Equivalency Problem #1: Hamburger or Kia?

Calculate *d*, where *d* is the distance you will drive your 2021 Kia Sportage from your home to the Safeway to purchase one kilogram of beef, such that the GHG contribution from driving your Kia distance *d* is equal to the GHG contribution associated with the production of the beef. Include an approximation for the embodied carbon associated with the manufacturing of the vehicle. Use EPA published city fuel economy for the Kia.

Solution to Equvalency Problem #1		
CO2e of beef (lbs CO2/lb of beef)	14.8	https://content.sierraclub.org/grassrootsnetwork/sites/content.sierraclub.org.activistnetwork/files/teams/documents/GreenhouseHamburger%202009.pdf
Embodied CO2e of the car (tons)	5.6	https://www.theguardian.com/environment/green-living-blog/2010/sep/23/carbon-footprint-new-car
Assumed useful lifetime of the vehicle (miles)	150,000	https://www.nbcnews.com/id/wbna12040753
Embodied CO2e of the car per mile (lbs/mile)	0.07	calculated from above
EPA fuel efficiency (MPG)	23	https://www.kia.com/us/en/sportage
CO2 produced by the combustion of a gallon of gasoline (lbs)	20	https://climatekids.nasa.gov/review/carbon/gasoline.html#:~:text=A%20gallon%20of%20gas%20%3D%2020,20%20pounds%20of%20carbon%20dioxide.
CO2 produced by the Kia per mile (lbs) – gasoline	0.87	calculated from above
CO2 produced by the Kia per mile (lbs) - gasoline+embodied	0.94	calculated from above
Answer: In terms of GHG contribution, a kg of beef is equivalent to driving the Kia this number of miles	35	calculated from above

Additional references:

- Check this FAO Report on Livestock and Climate Change
- For additional information on methane in beef production: Our World in Data