



Towards a global life cycle assessment

PGC A: Sustainable Development

IGU
2006



Content



- **Project definition**
- **Natural gas life cycle**
- **Methodology**
- **Results**
- **Conclusions**



Project definition

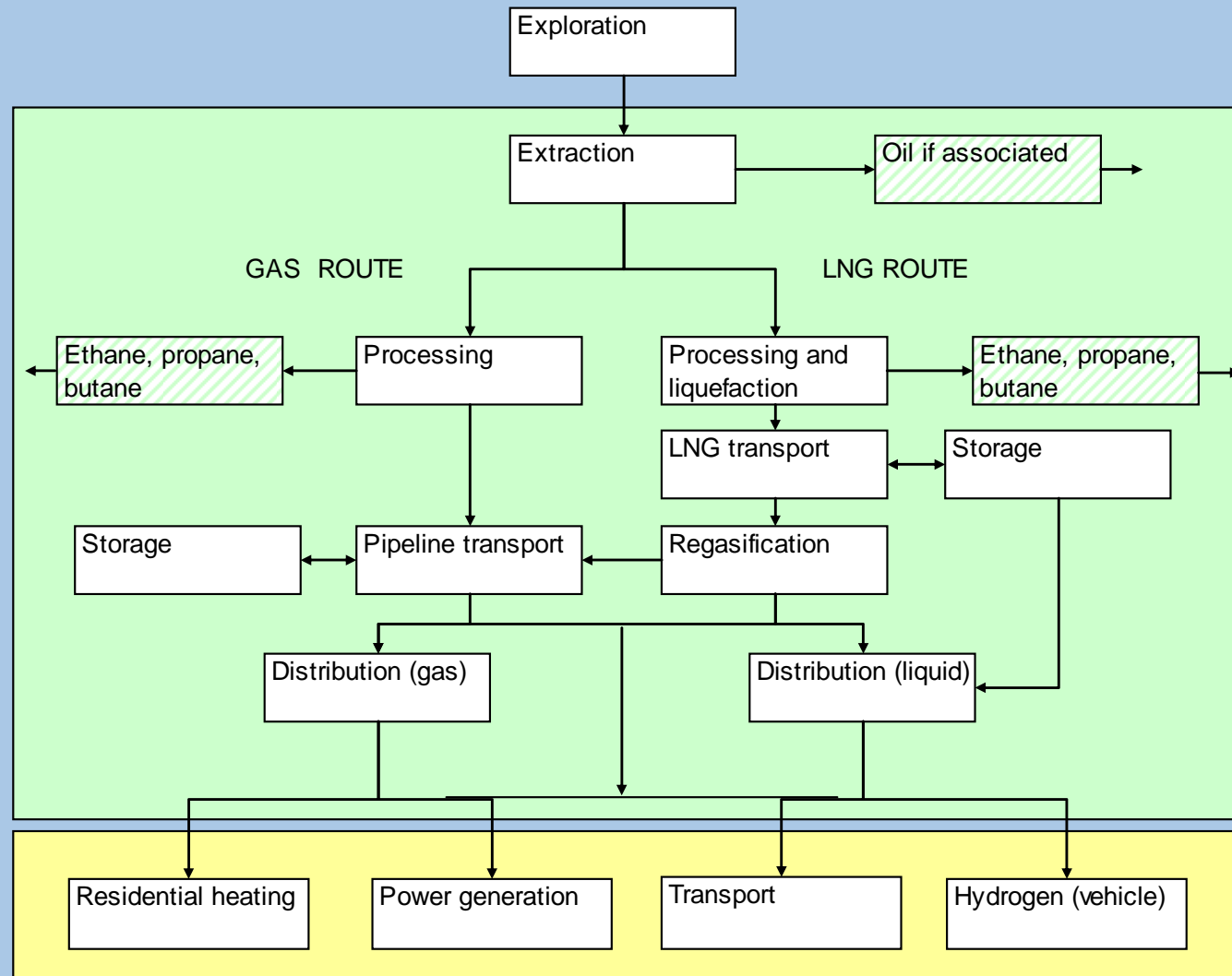


Goal of the study is the initiation of LCA by constructing a:

- **Framework to collect data of the gas industry itself**
- **Basis for more uniformity within the gas industry**
- **First overview of NG LCA per region**
- **Recommendations for way forward for IGU LCA project**

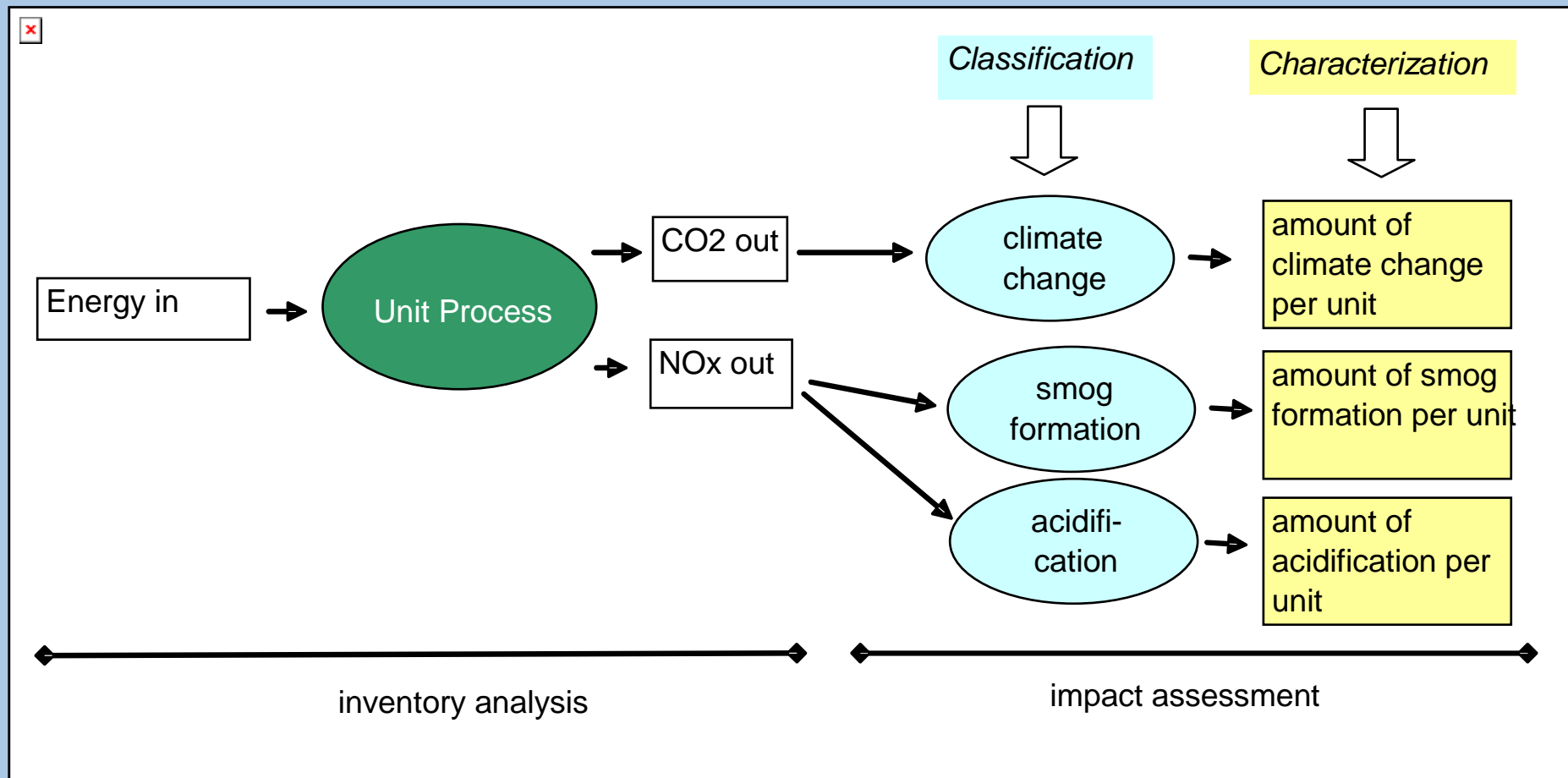


Life cycle of Natural Gas and Boundaries





Steps in a LCA





Methodology

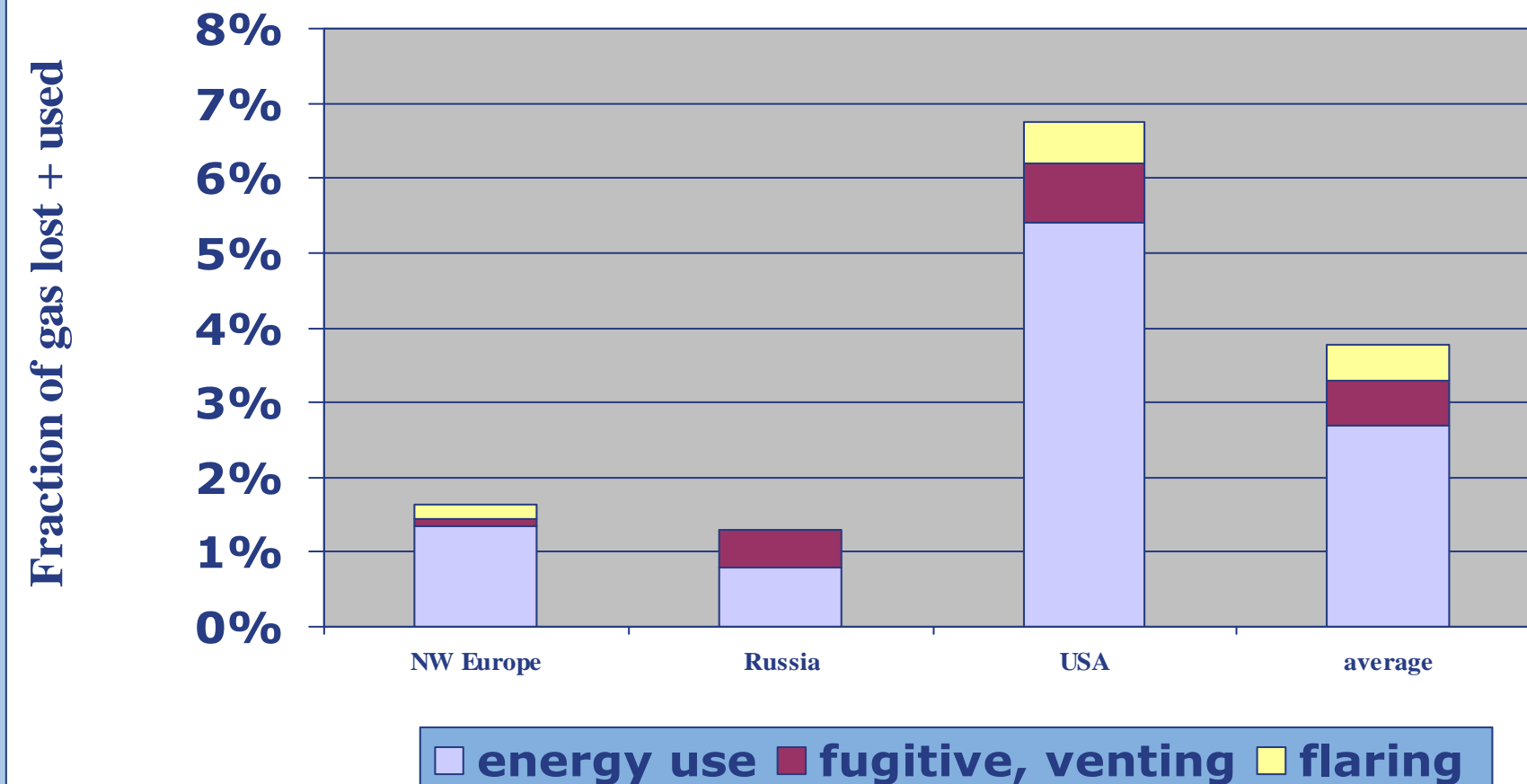


Focus on:

- **Energy use**
- **Atmospheric emissions:**
 - **Global Warming Potential: CO₂ and CH₄**
 - **Acidification: NO_x and SO₂**
- **Four types of end-users:**
 - **Heating**
 - **Electricity production**
 - **CNG vehicles**
 - **Hydrogen production (link to non fossil energy)**

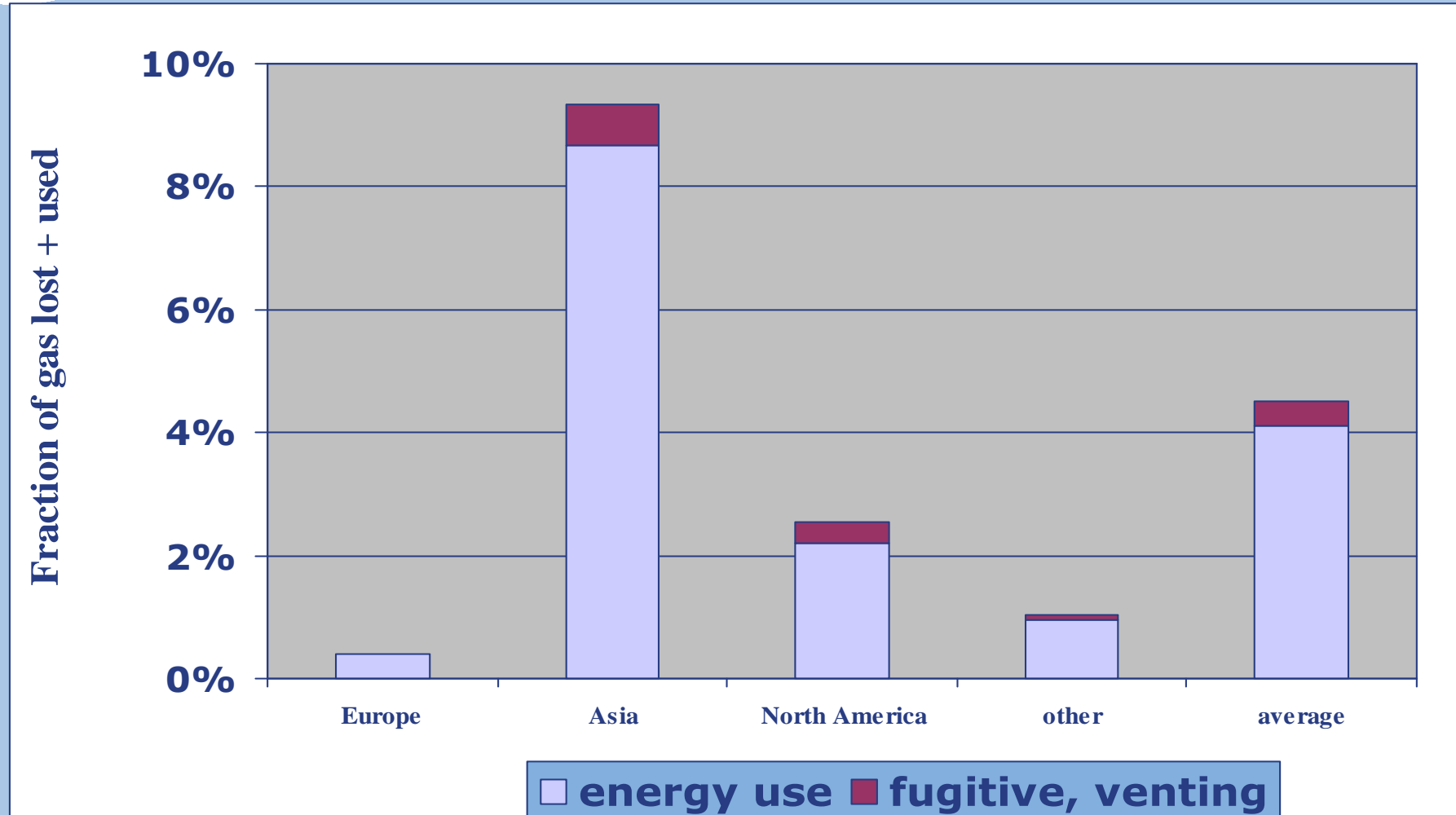


Energy consumption in the production stage (extraction and processing)



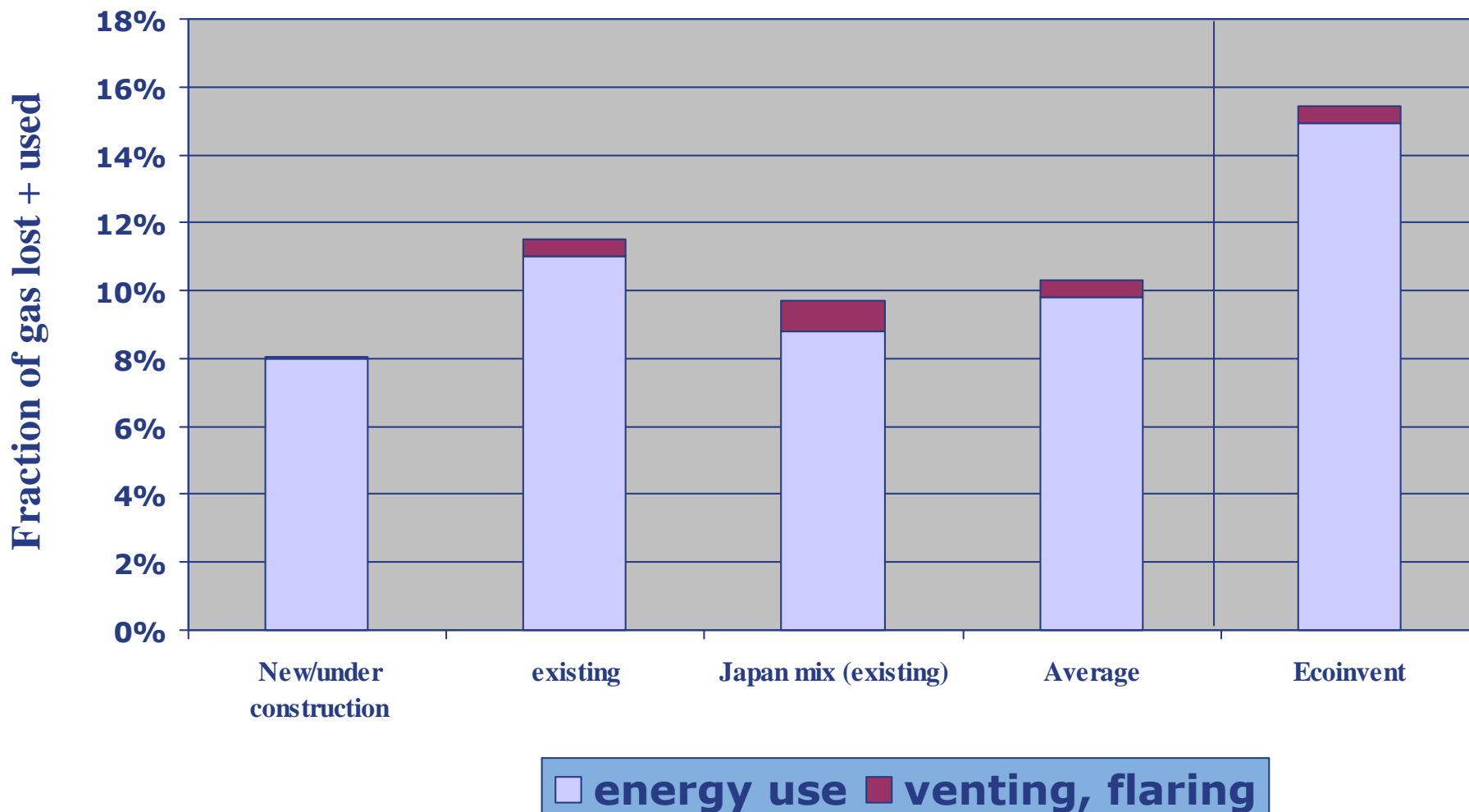


Energy consumption in the transmission stage



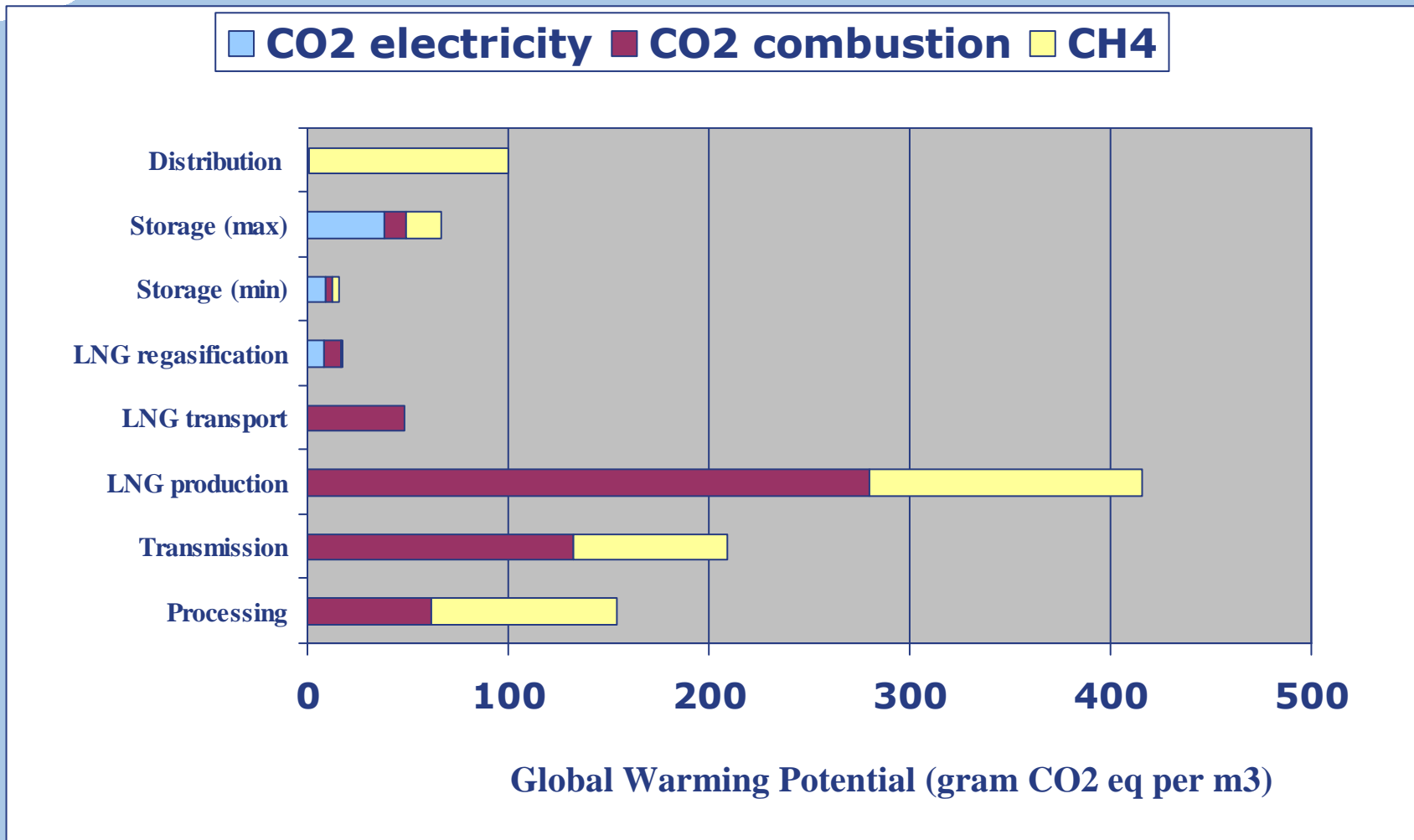


Energy consumption of LNG processing



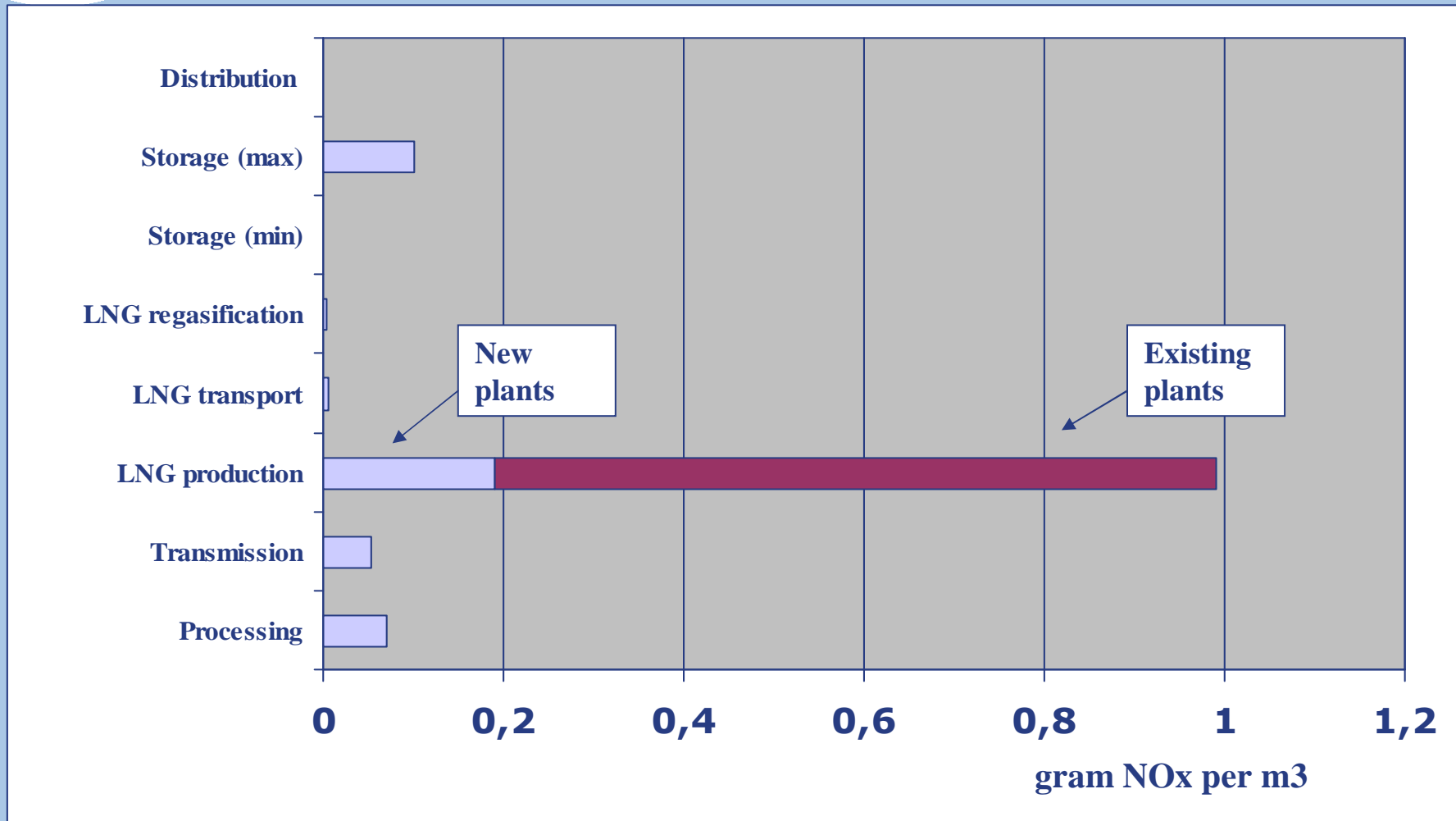


The GWP of the gas chain (average)



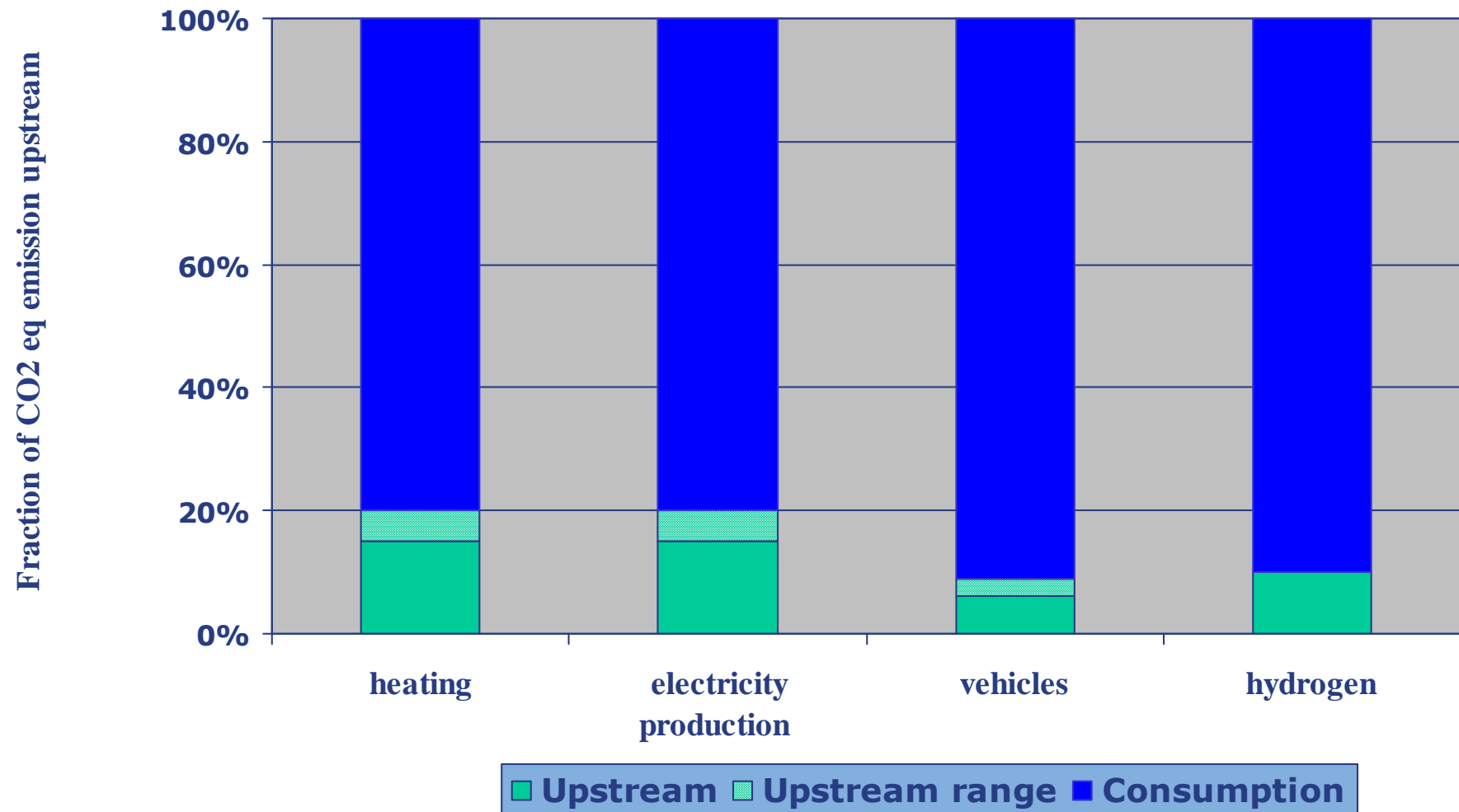


The gas chain: NOx emissions



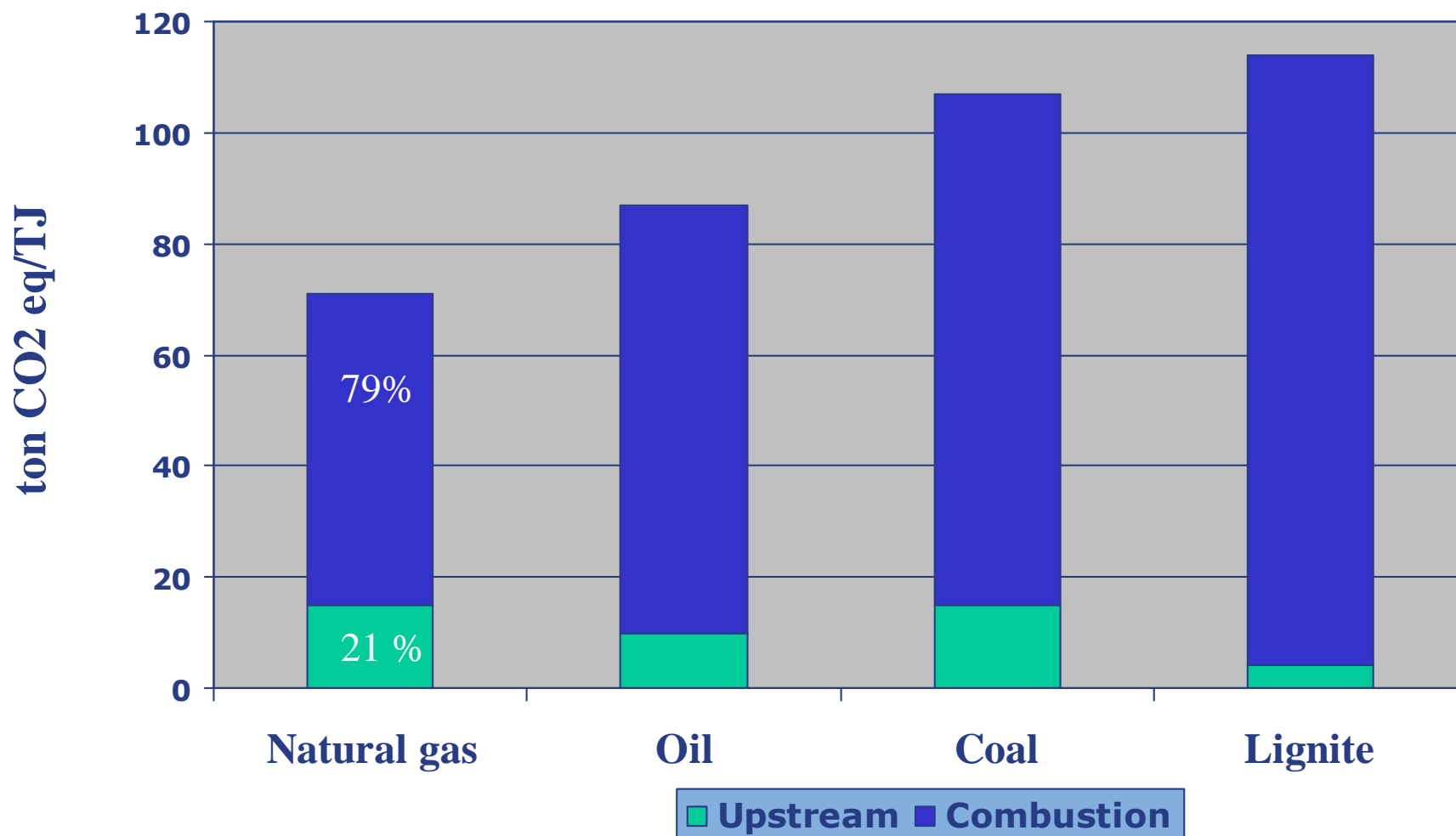


CO2 fraction end use





Combustion versus upstream (Wuppertal Institute 2003)





Some conclusions



- **LCA is the right tool for:**
 - Where to improve
 - Monitoring improvements
 - Benchmarking
 - Comparison with other fuels
 - Uniformity
- **The results show the weak & strong points of the natural gas industry related to sustainable development**
- **This LCA study is a good starting point for further studies and for continued efforts to collect data from the gas industry**
- **Data show that natural gas is the fuel of choice**



Final remarks



- **A lot of data available although data lacking: now 50 – 80% of the volume present**
- **Data should be collected and reported more systematic, more homogenous**
- **The quality of the data can be improved**
- **Presentation of Mrs Sevenster**