newcleo
Futurable Energy

newcleo
Company presentation

CERN, November 2021

Global context

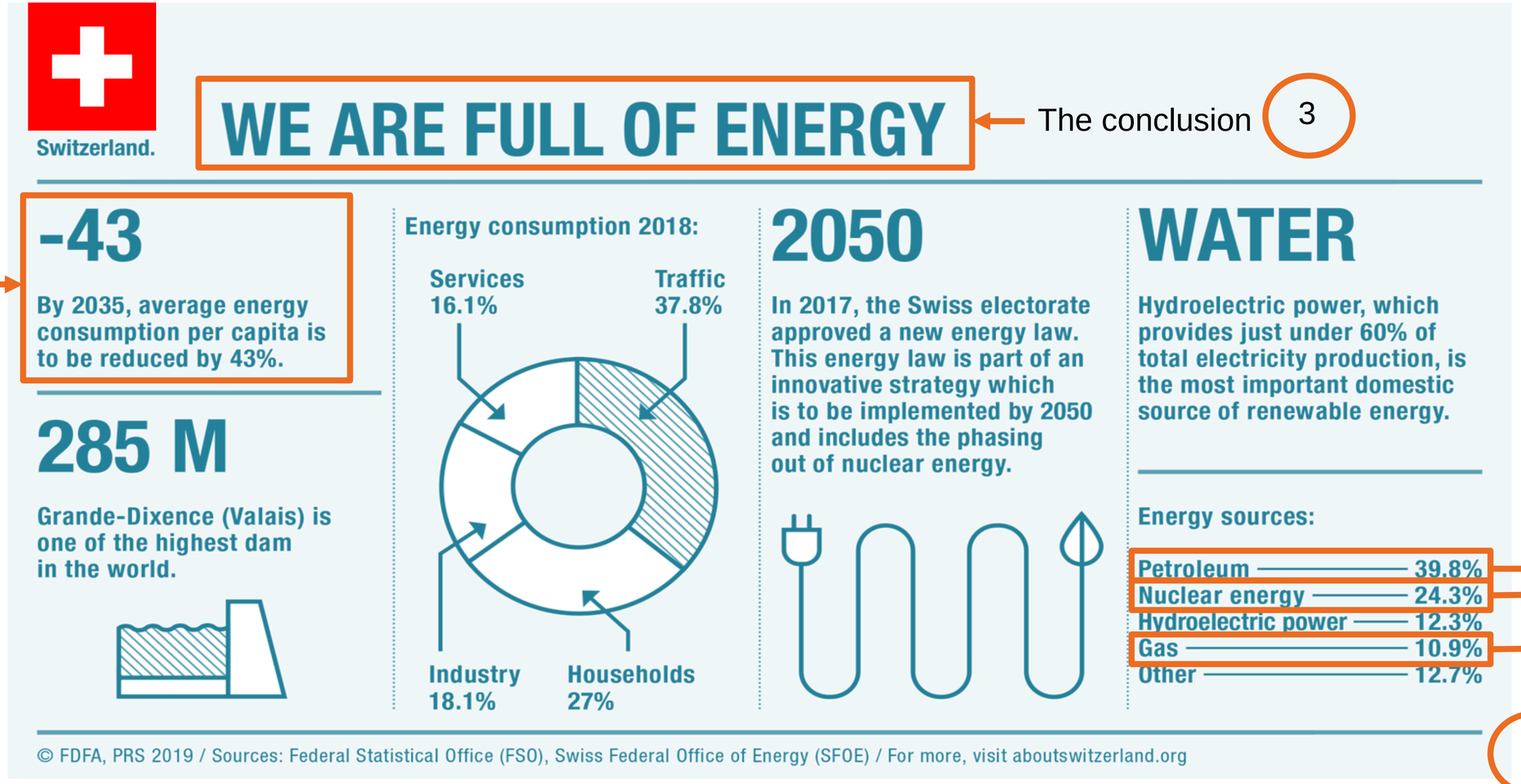
Meeting the growing energy needs of the planet is one of the main challenges for the coming years

Dependence on fossil fuels and the consequent huge pollution of the planet make the development of alternative energy sources dramatically urgent

The increasing use of solar and wind as sources represents an important transition of the energy balance, but they are not enough to meet needs

Nuclear has a key role to play in providing reliable and clean base load power, and ensuring the resilience of power networks during the transition

The case of Switzerland



The conclusion 3

2 The solution

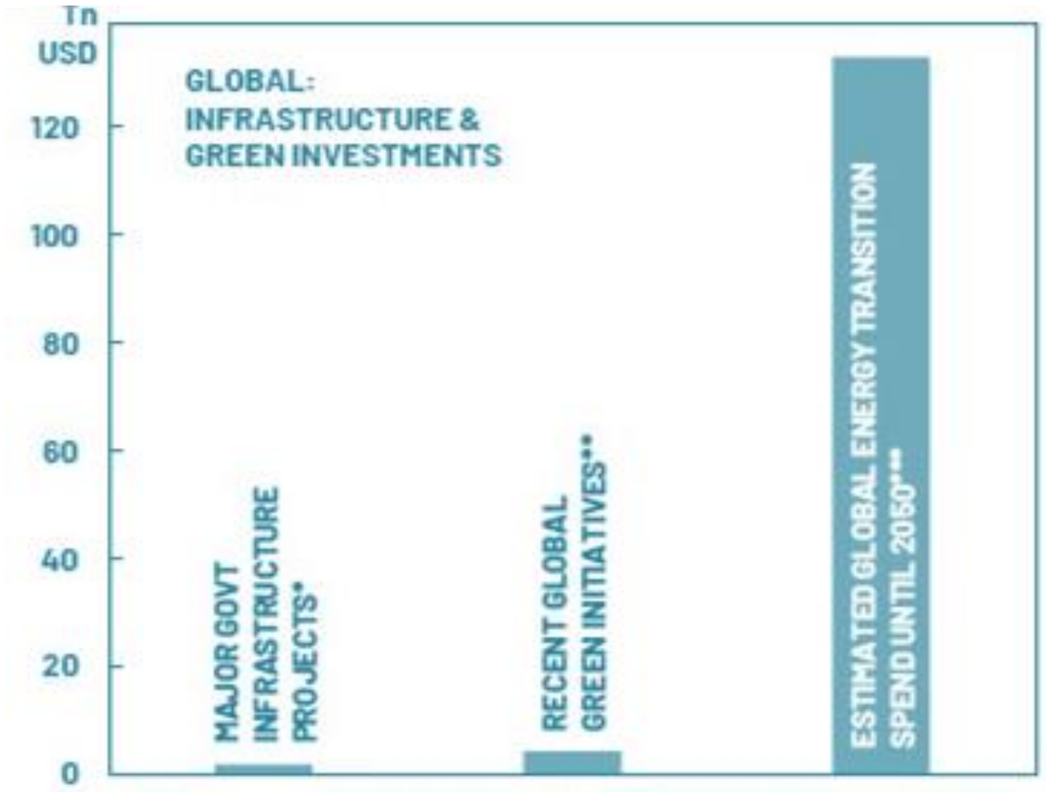
1 Electric mobility
Phase out
Heat pumps

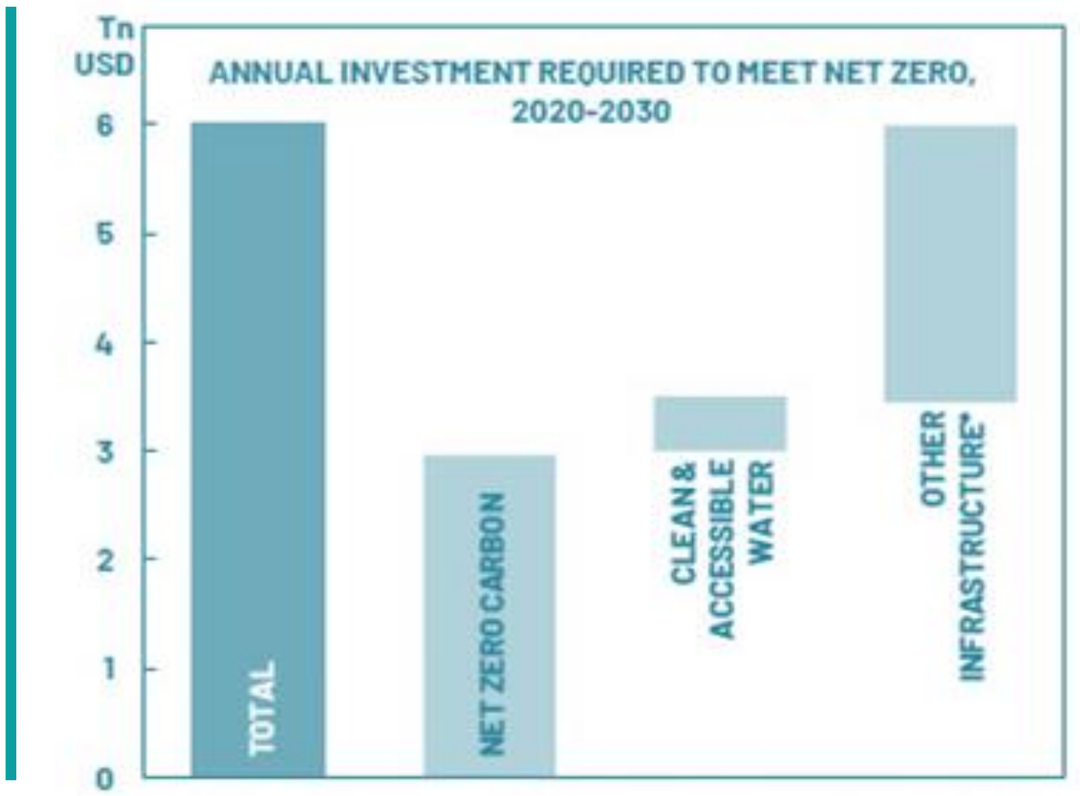
4

"Any supply shortfalls will be covered by electricity from fossil fuels and by imports" → Just in case…

The opportunity

Fighting climate change is estimated to require a huge capex buildout, likely to dwarf any global investment initiative ever made before





Source: Clocktower 2021

A new, disruptive player in nuclear energy

HQ in London, the ideal base for operations requiring connectivity and an international workforce

International research centre in Turin, Italy with over 100 nuclear physicists and engineers – our “energy innovators”

We secured our initial funding by successfully completing capital raising for USD 118 million

Approach based on our innovative application of well-developed technologies and our ownership of a significant number of relevant patents

This will enable us to build new industrial standards incrementally and efficiently

Safe, clean and inexhaustible

01

Use lead as a coolant, rather than water or sodium to create a new generation of Lead Fast Reactors (LFRs)

02

Implement a new fuel cycles, including *Thorium*, for cost effective, clean, safe and inexhaustible production of nuclear energy

03

Develop an Accelerator-Driven System (ADS), fed by a plurality of new fuels. In the ADS, energy generation is sustained and intrinsically safe – it is controlled with a cascade of reactions generated by a particle accelerator

Our technology **eliminates the use of geological repositories** currently necessary for plutonium and minor actinides (waste products of nuclear reactions) by using them as fuel

Timeline of priorities

01

5 years – prototype Micro

Design and realise a full-scale non-nuclear industrial prototype of a liquid lead modular micro-reactor in collaboration with ENEA

02

***7 years – Micro* 5 MWe, *Small* 30-40 MWe, *Burner* 30-40 MWe, *Burner* 200-300 MWe**

Significant commercial application of LFR with nuclear fuel for use in remote areas, shipping and to burn existing nuclear waste. Finally, large scale application

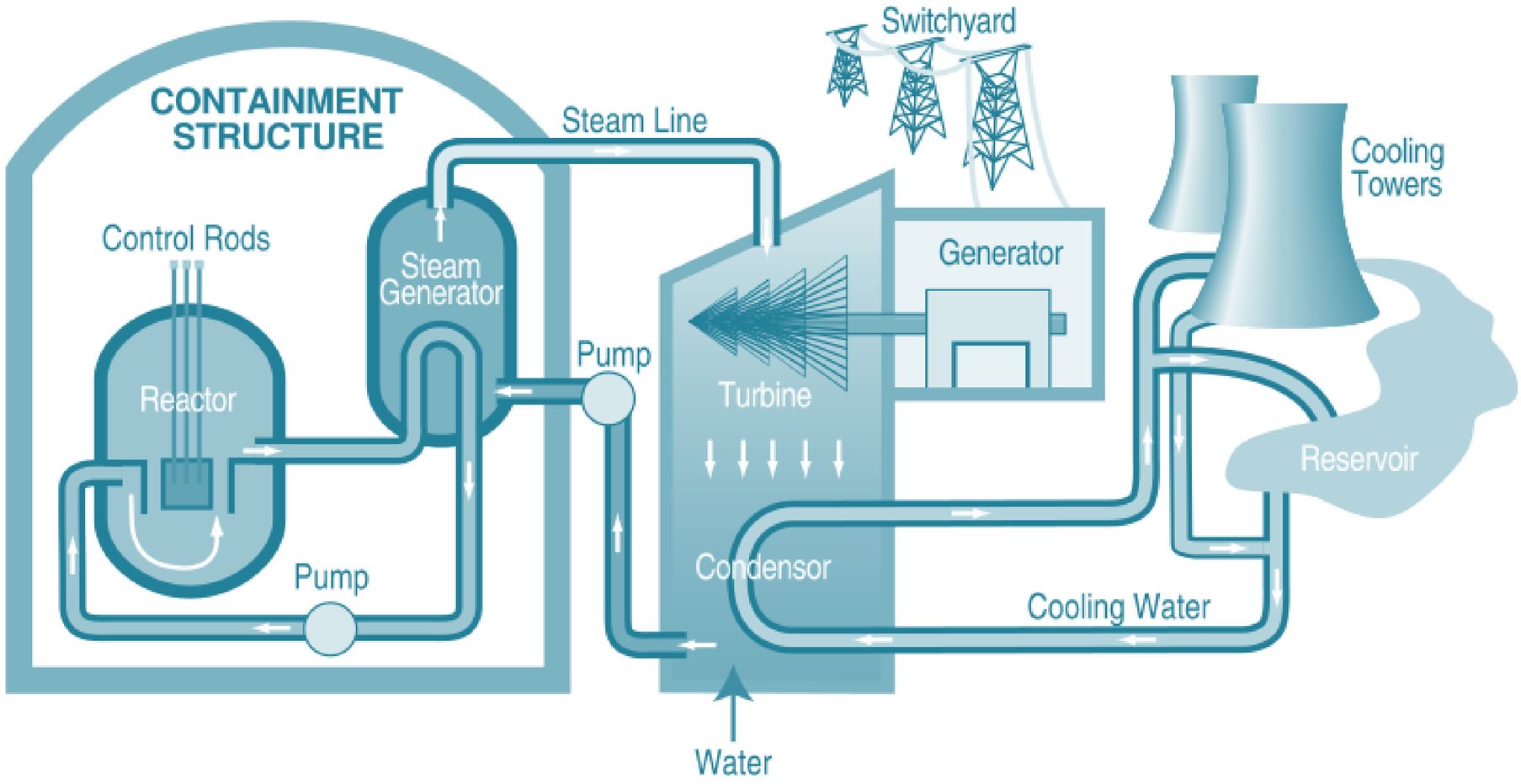
03

***15 year* - ADS 100 MWe**

Realisation of the ADS prototype with subcritical reactor core coupled with a high-energy proton accelerator

Electricity generation

Typical (PWR) power plant



newcleo's compact vessel

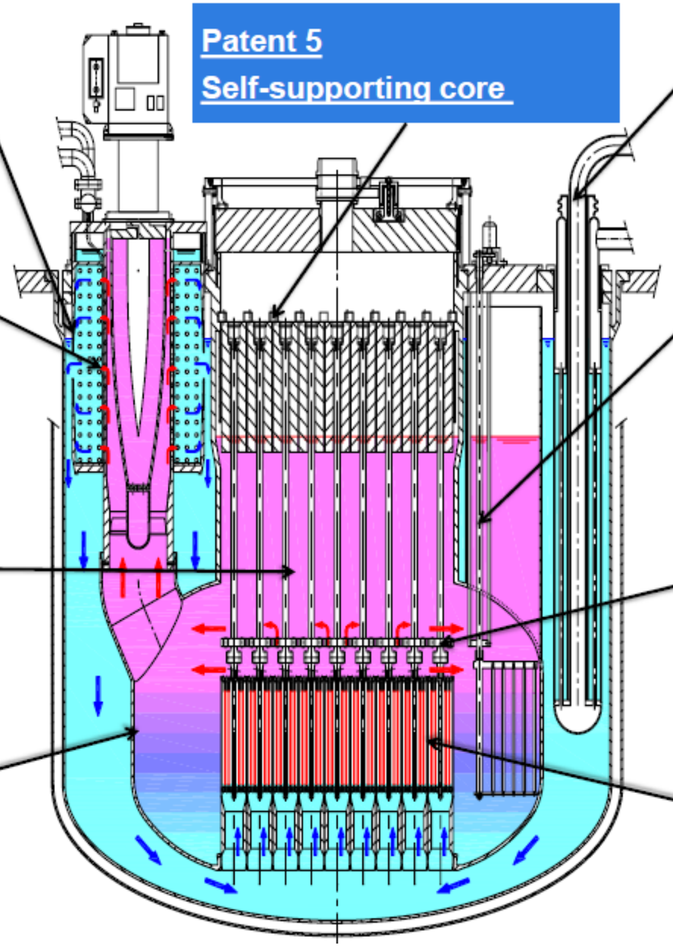
Lead-cooled LFR 300 MWe

Patent 1
Spiral-tube Steam Generator

Patent 2 and Patent 3
Pump/heat exchanger assembly

Patent 4
Extended stem FA

Patent 6
Amphora Shaped Inner Vessel



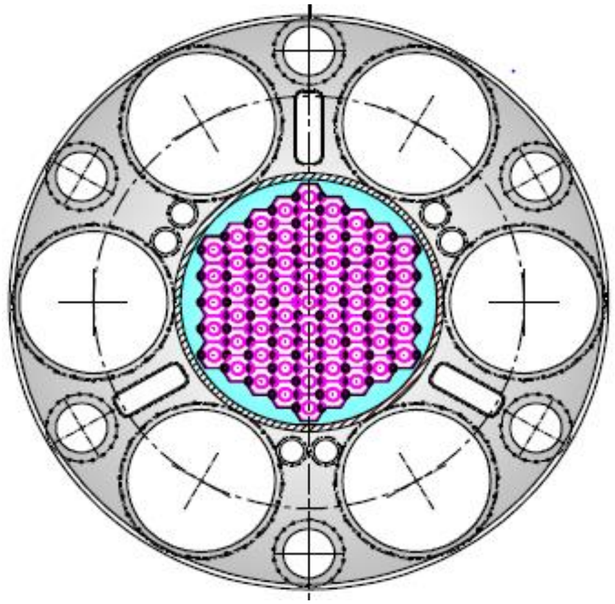
Patent 5
Self-supporting core

Patent 7 and Patent 8
DHR passive systems

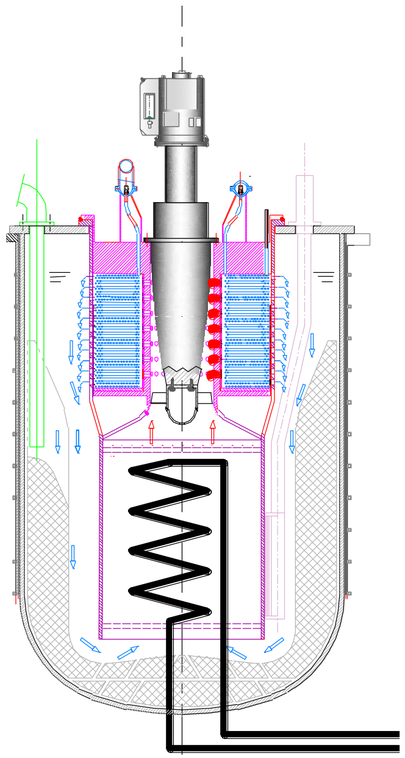
Patent 9 and Patent 10
Control and shut down rods

Patent 11
Expanders

Patent 12
FA with cooling ducts



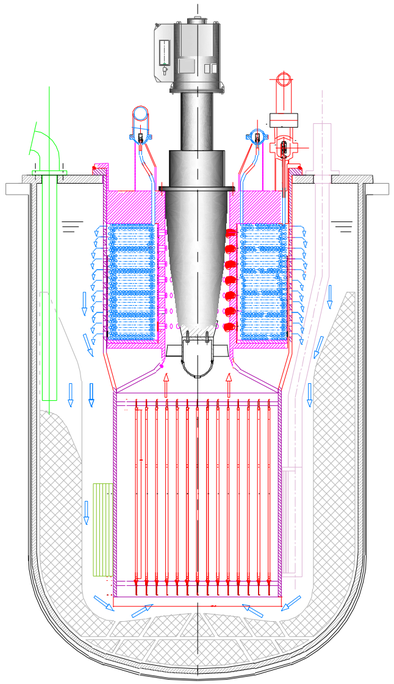
newcleo's development goals



Precursor

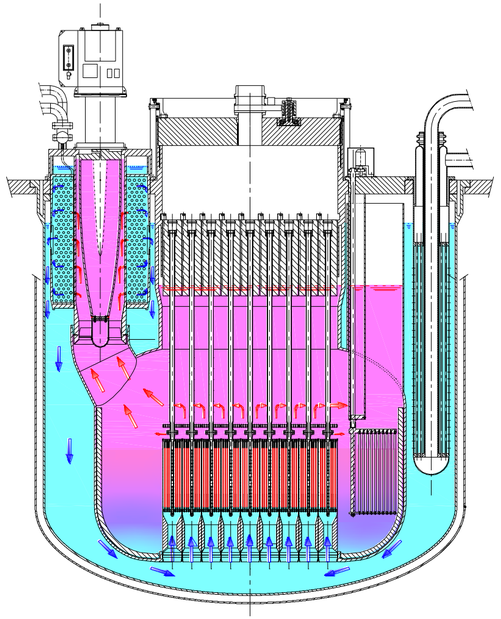
Electrically heated facility 15MWth, 5MWe reproducing the LFR-TL-5 except for fuel

Ideal for shipping



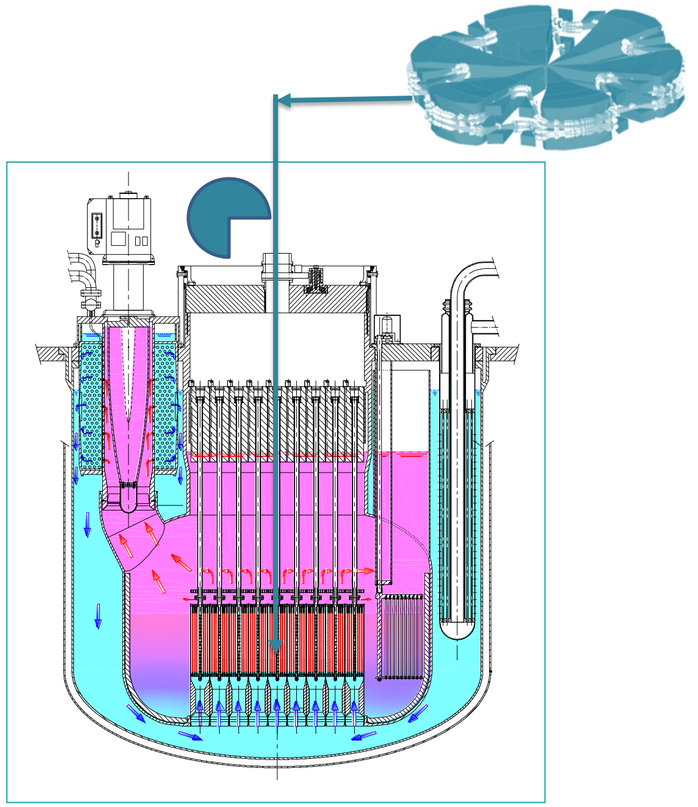
Micro LFR

Power range: 5-40 MWe
Fuel: UO_2 or MOX



Small LFR

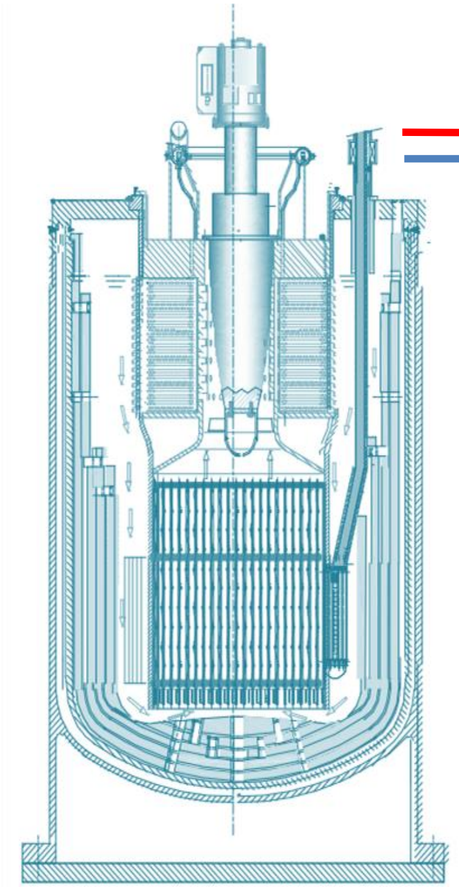
Power: 200 MWe
Fuel: MOX (+MA)

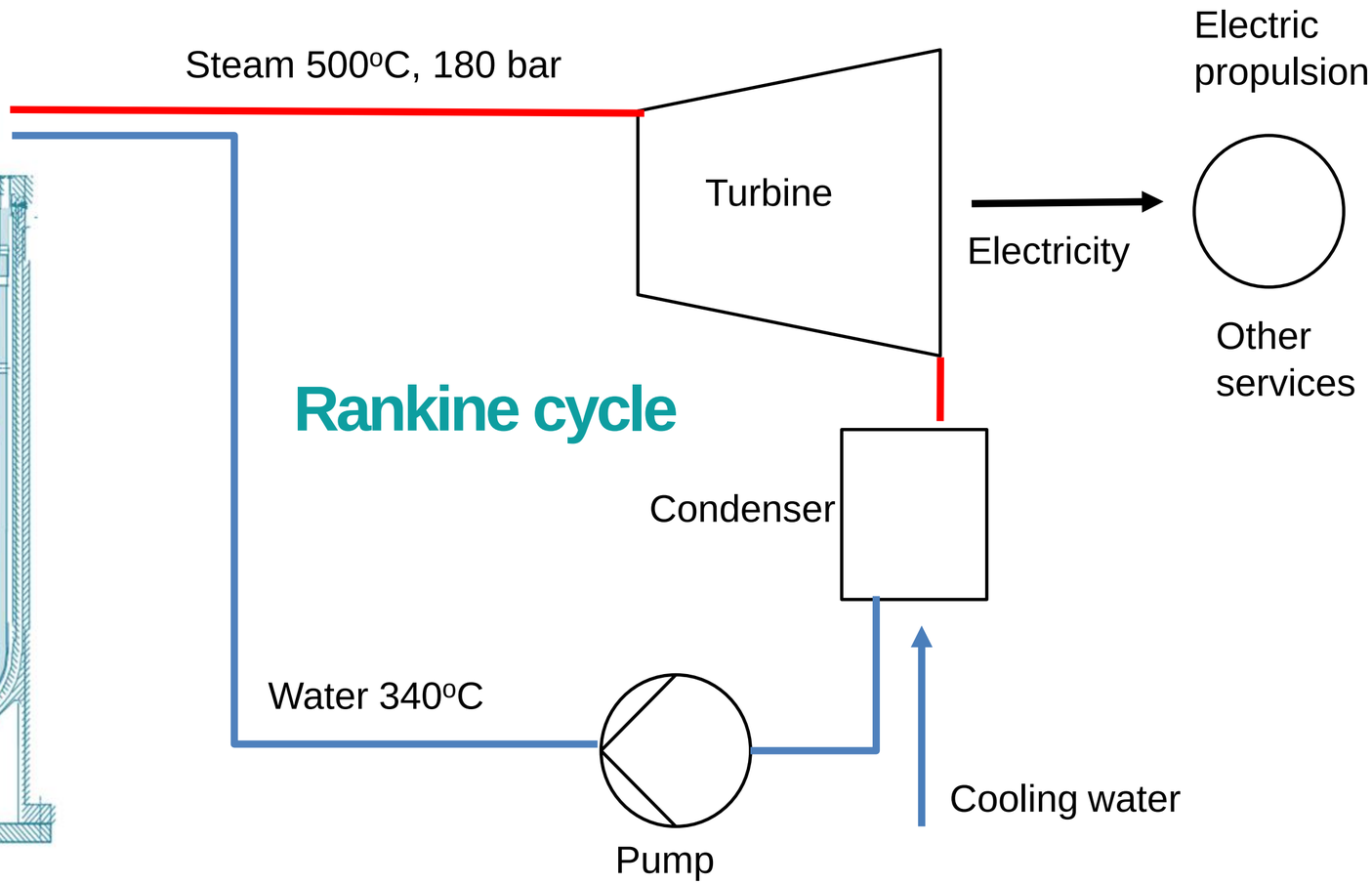


ADS

Power: TBD
Fuel: MOX + MA, U free fuels, Thorium

newcleo's solution for shipping: Mini-LFR (30MWe)

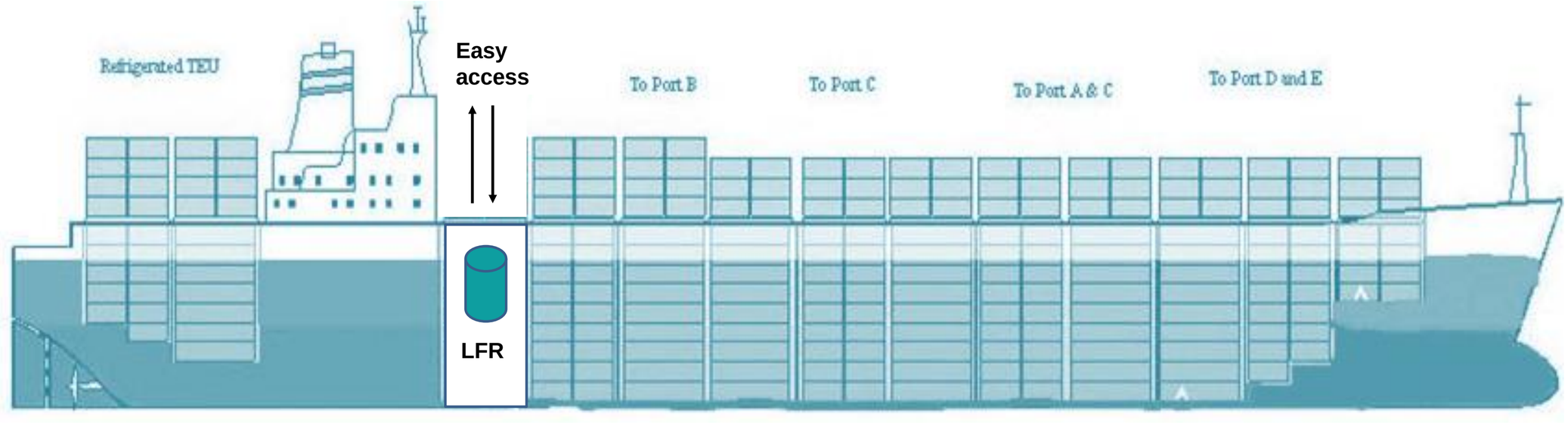




$100 billion potential market

Deals with steam turbine producers, shipyards and ship owners are under discussion

newcleo's solution for shipping: Mini-LFR (30MWe)



Safe

Passive safety
Atmospheric pressure vessel
Perfect radiation shield
Frozen lead sarcophagus in case of sinking

Practical

Most compact Gen IV reactor
Sealed battery concept with 10y+ lifetime
Virtually zero maintenance
Easy unit replacement

Economic

Cheapest Gen IV reactor
Supplies power to the grid at port
50% higher cruise speed
Close to commercialization (~7y)

Appendix

Co-founders and executive team members

Stefano Buono

Chief Executive Officer

An Italian physicist, he worked for 10 years with physics Nobel laureate Carlo Rubbia at CERN and CRS4, in the field of Accelerator Driven Systems and nuclear waste transmutation. In 2002, he founded Advanced Accelerator Applications, listed on NASDAQ from 2015 until its acquisition by Novartis for $3.9 bn.

Luciano Cinotti

Chief Scientific Officer

An Italian nuclear engineer, he worked at Ansaldo for 30 years and is a leading expert in Fast Reactor technologies. A Euratom representative and the Chairman of the LFR Steering Committee of the Generation IV International Forum from its inception until 2010, he is the author of most of the world's LFR-related patents.

Elisabeth Rizzotti

Chief Operating Officer / MD Italy

A French physicist, after a brief spell at CERN, she left physics to embrace the world of finance, working first for leading international consulting companies and then for several Italian commercial banks where for 30 years she developed her strong managerial expertise.

Executive team members

Laura Vergani

Chief Communications Officer
Italian/British communications professional with international experience, she has worked in the UK for the last twenty years in large companies both private and listed. Laura has operated across sectors, including highly complex and regulated environments (banking, healthcare). She holds an MA in English and Russian literatures.

Bruce Macfarlane

Chief Financial Officer
A British chartered accountant who spent 20 years of his international career at BP, spread across Europe, Asia, and the Americas, culminating in a global CFO role overseeing USD 6 billion of expenditure. With the energy sector as his backbone, he spent a further 10 years working with private equity, family offices and other funds on financial investments into the billions.

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Thank you