



Training event “Climate change and air quality: challenges and objectives for the atmospheric research.”

Air quality policies

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IR0000032 – ITINERIS, Italian Integrated Environmental Research Infrastructures System
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Mission 4 “Education and Research” - Component 2: “From research to business” - Investment
3.1: “Fund for the realisation of an integrated system of research and innovation infrastructures”





Take a breath!

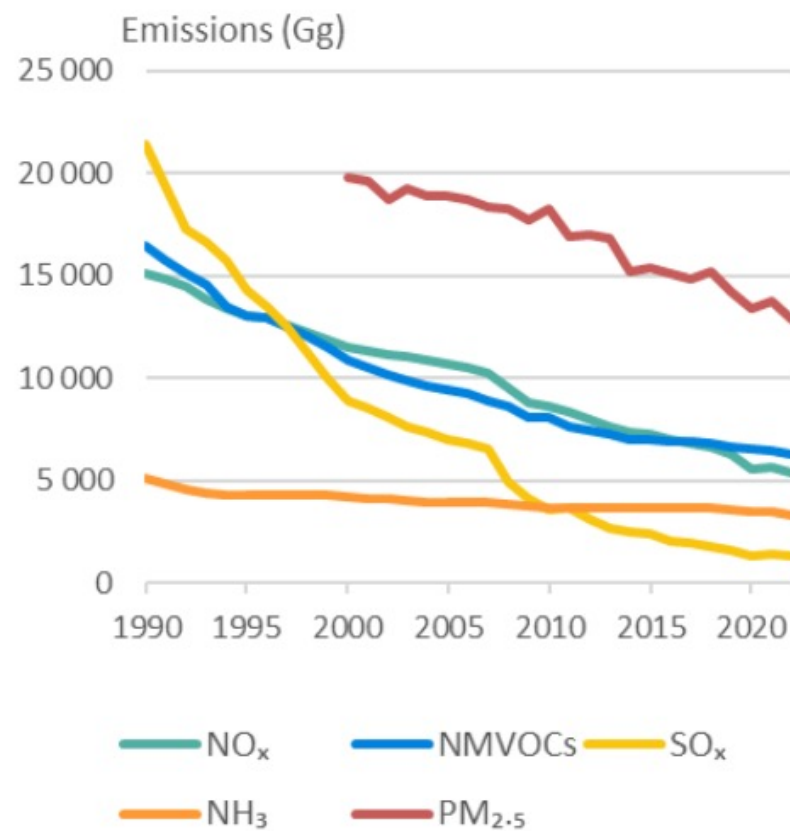
Air quality status in Europe

EU27 air emissions trend in the last 30 years

Is air quality improving?



EU AQ Index



EEA – EU27 emission trend 1990-2022

Success stories

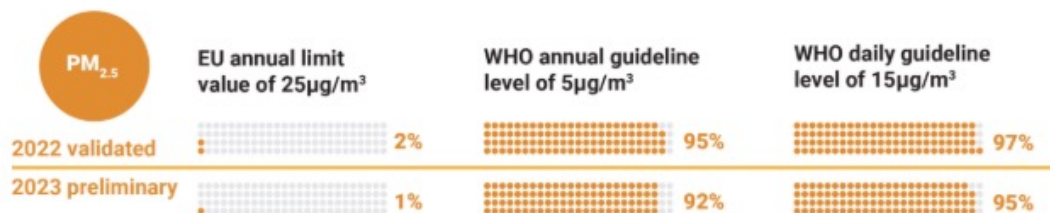
Pb - The introduction of mandatory production of vehicles fueled by **unleaded gasoline** in the mid-1990s led to a gradual decline of conventional gasoline, which was no longer sold in Europe as of early 2002. In parallel with the spread of "green gasoline" (unleaded gasoline), there has been a significant reduction in lead levels in the air. In Europe, decreases in lead emissions of 96% were recorded between 1990 and 2020 (EEA, 2022).

SO_x - Also since the 1990s, levels of sulfur oxides have decreased due to the installation of gas **desulfurization technologies** in industrial plants and the introduction of a maximum percentage of **sulfur content in fuels**. In Europe, there have been decreases in sulfur oxide emissions of 93% between 1990 and 2020 (EEA, 2022). Since the 2000s, a 79% reduction in sulfur oxide emissions (EU28, 2000-2018) has been accompanied by a 70% decrease in SO₂ concentrations (EU28, 2000-2017).

→ The decrease in S emissions has led to healthier forests and soils; the drop in emissions has reduced the deposition of acidifying compounds to levels below critical loads of acidity in large parts of Europe; N emissions have also been reduced, although to a lesser extent. Hence, in areas in Europe where acidification of forest soils is still a problem, these exceedances are mainly due to deposition of nitrogen compounds.

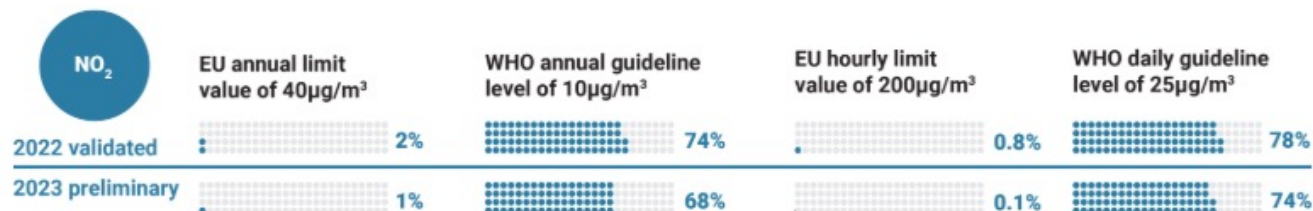
Air quality in Europe and WHO

Figure 4. Percentage of reporting monitoring stations registering PM_{2.5} concentrations above the EU annual limit value and the WHO guideline levels in 2022 and 2023



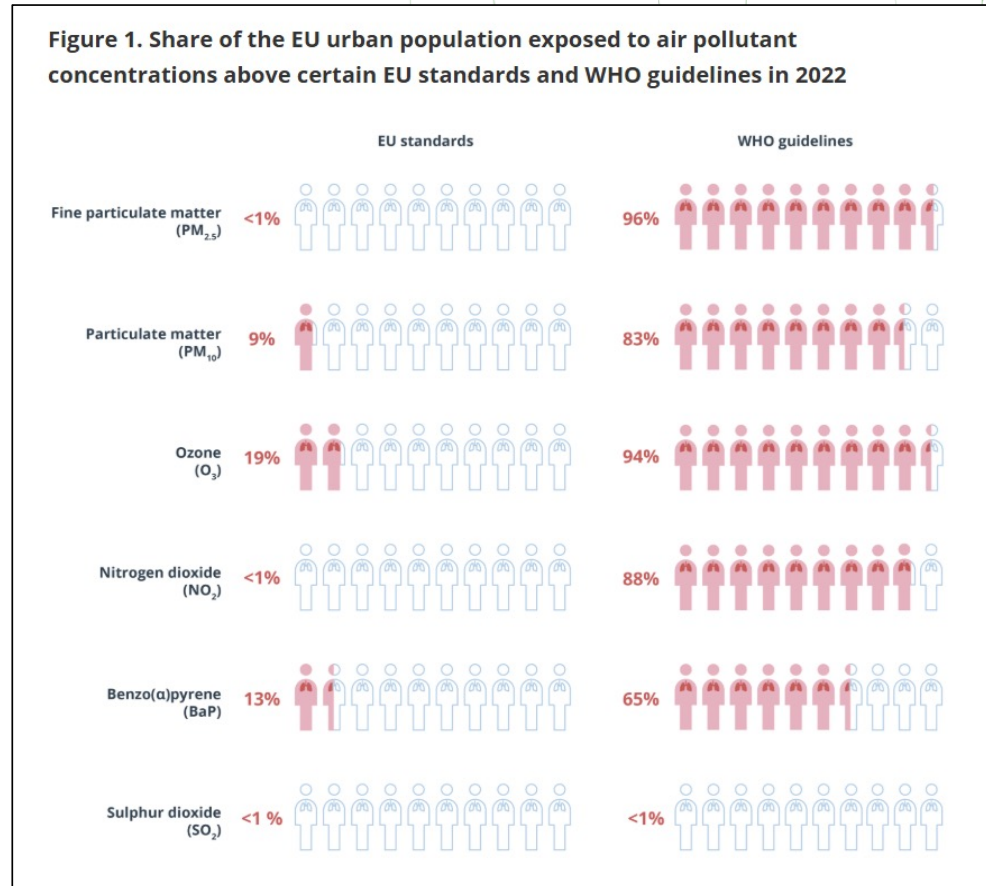
EEA Air Quality Status 2024

Figure 8. Percentage of reporting monitoring stations registering NO₂ concentrations above the EU limit values and the WHO guideline levels in 2022 and 2023



Air quality in Europe and WHO

**Air quality is improving!
but it is still not enough**



EEA – Ar Quality status 2024

Air quality policy

The core is: taking action!

The objectives are:

- ✓ Protecting human health according to WHO recommendations
- ✓ Protecting the ecosystems and biodiversity

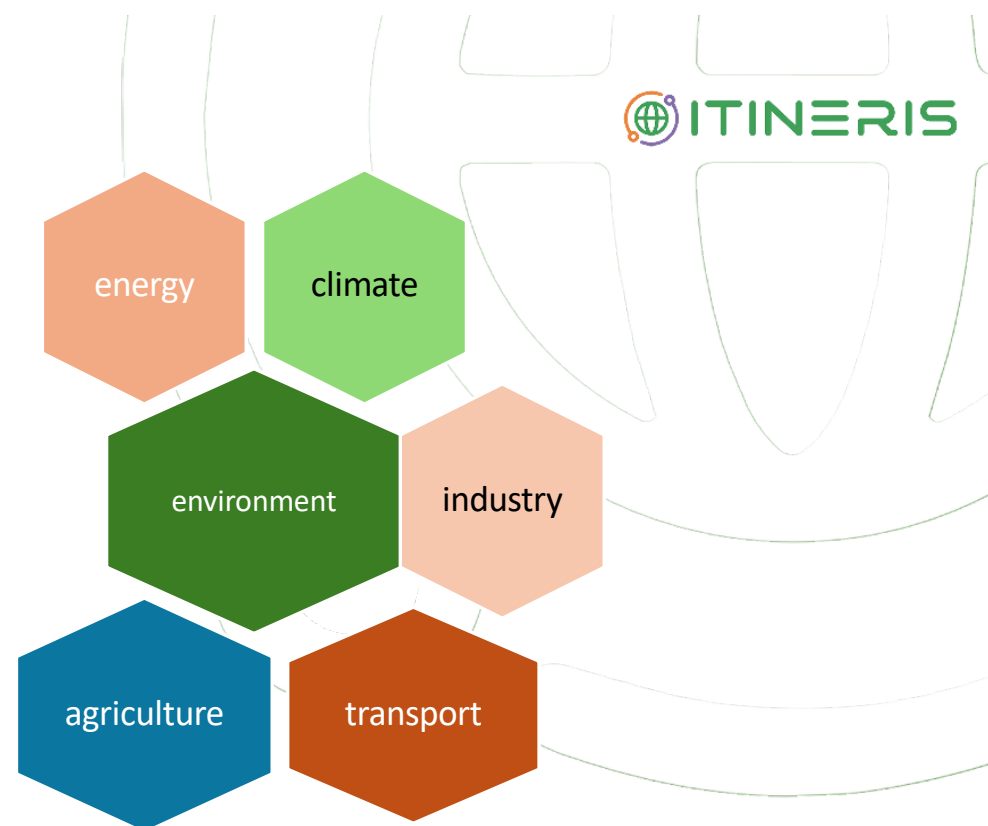
Through administrative choices and behavioural changes



European Green Deal

A package of policy initiatives to carry out a green transition, with the ultimate goal of achieving **climate neutrality by 2050**, launched by the Commission in **December 2019** (*A Clean Planet for all - A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy*)

The package includes initiatives covering different issues, strongly interconnected



Climate neutrality means net zero GHG emissions by balancing them so they are equal (or less than) the emissions that get removed through the planet's natural absorption

Zero pollution

Pollution has negative impacts on human health and the environment

It is the largest environmental cause of multiple mental and physical diseases and of premature deaths, especially among children, people with certain medical conditions and the elderly; and is one of the main reasons for the loss of biodiversity

On 12 May 2021, the European Commission adopted the EU **Action Plan: "Towards a Zero Pollution for Air, Water and Soil"** - a key deliverable of the European Green Deal

The zero pollution vision for **2050** is for **air, water and soil pollution** to be reduced to levels no longer considered harmful to health and natural ecosystems, that respect the boundaries with which our planet can cope, thereby creating a toxic-free environment

Platform

Progress of announced **actions** can be monitored on the **Zero Pollution Stakeholder Platform**:

https://environment.ec.europa.eu/zero-pollution-stakeholder-platform/actions_en



Zero pollution - Air

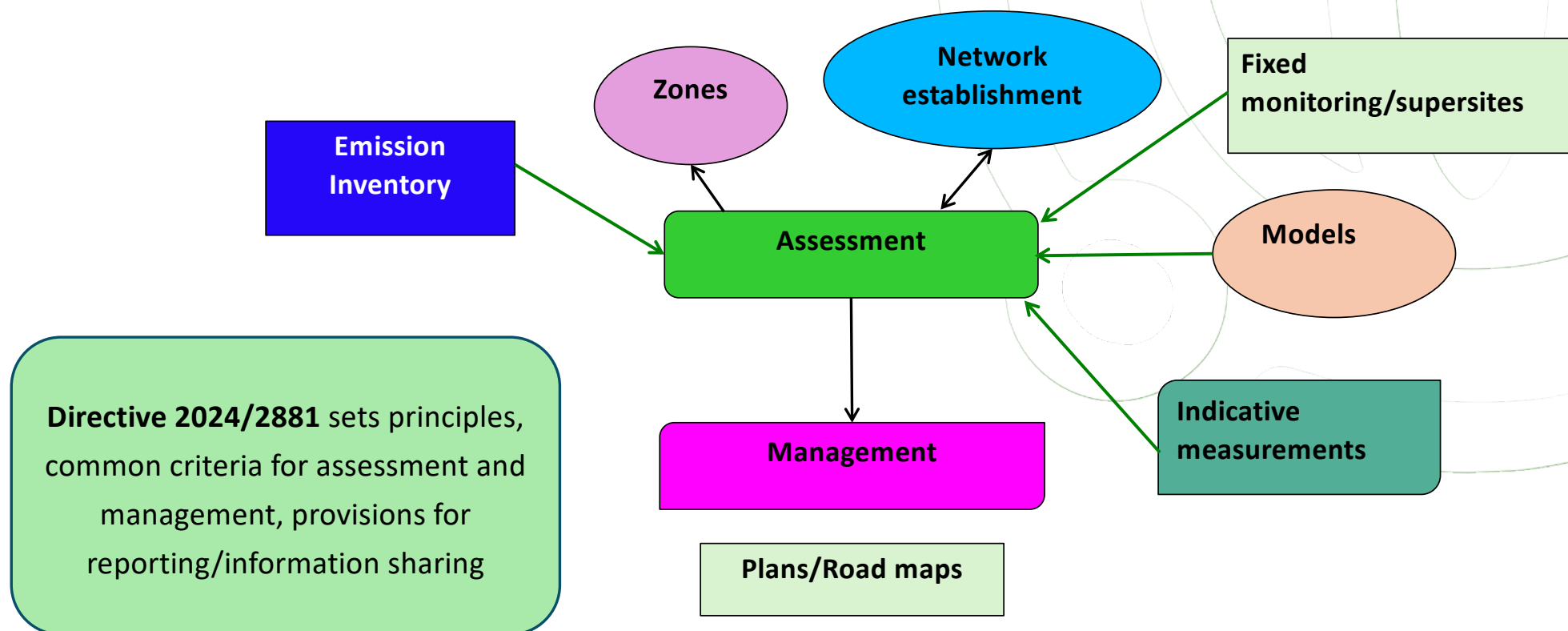
The plan foresees reviews of relevant EU legislation, among which aligning EU's air quality standards more closely with the recommendations of the WHO (updated in September 2021), through a revision of the **Ambient Air Quality Directives**

Plus revision of sectoral legislation:

- 🌐 introducing more stringent emission limits for motor **vehicles**
- 🌐 revision of **Industrial** Emissions Directive (IED)

Main objectives are improving air quality to **reduce the number of premature deaths caused by air pollution by 55%** and harmonizing activities on assessment and management of air pollution in EU

Air quality activities



New air quality directive

What has been improved:

- Technical provisions on AQ monitoring better defined (siting of stations, hotspots, procedures for assessment)
- Use of modelling for AQ assessment and spatial representativeness of monitoring stations
- Information gathering on additional pollutants (“special” cases and supersites)
- Road maps

Dealing with air pollution

- ❑ **Sectoral legislation** with provisions for reducing air emissions from energy and industrial activities, transport, residential heating, agriculture
- ❑ Energy strategy (Climate and Energy plan)
- ❑ **NEC directive (2016/2284)** and National Air Pollution Control Programmes
- ❑ Air Quality Plans
- ❑ Clean Air Dialogues, Taiex Instruments
- ❑ Agreements among different Institutions

NEC directive

Member States have to reach a **percentage reduction** of emissions (referred to the levels in 2005) by 2030

Pollutants: **SO₂, NO_x, NMVOC, NH₃, PM_{2.5}**

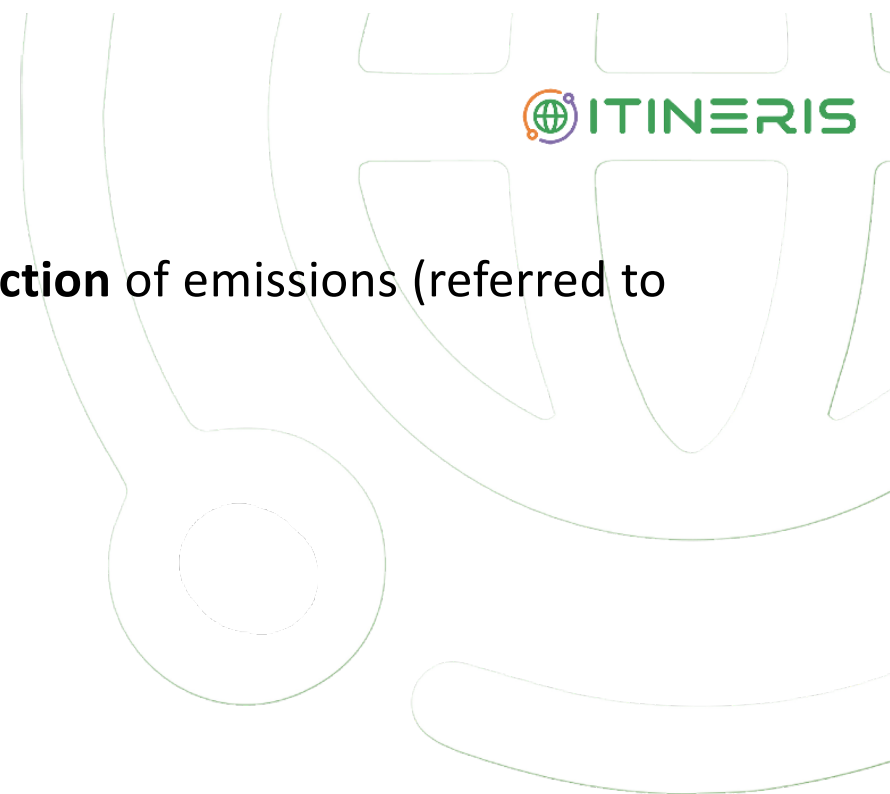
Emission inventory compilation

Emission projections

National Air Pollution Control Programmes

Reporting

Also impacts on ecosystems!



NEC directive

Baseline emissions scenario

Scenario analysis to assess the need of additional measures

Selection of possible reduction measures

Additional measures scenarios

Air quality modelling to assess the impact on concentrations

Air quality plans - Main sectors

NEC programmes for reducing national emissions while Air quality plans can be adopted also at local level to take care of local situations

- Permitting for industrial plants (implementation of BAT)
- Urban/Mobility planning for NO₂ reduction
- Domestic heating – Road transport – Agriculture for PM

→ in close cooperation with the relevant sectors/administrations

Synergies

Synergies are to be promoted through win-win policies among different:

- **SECTORS**, in the past there were some inconsistencies among policies
- **POLLUTANTS**, such as greenhouse gases and air pollutants
- **LEVELS**, International – Regional – National – Local

- CLIMATE/ENERGY and AIR POLLUTION (wood burning)
- AGRICULTURE and AIR POLLUTION (**methane as ozone precursor, ammonia contributing to secondary PM**)

Example on biomass

The diffusion of biomass in the past due to policies on climate mitigation, economic crisis and cultural disperception on the ecological nature of wood as a fuel, lead to an increase of **biomass** consumptions

→ increase of PM and PAH concentrations: quite high concentrations of benzo(a)pyrene are often observed during the cold season in areas where there is a significant use of wood as fuel for domestic heating

- Recently the strategies changed and more attention is paid to coherence between the two policies
- Win-win policies to reduce greenhouse gases and air pollutants are useful and more attention is paid also to some pollutants with double effect such as **black carbon**

Example - biomass

Italian Regulation on biomass burning plants (**decree DM n. 186, 7 November 2017**):

- procedures and requirements for environmental authorization system and certification of wood, charcoal and biomass fuel in domestic heating plants
- the reference emission levels for each different quality class of plant
- the trial run and tests to be performed to obtain certification
- rules for correct installation and management procedures for certified heating plants

A quality classification in a range between 1 and 5 stars is provided based on the plant emission values, for the concerned pollutants

→ **National level**: incentives only for plants with minimum 3 stars

→ **Local level**: some Regions banned the use of the most polluting plants with a gradual approach

Policy - Science

It is clear that **good quality data** are essential for taking good decisions (monitoring data, modelling applications, statistical data on activity indicators, emission inventories, scenarios) and also a **deep knowledge** of the atmospheric phenomenon, impacts of pollutants on human health and ecosystems

→ **Cooperation between Policy and Science is really relevant!**

Policy can give indications to new research lines and science can give advice on problems and possible solutions

Personal behaviours

Main sectors to be addressed at this point are:

- 🌐 Road transport
- 🌐 Domestic heating
- 🌐 Agriculture

Participation of citizens is an added value, especially when not popular policies are needed: active and shared mobility, avoiding wood burning, changing dietary habits

Conclusions

- 🌐 Synergies between climate change and air pollution policies are necessary
- 🌐 Synergies between different sectors must be promoted (environment, energy, transport, agriculture, production activities)
- 🌐 Good quality data are needed and cooperation between Science and Policy (deep knowledge of the issue to find good solutions to the problems)
- 🌐 Active involvement of citizens to implement effective measures
- 🌐 **Long term strategies and immediate action!**



THANKS!

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