



FUSION
clean energy for your future

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Weakness of the present energy mix

dominated by fossil fuels (80%):

SERIOUS CONSEQUENCES



New energy mix

CLIMAT CHANGE



**ENVIRONMENTALLY
CLEAN**

Global warming due to CO₂ emissions from burning of fossil fuels

DEPENDENCY ON ENERGY IMPORTS



SECURE

Rising dependency on energy imports from foreign countries
Potential for international conflicts and wars

ENERGY CRISIS



EFFICIENT

In 2050 the global energy demands will double or even triple
Primary energy sources - fossil fuels - are running out

Renewable energies

Important part of the new energy system - climate change mitigation
- sustainable energy development

Great potential especially in the first half of this century!

According to even the most optimistic scenarios,
the renewable energies will reach their limit
and taking into account fast-growing population with strong economic growth,
they can cover:

Maximum ~ 50% of global energy demands over the next half of this century!

It is important to think carefully about the potential of renewable resources
and think also of **other energy options for the future**, especially after 2050.

An option for the future energy system:

Thermonuclear FUSION

The energy which powers our sun and stars for billions of years

Kind of unconventional renewable energy

Possibly one of the key solutions for growing energy needs of the world

One of the **most promising** technologies for both:



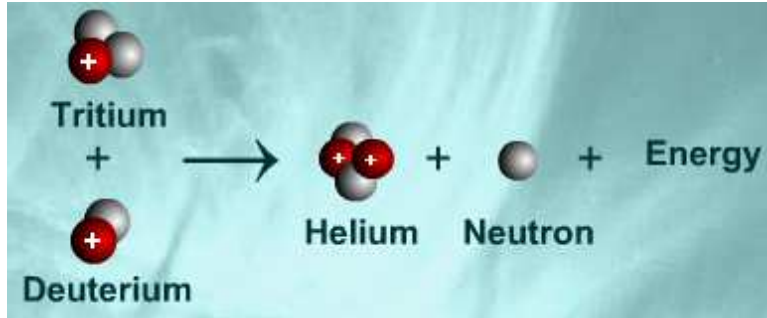
Economic growth

Sustainable environment

Offers important attractive advantages:

1. LIMITLESS SOURCE

☺ FUELS ABUNDANT around the globe for millions of years



DEUTERIUM (D) – from water →

TRITIUM (T)

– from **LITHIUM (Li)**:

- light metal in earth crust
- used in batteries



Energy released
is enormous:

Li from 1 laptop battery + D from 100 liters of water
=
200 000 kWh
40 tones of coal
30 years of electricity for EU citizen

2. NO ENVIRONMENTAL IMPACT

FUSION is **CLEAN ENERGY** :



~~No CO₂ emissions!!~~



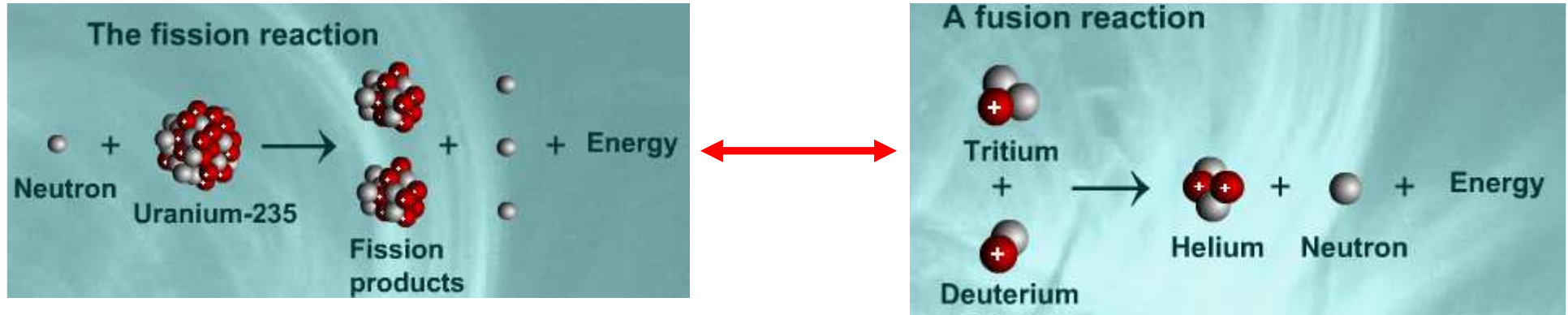
~~No long lived nuclear waste~~



Ash of fusion reaction: Helium
- inert non-radioactive harmless gas

3. INHERENTLY SAFE

FUSION is opposite process to nuclear **FISSION**



**FUSION: No chain reaction
=> no possibility of explosion!**

If fuel supply closed – reaction stops

Any deviation from normal conditions lead to slowing down of the fusion reaction.

Thermonuclear FUSION

Energy :

Safe
Environmentally responsible

Electricity:

Continuously
Large scale

Competitive cost → 5-10 eurocents per kWh
(range of cost of other renewables)

Ideal complement of other renewable sources
in future energy mix

Potential to contribute up to **35%** of world **electricity**
in the second half of this century!!

FUSION, UNO and FUTURE

1958 : UNO in Geneva: The first world fusion conference (IAEA)

2008: UNO in Geneva: 22th IAEA Fusion conference : 50th anniversary

Fusion enters new era – ready to move out of the laboratory.

NEXT step of fusion community : ITER

The biggest and most exciting global research project

First to demonstrate the possibility to produce commercial energy from fusion



the way to new energy

china eu india japan korea russia usa

ITER means the 'the way' in Latin and brings together nations representing half of the world's population.

The construction of ITER started in 2008 in Cadarache (South of France)

~ about **20 years of delay** with respect to the initial idea

With **appropriate support and funds allocation** fusion is expected to produce electricity in **30 years**. Otherwise there can be another 20 years of delay...

The future of the energy of the second half of the century starts today.

We need to invest in ALL new options for energy production!

UNECE plays a significant role in the very important process of increasing the awareness, interest and support of these new energies.

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For more information see : www.efda.org; www.iter.org