French Nuclear Policy and Industry Update

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April 9th 2019

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Global Warming – An emergency

ipcc
INTERGOVERNMENTAL PANEL ON climate change

WMO UNEP

> We are already seeing the consequences of 1°C of global warming through more extreme weather, rising sea levels and diminishing Arctic sea ice, among other changes"

Panmao Zhai, co –chairman of the IPCC

The New York Times
PAYS :États-unis
PAGE(S) :5
SURFACE :58 %
PERIODICITE :Quotidien
RUBRIQUE :News
DIFFUSION :139069
JOURNALISTE :Henry Fountain
► 12 octobre 2018 - N°42.170

A triple threat from climate change

More rain, larger storms

The New York Times
PAYS :États-unis
PAGE(S) :5
SURFACE :38 %
PERIODICITE :Quotidien
DIFFUSION :(642752)
► 8 décembre 2018 - N°NC

The Paris Climate Pledges Are Overly Modest. And They're Not Being Met.

The New York Times
PAYS :États-unis
PAGE(S) :9
SURFACE :22 %
PERIODICITE :Quotidien
RUBRIQUE :News
DIFFUSION :139069
JOURNALISTE :Nathaniel Rich
► 21 novembre 2018 - N°42204

Climate change and the future of human beings

FROM THE MAGAZINE

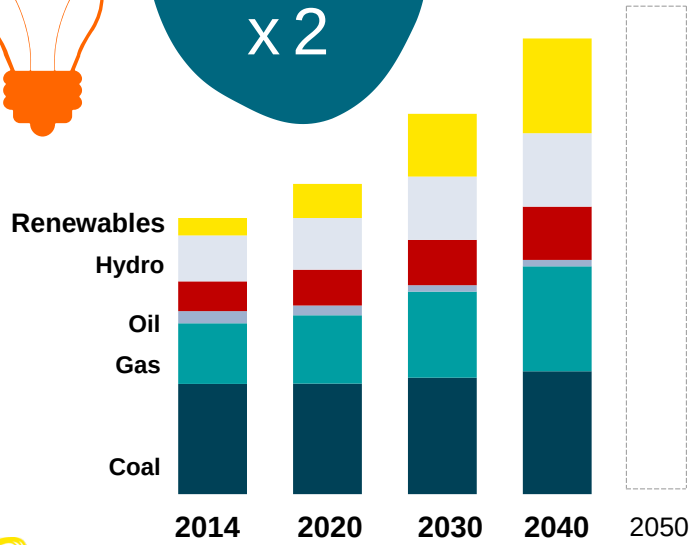
In the beginning, human beings tended to view nature as a mortal ene-

Global Warming:
An equation that has to be solved

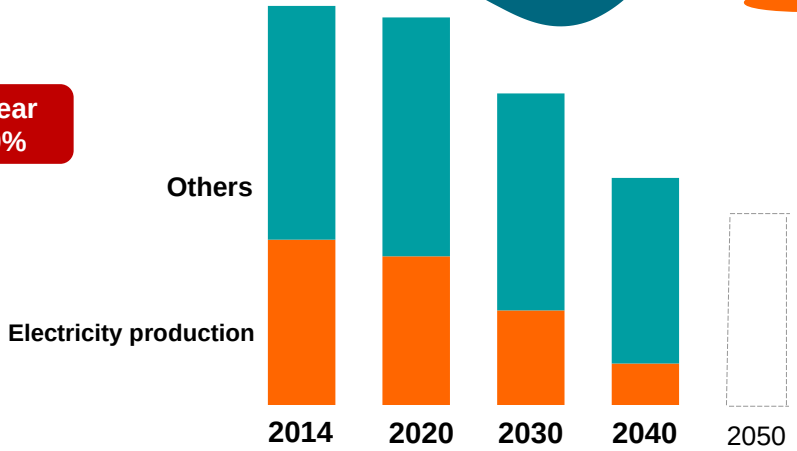
Energy
x 2

Factor
4

CO2
÷ 2



Nuclear
+ 80%



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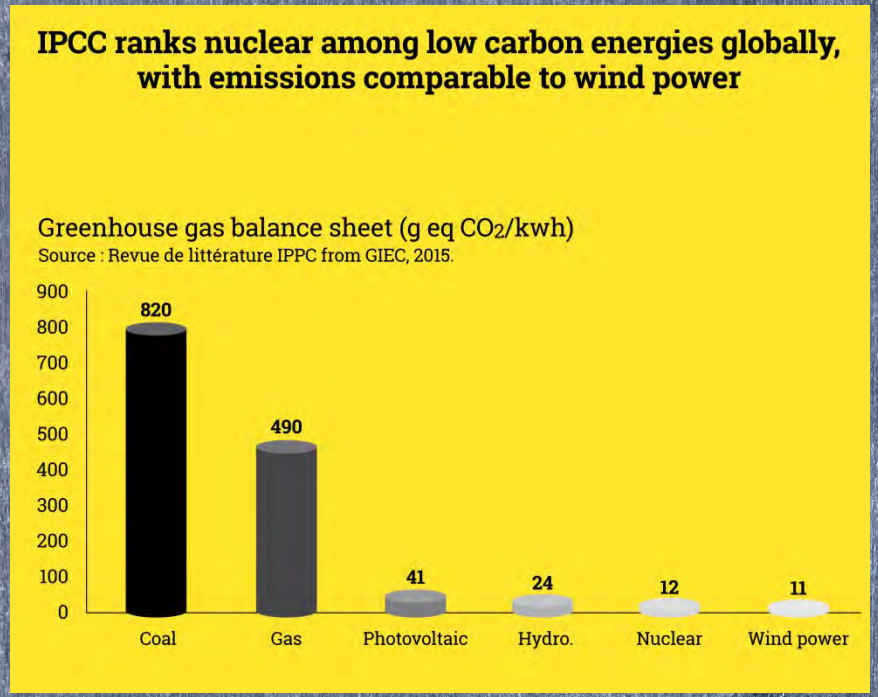
Source: WEO 2016

Nuclear – a need underlined by IPCC



PPE: aiming for France's total decarbonization by 2050

-30% greenhouse gas emissions in 2028 compared to 2016

35% less fossil fuel consumption by 2020 compared to 2012

+100% of renewable installed capacity compared to 2018

- Housing renovation and polluting car replacement (300 000 housings and > 600 000 cars by 2023)
- -14% total energy consumption by 2028

Diversify electricity production and reduce the share of nuclear power to 50% by 2035

Social and Economic

Social and economic orientation to the MEP:

- Stable electricity prices over the MEP period (-1% target by 2030)
- Boost economic growth and employment

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PPE: aiming for France’s total decarbonization by 2050

- Goal for nuclear electricity to have a share of 50 % by 2035
- Decision to close 14 reactors by 2035 (including Fessenheim) and to plan the nuclear fleet renewal roadmap
- EDF has to work on a new nuclear program between now and 2021

> Let's stop saying that it is necessary to force the rapid closure of nuclear reactors so that renewable energies can find their place, as it's not true and it's not the case.

> Nuclear allows us, today, to benefit from energy that is low-carbon and low-cost, that is the reality.

Emmanuel Macron, speech given on November 27, 2018

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PPE: confirmation of recycling/processing strategy for the nuclear sector

The strategy for the recycling/processing of nuclear fuel

will be maintained for the period of France's multi-year energy program (*Programmation Pluriannuelle de l'Energie – PPE*) and beyond, into the 2040s

The strategy for recycling/processing has to be maintained (…)

by opting for the use of Mox fuel in 1,300 MWe reactors

by conducting study in the perspective to multirecycle Plutonium in current PWR reactors.

Extracts from the press kit and synthesis of French Strategy for Energy and climate issued by the French Ministry for the Ecological & Inclusive Transition

Fuel closed cycle – 3 steps approach

Short term

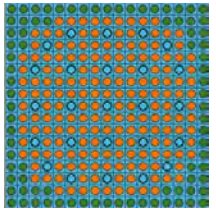
MOX 1300

Maintain current treatment policy by using MOX Fuel in 1 300MW NPP, to compensate closure of 900MW NPP in the frame of French PPE

Mid Term

MOX 2

Research and development program to introduce the multirecycling of spent MOX fuels into the current fleet of reactors



Long Term

GEN IV

Development for a new generation of nuclear reactors

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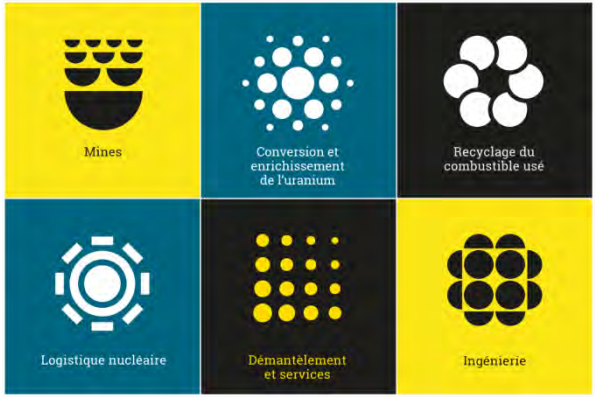
Orano in a glance

€33.2 bn
In backlog as of June 2018 i.e. more than 8 years of revenue

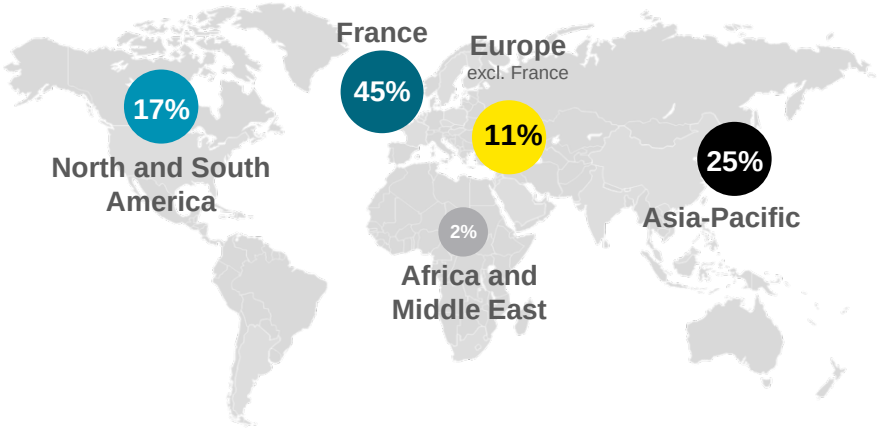
€3,926 M
in revenue 2017

16,000
employees across the world

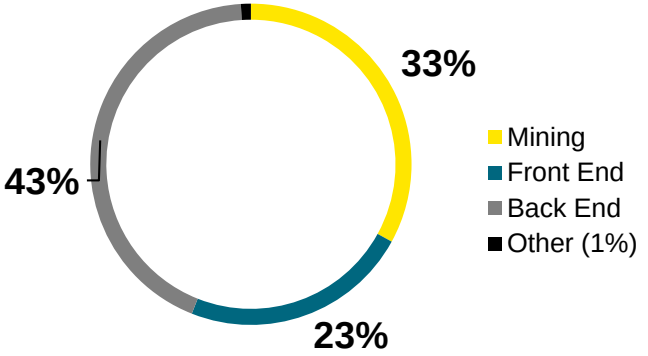
among **Top 3** worldwide in each of its businesses



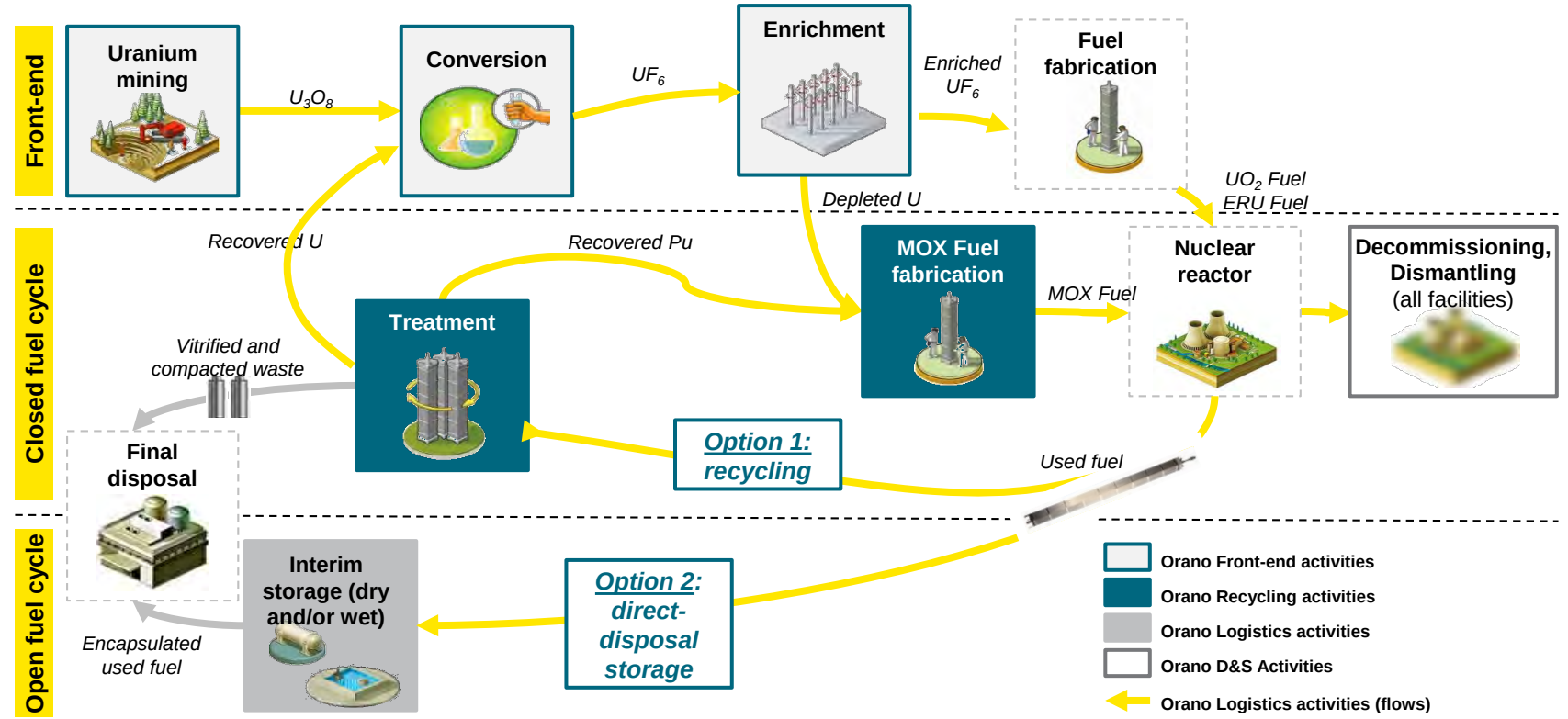
Breakdown of 2017 revenue by region



Breakdown of 2017 revenue by business



Orano activities – Nuclear Fuel cycle



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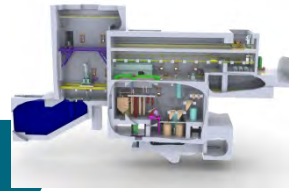
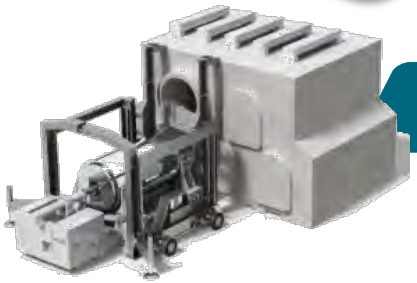
Innovation

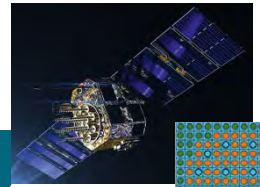
Innovation for D&D projects



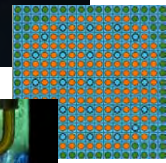
Treatment of special fuel



Waste and spent fuel management



R&D for a further recycling of spent fuels in order to improve current Fuel closed Cycle



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Use of Pb^{212} Cancer treatment

New conversion plant

Improve our engineering methods

Thank you