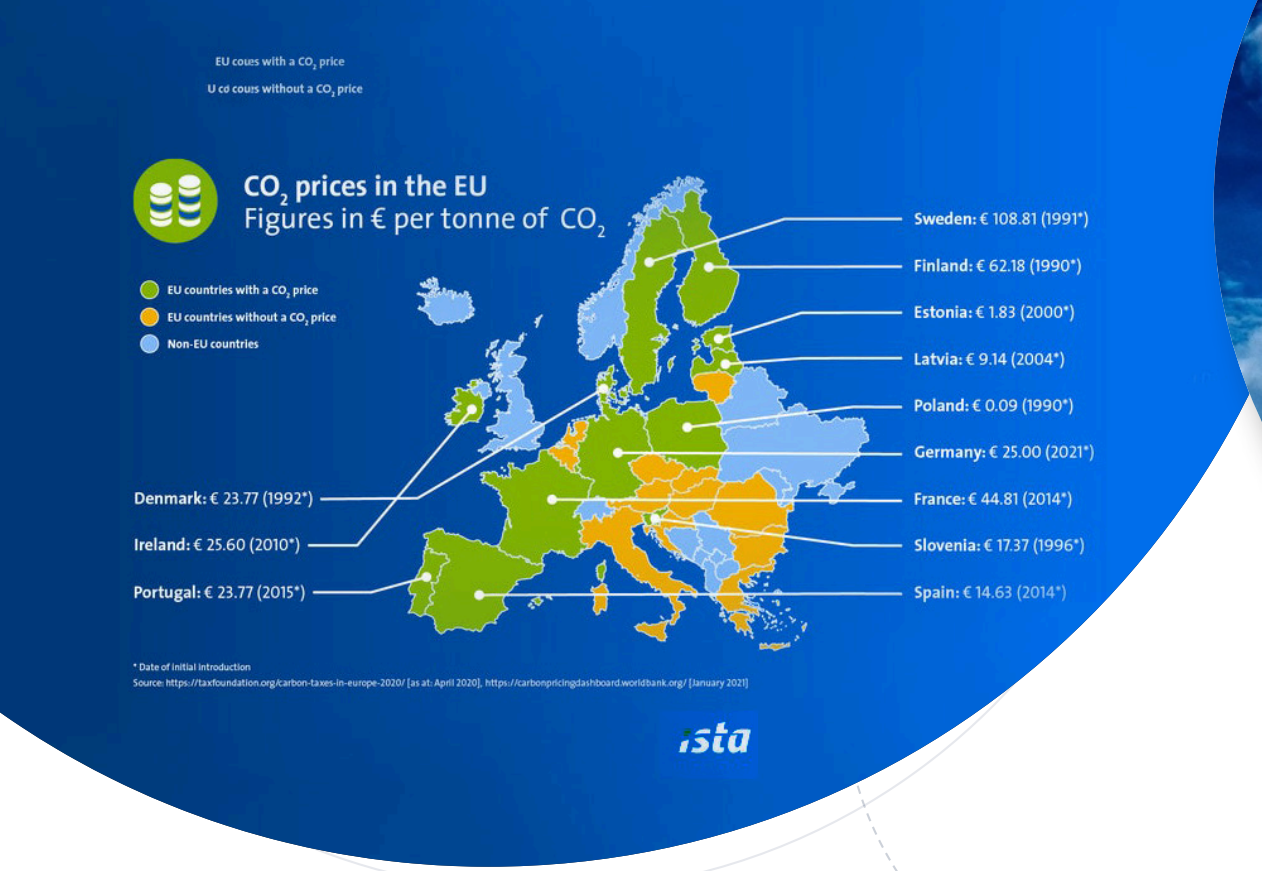
In addition, a viscosity change occurs in this process stage - this means that the spray mist becomes finer and therefore easier to mix with air and easier to ignite, which brings further advantages (better and faster combustion), especially in turbines.





In the further stages of the reactor, the fuel is brought to its vaporization temperature. As the fuel changes from the liquid to the gaseous state as a result of the vaporization temperature, almost 100% combustion is achieved during the ignition process with minimal pollutants and optimum performance with a faster ignition time. The state of aggregation is thus changed and can be optimized according to the stoichiometric mixture used as a basis. Ignition is much faster than with a conventional fuel mist. However, if the fuel were converted to a gaseous state before entering the combustion chamber, a significantly lower energy density would be achieved, as evidenced by the performance data of gas engines.

Only the factors that come together here, i.e. the volume expansion, the ease and speed of ignition and the conversion in the combustion chamber, with the energy released in the process and the resulting high energy density (boost pressure) and the advantages of virtually residue-free combustion under these conditions, bring about the outstanding performance of ReduX.



7. Minimize taxes and duties, avoid penalties

Many nations' law currently penalises the use of fossil fuels and the accompanying emissions by raising taxes and fees.

The German government adopted a CO_2 tax in the BEHG in May 2020, and it has been in place since January 2021. The tax on one ton of CO_2 will be raised to 55 Euro per ton by 2025.

Sweden has imposed a CO_2 tax since 1991. By 2025, the government intends to have met its objective of being CO_2-neutral. As a result, hardly any heating in Sweden is still done with oil. In Sweden, too, there are tax breaks for companies that compete internationally.

Slovenia and Estonia, unlike the majority of EU member states, have legislation that regulates other pollutants like as NOx and SO_2. Other EU countries having a CO_2 tax include Latvia, Finland, Denmark, Poland, Ireland, Spain and Portugal.

8. Reduced emissions - an important issue for consumers and producers

The global scandal known as "Dieselgate," which began in 2015, highlighted how sensitively both courts and consumers are now reacting to the issue of emissions. Initially, it was determined that Volkswagen had installed technical devices in their vehicles that produced lower emissions on the test bench than they did on the road. It was ultimately established that Daimler, Porsche, Audi, and BMW were all involved in identical actions. Identical defeat devices were also discovered at Fiat in 2017.

This deception by the manufacturers was especially crucial for German car buyers, as there was a chance that diesel driving limits based on emissions could be implemented in several German towns. In other nations, however, there were legal implications. The Volkswagen Group has incurred a total cost of at least 32 billion Euro as a result of "Dieselgate". The so-called Ohio ruling in the United States in June 2021 increased the possibility of future damage claims of up to one trillion Euro (!) from other US states.

9 Possible applications of ReduX

Cars

Lines/Tour buses

Trucks

Municipal vehicles

Large vehicles

Open Sea and Inland vessels

Ferries

Generators

Drones

Helicopter

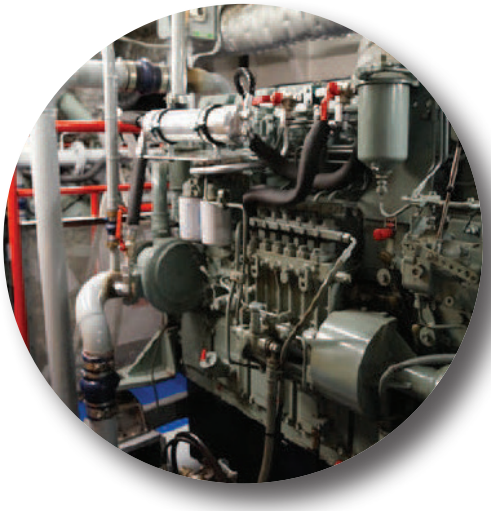
Airplane

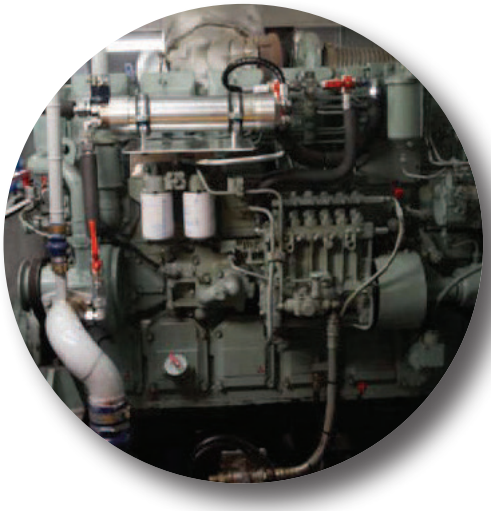
10. Examples from practical tests

ReduX has proven itself in numerous field tests over many years:

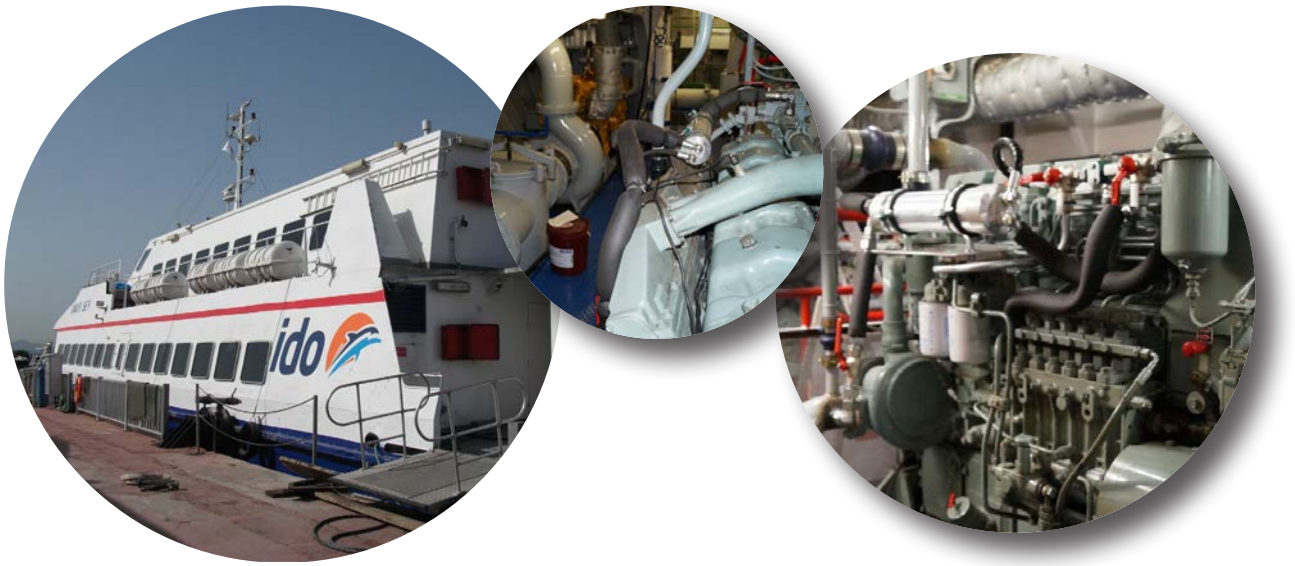
Coaches and buses

Marine engines and generators





Trucks and other large vehicles



ReduX has been widely tested on trucks and other large vehicles, including Mercedes-Benz, Volvo, MAN, DAF, and SCANIA.

For marine engines, ReduX can provide considerable fuel savings (up to 22%) as well as significant emissions reductions (up to -70%).

11. ReduX at a glance

An innovative, pragmatic and efficient solution:

- **setup process is easy and straightforward**
- **average payback period is 10 to 12 months**
- **system is compact and can be utilised independently**
- **TÜV-certified and has a 10 to 12-year service life**

Finally, there are positive effects to employing ReduX for engines and generators:

- **reduction of emissions by 15 to 80% (depending on substance)**
- **reduction of fuel consumption by 10 to 25%**
- **engine parameters such as noise emissions, vibration, temperature, and thermodynamic behaviour can all be improved**

12. Direct comparison with current emission reduction systems (catalytic converter)

A direct comparison demonstrates that ReduX is the superior emission reduction solution in a variety of ways. Here's a concrete example of a comparison:

Properties / Effects	Catalyst	ReduX-Converter
Reduces emissions	Yes	Yes
Reduces CO_2	No (on the contrary)	Yes
Increases engine performance	No (on the contrary)	Yes
Reduces noise emissions	No	Yes
Amortization	No (on the contrary)	Yes
Retrofit possible	Possibly with high effort	Yes

13. Testing and approval of the ReduX technologies

The ReduX technology is already recognized by the following organizations or has been tested by them and in some cases has already received an award (Green Award):

iaph international association of ports and harbors

ESI ENVIRONMENTAL SHIP INDEX

GREEN AWARD

TÜVRheinland® Precisely Right.

DEKRA

TÜV AUSTRIA

REDUCE EMISSIONS!
REDUCE FUEL CONSUMPTION!
FIGHT CLIMATE CHANGE!
GO GREEN!
GO REDUX!
GO NOW!

REDUX IS READY TO GO NOW!

@goreduxnow

@goreduxnow

redux-technologies.com