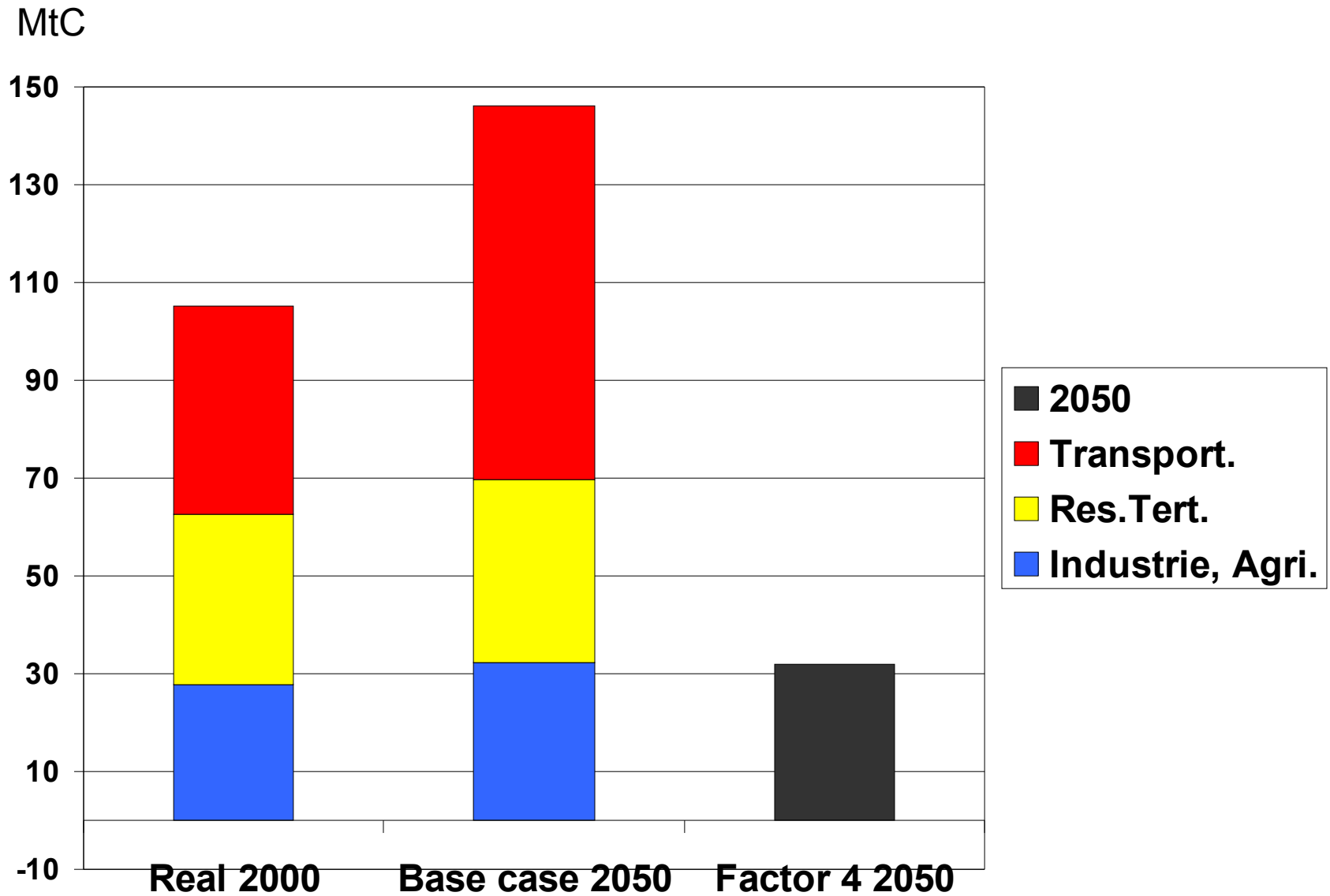


# *Typical European strategies to apply the Kyoto protocol*

- **The first step** (Italy, Belgium, Spain)
  - To shift from coal to gas (Electricity production, industry).
  - To use flexible mechanism.
- **A larger effort of energy efficiency** (UK, France, NL)
  - + Energy efficiency (heating, domestic appliances, small industry),
  - New building codes.
- **A deeper strategy** (Germany)
  - Renewables development,
  - Building Stock retrofitting.
- **An avoid effort** :
  - Energy efficiency in transportation,
  - Modal transfers.

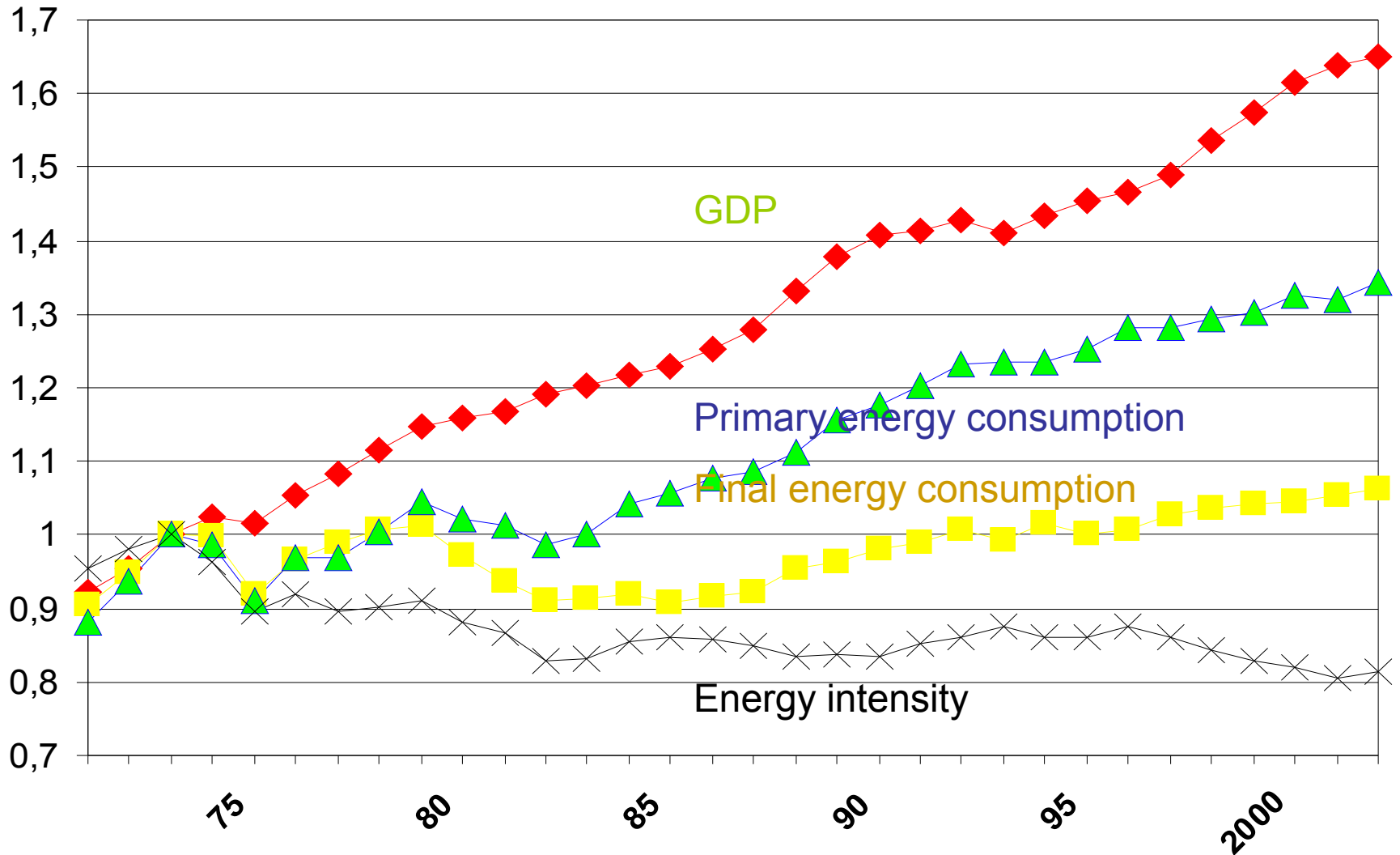
# *Sizing the problem*



## *Forbidden paths*

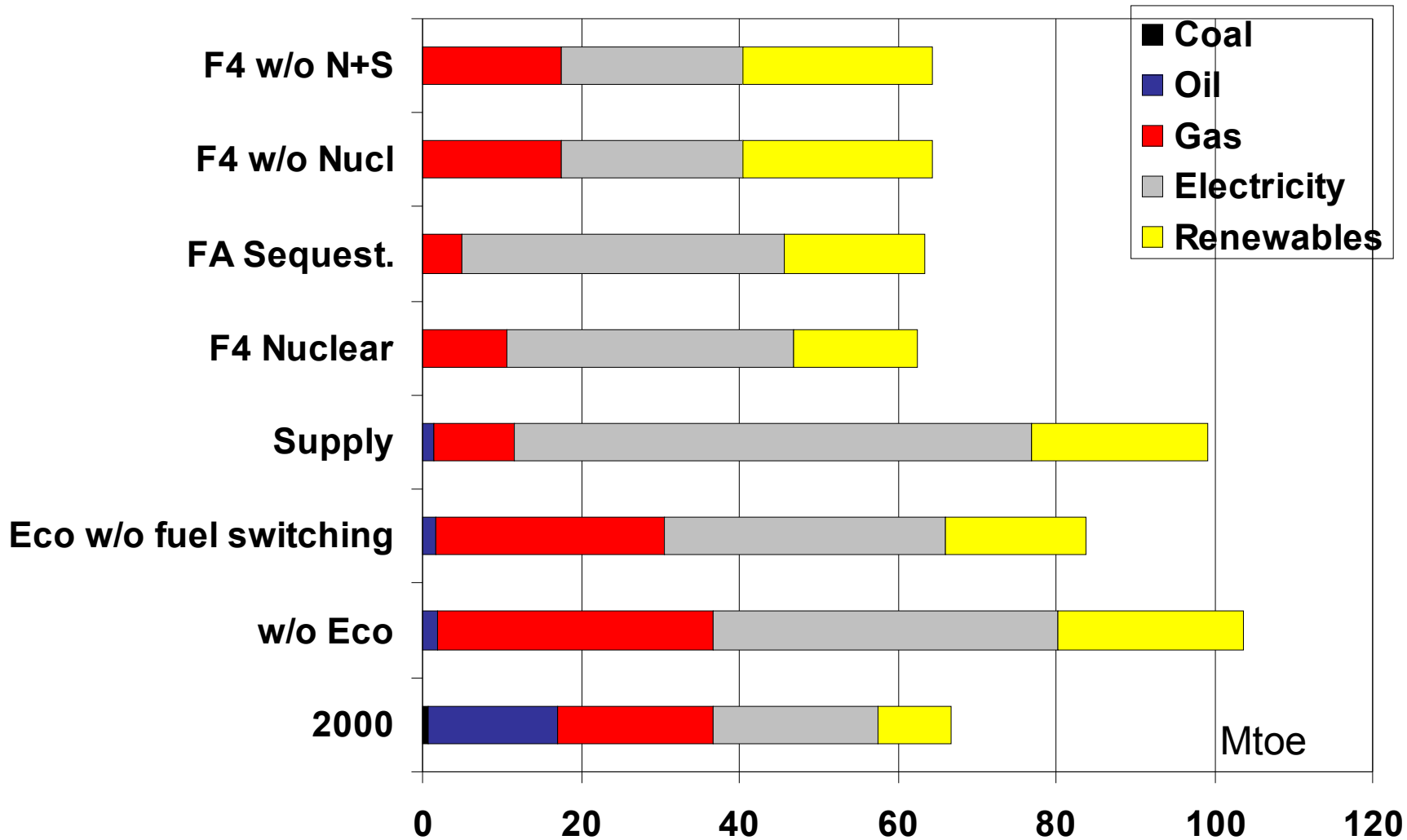
- An **electric generation** based on fossil fuels in plants without any valorization of heat in cogeneration.
- A **transportation** sector essentially based on oil.
- **Buildings heated** with fossil fuels at low efficiency.
- An **industrial production** with a massive use of fossil fuels (steam, furnaces...).
- **Waiting.**  
The crucial sectors in further evolutions are the building stock, transportation infrastructures, urban planning, jobs localization.

# ***Economic growth and energy consumption in France per inhabitant (1970 - 2003)***

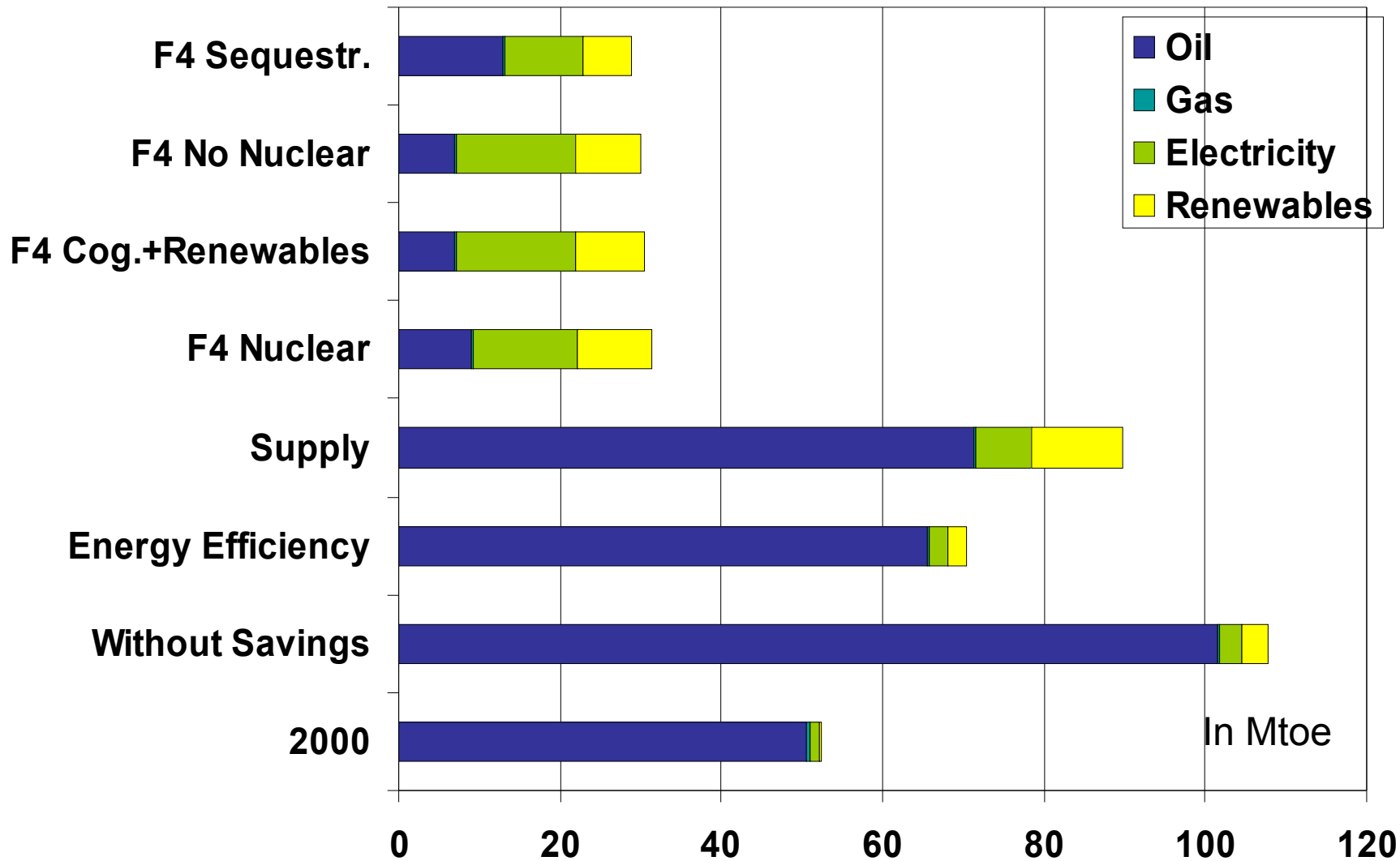


Source : Observatoire de l'Énergie

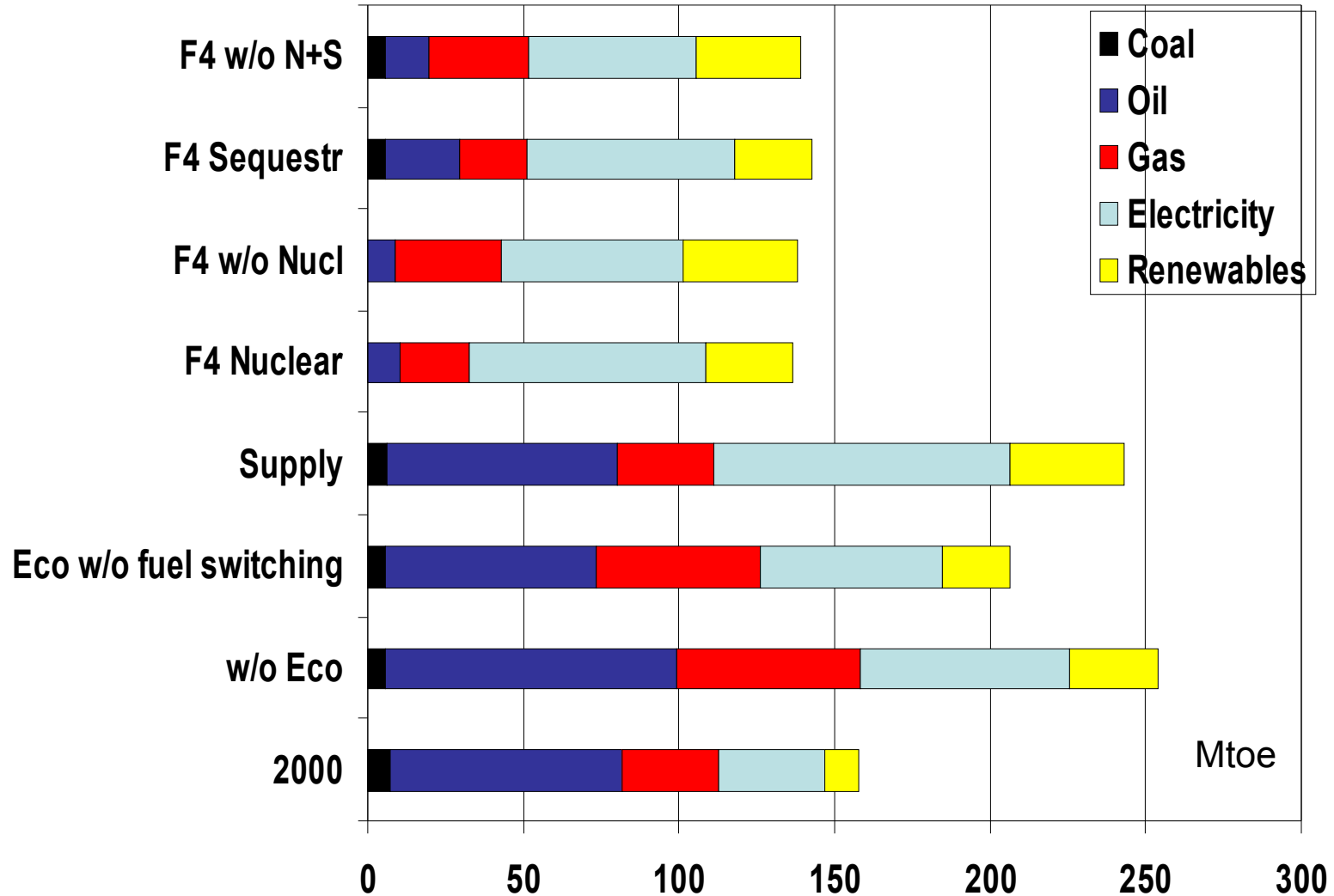
# *Final energy consumption in the residential-tertiary sector by energy type and by variant*



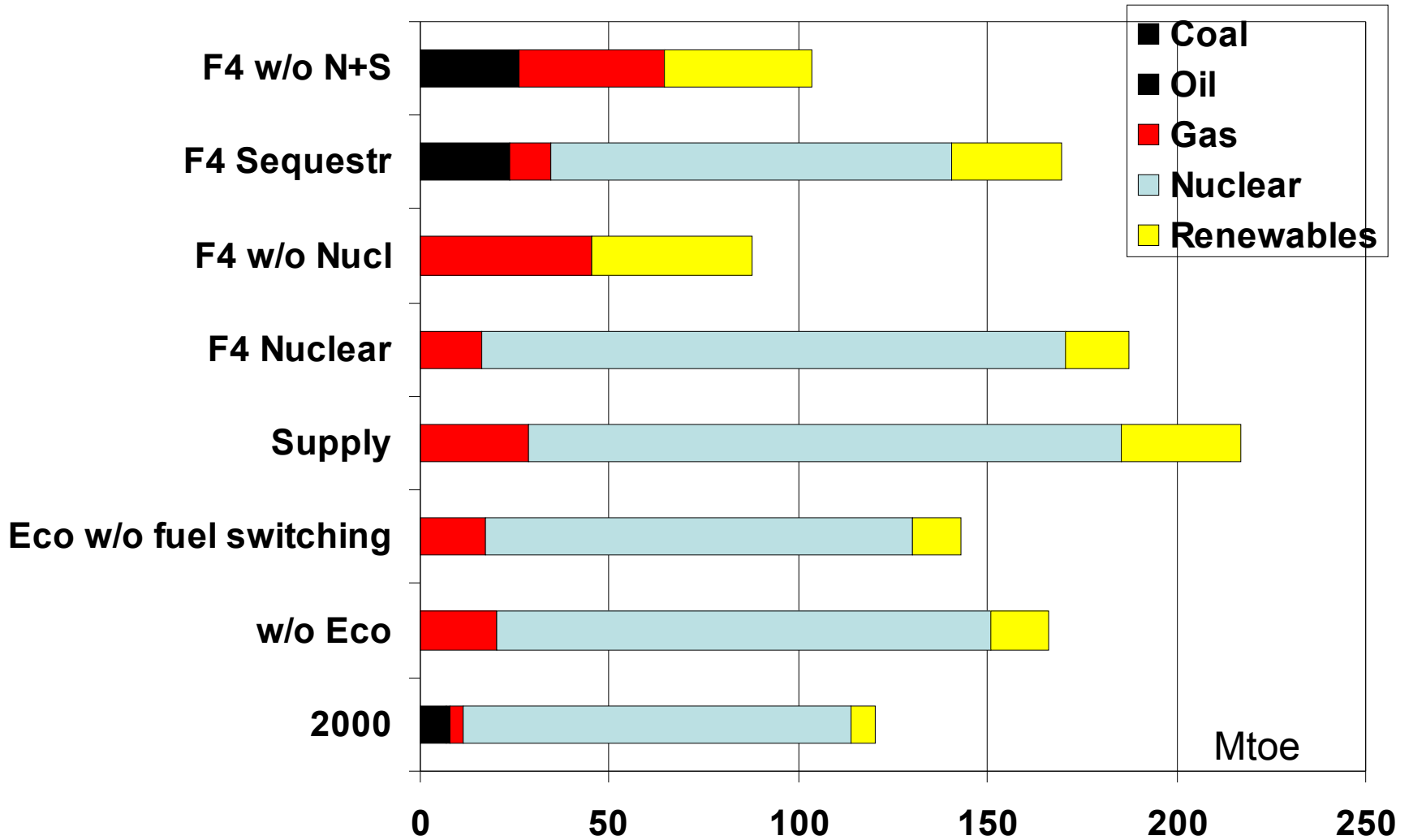
# *End-use energy consumption in agriculture and transportation*



# Total final energy consumption per energy type and per variant



# *Electricity production per energy type and per variant*



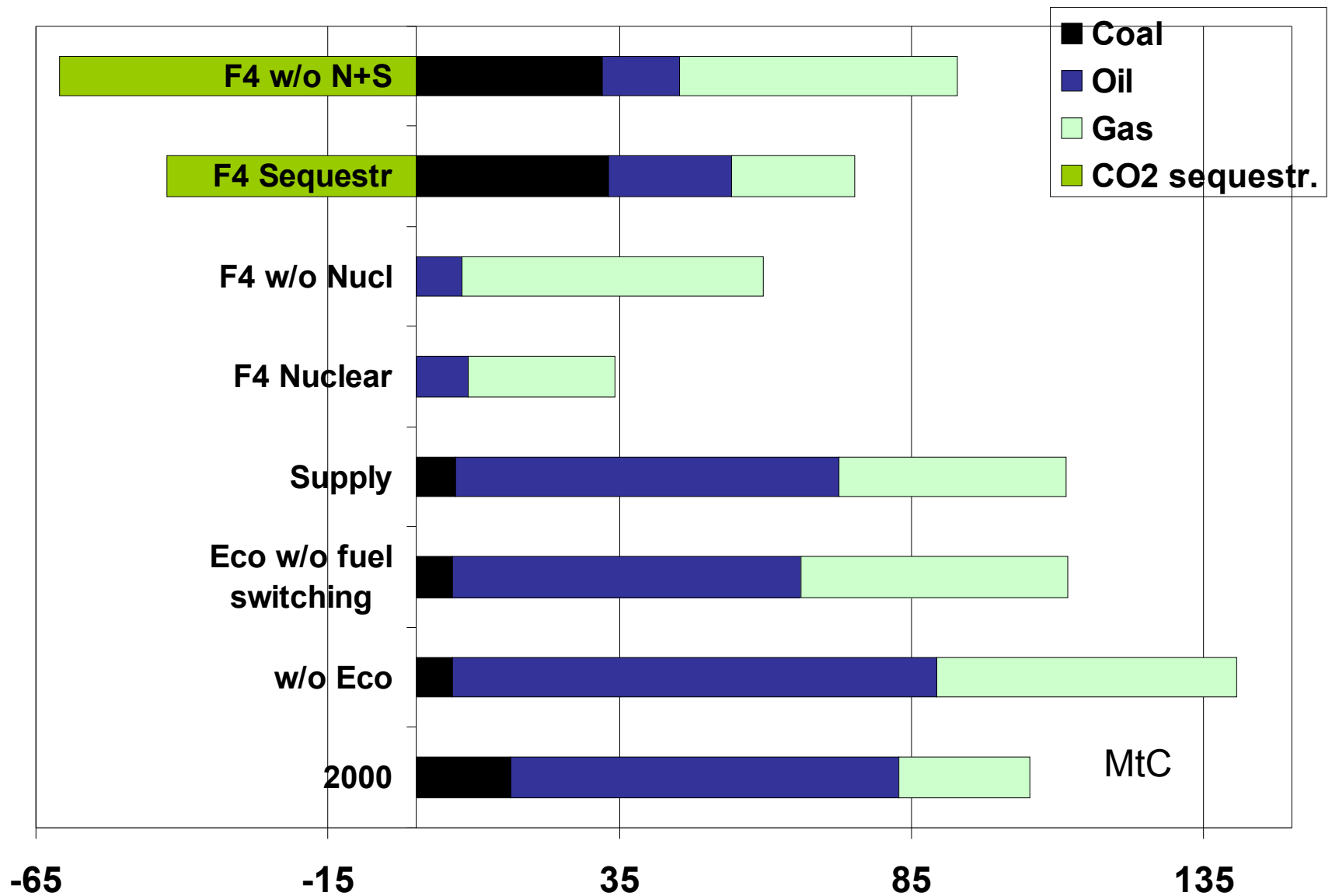
# *Waited good news*

- **The technology to help ethic**
  - Technical assistance for day life behaviors.
- **Electricity storage**
  - To permit a spreading of electrical vehicle including for long distance displacements.
  - To permit a better integration to the grid of renewables with intermittent production.
- **CO<sub>2</sub> sequestration**
  - To permit an important use of fossil fuels in great industrial units.
  - To permit an electric generation for base load and peak load production with coal.
- **An hydrogen network development**
  - Production of hydrogen by high temperature nuclear plants and renewables.
  - Impossibility of electric production with fossil fuels without massive CO<sub>2</sub> sequestration.
  - Impossibility of embarked reforming.

## *Finally, major choices in competition*

- **3 major options for technologies of vehicles**
  - **Electric vehicle** without a larger capability of electric storage,
  - **Hybrid Vehicles** using a high rate of biofuels,
  - **Hydrogen** powered cars.
- **Electric generation**
  - **Nuclear**. But a growing difficulty to produce peak load electricity in case of a massive proportion of electricity for thermal uses.
  - **Renewables**. But a difficulty to manage the electric system in case of a massive production from intermittent renewables (wind mills, solar cells).
  - And in all cases the need of a complement with fossil fuels in **cogeneration**.

# CO<sub>2</sub> emissions per energy



# *Politiques issues*

- At first, to help to largely take the measurements of the problems to launch the **public debate**.
- So, it is not a discussion for experts. What is at stake : a **deep mutation** of civilization.
- A fundamental political need to widely **open the choices**.
- To describe precisely **what is** obliged, **forbidden and open** with contrasted scenarios.
- **To structure imagination** of people to allow a real debate.
- To discuss **individual behaviors**.
- **I do if you are doing**.