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### PM25_USA_EPA_NEI ###
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# Question 1 : Have total emissions from PM2.5 decreased in the United States from 1999 to 2008?  
# Using the base plotting system, make a plot showing the total PM2.5 emission from all sources for each of the  
years 1999, 2002, 2005, and 2008.
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### Resources ###
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```
# EPA Government references
```

```
# Reference 1. 2011 National Emissions Inventory, version 1 Technical Support Document November 2013 -  
DRAFT
```

```
# http://www.epa.gov/ttn/chief/net/2008neiv3/2008\_neiv3\_tsd\_draft.pdf
```

```
# Reference 2. 2008 National Emissions Inventory, version 3 Technical Support Document September 2013 -  
DRAFT
```

```
# http://www.epa.gov/ttn/chief/net/2011nei/2011\_neiv1\_tsd\_draft.pdf
```

```
# STATE Government references
```

```
# Reference 3. Methodologies for U.S. Greenhouse Gas Emissions Projections: Non-CO2 and Non-Energy CO2  
Sources DECEMBER, 2013
```

```
# http://www.state.gov/documents/organization/219472.pdf
```

```
# barplot
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```
# 1 - http://www.ats.ucla.edu/stat/r/faq/barplotplus.htm
```

```
# 2 - http://www.spw.uzh.ch/vangijn/teaching/typologyinpractice/weekbyweek/R\_Bar\_plots.pdf
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### plot1 R code ###
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```
# Create a function called plot1_TotalEmissionsPM2.5_USA_1999_to_2008() to do the requested plot
```

```
plot1_TotalEmissionsPM2.5_USA_1999_to_2008 = function()  
{
```

```
  # Set the working directory on my local machine
```

```
  setwd("~/Desktop/Data Science Specialization/Exploratory Data Analysis/Course project 2")
```

```
  # Read the PM2.5 Emissions Data in summarySCC_PM25.rds file with readRDS() function
```

```
  NEI <- readRDS("summarySCC_PM25.rds")
```

```
  # Read the Source Classification Code Table in Source_Classification_Code.rds file with readRDS() function
```

```
  SCC <- readRDS("Source_Classification_Code.rds")
```

```
  # Sum emissions by year: use the function tapply()
```

```
  NEI_Emmissions_Year <- tapply(NEI$Emissions, NEI$year, sum)
```

```
  # Plot barplot
```

```
  barplot(NEI_Emmissions_Year,  
    names.arg = toupper(names(NEI_Emmissions_Year)),  
    legend.text = TRUE,  
    col = c("darkviolet", "orangered", "deeppink", "gold"),  
    border = "blue",  
    xlab = "Year",  
    ylab = "PM2.5 Emissions (Tons)",
```

```

ylim = c(0,8000000),
main = "USA Total PM25 Emissions from 1999 to 2008",
font.main = 3,
cex.main = 1.5,
sub = "source : summarySCC_PM25.rds",
cex.sub = 0.8,
cex.names = 0.8,
cex.axis = 0.8,
args.legend = list(title = "Legend: Color - Year", x = "topright", cex = 1.0))
# Add a dashed line relaying each total emissions from PM2.5 for 1999, 2002, 2005, 2008
lines(NEI_Emissions_Year,lw = 2,col = "darkgrey",lty = 2,cex = 1)
# Add points to each total emissions from PM2.5 for 1999, 2002, 2005, 2008
points(NEI_Emissions_Year,lw = 4,col= "darkgrey", pch = 15)
# Add all values for total emissions from PM2.5 for 1999, 2002, 2005, 2008 next to the points
text(1, NEI_Emissions_Year[1], labels = round(NEI_Emissions_Year[1], 0), pos = 3,cex = 1, col =
"navyblue")
text(2, NEI_Emissions_Year[2], labels = round(NEI_Emissions_Year[2], 0), pos = 3,cex = 1, col =
"navyblue")
text(3, NEI_Emissions_Year[3], labels = round(NEI_Emissions_Year[3], 0), pos = 3,cex = 1, col =
"navyblue")
text(4, NEI_Emissions_Year[4], labels = round(NEI_Emissions_Year[4], 0), pos = 3,cex = 1, col =
"navyblue")

# Save png
dev.copy(png, filename = "plot1.png", height = 600, width = 800, unit = "px", bg = "transparent")

# Release screen
dev.off()
}

```

```

plot1_TotalEmissionsPM2.5_USA_1999_to_2008()

```

Answer 1: PM2.5 Total Emissions decreased in the USA between 1999 and 2008.