Recycling polyurethane foam to produce repolyol can significantly reduce CO2 emissions compared to producing polyol from virgin materials. Repolyol is made by breaking down polyurethane foam, which is a form of chemical recycling. This process not only diverts waste from landfills but also reduces the need for raw materials derived from fossil fuels, thereby lowering overall carbon emissions.

### Estimating CO2 Savings

The CO2 savings from generating repolyol from polyurethane foam instead of producing virgin polyol can be broken down into two main components:

1. \*\*Avoided CO2 Emissions from Landfilling or Incineration\*\*:

- Polyurethane foam in landfills can decompose over time, potentially releasing methane (a potent greenhouse gas) and CO2. If incinerated, the foam directly releases CO2 and other pollutants.

- Recycling prevents these emissions.

2. \*\*CO2 Savings from Raw Material Substitution\*\*:

- Producing virgin polyol involves extracting and processing petrochemicals, which is energy-intensive and emits a significant amount of CO2.

- Repolyol production uses waste polyurethane foam, which requires less energy and fewer resources.

### CO2 Emissions from Virgin Polyol Production

- Producing 1 kg of virgin polyol typically emits around 2.5 to 3.5 kg of CO2, depending on the specific processes and energy sources used.

### CO2 Emissions from Repolyol Production

- Repolyol production emits significantly less CO2, with estimates ranging from 0.5 to 1.5 kg of CO2 per kg of repolyol, depending on the efficiency of the recycling process and the energy mix used.

### Estimated CO2 Savings

- \*\*CO2 Saved per kg of Repolyol\*\*: By using repolyol instead of virgin polyol, you could save approximately 1.5 to 3 kg of CO2 per kg of polyol produced.

These savings are significant, particularly when scaled up across large volumes of polyurethane foam recycling.

### Conclusion

By generating repolyol from polyurethane foam, you save a considerable amount of CO2, primarily through reduced energy use in production and avoidance of emissions from waste management processes like landfilling or incineration. On average, each kilogram of repolyol produced can save between 1.5 to 3 kg of CO2 compared to the production of virgin polyol.