NOVATRON

Fusion powering the sustainable planet

MAY 2024

Novatron Fusion Group

- Founded in 2019
- 35+ employees
- Capitalization of EUR 14 million
- Growing IP portfolio
- Fusion lab at KTH, Stockholm

HEADQUARTERS
Stockholm | Sweden

Investors

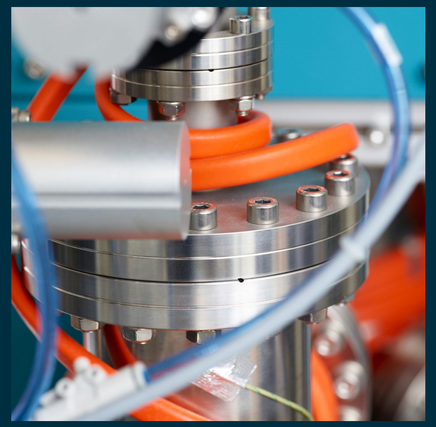
KTH HOLDING AB · InnoEnergy · Climentum Capital · Santander Climate Tech Fund · Industrifonden · granitor

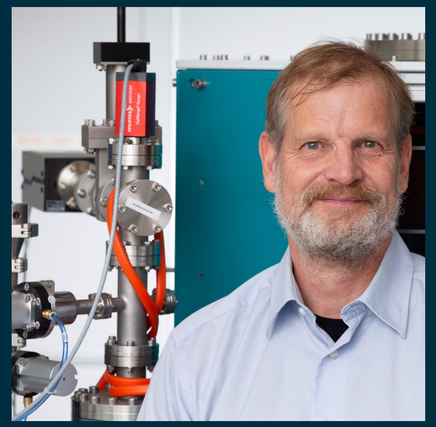
Partners and memberships

KTH · InnoEnergy · FUSION INDUSTRY ASSOCIATION · THE FUSION CLUSTER · OXFORD SIGMA · UK Atomic Energy Authority

A multi-disciplinary team with deep-tech successes

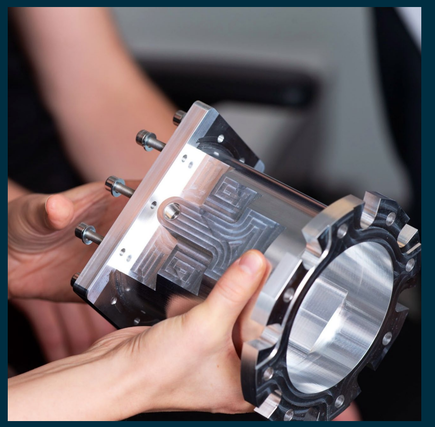
ENGINEERS, SCIENTISTS AND ENTREPRENEURS

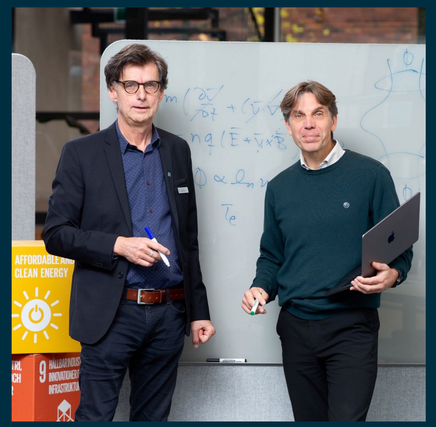




Experience

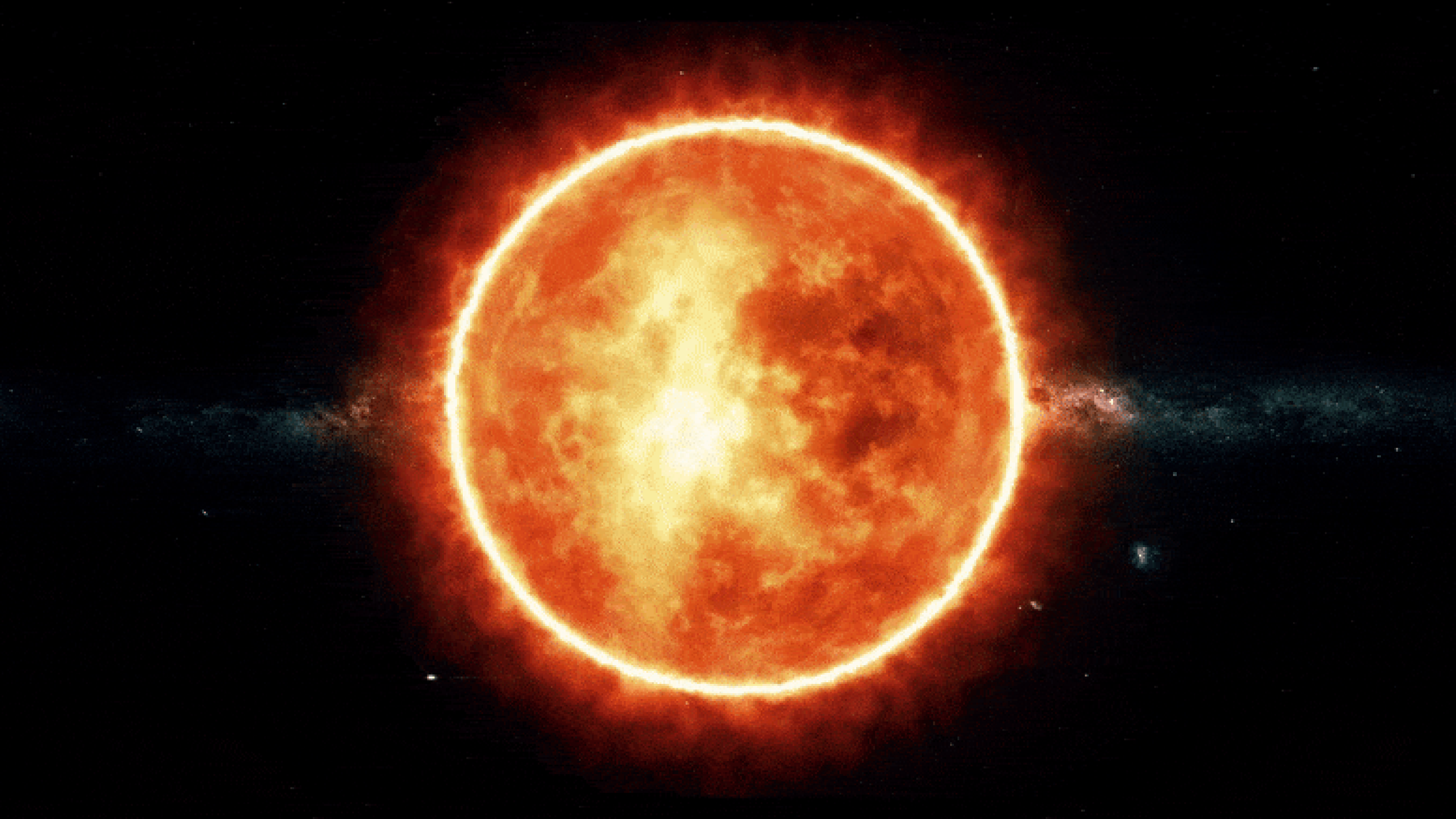
- SEK 3B+ in combined fundraising
- 3 successful IPOs
- 900+ scientific articles produced
- 800+ years of industrial & scientific experience
- 110+ patents





Skills

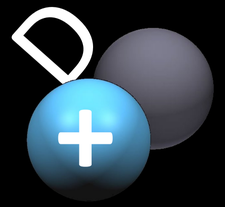
- 10 scientists with PhD
- 11 plasma physicists
- 17 advanced system engineers
- 5 software simulation experts
- 3 serial entrepreneurs
- 8 nationalities speaking 11 languages



The fusion process

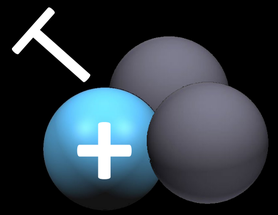
Deuterium + Tritium → Helium + Neutron

$$D + T \rightarrow {}^{4}He + n$$



$^{4}He + 3.5\ MeV$

$n + 14\ MeV$

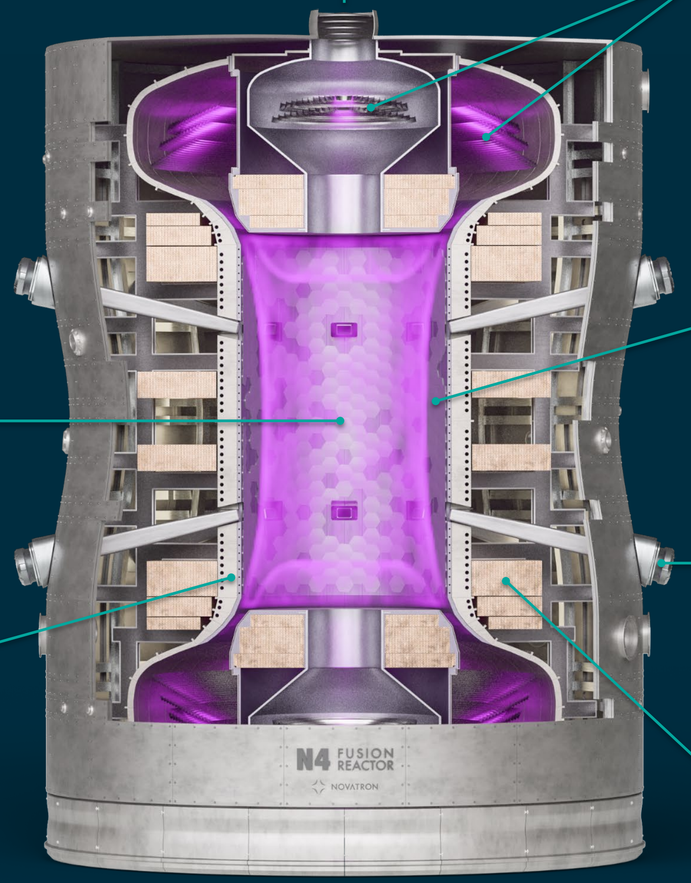


NOVATRON N4

A STEADY STATE +1 GW FUSION REACTOR

EXHAUST
Helium extraction

DIRECT CONVERTERS
Converts releasad plasma to electricity
– up to 20 % of total electricity output.



LITHIUM SHIELD
Used for tritium production

PLASMA
Fusion reactions convert mass to energy and sustain the fusion process

NBI PORTS
Neutral Beam Injectors are used for plasma ignition

REACTOR WALL
Heat extraction for energy production

ELECTRO-MAGNETS
Copper-based magnets with internal cooling

FUEL SUPPLY
Deuterium injection

The importance of fusion

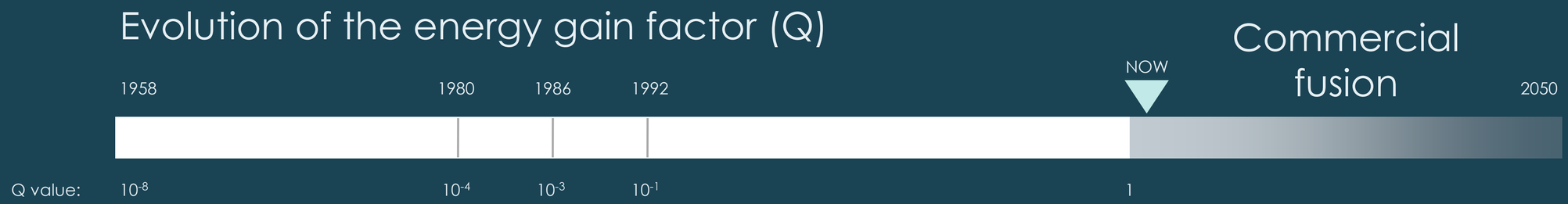
AN OPPORTUNITY TO SUPPLY MANKIND WITH UNLIMITED ENERGY

THE TECHNOLOGY THAT WILL BRING US TO NET ZERO. AND KEEP US THERE.

- Ideally suited for scaleable base-load power generation in national energy grids
- An unlimited fuel supply – hydrogen is the most common element in the universe
- Access to abundant energy is key to peaceful conflict resolution, energy security and sustainable development

The last mile

WE ARE GETTING VERY CLOSE TO COMMERCIAL FUSION



$$Q = \frac{\text{energy output}}{\text{energy input}} =$$

The fusion energy gain factor is the ratio of fusion power produced in a nuclear fusion reactor to the power required to maintain the plasma in steady state

A global fusion industrialization movement

SIGNIFICANT PUBLIC INVESTMENT TO BRING FUSION ENERGY TO THE GRID

REUTERS

US to announce global nuclear fusion strategy at COP28

By **Valerie Volcovici** and **Timothy Gardner**

November 21, 2023 12:17 AM GMT+1 · Updated 4 days ago

Bloomberg

US Says Scientists Make Breakthrough in Nuclear Fusion Energy

- Laboratory in California records reaction with net-energy gain

12 december 2022 at 08:23 CET
Updated on 12 december 2022 at 16:02 CET

The Economist

Fusion power is coming back into fashion

This time it might even work

Mar 22nd 2023 | CULHAM

THE WALL STREET JOURNAL.

Microsoft Bets That Fusion Power Is Closer Than Many Think

Startup backed by OpenAI founder Sam Altman agrees to provide tech giant with electricity by 2028

By Jennifer Hiller Follow

May 10, 2023 at 8:56 am ET

INDEPENDENT

Landmark nuclear fusion deal struck by US and UK

Major breakthrough in fusion was made last year by Lawrence Livermore National Laboratory in California

Louise Boyle Senior Climate Correspondent, New York • Friday 10 November 2023 17:39 GMT

The Brussels Times

Germany aims to invest €1 billion in nuclear fusion research

Wednesday, 6 September 2023

BBC

Major breakthrough on nuclear fusion energy

European scientists say they have made a major breakthrough in their quest to develop practical nuclear fusion - the energy process that powers the stars.

9 February 2022

The Asahi Shimbun

Japan to draft nuclear fusion strategy amid fierce global race

By YU FUJINAMI/ Staff Writer

September 14, 2022 at 19:04 JST

THE RACE TO FUSION ENERGY

nature

An emerging industry of nuclear fusion firms promises commercial reactors in the next decade. **By Philip Ball**

FINANCIAL TIMES

Governments join race for commercial fusion power

Goal of abundant, zero-carbon electricity from fusing atoms brings together private and public sector

Science

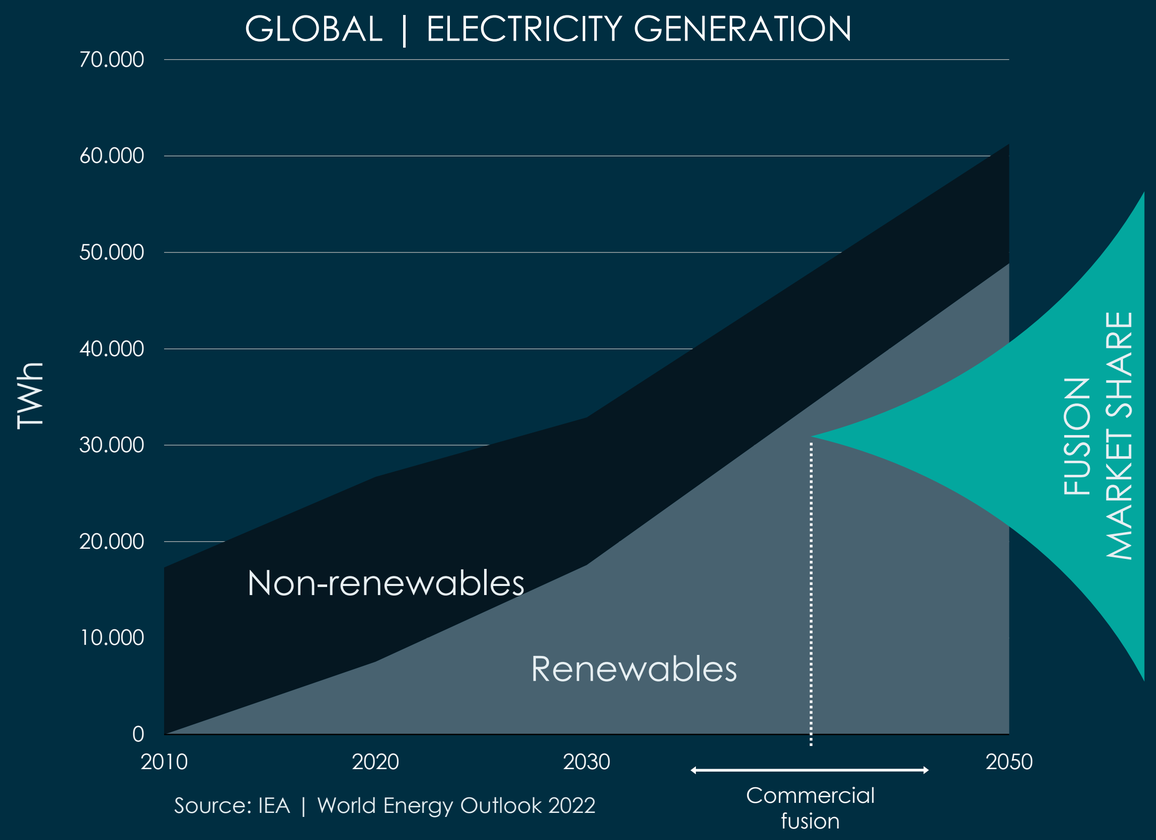
The new shape of fusion

After decades of slow progress with doughnut-shaped reactors, magnetic fusion labs are gambling on a redesign.

SCIENCE • 22 May 2015 • Vol 348, Issue 6237

Fusion will dominate in the future

SAFETY, RELIABILITY AND COST WILL OUT-COMPETE EVERYTHING ELSE



Source: IEA | World Energy Outlook 2022

FUSION IS THE FUTURE

- Industrialized MOAK (Many Of A Kind) scalable technology will enable high-volume rollout of standardized power plants.
- Fusion will become the obvious choice for:
  - Replacement/EOL capacity
  - New capacity
- Fusion Power will begin the coming decade, and then grow exponentially.

Nuclear fusion market could achieve a $40 trillion valuation

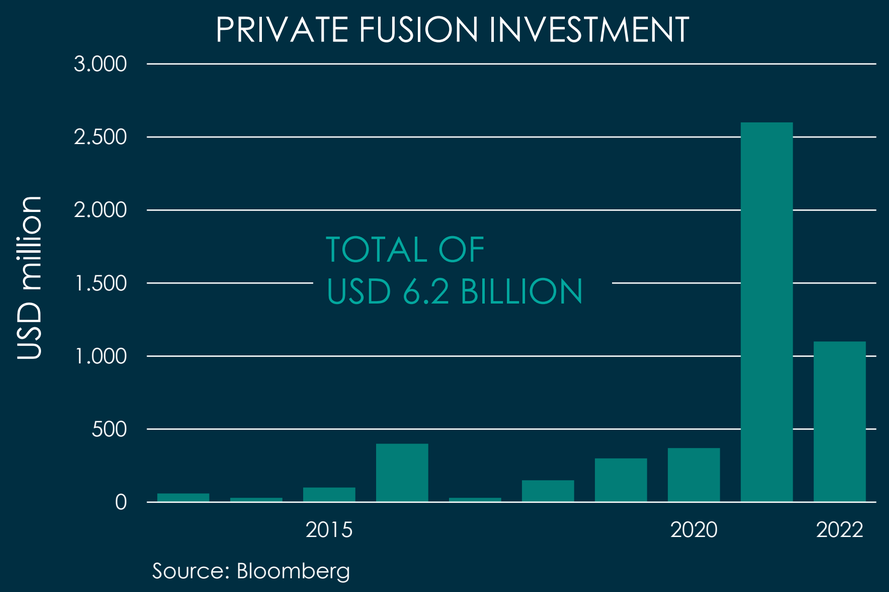
Achievement of net energy — where energy produced exceeds the energy used — via nuclear fusion is nearing and would be momentous for the $15 trillion global energy market and GDP.

Extrapolation of game-changer tech multiples like Tesla implies a potential $40 trillion in valuation.

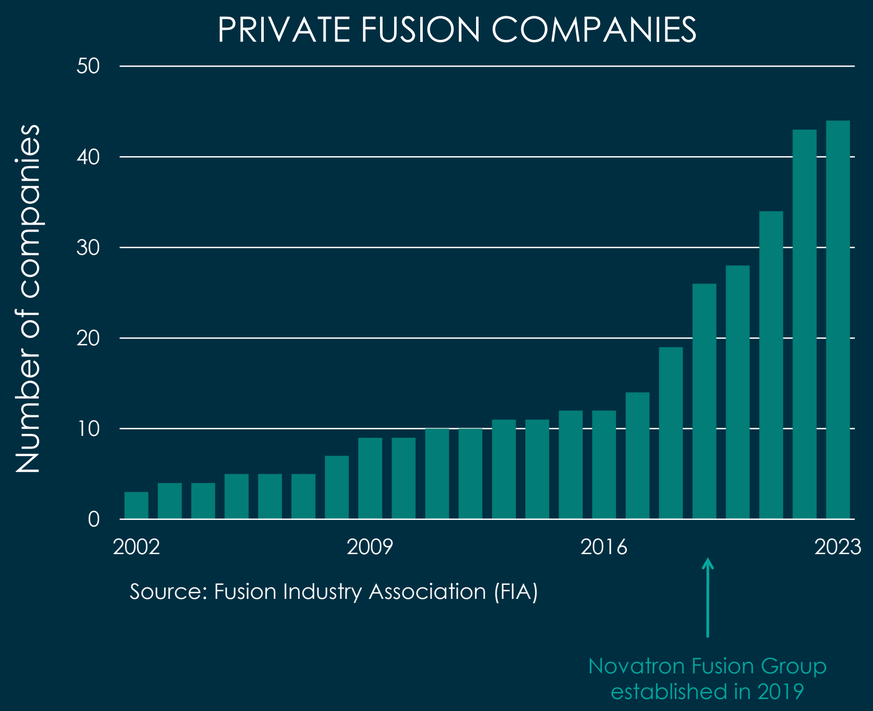
Bloomberg, 2021

Rapid increase of private investment

OVER USD 6.2B OF NON-PUBLIC FUSION FUNDING SO FAR

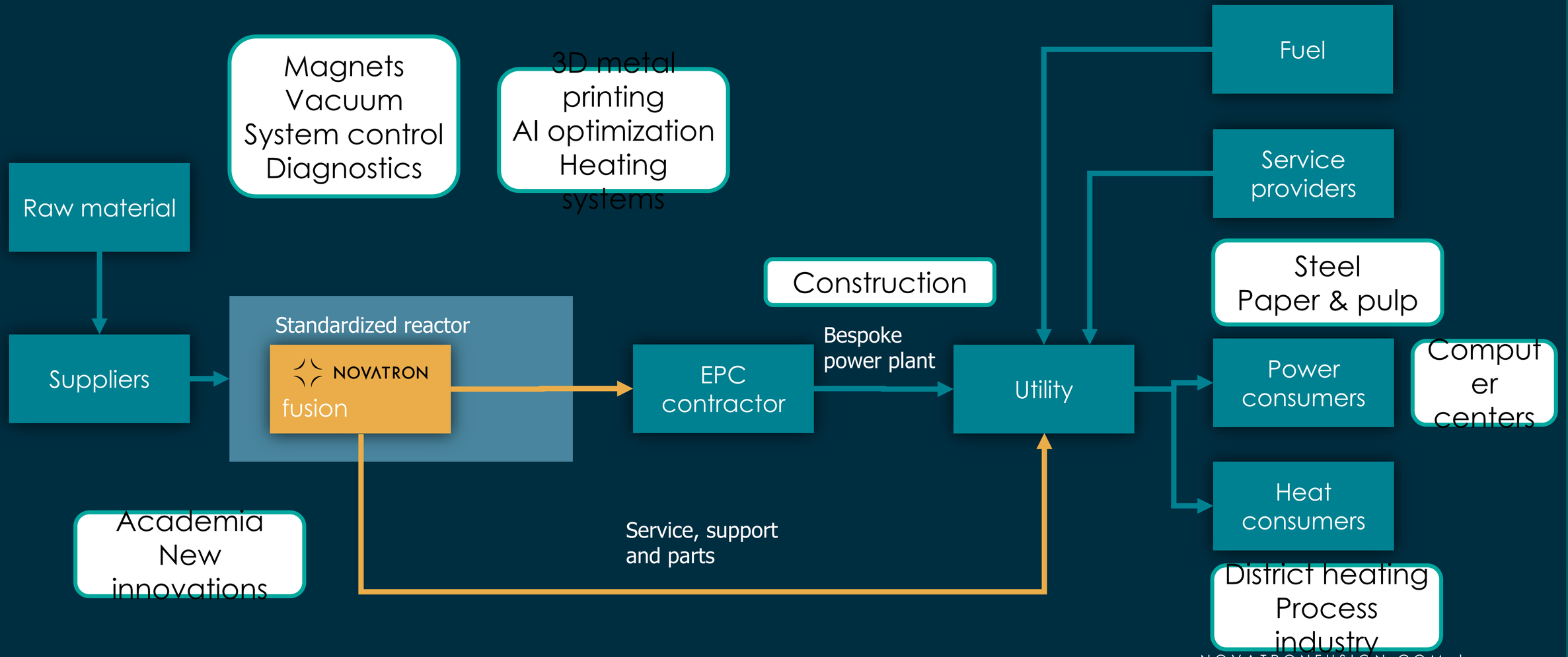


Source: Bloomberg



Source: Fusion Industry Association (FIA)

A New Multi-billion Euro industry



UK as a benchmark

- Government grants & investments: £700m, 2021 – 2024
- Invested money vs added tax income: 1 to 4
- Employees in UKAEA (fusion only): 3 000
- Employees in Energy Department (fusion only): 21
- Companies in the Fusion Cluster: >160

Fusion power for the grid

OUR ROADMAP TO COMMERCIAL ENERGY PRODUCTION

N1	N2	N3	N4
Plasma experiment	Fusion experiment	Pilot reactor	Fusion reactor for power plant
Development platforms		Industrialization	Commercial reactor
2027		203X	203Y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