

# HVolution

The role of biofuels in decarbonization pathway and future perspectives of Eni biofuels

October 2023

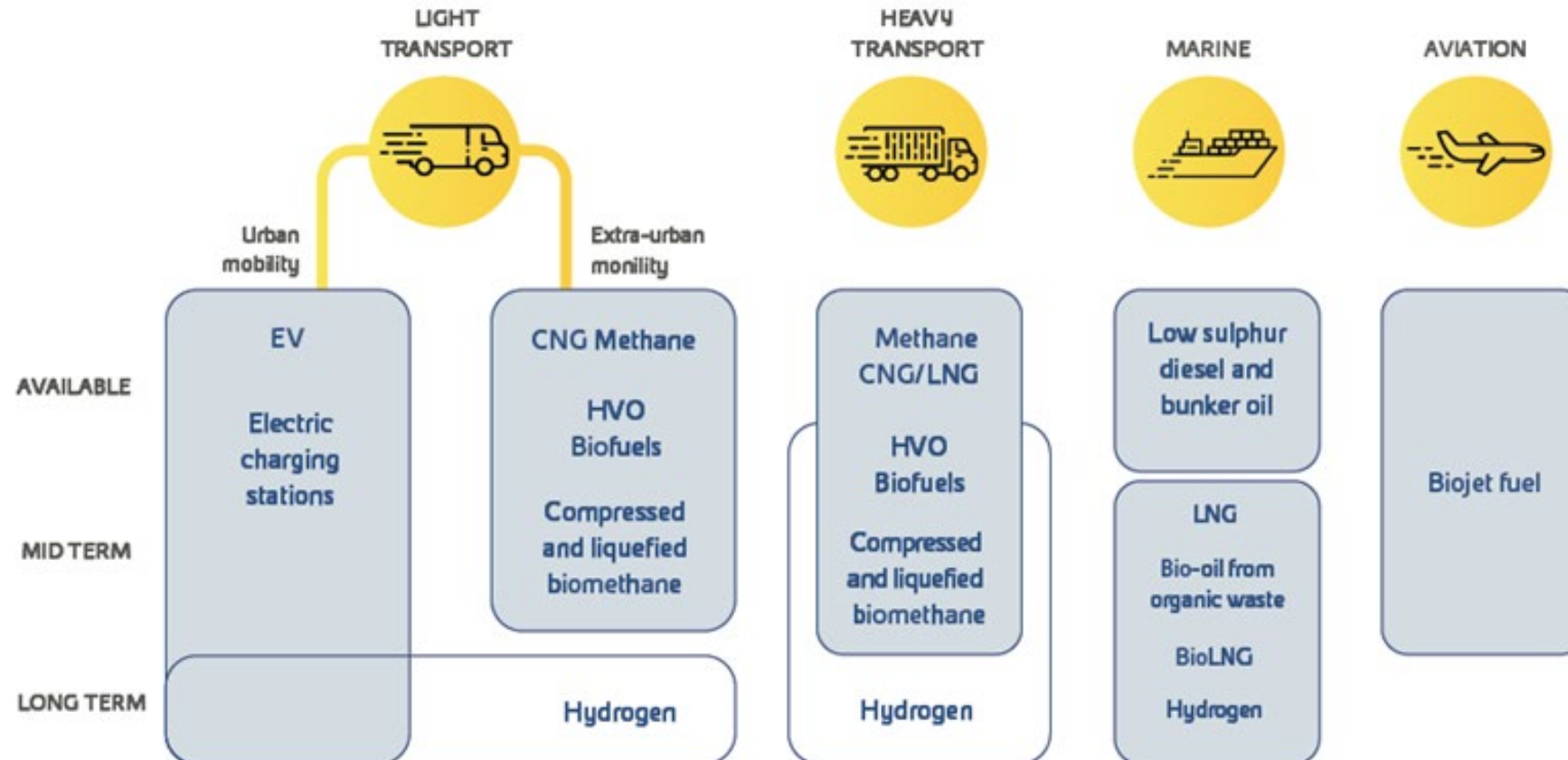


# Eni vision towards a sustainable mobility

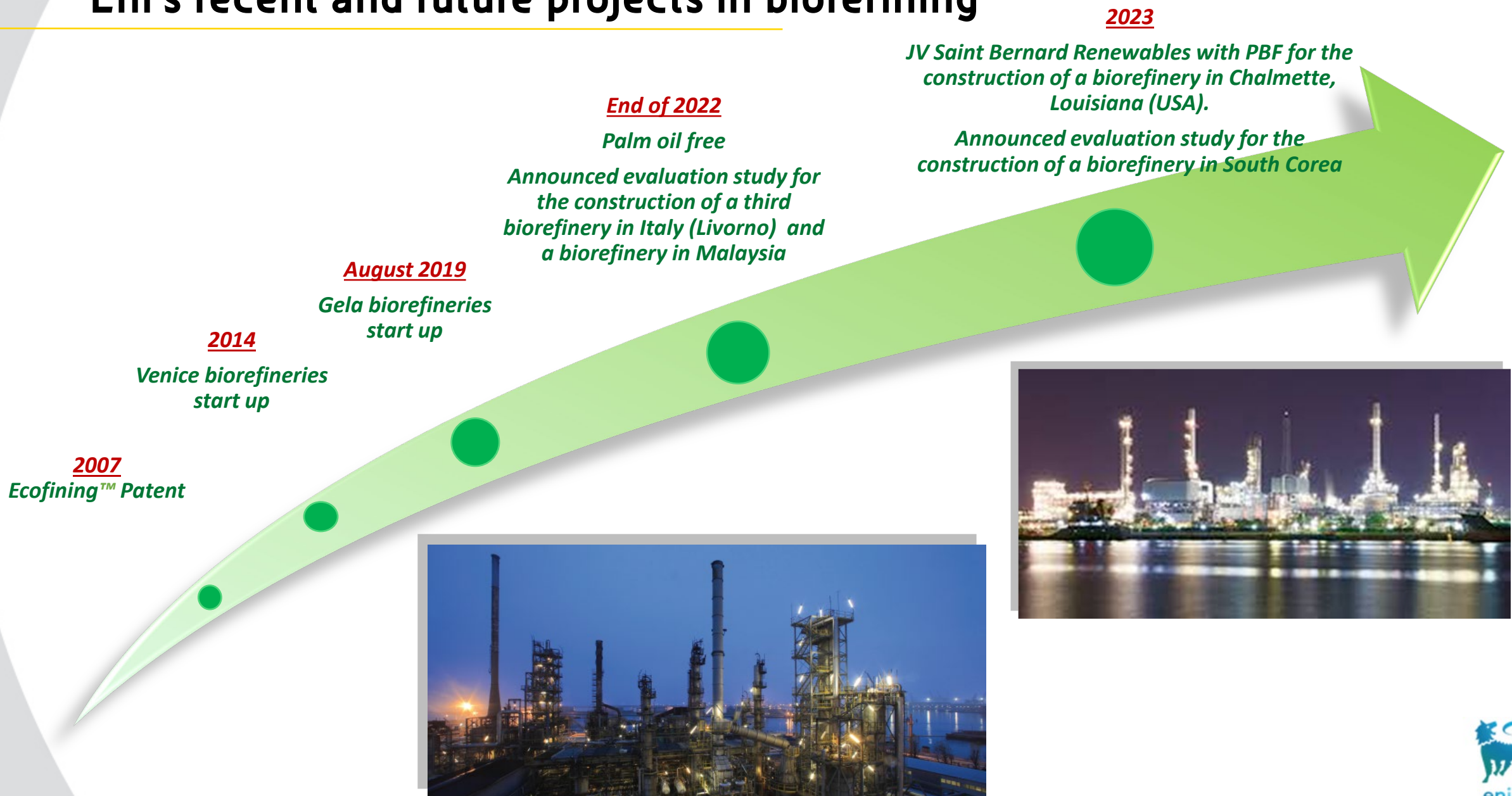
Eni has planned a **decarbonization pathway** that will reduce emissions generated throughout the life cycle of energy products achieving **carbon neutrality by 2050**.

➤ We have a pledge in the strategic sector of transport, aiming to achieve carbon neutrality through **a global approach** and all our projects converge into the increasingly integrated offer of a **mix of solutions** including new energy carriers (e.g. biofuels, biomethane, hydrogen and electric).

➤ **Biorefineries and biofuels** are a key component to reduce greenhouse gas emissions in the transport sector



# Eni's recent and future projects in biorefining



# Processing capacity

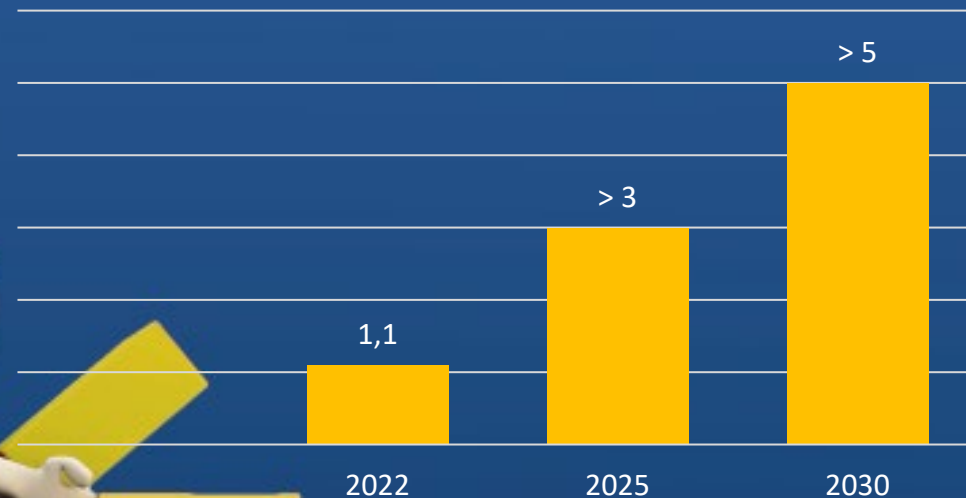
## CURRENT

total processing capacity of 1.6 million tons/year of renewable raw materials.

## TARGET

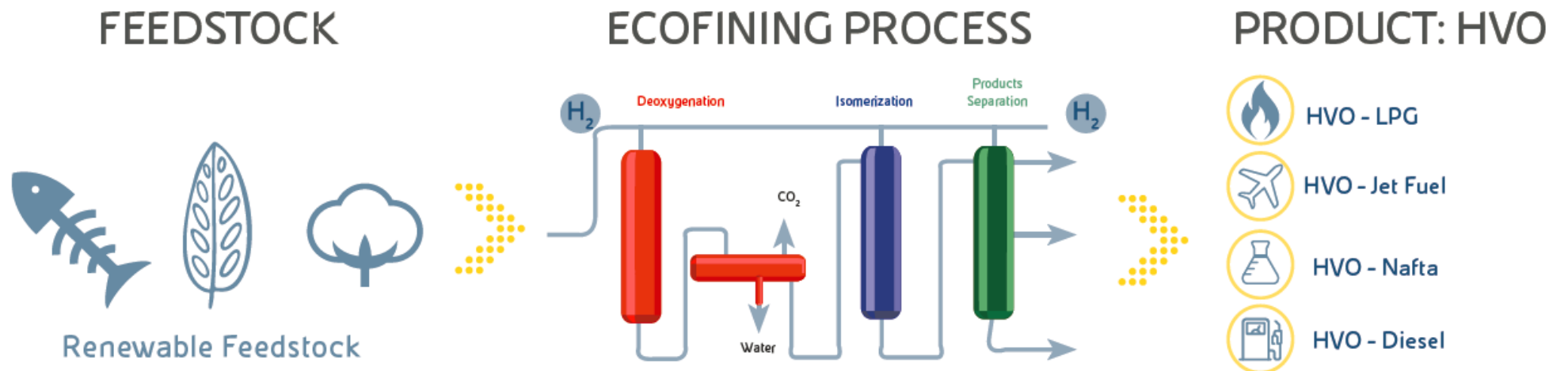
over 3 million tons/year of total processing capacity by 2025 and over 5 million tons/year by 2030.

Processing capacity  
Mton/year



# Ecofining™: the technological heart of biorefineries

- Ecofining™ technology is able to process different renewable feedstocks, guaranteeing the removal of oxygenated components through hydrogenation
- The outputs of the process have an entirely hydrocarbon molecular structure



Jointly Developed



Honeywell  
UOP





# Biofuels to decarbonize transports

Cooking oils, tallow, animal fats, vegetable oils and their processing wastes are used as feedstocks in Eni biorefineries

Since the end of 2022, Eni biorefineries are no longer using palm oil, and are increasing “advanced raw material” (biomass not competing with conventional food and feed production)

Eni is developing agri-feedstocks (mainly in Africa) from which it is possible to extract vegetable oils that can be used to supply biorefineries. These plants can grow in degraded, abandoned or marginal areas. Oils can also be obtained from waste and residues produced by the textile industry, in particular from cotton.

# HVOlution: performance

## WHAT IS HVOlution?

It is a non-hygroscopic mixture of stable paraffins that is therefore not affected by bacterial contamination.

It contains no monoaromatics and polyaromatics, compounds that have an environmental impact.

Thanks to its high cetane number, it guarantees a better combustion, especially in cold starting, and reduces noise.

It complies with European standard EN 15940 defining the specifications for paraffinic diesel fuel from synthesis or hydrotreatment (XTL).





# HVolution: main characteristics

## ADVANTAGES

It is a 'drop in' fuel: it does not require modifications in the supply chain and can be used pure in engines validated for its use.

Can be mixed with fossil fuel in high percentages, much higher than the 7% permitted for FAME.

Compared to fossil diesel, it allows a CO<sub>2eq</sub> emission reduction over the entire value chain.

It is immediately available in more than 600 Eni Service Station





# Commercial Diesel and HVOlution in comparison

	Commercial diesel fuel	HVOlution
Biocomponent (%v/v)	Max 7% (FAME)	100%
Typical cetane number	51 - 55	75-90
Density at 15°C (kg/m <sup>3</sup> )	820-845	770-790
Sulphur (mg/kg)	Max 10	Max 5
Typical heating value (MJ/kg)	43	44
Polyaromatics (% m/m)	Max 8	None
Typical total aromatics (% m/m)	15-30%	None

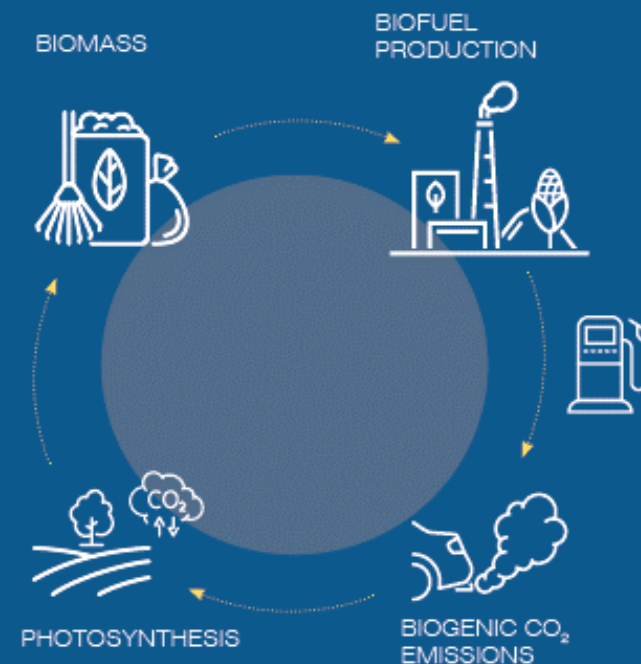
# HVolution : GHG saving

Due to the global effect on planet warming, CO<sub>2</sub>eq emissions are calculated using a Well-to-Whell approach, regardless the location of the emission source.

Following the RED II Directive approach, CO<sub>2</sub> produced during the combustion phase of a biofuel is conventionally posed as zero. This is a clear application of a circular economy concept: it is assumed that the CO<sub>2</sub> captured during the growth of the bio-feedstock offsets the biogenic CO<sub>2</sub> emitted during biofuel combustion

According to the conventional principle of Directive (EU) 2018/2001 “REDII”, GHG emissions reduction of ENI HVolution along the logistics and production chain in 2022 was between 60% and 90%, compared to the fossil fuel comparator (i.e. 94 gCO<sub>2</sub>eq/MJ), depending on the feedstocks used for its production\*.

REDUCTION OF CO<sub>2</sub>eq EMISSIONS AND CIRCULAR ECONOMY



\*The calculation methods and the data obtained are certified by RINA according to the rules of the EU voluntary schemes (2BSvs and ISCC for Eni).



# Conclusions



- ✓ It's produced 100% from **renewable feedstocks** (pursuant to Directive (EU) 2018/2001 "REDII") and has a totally hydrocarbon nature
- ✓ Can be **used 100% pure** in validated engines
- ✓ It has an **excellent combustion thermodynamic efficiency**, thanks to its paraffinic nature
- ✓ According to the conventional principle of Directive (EU) 2018/2001 "REDII", **GHG emissions reduction** of ENI HVOlution across the entire value chain in 2022 ranged **between 60% and 90%**, compared to the fossil fuel comparator (i.e. 94 gCO<sub>2</sub>eq/MJ), depending on the feedstocks used for its production.
- ✓ **HVOlution is already available** and can immediately contribute to the decarbonization of transports, above all heavy transport, because it can already be used today in all engines validated for the use of EN 15940 (XTL)
- ✓ Biofuels should be considered a **complementary tool** to support the decarbonization of transports, together with electricity, hydrogen and other available technologies





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Thank you for your attention