

## Safety and Environmental Impact of Energy

### Safety

What we consider to be “safe” varies greatly from country to country and person to person. It is highly dependent on circumstances and personal experience. Safe is not an objective term that can be quantified. Given the variance in what we consider safe, regulators have a challenging task when setting one-size-fits-all safety standards that must meet the needs of all members of society.

Measuring safety can be done with a number of metrics:

- Days/man-hours lost to accidents
- Injuries per year or unit production
- Deaths per unit production etc.

Safe operation and Safety Culture are deeply imbedded in the management and workforce of many companies eg. mining, airlines, power plants



### Environmental Impact

Environmental impact covers a huge swath of factors and metrics. Consciously or sub-consciously we break them down into whether the impact affects humans or the natural environment or both. With energy production, transportation and use, it is usually the natural environment and the ecological systems it supports that garners the most attention. Climate stabilization has been the primary driver behind the energy transition the world is currently undergoing.

There are many different gases that trap heat in the atmosphere, each with their own distinct level of effectiveness. The heat trapping effect of CO<sub>2</sub> is the most commonly produced anthropogenic Greenhouse Gas and is the standard by which other GHGs are compared. For example, one gram of methane (natural gas) has a global warming potential 25 times greater than CO<sub>2</sub> and so it would be rated as 25 CO<sub>2</sub>e (equivalent).

Energy technologies that emit no GHGs when operating e.g. wind turbine, nevertheless create GHGs during their manufacture, on-going maintenance, and their ultimate decommissioning and/or recycling. These are known as Full Life Cycle emissions and are the most informative metric to use when judging the environmental/climate impact of the energy source. The Intergovernmental Panel on Climate Change uses this metric expressed as CO<sub>2</sub>e per kilowatt hour of electricity produced. They review their calculations every few years to account for improvements in technology.