

The Future of Nuclear from a consultant's perspective

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Professional Career

Since 2013 AFRY Switzerland Ltd
2012 - 2013 University of Florida
2011 - 2011 Resun Ltd., Switzerland
2008 - 2011 Paul Scherrer Institute

Roles and Competences

- Business unit management
- International project management
- Strategic project development, sales
- Safety analyses, safety analysis reports
- Fuel element and core design
- Criticality and shielding

Reference projects (excerpt)

- - KKB, system analysis for period safety review
- - KKG, combination of external hazards
- - KKG, KKB, update of safety analysis report according to IAEA standard
- - KKL, Beldo Project: analysis of fuel element damages
- - KKB, documentation of radiological safety analyses
- - EPFL, cost study for decommissioning of LOTUS (test reactor)
- - ETN Brazil, basic design of wet storage facility
- - CI-Energies Ivory Coast, RACA project, 380 kV transmission line and substations
- - Electricite de Guinee, Linsan-Maneah, 220 kV transmission line and substations
- - Georgian State Electrosystem, Implementation of Open Programme Extension of the Transmission Network II

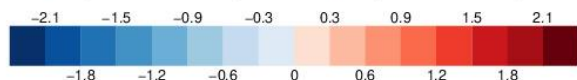
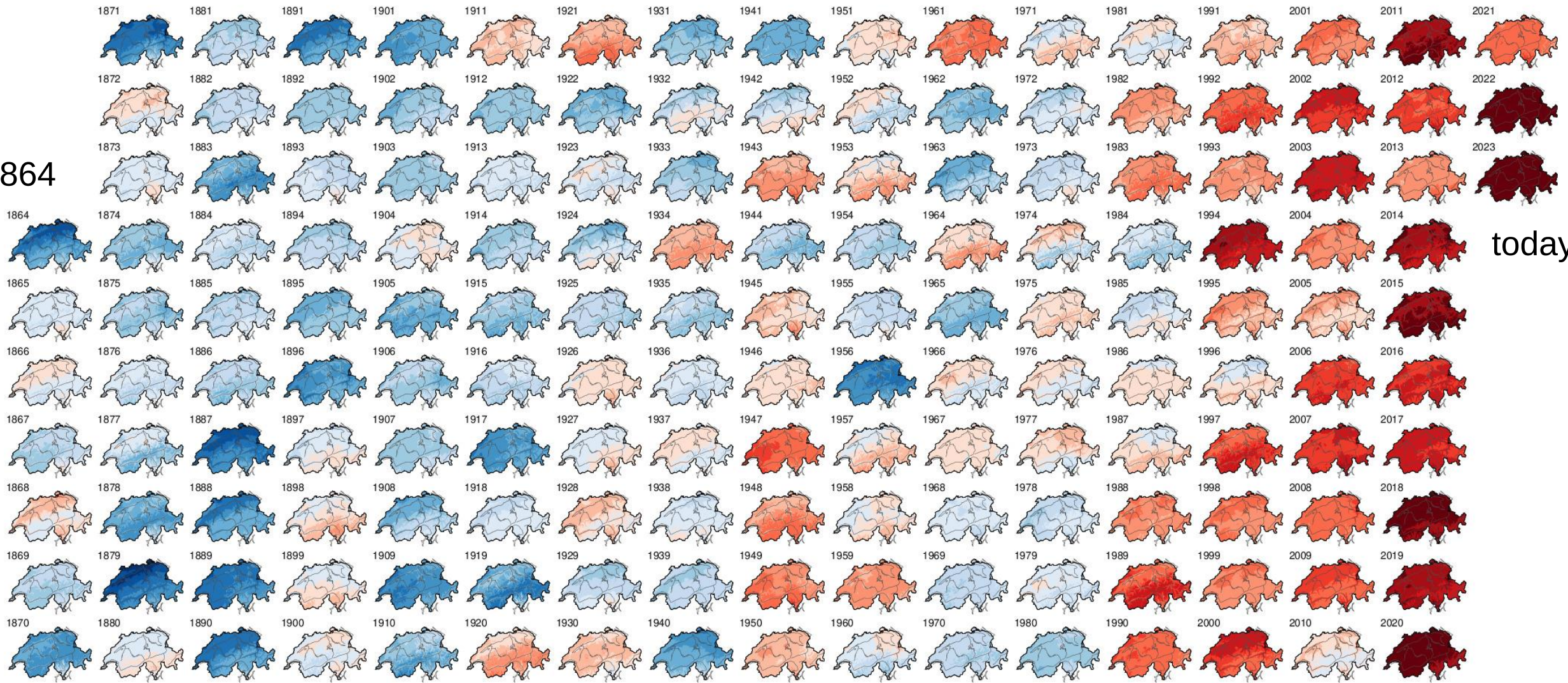






1864

today



Abw. / dév / dev. / dev. 1961 – 1990 [°C]

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<https://www.meteoschweiz.admin.ch/klima/klimawandel.html>

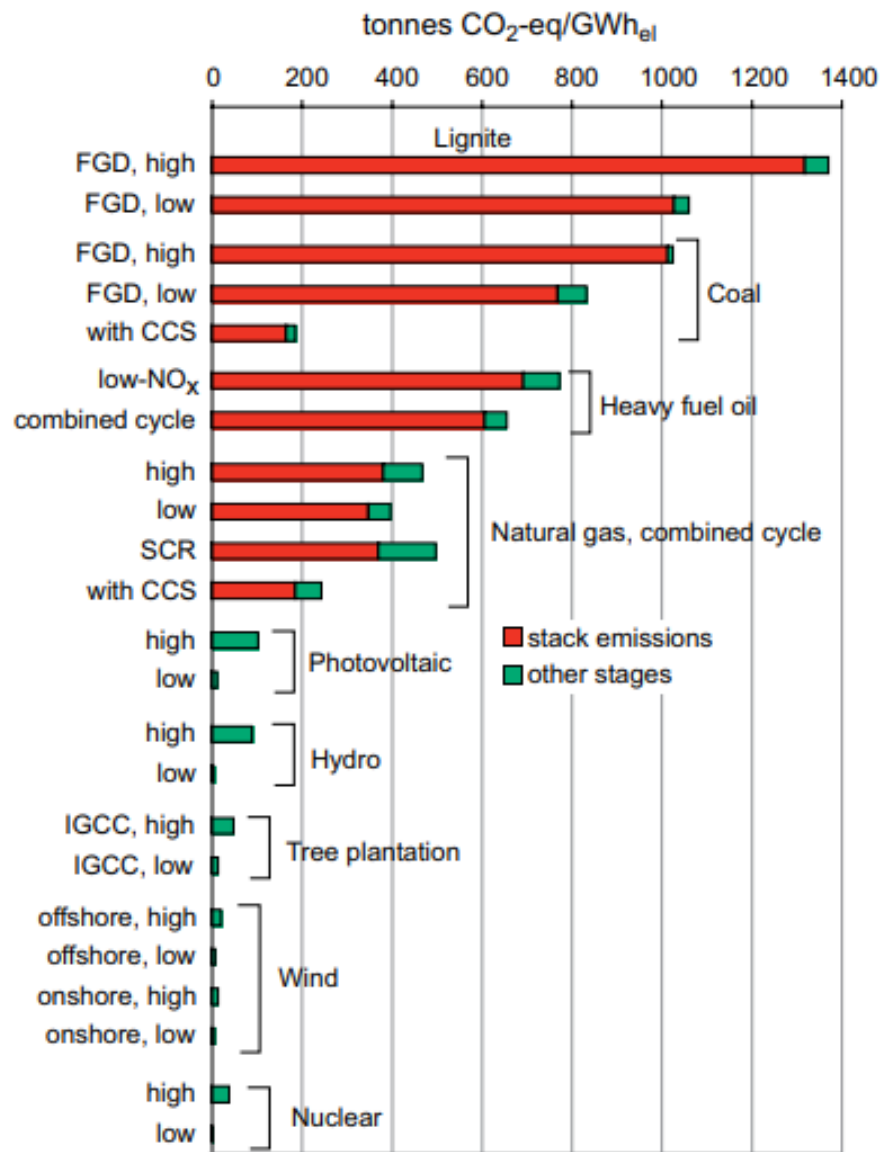


Figure 4.19: GHG emissions for alternative electricity-generation systems.

Notes: 1 tCO₂-eq/GWh = 0.27 tC -eq/GWh. Hydro does not include possible GHG emissions from reservoirs (Section 4.3.3.1)

Source: WEC, 2004b

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

Carbon Neutrality in the UNECE Region: Integrated Life-cycle Assessment of Electricity Sources



<https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg3-chapter4-1.pdf>

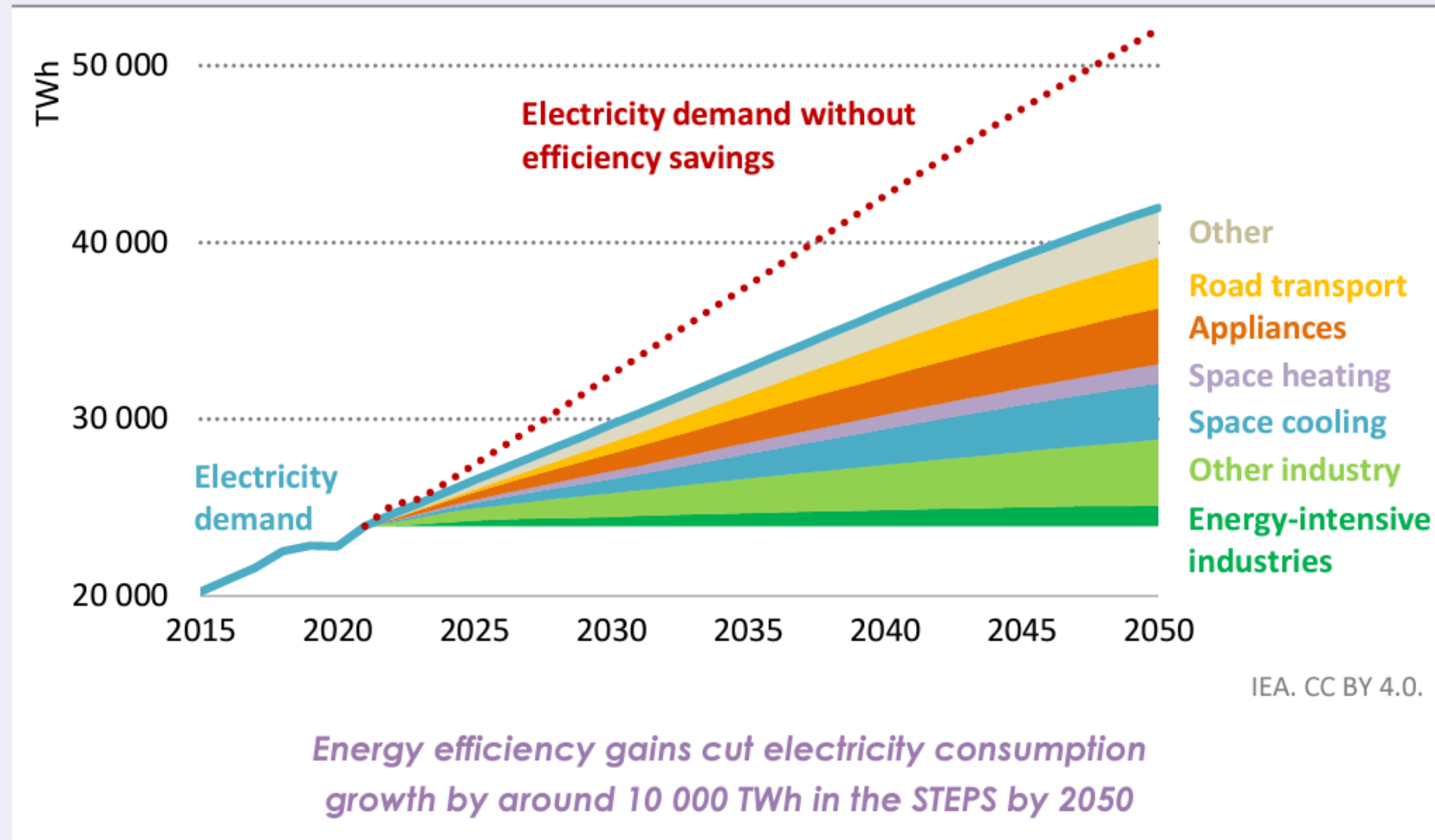
Our CO₂ emissions

A legacy for the future

The world has (partly) realized the threat coming from climate change and from the emission of green house gases

=> A number of **macro-economical trends** arise from this realization

Figure 6.6 ▶ Global total electricity consumption with and without energy efficiency gains in the STEPS, 2015-2050

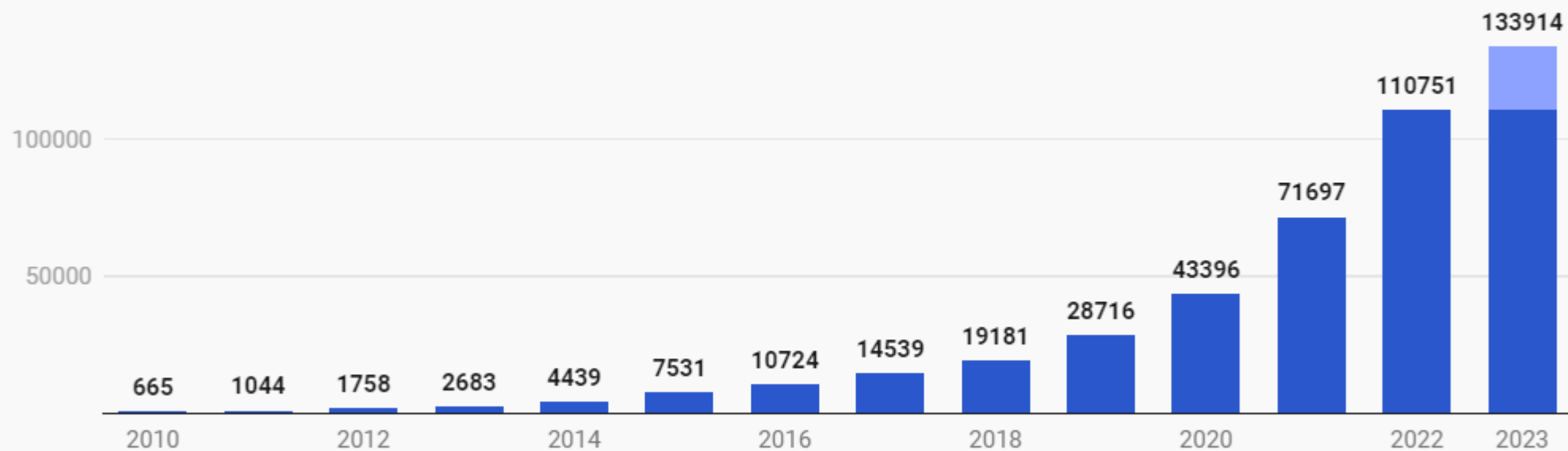


Note: Efficiency gains are mainly due to stricter fuel economy standards in road transport; minimum energy performance standards and labels in the buildings sector; technological improvements and material recycling in industry.

Entwicklung Bestand Elektroautos

Schweiz 2010 – 2022, 2023: Vorjahresbestand und unterjährige Neuzulassungen BEV

■ Bestand ■ Neuzulassungen 2023



Abmeldungen in 2023 sind noch nicht erfassbar.

Grafik: Swiss eMobility • Quelle: BFS, ASTRA • [Daten herunterladen](#) • [Einbetten](#) • [Grafik herunterladen](#) • Erstellt mit [Datawrapper](#)

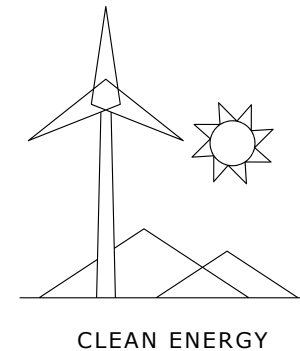
- Cornerstone of the EU's sustainable finance framework
- Gives a definition for sustainability
- Transparency tool
- Aimed to direct the money to sustainable projects
- It is a classification system that defines criteria for economic activities that are aligned with a net zero trajectory by 2050

- <https://ec.europa.eu/sustainable-finance-taxonomy/activities/activity/190/view> (Nuclear existing)
- <https://ec.europa.eu/sustainable-finance-taxonomy/activities/activity/189/view> (Nuclear New Build)
- <https://ec.europa.eu/sustainable-finance-taxonomy/activities/activity/188/view> (Nuclear R&D)



Clean Energy => substantial part of the 17 SDGs

- In Clean Energy, we are helping to secure access to reliable, sustainable, modern and affordable energy for all, and to mitigate climate change and adapt society to climate change.
- We are contributing by increasing the share of renewable energy in the global energy mix, by improving energy efficiency, expanding infrastructure and upgrading technology for supplying modern and sustainable energy services.
- Through our assignments, we can minimise impacts on ecosystems on land and in inland freshwater, and support the protection and restoration of water-related ecosystems.



Conclusions

- Climate Change is real, accelerating and a thread to society
- The need for clean electricity will increase
- **AFRY Energy Division AND ALL OF YOU operate in the center of the most important necessary global change**
- What we do is in line with
 - SDGs
 - EU taxonomy (partly)

WHAT WE DO MATTERS

IT IS IMPORTANT

&

IT IS URGENT

Making Future



AFRY

No. of
employees: 19,000

Approx.
Net sales: 2 b€

Offices in
more than
countries:

40

AFRY Nuclear

AFRY Nuclear is
established in

8

European
countries

Nuclear energy
consulting for

60

years

A total of

1000+

projects delivered

AFRY has

600+

engineers and
leading experts
in Nuclear

AFRY is ranked
as #

7

design firm in
Nuclear globally*

* ENR Global Sourcebook 2022



AFRY Nuclear Services



Interns at AFRY

- System Handbooks for the safety systems of KKG
- Feasibility study of a calorimeter to measure the decay heat of spent fuel (Master thesis. Fig. 1)
- Contribution to the Project Dynamic Analyses of a fuel assembly with RELAP5 (supporting BELDO)
- Data analyses of seismic activity on the KKG site (Fig. 2)
- Contributing to the DABKO project (Digitally optimised cutting and packing of activated concrete structures in Konrad-containers during the dismantling of nuclear facilities) (Fig. 3)
- Feasibility of SMRs for non-electrical markets (Fig. 4)
- Utilizing Artificial Intelligence to bring order into the SMR jungle
- Modernize the development of safety case documentation

Fig. 1

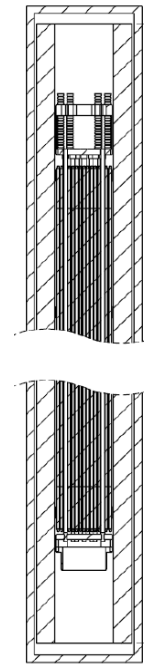


Fig. 2

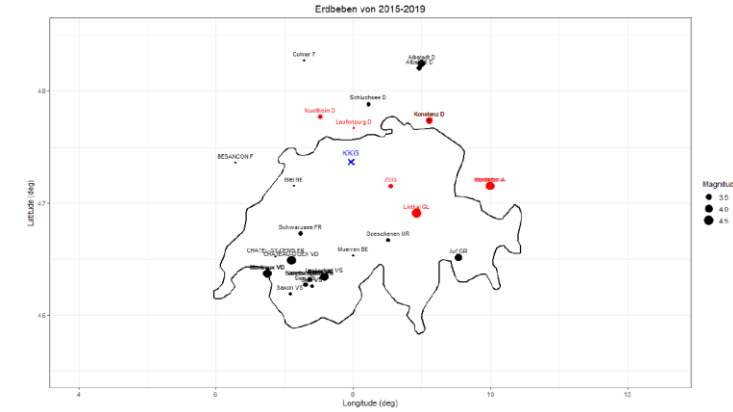


Fig. 3

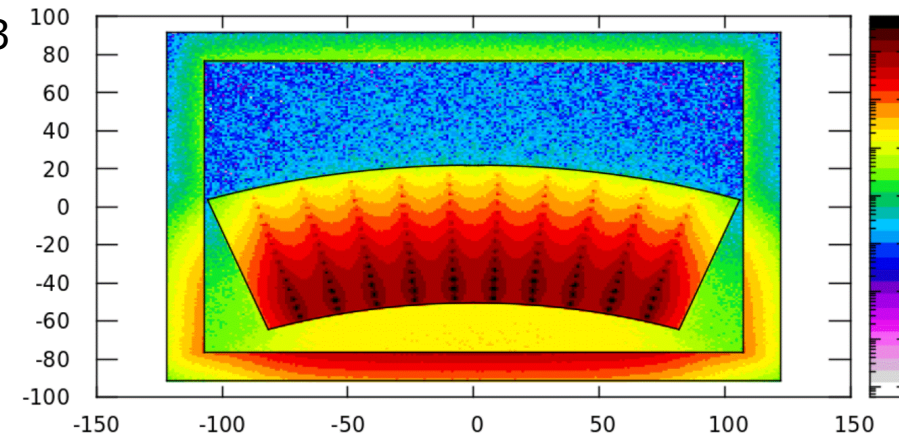
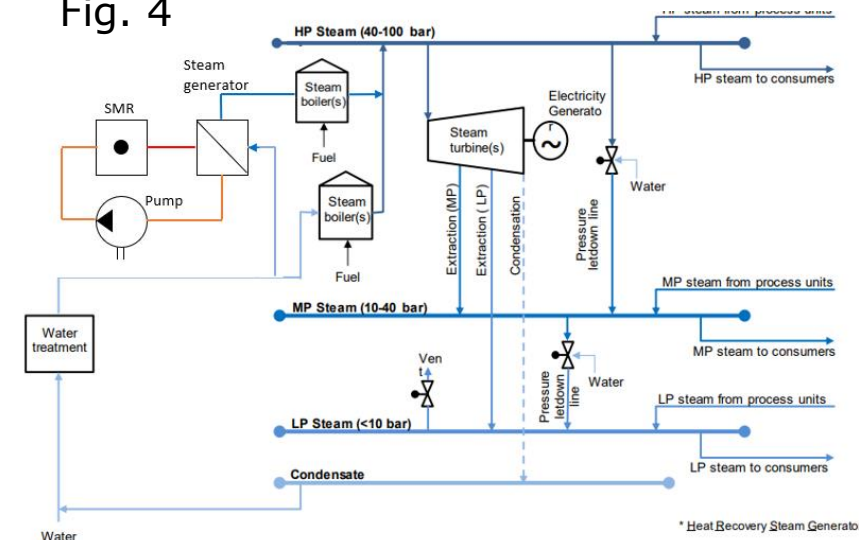


Fig. 4



Nuclear Future in Switzerland

- New builds?
- Lifetime extensions!
- R&D -> PSI, transmutex (SMR), Copenhagen Atomic
- Backend



Nuclear Future International

- New builds
- Newcomer
- Lifetime extensions
- R&D
- SMRs
- Backend



A woman with grey hair and large green hoop earrings stands on a bridge at night. She is wearing a dark, shiny, long-sleeved jacket. The bridge's structure is visible in the background, illuminated by streetlights.

Making Future

Q&A

Last slide – free advice

- Learn the local language
- Nuclear family in Switzerland is small