

WHAT IS PLASTIC?

WHAT ARE ITS IMPACTS ON HUMAN HEALTH?

WHAT ARE THE ECONOMIC COSTS OF THOSE IMPACTS?

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WHAT IS PLASTIC?

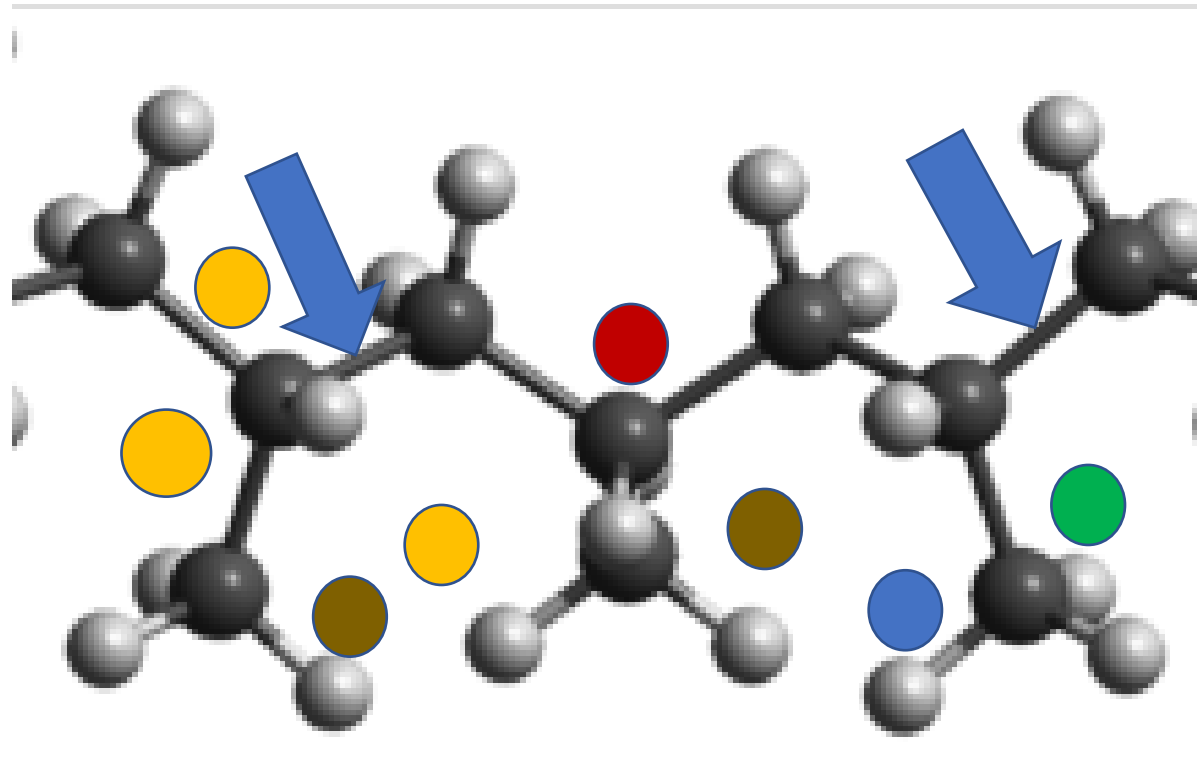
- All plastics are synthetic (manmade) chemicals
- They are comprised of a carbon-based backbone – a polymer - plus thousands of chemical additives - dyes, plasticizers, stabilizers, flame retardants, water repellants, and ultraviolet blockers
- Many plastic additives are highly toxic. They include carcinogens, neurotoxicants and endocrine disruptors.
- 98% of all plastics and plastic additives are made from fossil carbon – coal, oil, gas



WHAT IS PLASTIC?

Polymer Backbone:
Carbon-Carbon Bonds

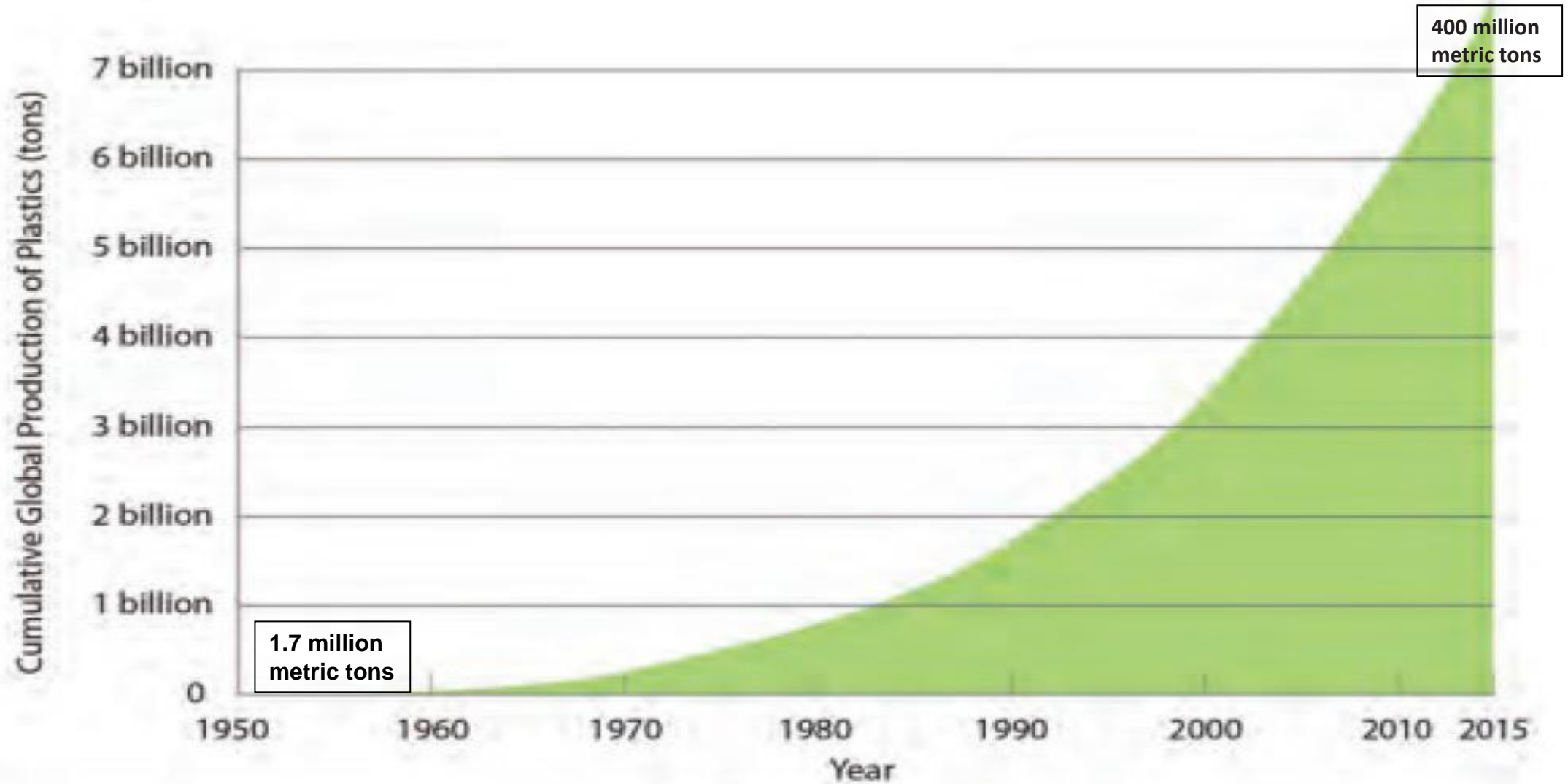
Multiple Chemical Additives. Phthalates,
Bisphenols, PFAS, Brominated Flame Retardants



Additives can comprise up to 50% of plastic by weight

They can escape from plastic to get into the environment and into people

PLASTIC PRODUCTION IS INCREASING EXPONENTIALLY



PLASTICS TODAY

- More than 8,300 million tons (Mt) of plastic have been manufactured since 1950. One ton for every person on earth.
- Production is on track to double by 2040 and treble by 2060 if current trends continue unchecked
- **Single-use and short-lived plastics, which are made to be thrown away, account for about 40% of production, a fraction that is increasing year to year**
- Plastic is responsible for 5% of current greenhouse gas emissions. Projected to exceed 20% by 2050
- About 20 Mt of plastic waste are released annually to the environment.

**WHY ARE CHEMICAL AND PLASTIC
POLLUTION INCREASING SO RAPIDLY?**

THE BIG PIVOT

The fossil carbon industry is pivoting away from producing fuel

They are redirecting their investment into plastics and petrochemicals.

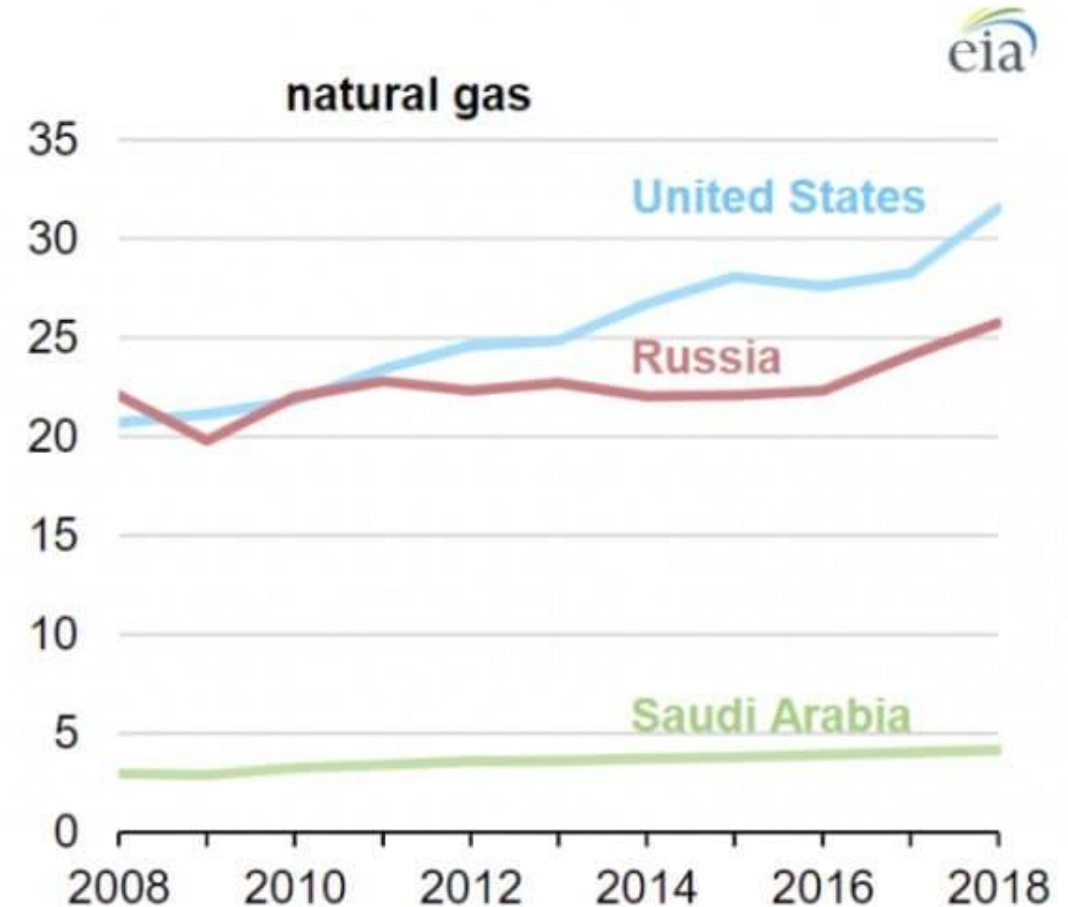
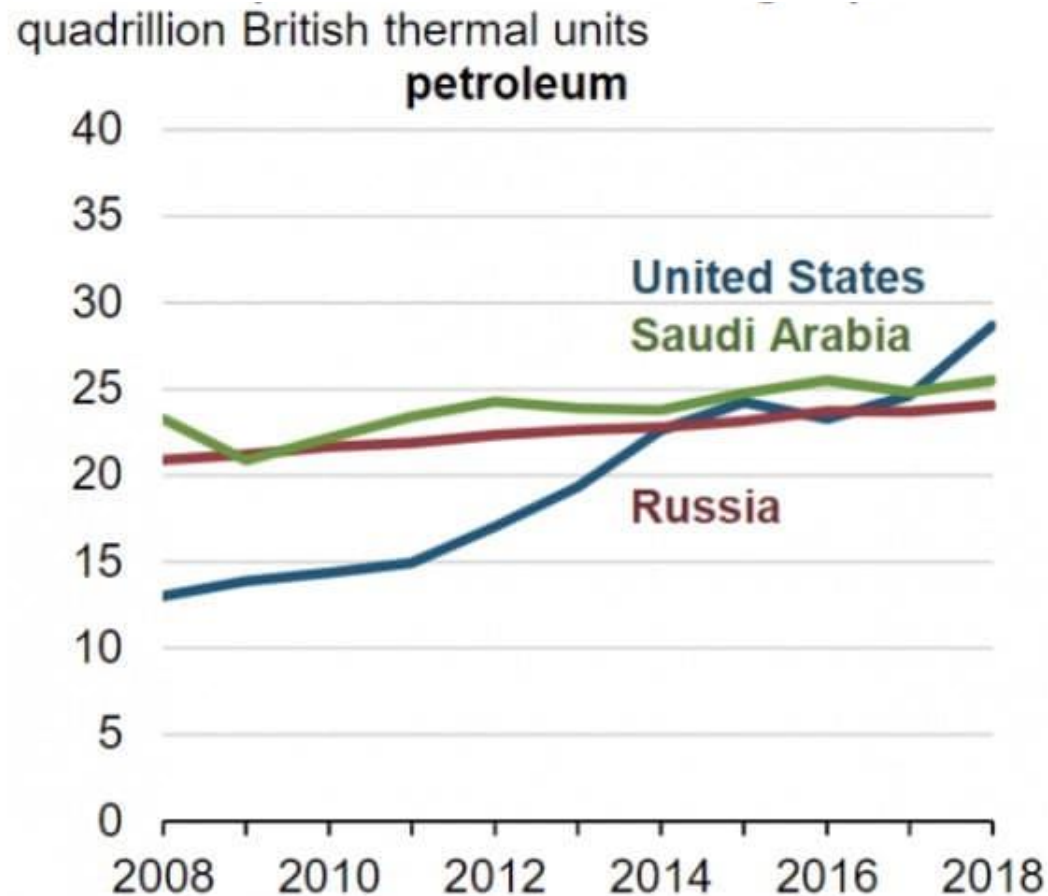
Why?

- The global transition to green energy
- Enormous expansion in oil and gas production due to fracking – the USA is now the world's largest gas and oil producer

This pivot is the major driver of almost exponential recent increases in petrochemical and plastic production

Single-use plastics are at the center of this strategy

TRENDS IN OIL AND GAS PRODUCTION, USA, RUSSIA AND SAUDI ARABIA, 2008-2018

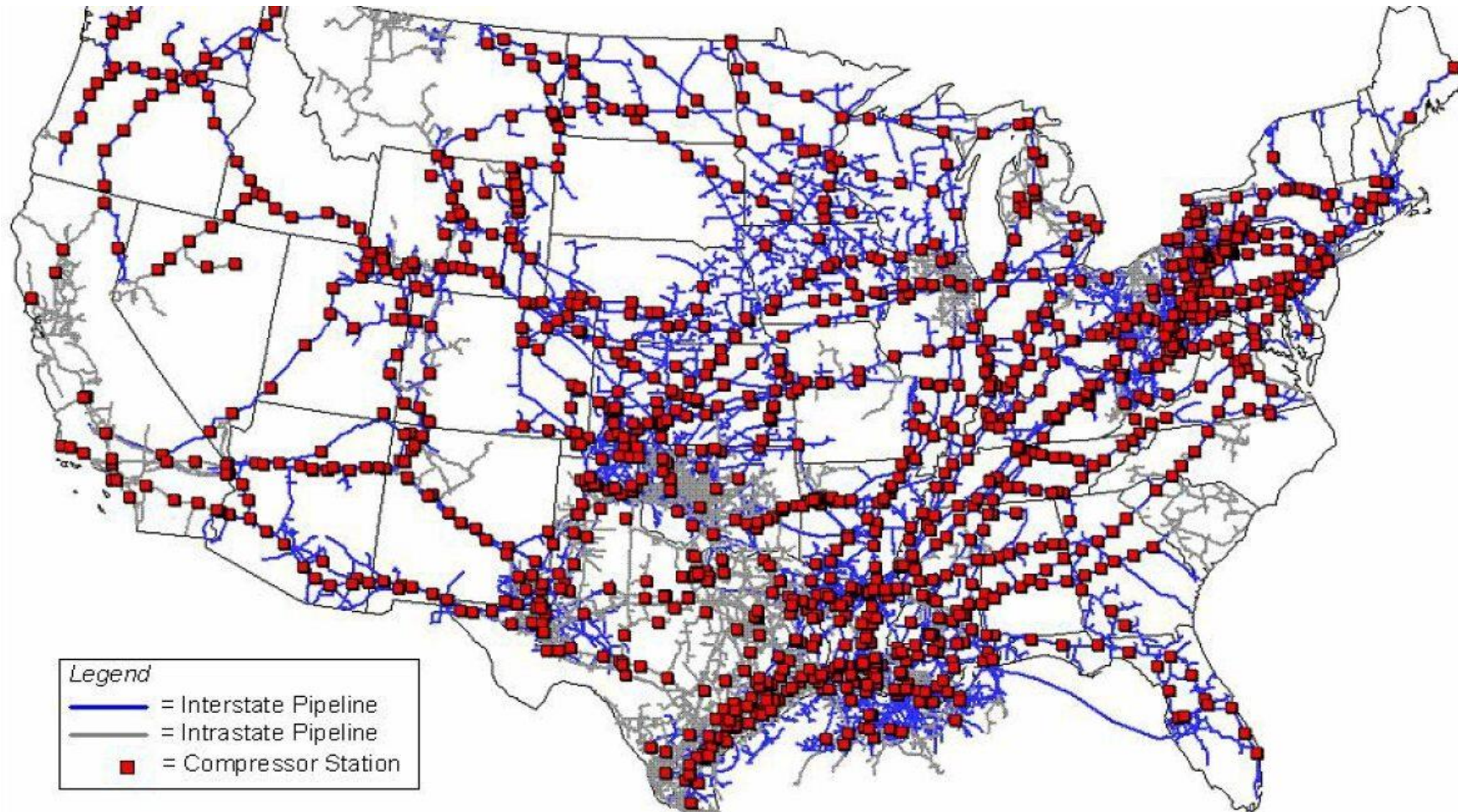


Source: U.S. Energy Information Administration, based on International Energy Statistics

Note: Petroleum includes crude oil, condensate, and natural gas plant liquids.

THE US GAS PIPELINE NETWORK

COMPRESSOR STATIONS EVERY 50-75 MILES



ETHANE CRACKER PLANT

WHERE OIL AND NATURAL GAS ARE CONVERTED TO
CHEMICAL AND PLASTIC FEEDSTOCKS



PLASTIC CAUSES DISEASE AND DEATH AT EVERY STAGE OF ITS LIFECYCLE

Disease and Death in Plastic Workers

- **Oil & Gas Extraction (Conventional and Fracking):** Traumatic injury, fire, explosion, silicosis, COPD, cardiovascular disease, lung cancer.
- **Coal mining:** Traumatic injury, cave-ins, coal workers' pneumoconiosis, silicosis, cardiovascular disease, lung cancer.
- **Fossil Fuel Transport:** Burns, injuries, traumatic death.
- **Production (Cracking, Polymerization, Compounding):** Leukemia and lymphoma, hepatic angiosarcoma, brain cancer, mesothelioma, lung cancer, breast cancer, neurotoxic injury, decreased fertility/sterility.
- **Synthetic Textile Manufacture:** Bladder cancer, lung cancer, mesothelioma, interstitial lung disease.
- **Recycling & Waste Disposal:** Acute and chronic lung disease, cardiovascular disease, heavy metal poisoning, neuropathy, cancers.

Disease and Death in Fenceline Communities

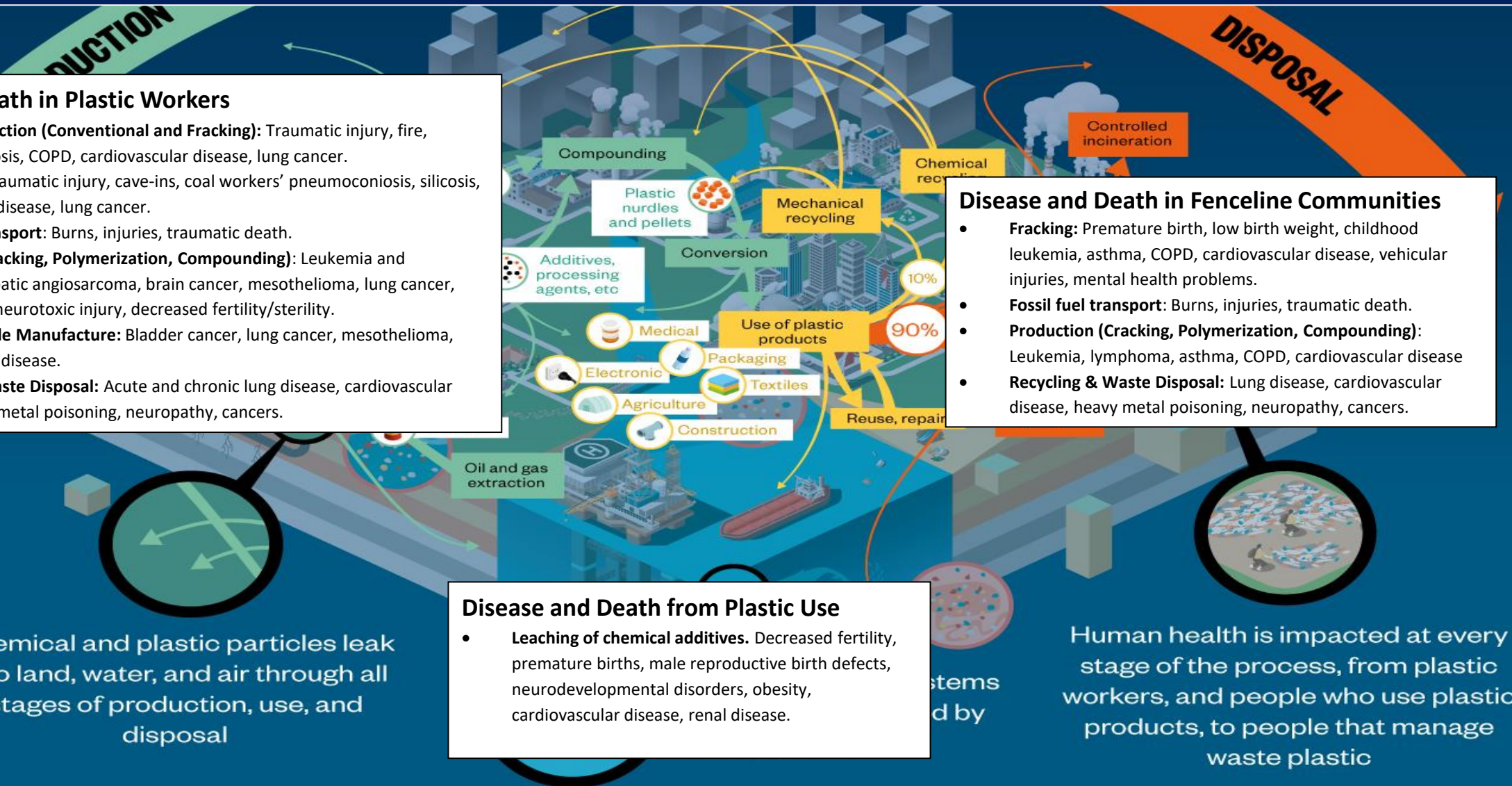
- **Fracking:** Premature birth, low birth weight, childhood leukemia, asthma, COPD, cardiovascular disease, vehicular injuries, mental health problems.
- **Fossil fuel transport:** Burns, injuries, traumatic death.
- **Production (Cracking, Polymerization, Compounding):** Leukemia, lymphoma, asthma, COPD, cardiovascular disease
- **Recycling & Waste Disposal:** Lung disease, cardiovascular disease, heavy metal poisoning, neuropathy, cancers.

Disease and Death from Plastic Use

- **Leaching of chemical additives.** Decreased fertility, premature births, male reproductive birth defects, neurodevelopmental disorders, obesity, cardiovascular disease, renal disease.

Chemical and plastic particles leak into land, water, and air through all stages of production, use, and disposal

Human health is impacted at every stage of the process, from plastic workers, and people who use plastic products, to people that manage waste plastic



A FEW OF THE HAZARDOUS CHEMICALS IN PLASTIC



INFANTS IN THE WOMB AND YOUNG CHILDREN - HIGHLY VULNERABLE TO PLASTIC CHEMICALS



- Toxic chemicals in plastic can cause damage to infants and children at even the lowest levels detectable – levels far below those that harm adults
- Plastic chemicals can cause brain damage, birth defects and cancer.
- Prenatal exposure in the womb during pregnancy is especially dangerous
- There are no safe exposure “thresholds” in prenatal life
- The brain damage caused by plastic chemicals can cause autism, ADHD and IQ loss
- These effects can last lifelong
- Exposure prevention is the only effective treatment



HEALTH-RELATED COSTS OF PLASTIC CHEMICALS, USA

CHEMICAL	HEALTH EFFECT	ECONOMIC COST
Phthalates (DEHP)	Cardiovascular deaths 100,000 per year	\$68 Billion per year
Brominated Flame Retardants (PBDE)	IQ point loss, intellectual disability	\$244 Billion per year
Organophosphates	IQ point loss, intellectual disability	\$245 Billion per year
PFAS	Low birthweight; childhood obesity	\$4.03 Billion per year

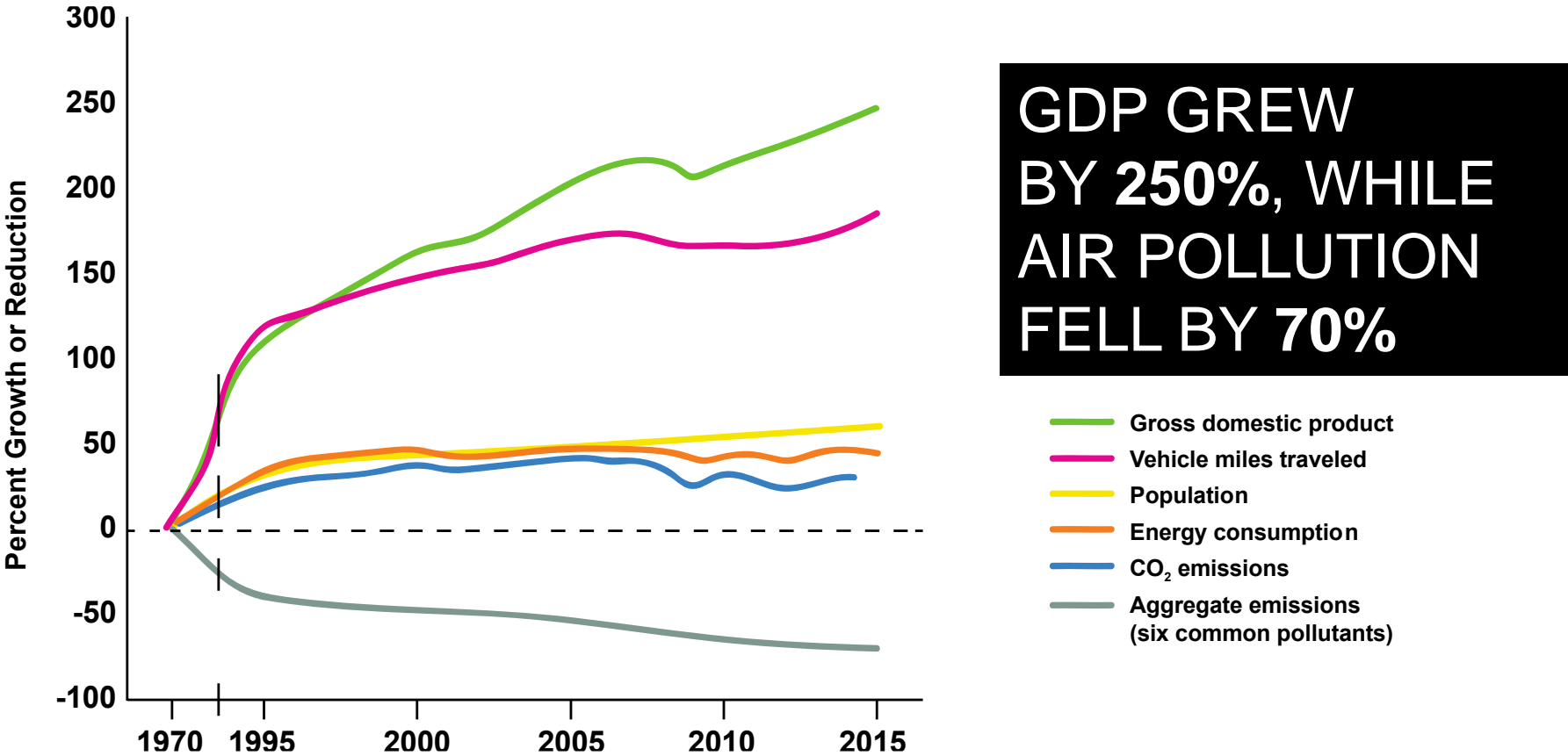
These costs are 'externalized' – imposed on governments and taxpayers by the plastic industry

THE GOOD NEWS:

PLASTIC POLLUTION CAN BE PREVENTED

- Proof of principle. High-income and some mid-income countries are already making progress against pollution – They are saving lives today
- These countries have implemented science-based control strategies based on law, policy and technology, backed by monitoring and regulation, and encouraged by incentives
 - Control of air pollution in the United States – 74% reduction in air pollutant emissions since passage of the Clean Air Act in 1970
 - Clean-up of Boston Harbor
 - Bans on single-use plastic. Extended Producer Responsibility
- We know how to do it

POLLUTION CONTROL IS HIGHLY COST-EFFECTIVE



EVERY \$1 INVESTED IN AIR POLLUTION CONTROL IN THE USA SINCE 1970 HAS YIELDED A RETURN OF \$30



THANK YOU!