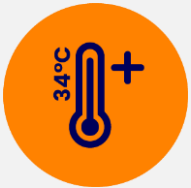


The Shift Project: France's most influential carbon transition think tank



a non-profit organisation **committed to serving the general interest** through **scientific objectivity**

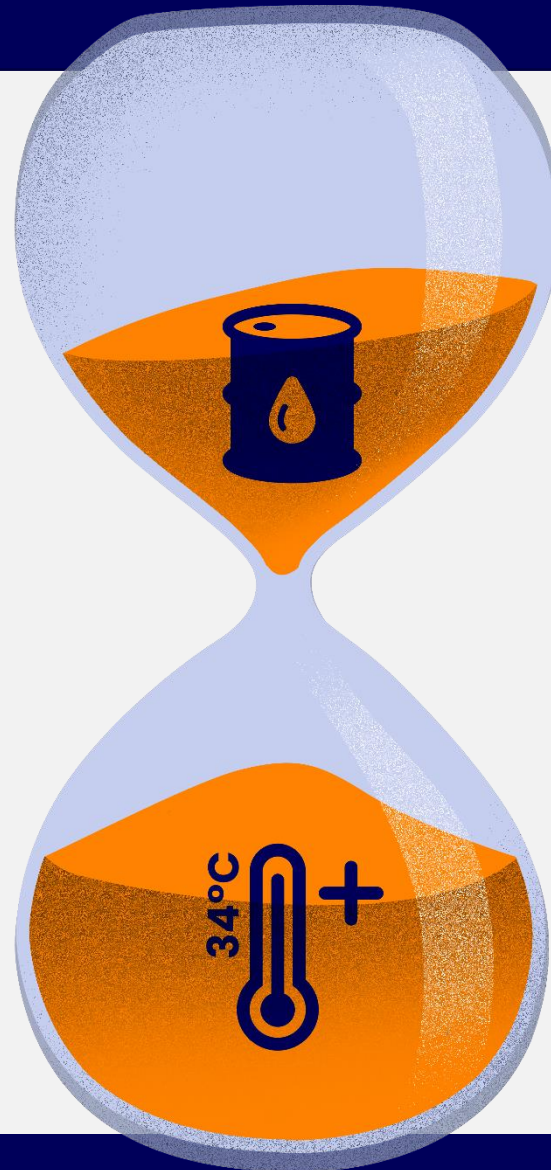


we're dedicated to **informing** and **influencing** the debate on **energy transition in Europe**

a double carbon constraint

CLIMATE

reduce greenhouse
gas emissions

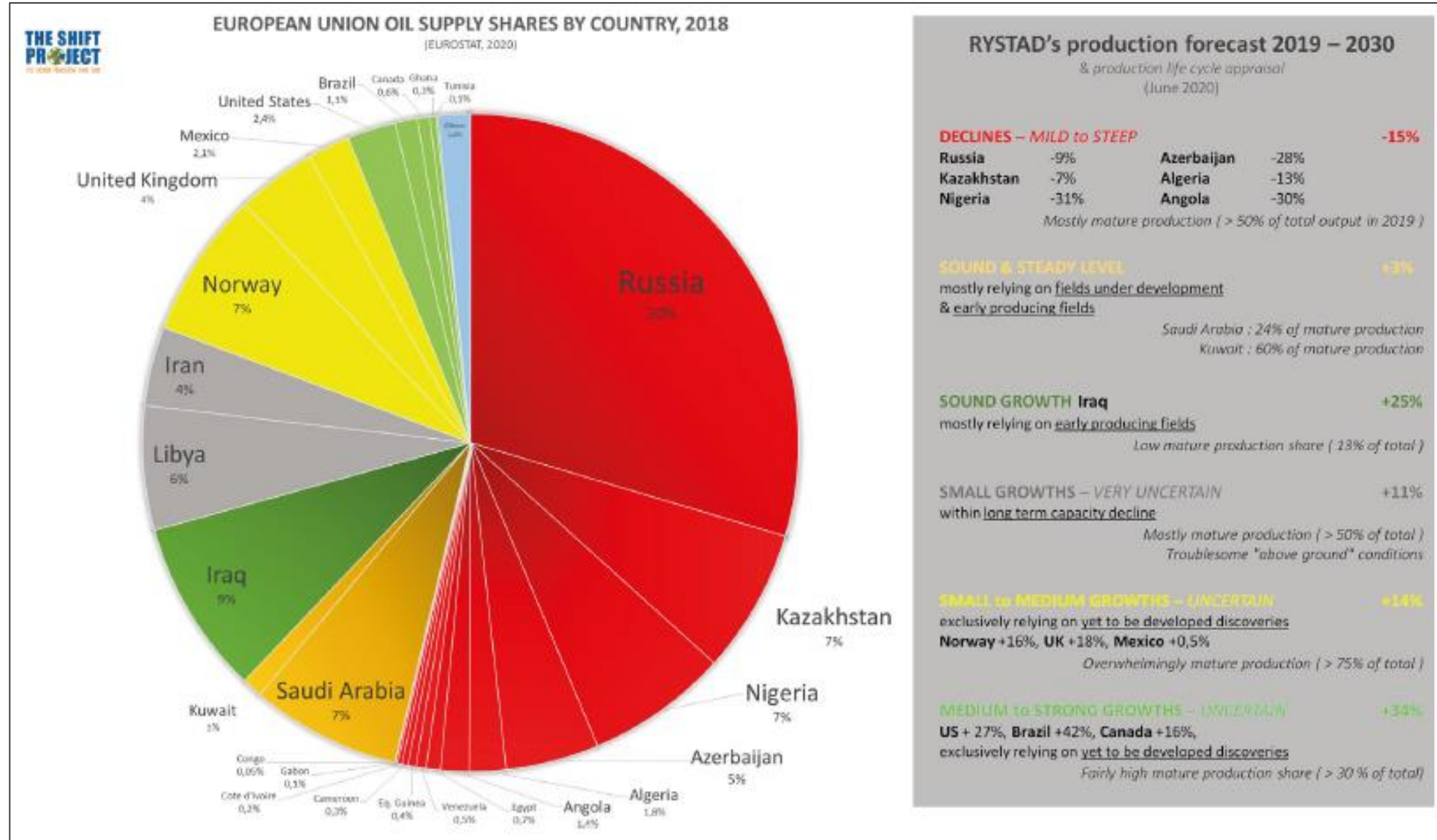


ENERGY

anticipate exhaustion
of vital oil&gas supplies

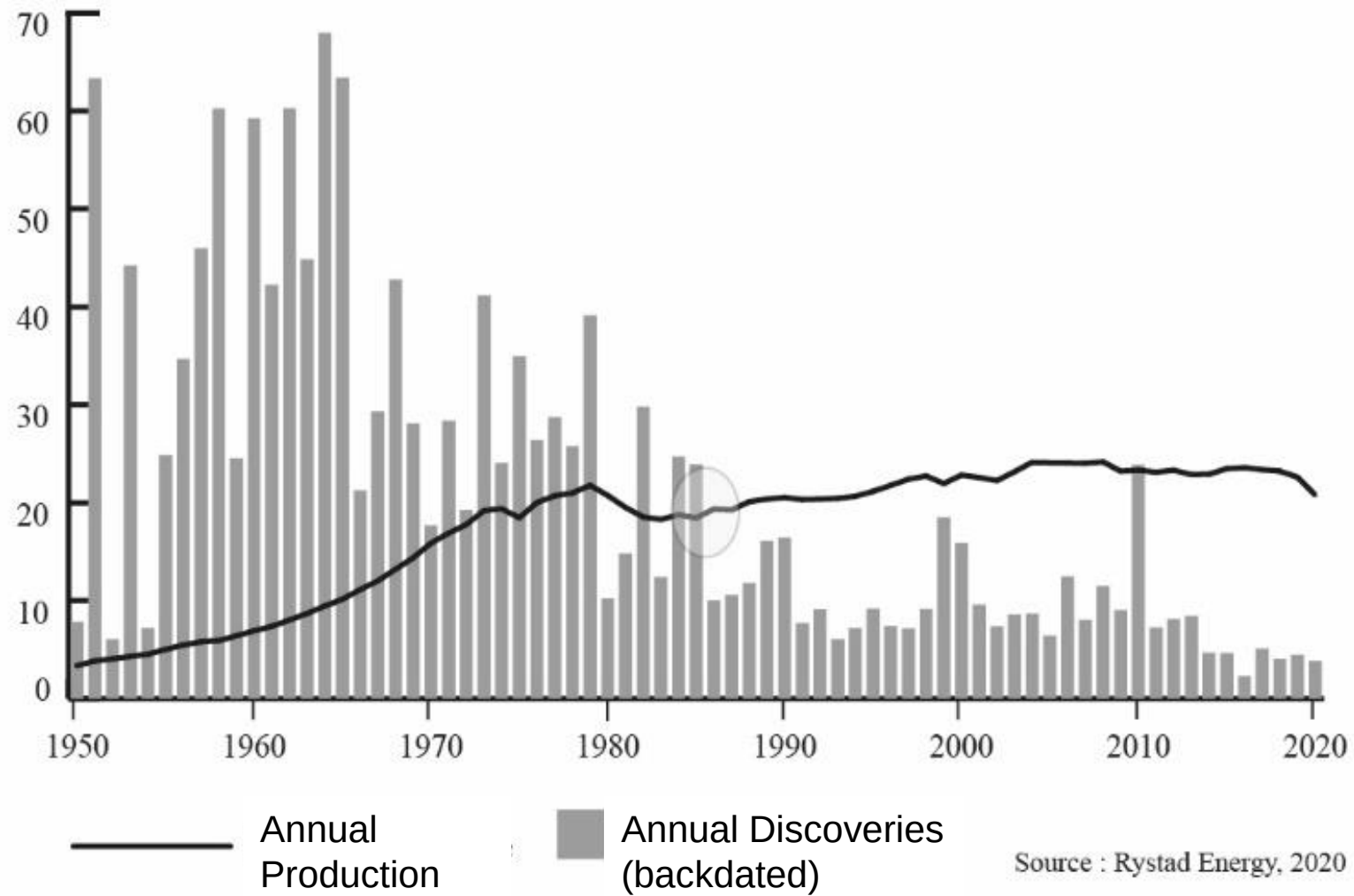


Crude oil Over 50% of European union imports come from declining or « mature » oil fields



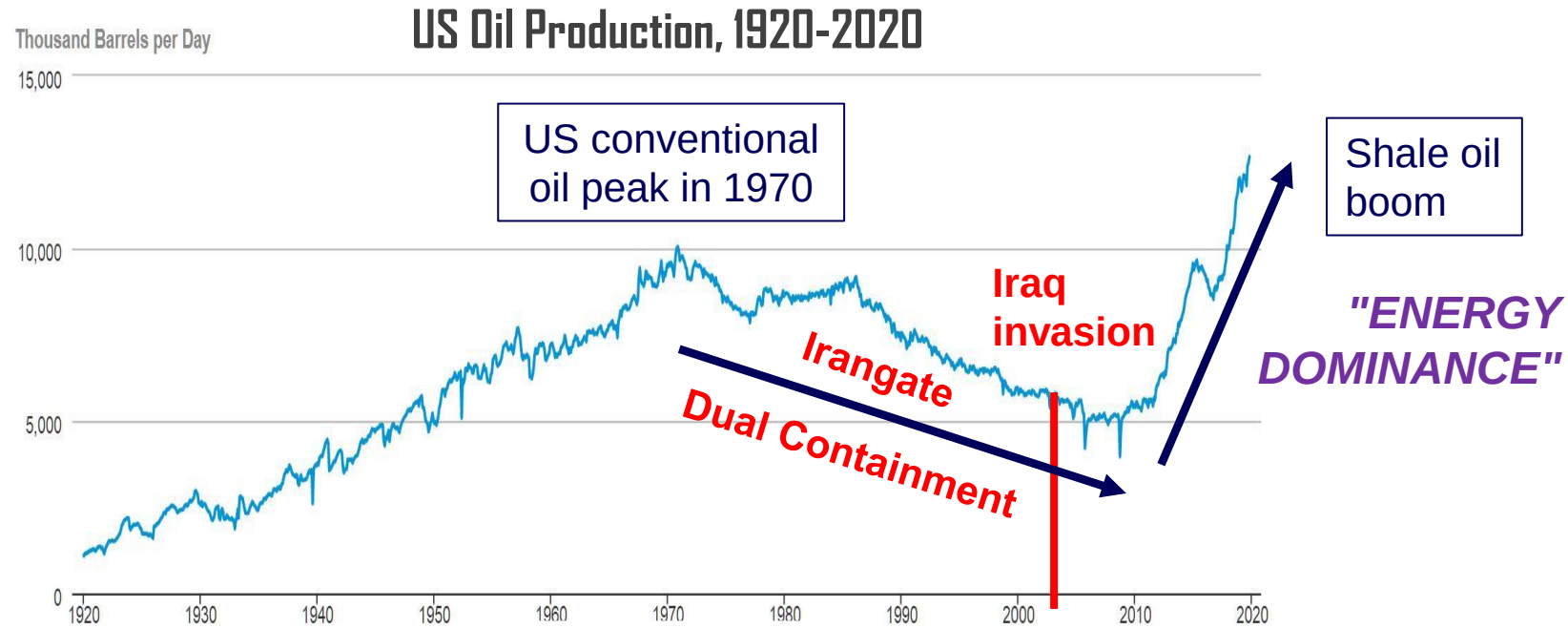
World conventional oil production and discoveries

Billions of barrels per year



Alan GREENSPAN *"The Iraq war is largely about oil"*

General ABIZAID, commander of **CENTCOM** *"Of Course, It's about Oil"*



Dick CHENEY as CEO of **Halliburton**
"Middle East: the ultimate prize"

Donald TRUMP *"I always said: 'Take the Oil!'"*



Riyad, 2017

Natural gas

The drying-up of the North Sea
(-40% since 2004)
put Europe **in Putin's hands**.

This decline **undermined**
inexorably Europe's competitiveness.

(Shift Project alert since Crimea in 2014
+ study under the aegis
of the French Army ministry
launched before Ukraine's invasion.)

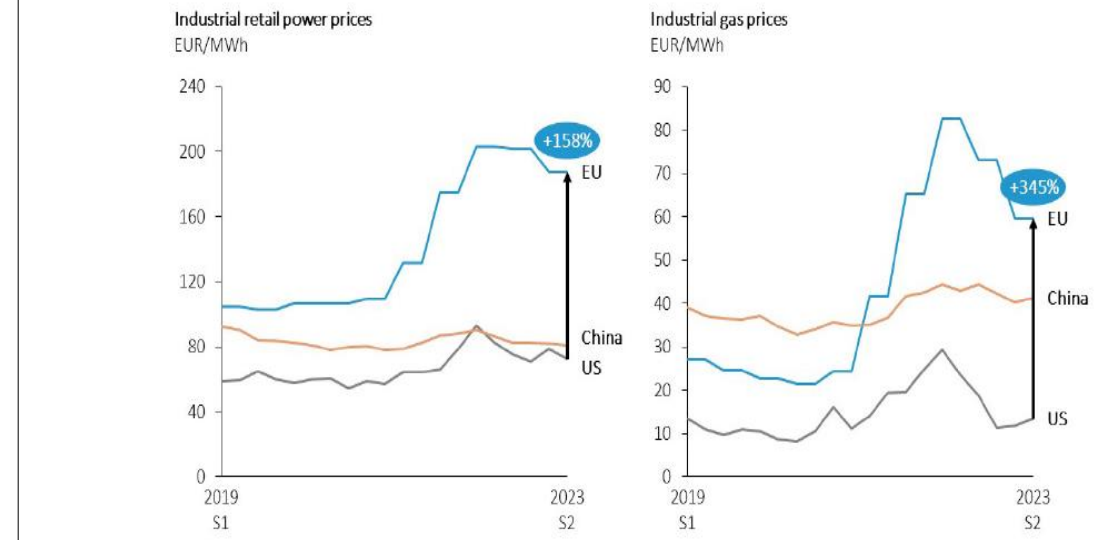
Rapport Draghi, sept. 24

**"The EU suffers from a major gap
in terms of competitiveness
of energy"**



FIGURE 1

Gas and retail price gap for industry



Natural gas

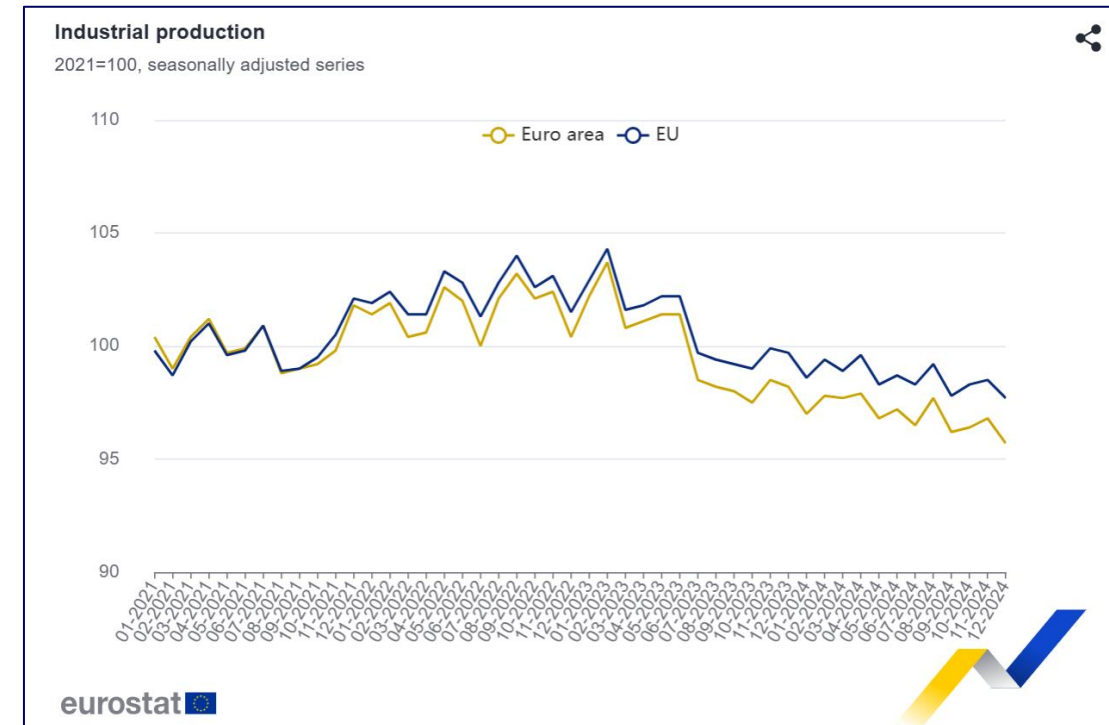
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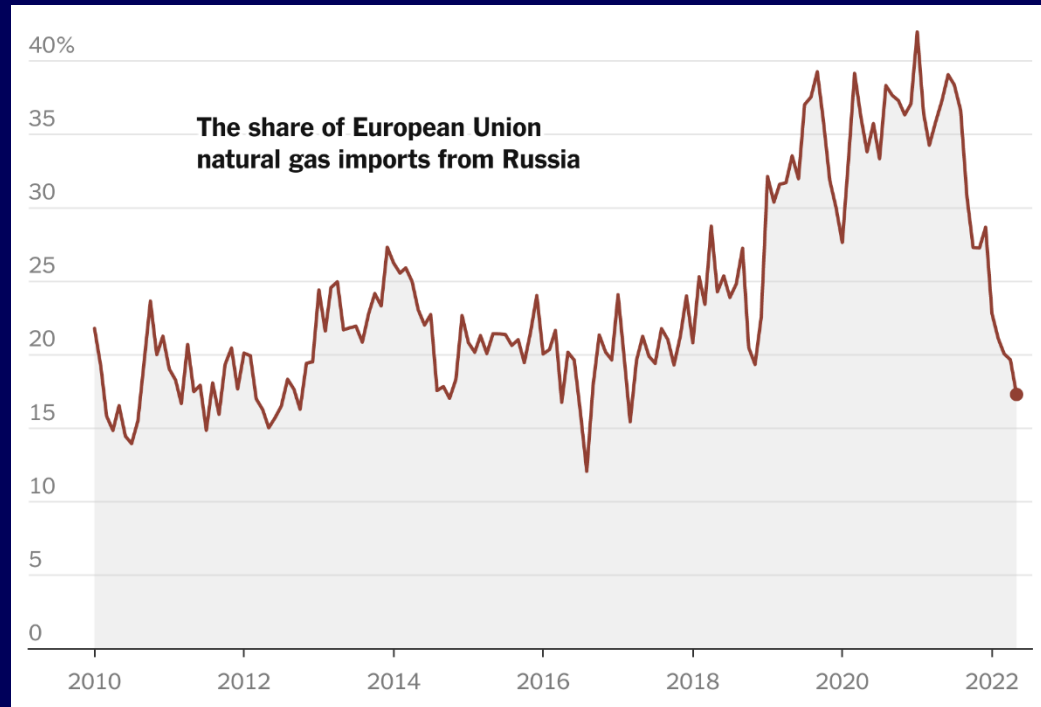
Rapport Draghi, sept. 24

**"The EU suffers from a major gap
in terms of competitiveness
of energy"**



Natural gas

A huge strategic mistake...



Natural gas consumption growth between 2014 (Crimea) and 2021 (Ukraine)

(source : Energy Institute)

Germany +24%

European Union +20%

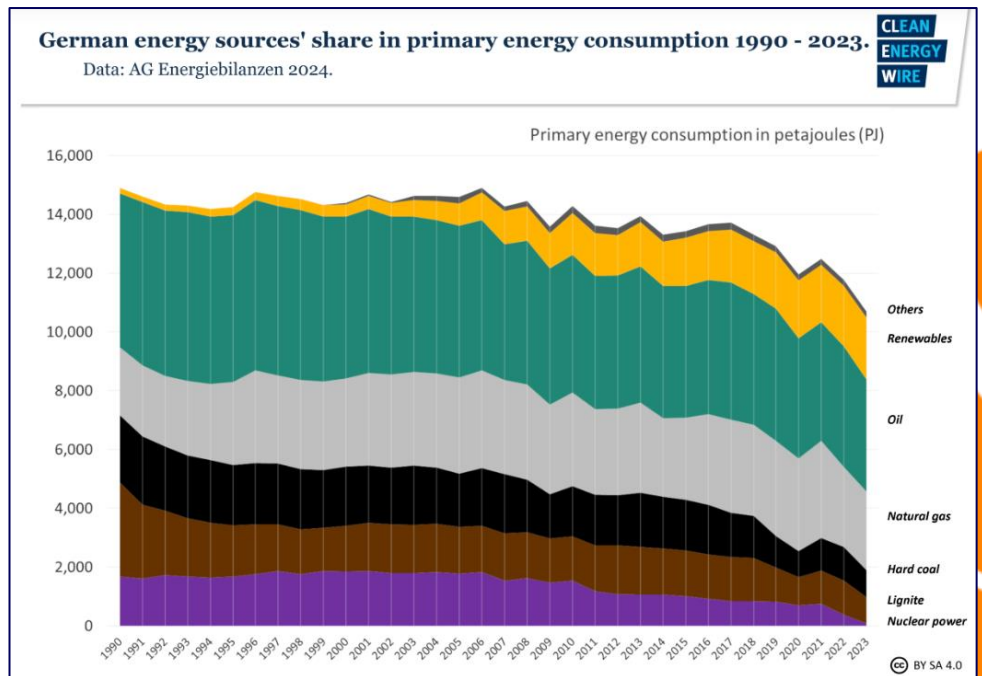
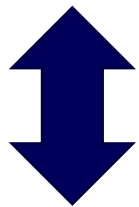


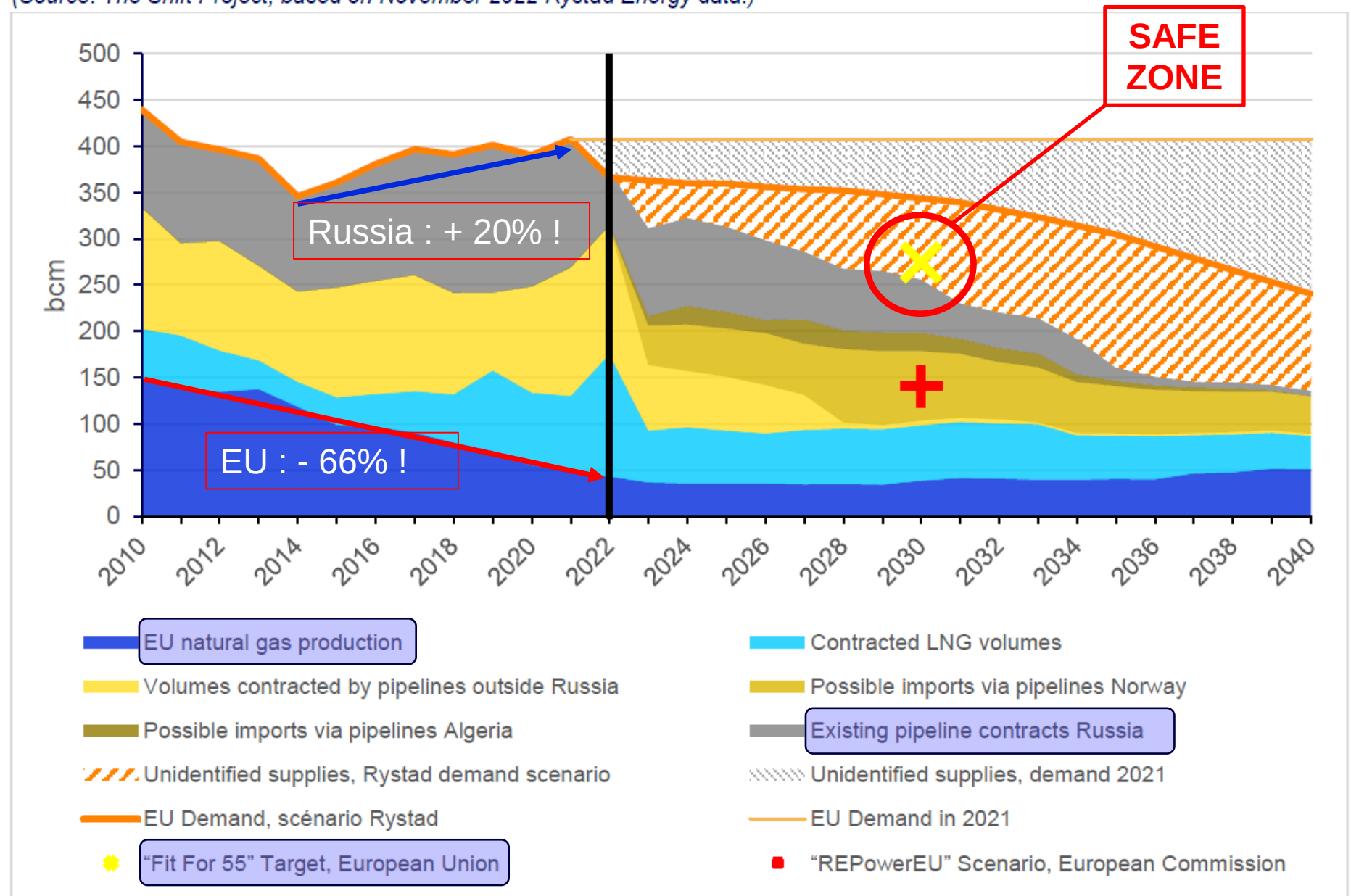
Figure 1. Comparison of EU demand and supply over the 2010-2040 period.

(Source: The Shift Project, based on November 2022 Rystad Energy data.)¹

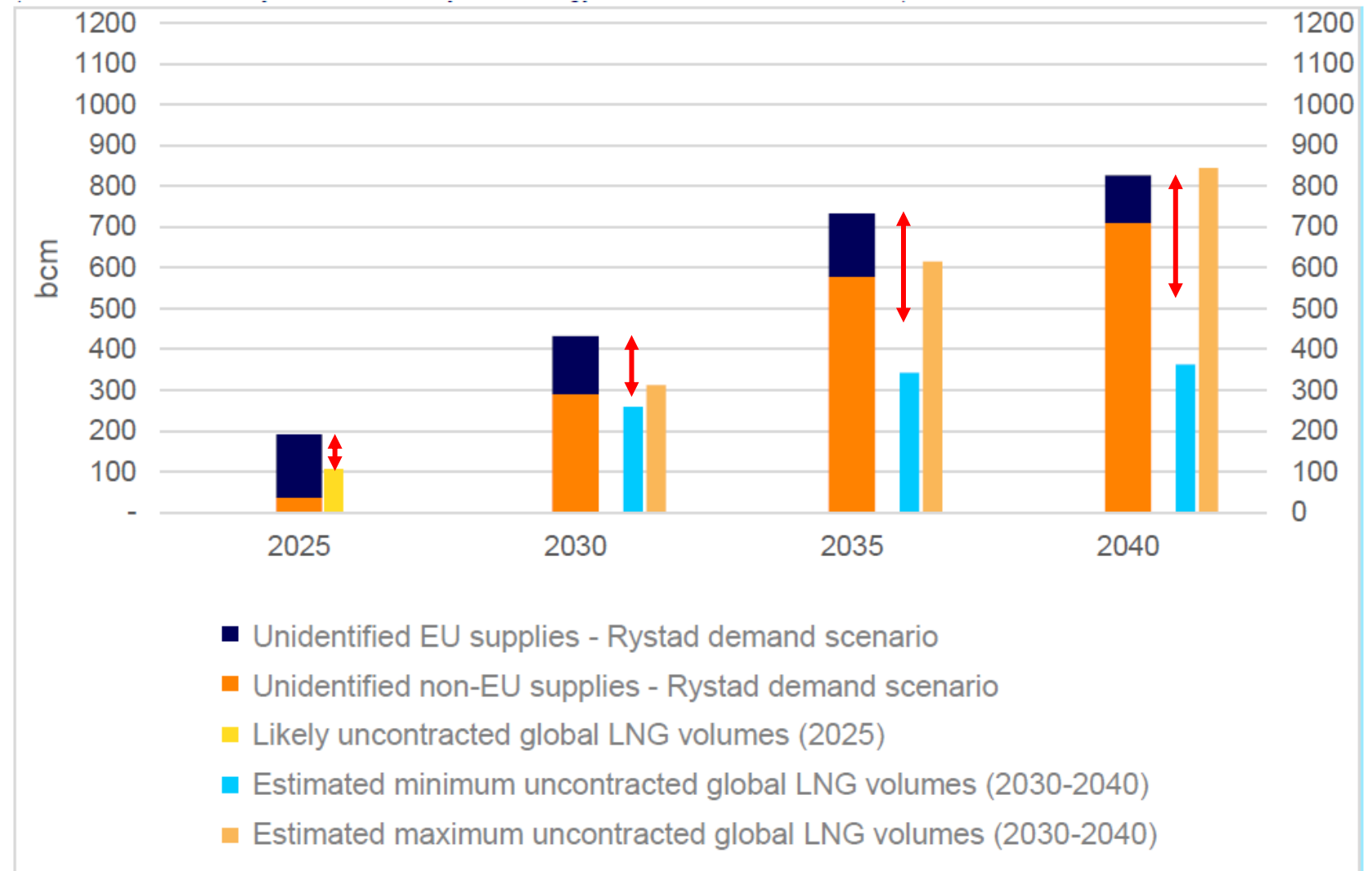
Decarbonization



Sovereignty



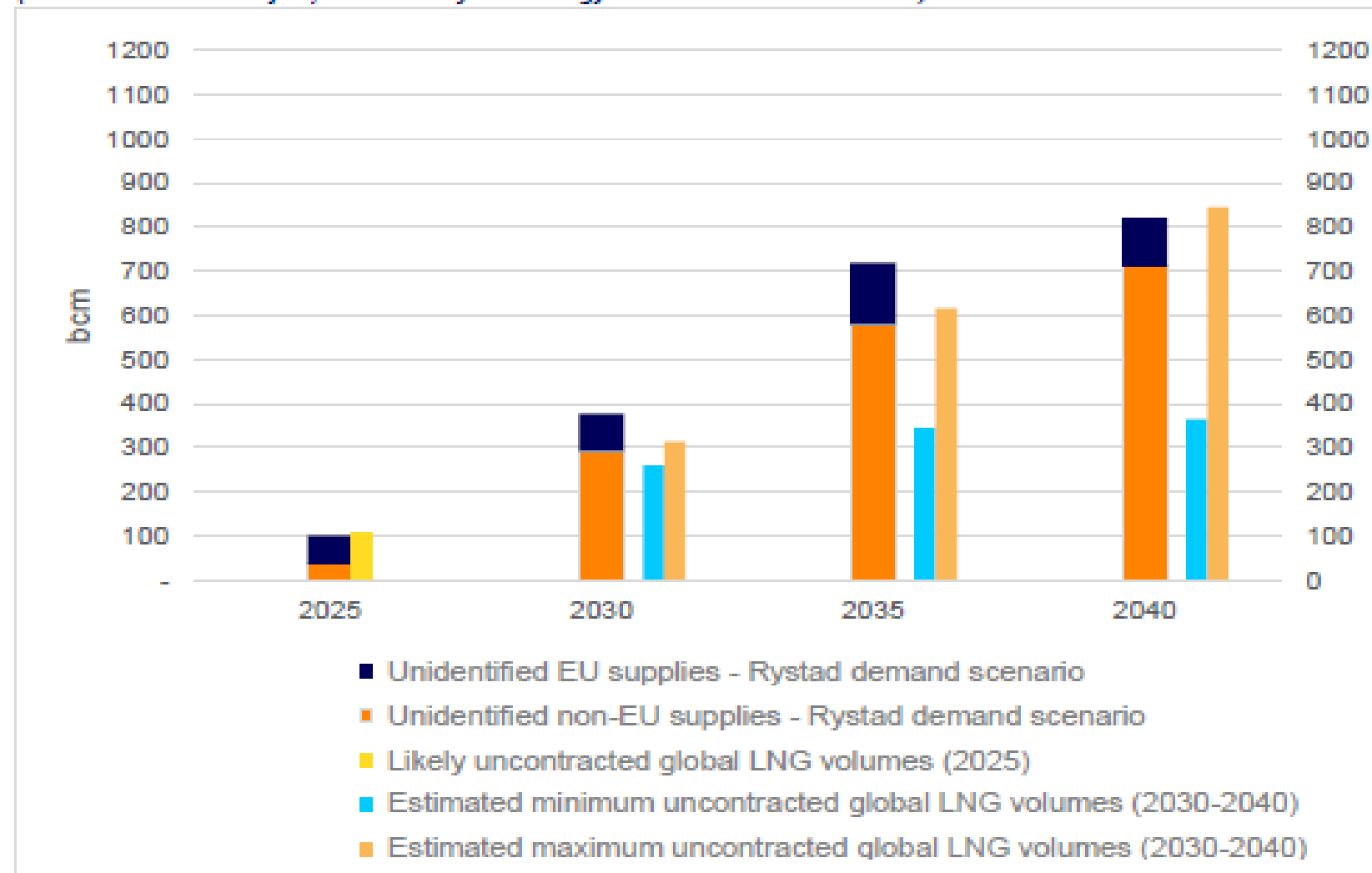
**prolonged shutdown of
Russian supplies
=> severe deficits
on world LNG market**



Source : The Shift Project – Natural Gas: What Supply Risks for the European Union – December 2022



Figure 2. Comparison between EU and non-EU unidentified future supplies, and the global uncontracted LNG volumes, assuming that existing contracts between Russia and the EU are fulfilled, and following Rystad demand scenario. (Source: The Shift Project, based on Rystad Energy data from November 2022.)



Natural Gas

**On major LNG exporter lacking
to meet growing global demand**

(Shift Project)

Financial Times, 2023

**Europe has diverted
70 bcm LNG (= Qatar exports)
originally destined for Asia.**

Financial Times, 2023

**Will Bangladesh come to regret
its dash for LNG?**



Natural Gas

**On major LNG exporter lacking
to meet growing global demand**

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Financial Times, 2023

**Europe has diverted
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originally destined for Asia.**

Financial Times, 2025

**Modi-Trump energy pledge signals
bonanza for US gas exporters**



Natural Gas

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Financial Times, 2025

**AI set to fuel surge
in new US gas power plants**

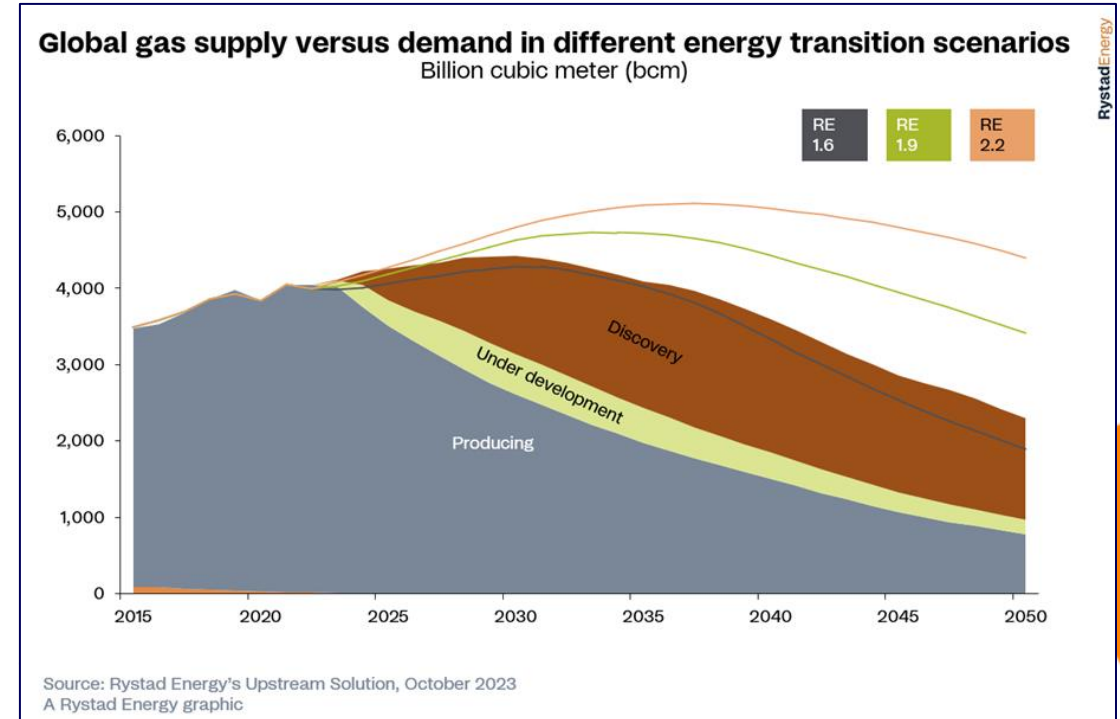


Natural Gas

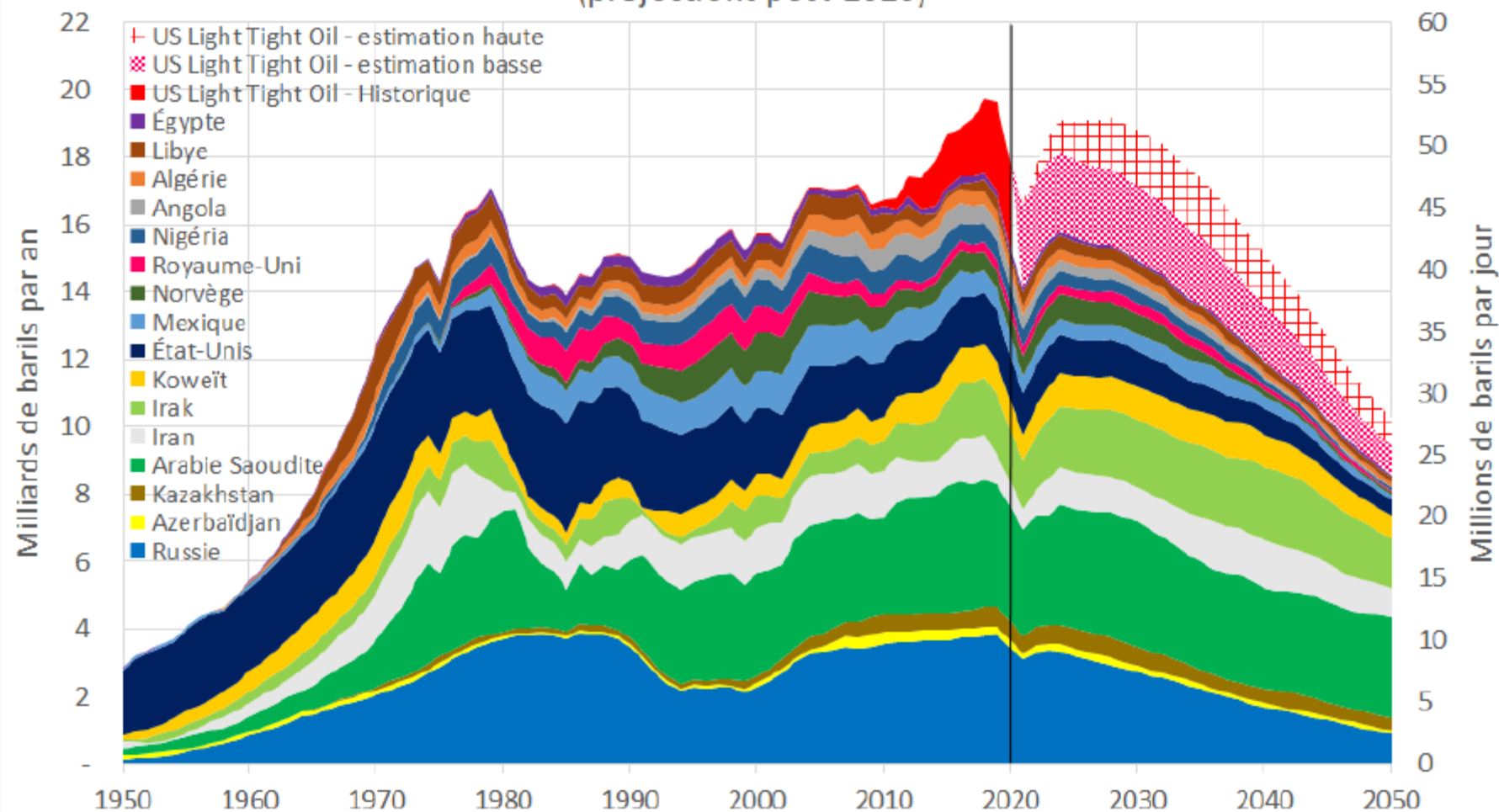
**On major LNG exporter lacking
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(Shift Project)

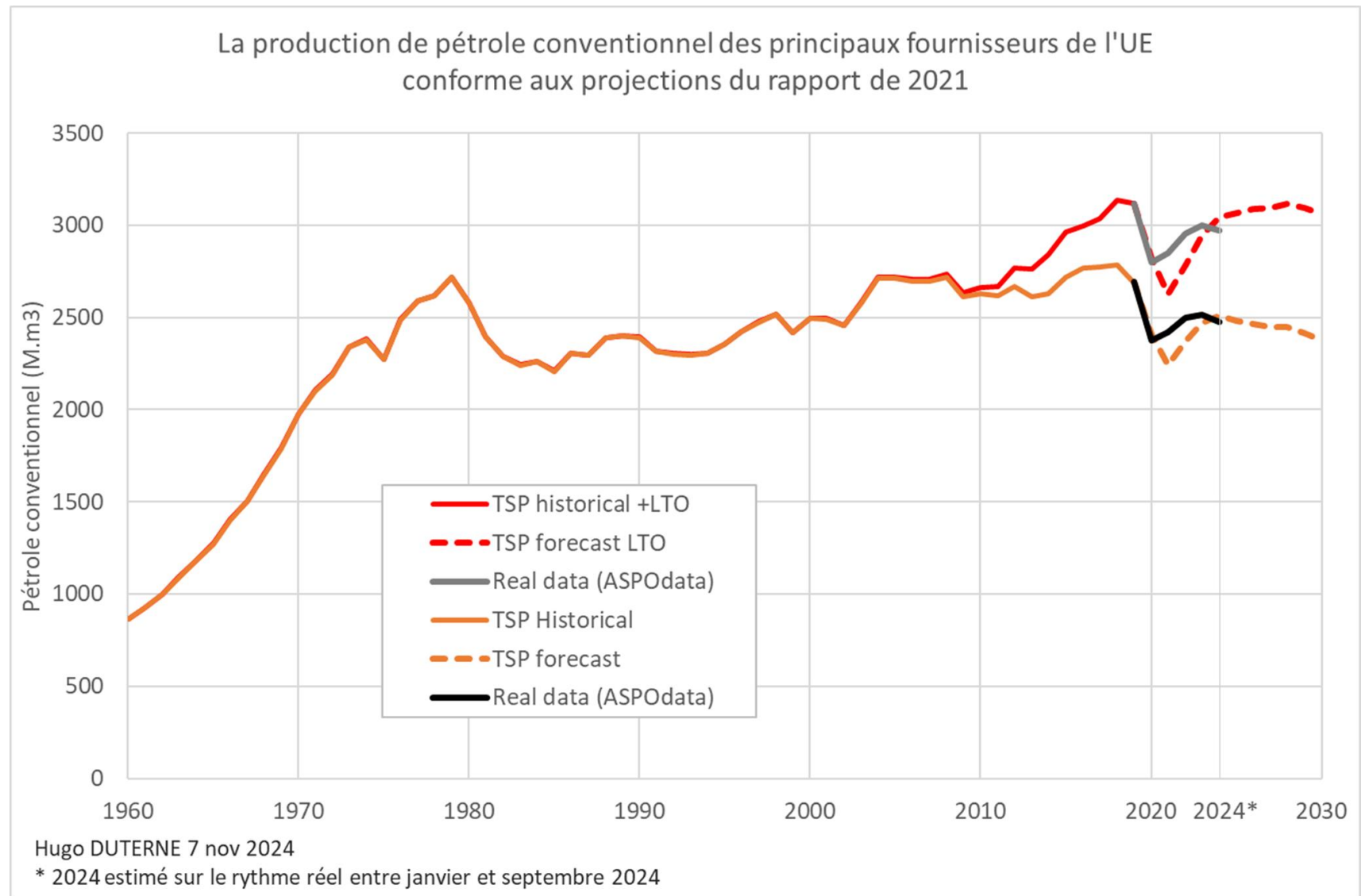
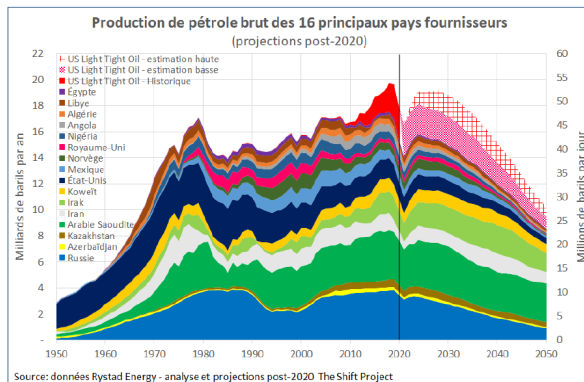
Rystad Energy, 2023



Production de pétrole brut des 16 principaux pays fournisseurs (projections post-2020)



Source: données Rystad Energy - analyse et projections post-2020 The Shift Project

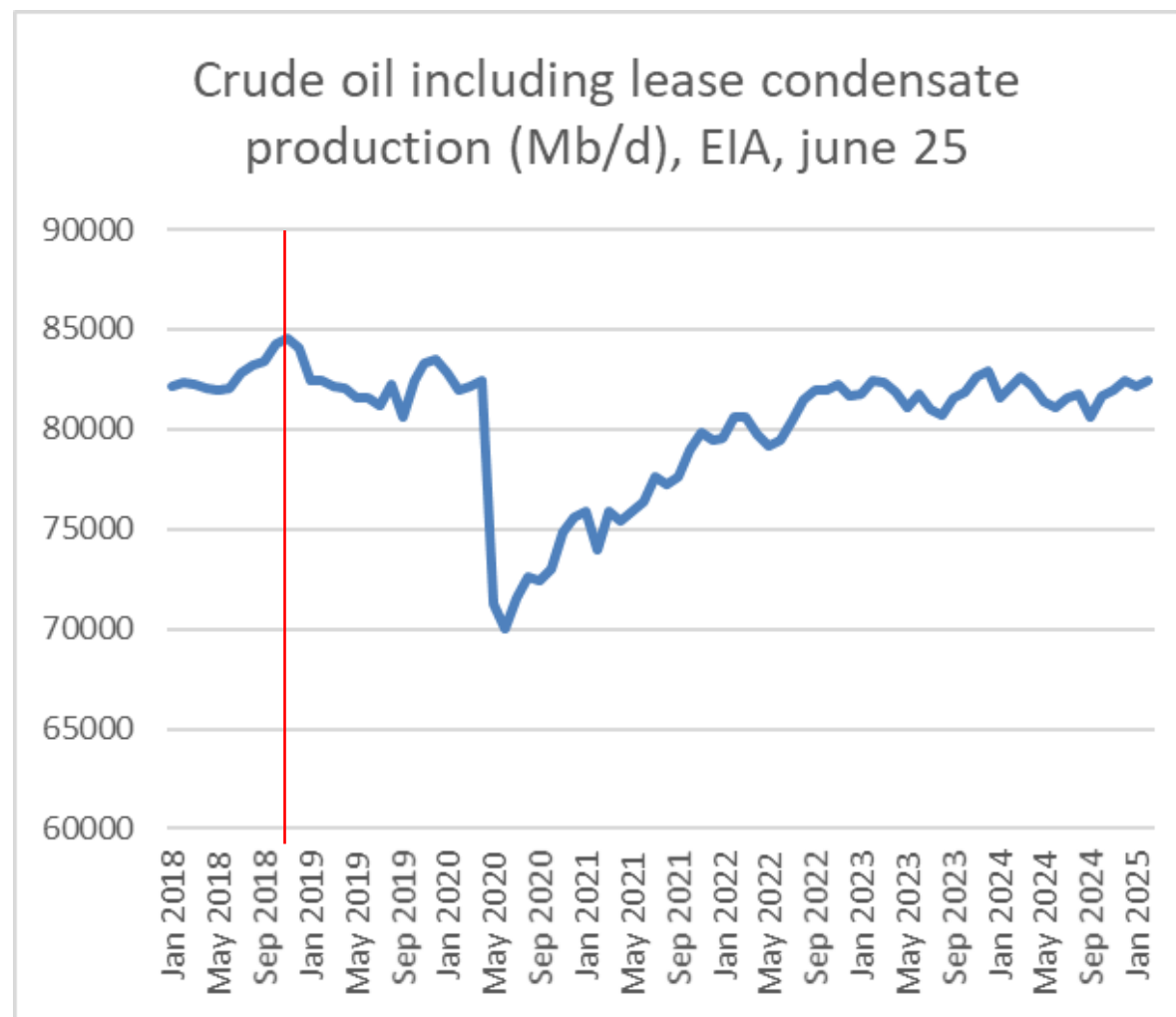


L'hypothèse d'un peak oil (supply) franchit au Q4 2018 tient toujours.

D'après l'EIA, "crude oil including lease condensate" (càd production mondiale de carburants liquides fossiles) :

nov 2018 : 84,6 Mb/d,

fév. 2025 : 82.4 Mb/d (- 2,5 %)



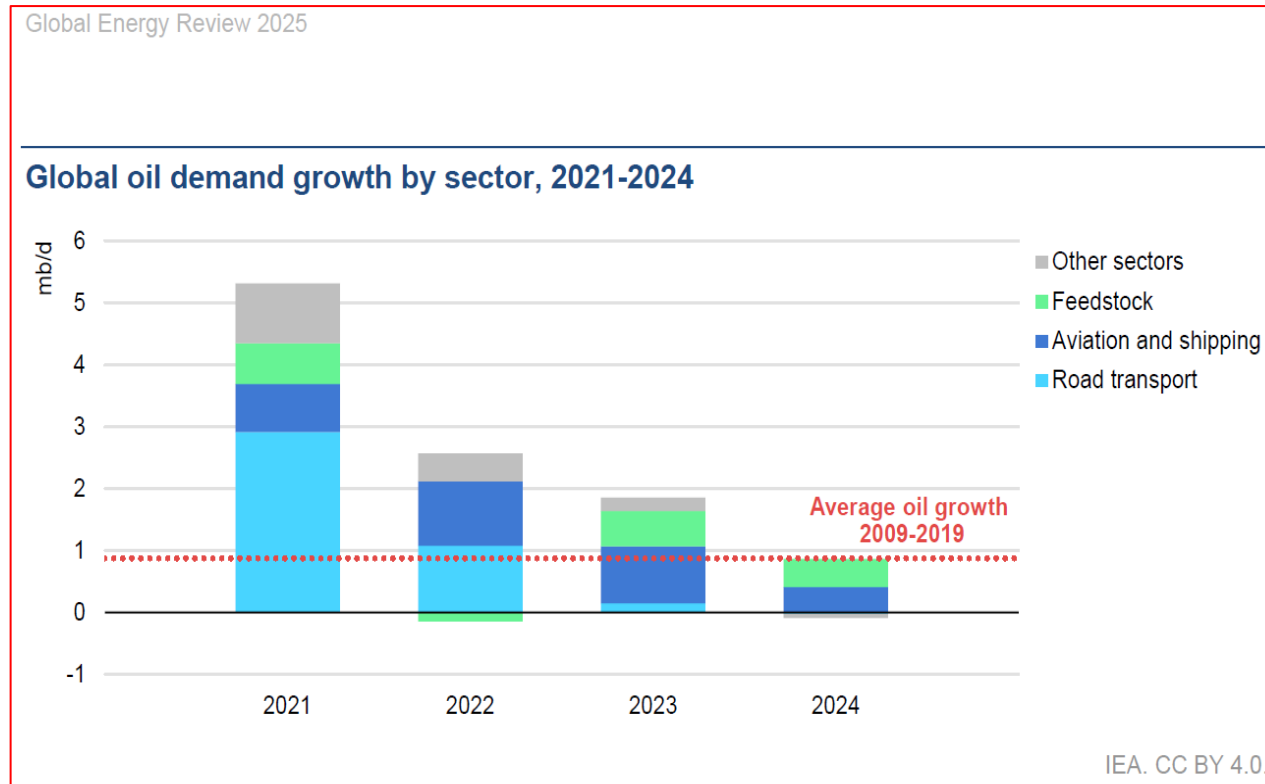
For now, so much with “peak demand”!...

Or la demande mondiale de carburants liquides (inclus biofuels) ne baisse toujours pas :

D’après le Statistical review of world energy,

100,5 Mb/d en 2018 (année supposée d’un peak liquid fossil supply)

103,4 Mb/d en 2023



(tendance à un ralentissement de la croissance de la demande pour les transports ?)

Peak supply 2018, too close to call ?

P. BROCORENS :

« Il est étonnant que la production de C+C n'ait pas dépassé le record de 2018, avec en plus des prix bas. **Ces prix bas pointent plutôt vers un peak demand.** L'électrification des véhicules aurait-elle donc un réel impact sur la demande ? C'est ce que semble confirmer l'évolution de la variation de la demande liée au transport routier, atone en 2024, et qui sait, en déclin les années suivantes.

La demande de carburants liquides reste en croissance depuis le trou d'air du COVID. Ce qui conduit à mes yeux à considérer en première approximation **le pic C+C des données EIA comme un phénomène côté offre.**

Les prix sont bas depuis 2014 environ, si on ne tient pas compte de la hausse temporaire liée à la guerre en Ukraine.

Donc, pour le moment, le plateau de production depuis 2018 n'engendre pas de contrainte d'offre,

ça se verrait dans les prix comme lors du plateau de 2004-2011.

Ca se verrait aussi dans les spare capacities, qui sont récemment en croissance si on peut se fier aux données IEA.

La demande de C+C n'est donc pas en croissance, la croissance du graphique de l'IEA étant le rattrapage du covid, tous liquides. »

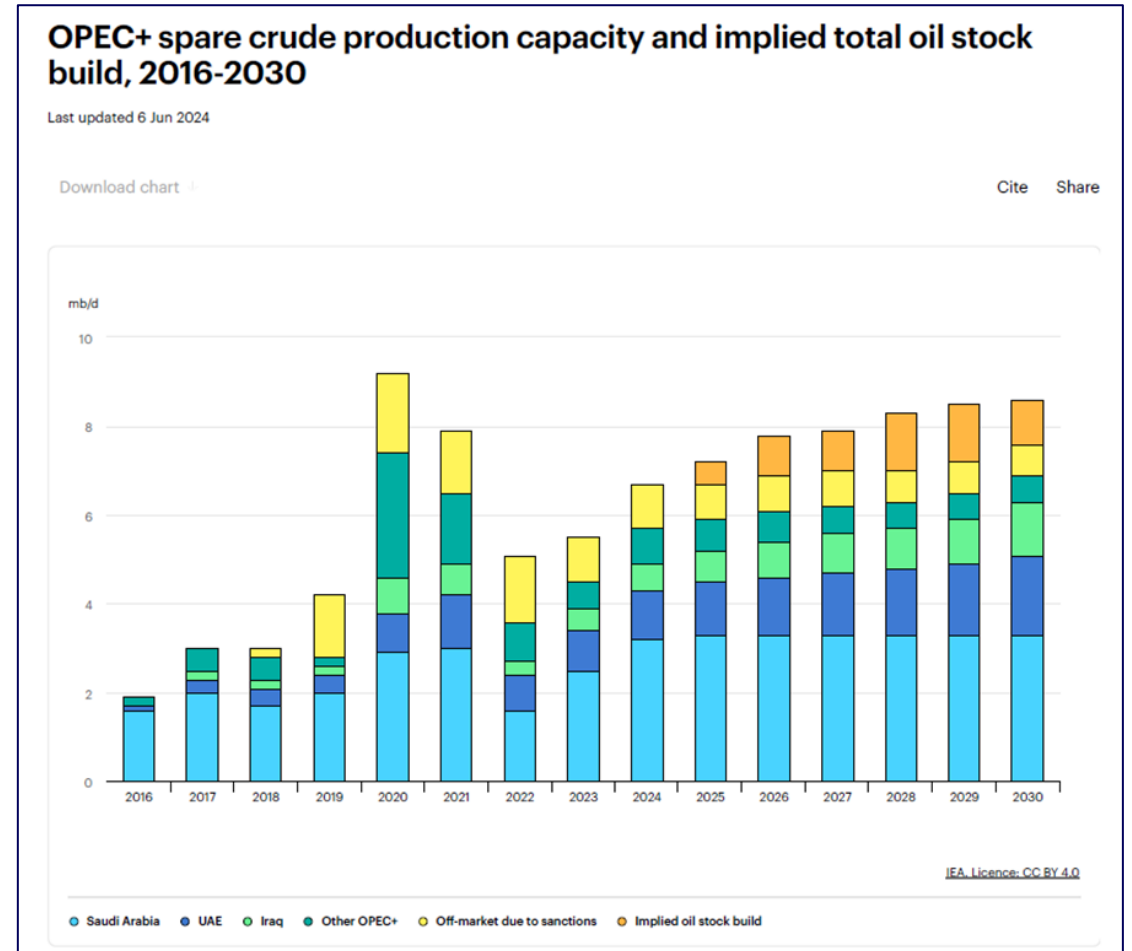
PRODUCTION MONDIALE C+C, TENDANCE 2010 - 2023
 ROUGE->DECLIN ; JAUNE->MATURE OU INCERTAIN ; VERT->CROISSANCE

Region / Country	Production (%)	Tendance
Red (Decline)		
Venezuela	1,0%	Decline
Mexico	2,3%	Decline
Trinidad & Tobago	0,1%	Decline
Norway	2,2%	Decline
United Kingdom	0,8%	Decline
Other Europe	0,3%	Decline
Romania	0,1%	Decline
Denmark	0,1%	Decline
Italy	0,1%	Decline
Azerbaijan	0,7%	Decline
Yemen	0,0%	Decline
Syria	0,0%	Decline
Uzbekistan	0,1%	Decline
Nigeria	1,8%	Decline
Equatorial Guinea	0,1%	Decline
Tunisia	0,0%	Decline
Indonesia	0,7%	Decline
Sudan	0,1%	Decline
Malaysia	0,6%	Decline
Vietnam	0,2%	Decline
Thailand	0,2%	Decline
Australia	0,3%	Decline
Brunei	0,1%	Decline
Other Asia Pacific	0,2%	Decline
Yellow (Mature or Uncertain)		
US	15,6%	Mature or Uncertain
Russian Federation	12,8%	Mature or Uncertain
Colombia	0,9%	Mature or Uncertain
Ecuador	0,6%	Mature or Uncertain
Peru	0,1%	Mature or Uncertain
Kazakhstan	2,3%	Mature or Uncertain
Other CIS	0,1%	Mature or Uncertain
Turkmenistan	0,2%	Mature or Uncertain
Saudi Arabia	11,6%	Mature or Uncertain
Iran	4,8%	Mature or Uncertain
Kuwait	3,1%	Mature or Uncertain
Qatar	1,6%	Mature or Uncertain
Oman	1,3%	Mature or Uncertain
Other Middle East	0,2%	Mature or Uncertain
Libya	1,5%	Mature or Uncertain
Republic of Congo	0,3%	Mature or Uncertain
Gabon	0,3%	Mature or Uncertain
South Sudan	0,2%	Mature or Uncertain
Chad	0,2%	Mature or Uncertain
Other Africa	0,3%	Mature or Uncertain
Green (Growth)		
China	5,1%	Growth
Canada	6,0%	Growth
Guinea	4,1%	Growth
Guyana	0,5%	Growth
Argentina	1,1%	Growth
Iraq	5,2%	Growth
United Arab Emirates	3,9%	Growth



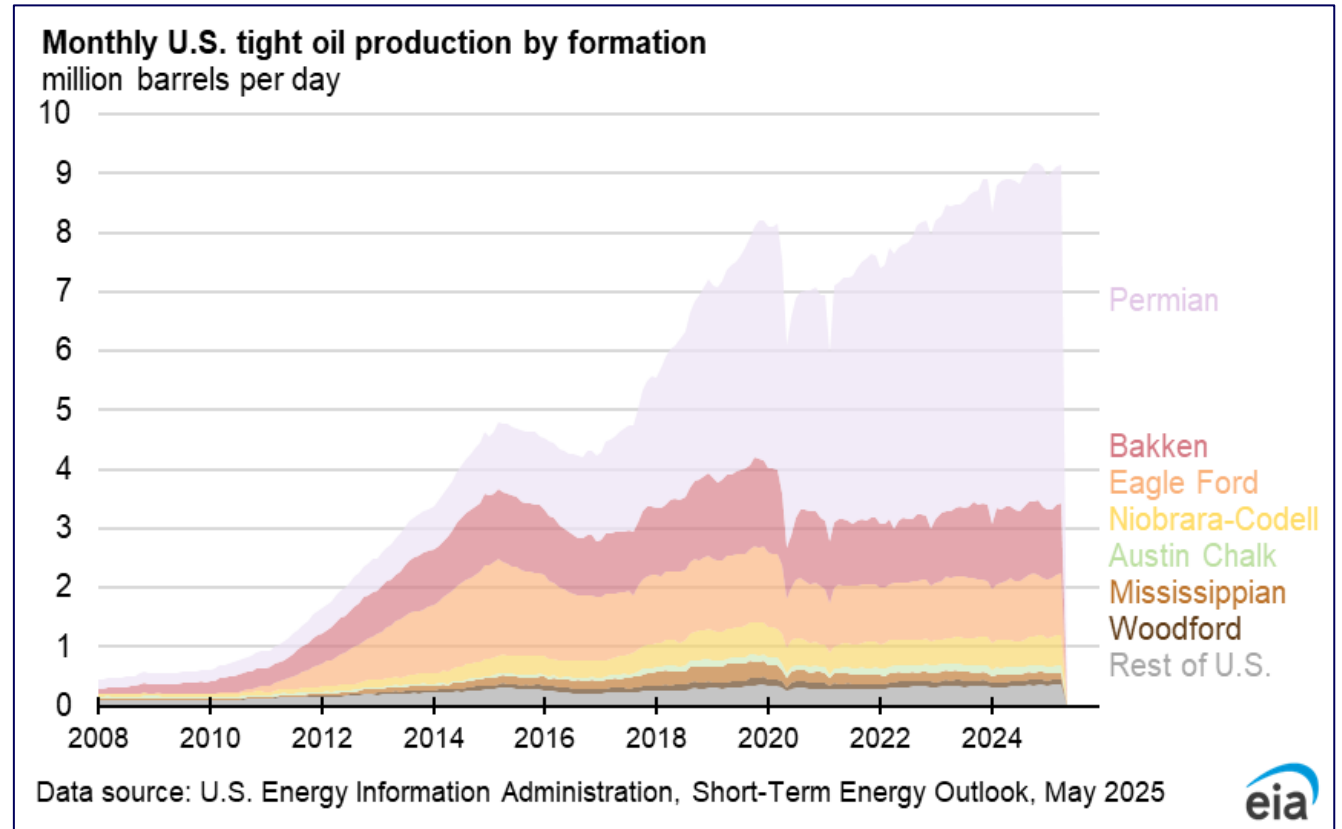
Conventionnel :

- 70 Mb/j en 2008, 62,7 en 2023 (IEA) : - 7,3 Mb/j
- OPEC+ aurait réduit sa production de **-4,2Mb/j** depuis 2022 (quid de 2019 ?) :
 - -2Mb/j, dont 1,65 pour 8 membres de l'OPEC en 2022, réduction qui restera en place,
 - puis -2,2Mb/j pour les mêmes 8 membres de l'OPEC, sur lesquels il est question d'une éventuelle remontée de +1,4Mb/j d'ici juillet 2025)
- EIA production OPEC+ Crude+Condensat
2018 50,8 Mb/j
2022 47,2 Mb/j
2024 46,0 Mb/j, fév 2025 46,3 Mb/j
soit **-0,9 Mb/j** entre 22 et 25,
mais **-4,5 Mb/j** entre 18 et 25
=> Part spare capacities
vs déclin producteur matures : **à clarifier!**



US Shale Oil :

- **FT, may 25 | US oil output has peaked amid price fall**
(...) *“As a result of these activity cuts, it is **likely that US onshore oil production has peaked** and will begin to decline this quarter,”* said Diamondback chief executive.
- **Bloomberg, may 25 | US Oil Output Has Peaked. But Don’t Expect a Rapid Decline.**
(...) *“We had expected that US production overall would peak between 2027 and 2030,”* Vicki Hollub, chief executive officer of top shale producer Occidental Petroleum Corp., told investors last week.
“It’s looking like that peak could come sooner.”
Others echoed her words.



Recoverable oil by country and resource classification

Billion barrels of oil

	1P	2P	2PC	2PCX	Added	Mbbl/d*	1P life	2PCX life
Non-OPEC	219	345	627	880	-10	63.5	11	45
United States	32	44	102	156	-16	13.2	7	32
Russia	58	93	123	143	-3	10.3	16	38
Canada	34	45	110	122	2	4.8	19	70
China	19	35	53	70	-5	4.2	12	46
Brazil	12	25	40	58	-0	3.6	9	44
Qatar	10	15	33	37	0	1.3	20	75
Kazakhstan	11	17	26	32	-1	1.8	18	49
Mexico	5	8	15	23	-1	1.9	7	33
Argentina	2	3	10	22	4	0.7	7	83
Australia	1	1	3	16	0	0.3	7	144
Norway	5	7	11	15	-1	1.8	8	24
Guyana	2	5	11	14	1	0.6	9	64
Angola**	3	6	9	12	1	1.1	9	30
Other	25	42	80	160	-0	9.0	8	49
OPEC	231	392	697	657	-39	29.1	22	62
Saudi Arabia	106	177	233	247	-27	9.6	30	71
Iraq	31	58	100	106	0	4.3	20	68
Iran	27	48	78	86	-2	4.0	19	59
UAE	27	44	67	79	-1	3.2	23	67
Kuwait	18	31	45	48	-6	2.5	20	53
Venezuela	5	9	26	29	3	1.0	14	81
Nigeria	4	7	19	22	1	1.7	7	36
Libya	7	11	15	20	0	1.3	15	42
Algeria	5	7	8	13	-0	1.1	11	31
Congo	1	1	3	4	0	0.3	9	39
Gabon	0	1	1	2	0	0.2	7	30
Equatorial Guinea	0	0	0	1	-0	0.1	5	17
World Total Oil	449	738	1,224	1,536	-49	82.6	15	61

Natural Gas Liquids 14.0

Other liquids 5.9

World Total Liquids production 2024e 102.5

Source: UCube by Rystad Energy

Source: Rystad Energy Upstream Solution, July 2024

A Rystad Energy graphic

* Global oil production 2024, excludes natural gas liquids, biofuel and refinery gains

** Angola was part of Opec in 2023, not in 2024.

1P Proved oil reserves (as of 1.1. 2024), conservative estimate in existing fields

2P Proved+Probable oil reserves, most likely estimate in existing fields

2PC Proved+Probable oil reserves plus mean contingent recoverable oil resources in yet undecided projects/discoveries, including noncommercial volumes

2PCX Most likely estimate for existing fields, plus contingent resources in discoveries, plus risked prospective resources in yet undiscovered fields

The above classification scheme is aligned with the PRMS standard from the Society of Petroleum Engineers.

"Oil" is crude oil + lease condensate.

Rystad July 2024 | [The world's remaining oil reserves are insufficient to support oil demand if there is no transition to electric vehicles.](#)

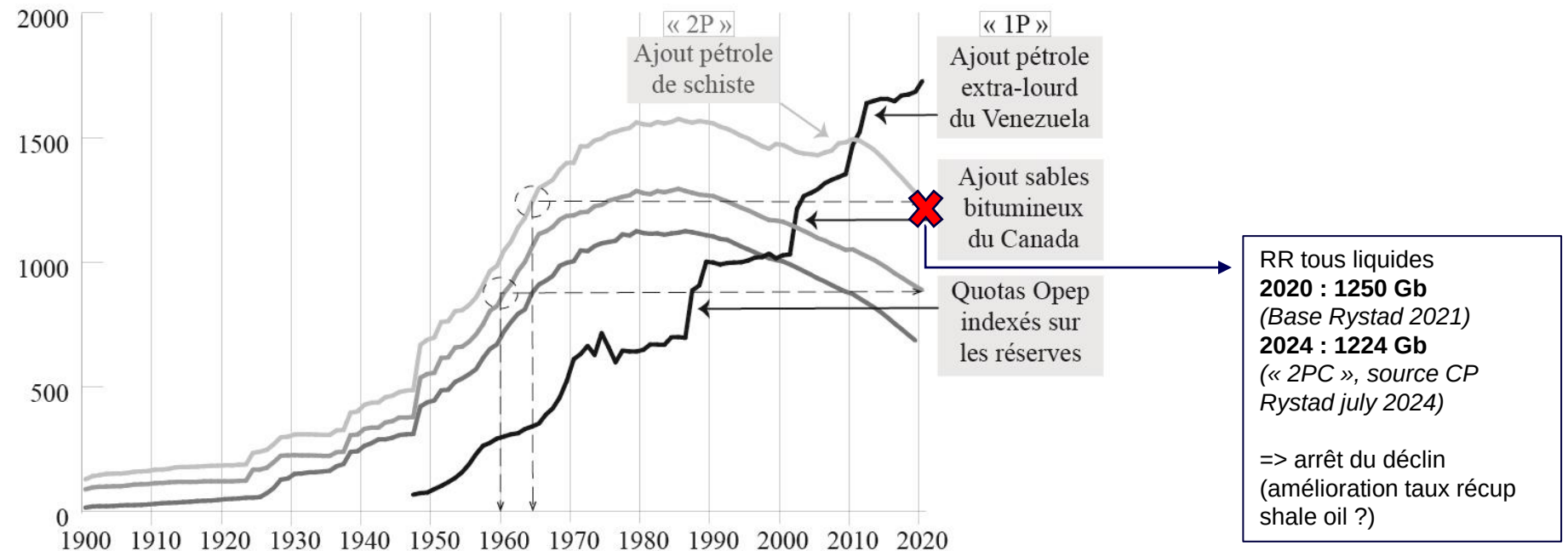
(...) This total recoverable oil resource of 1,500 billion barrels gives an upper limit of how much oil can be produced over the next 100 years or more. Of course, this upper limit is only realistic and economical if oil demand is not impacted by the energy transition, meaning oil prices would rise far above \$100 per barrel.

In this theoretical "high case," total oil production would peak around 2035 at 120 million barrels per day (bpd), then decline steeply to 85 million bpd in 2050.



Réserves : les données officielles augmentent, les données techniques déclinent

Réserves mondiales restantes de pétrole, 1900 - 2020 (Milliards de barils)



Réserves restantes déclaratives « 1P » « prouvées »

— Pétroles conventionnel et non conventionnels. Source : EIA/Oil & Gas Journal

Réserves restantes techniques « 2P » « prouvées et probables »

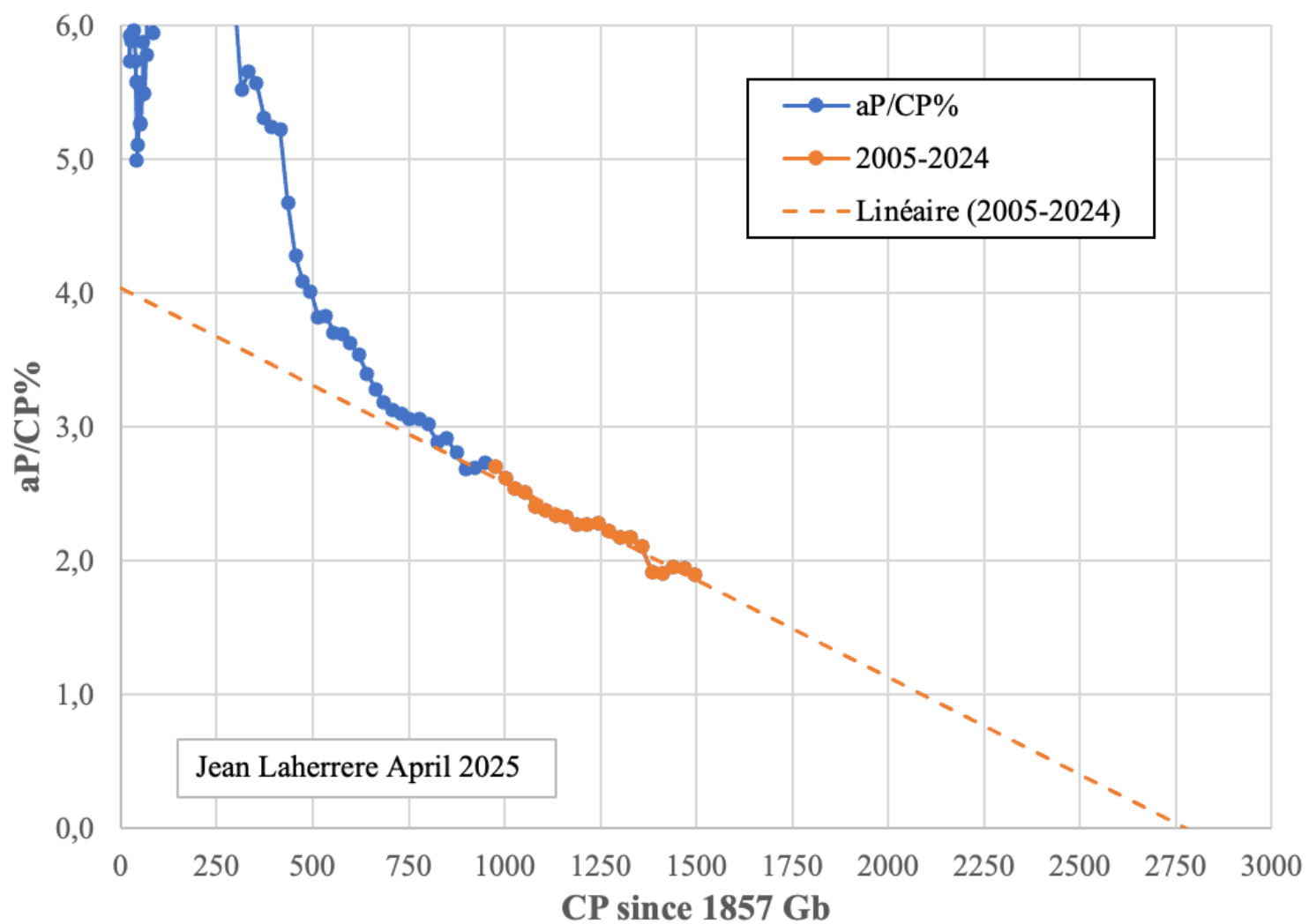
— Pétroles conventionnel et non conventionnels. Source : Rystad Energy, 2020

— Pétrole conventionnel. Source : Rystad Energy, 2020

— Pétrole conventionnel. Source : Jean Laherrère 2020 (Petroconsultants, IHS, USDOE, CAPP, API)

NB : Ces trois séries sont « backdatées », c'est-à-dire que le volume total des découvertes passées a été réévalué et réajusté au fil du temps.

HL of world crude less extra-heavy production 1900-2024



Conclusion en forme de question :

- **Puisque le pétrole conventionnel a franchi son pic en 2008** (modulo prod conventionnelle réelle + spare capacities « réelles », voir questions plus bas),
- **si le shale oil américain a atteint ou est proche d'un maximum**
- **et si aucune nouvelle source significative n'est développée** (potentiel maximum Guyana, Chine ; booms shale oil Vaca Muerta, et potentiel Chine, Golfe Persique, Bajenov ; NGL gaz Afrique, notamment de l'Ouest, *etc.* ?)

alors certains membres de l'ASPO France sont-ils prêts
à mettre leur expertise à la disposition de la République ?

Clarifier la situation :

1- poser un diagnostic clair et à jour sur le conventionnel

Parmi les questions à poser

- Clarifier incertitude réserves (ploter le 2PX dans les communiqués Rystad
- Désambiguïsation sur les spare capacities (réduction quotas 2019 post peak nov 2018), versus déclin des producteurs conventionnels matures (voir SLB pour la Russie)
- peak exports
- NGL

2- Perspectives non-conventionnels

3- Risques d'appro pour l'Europe et la France