Periodic Graphics

A collaboration between C&EN and Andy Brunning, author of the popular graphics blog *Compound Interest*

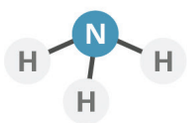
More online

To see more of Brunning's work, go to **compoundchem.com.** To see all of C&EN's Periodic Graphics, visit **cenm.ag/periodicgraphics.**

ENVIRONMENTAL IMPACT OF INDUSTRIAL REACTIONS

The chemical industry accounts for about 10% of the world's energy demand and 7% of its greenhouse emissions. Here we take a look at the top 5 chemical products responsible.

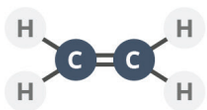
1 AMMONIA



Synthesis
Haber-Bosch process

Major uses
Fertilizers, medicines, and cleaning products

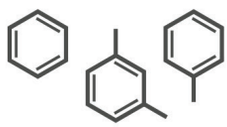
2 ETHYLENE



Synthesis
Cracking of long-chain hydrocarbons

Major uses
Making polyethylene

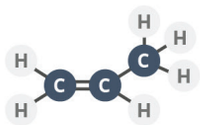
3 AROMATICS



Synthesis
Catalytic reforming of naphtha

Major uses
Solvents and reagents in chemical reactions

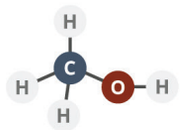
4 PROPYLENE



Synthesis
Cracking of long-chain hydrocarbons

Major uses
Making polypropylene

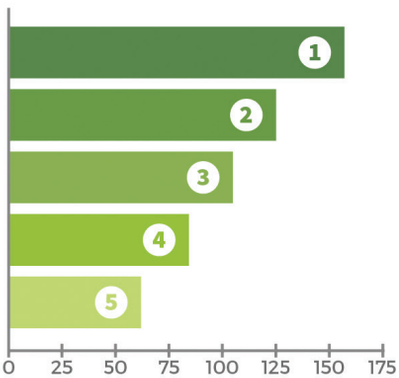
5 METHANOL



Synthesis
Reactions with CO, CO_2, and H_2

Major uses
Making other chemicals

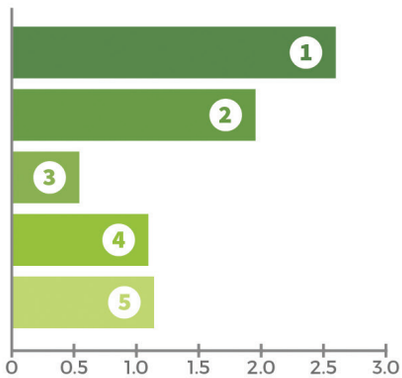
PRODUCTION VOLUMES



MEGA–METRIC TONS/YEAR

1 Mt: Equivalent to the mass of nearly 5,000 Statues of Liberty

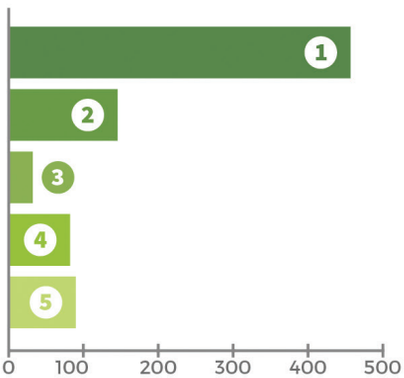
ENERGY CONSUMPTION



EXAJOULES/YEAR

1 EJ: Equivalent to the energy from about 174 million oil barrels

GREENHOUSE GAS EMISSIONS



Mt OF CO_2 EQUIVALENT/YEAR

1 Mt CO_2 eq: Equivalent to 25% of the CO_2 emitted from a coal power plant per year

Source: DECHEMA, 2010. For ethylene and propylene, figures are representative of the steam cracking process.

PERIODIC GRAPHICS