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# == Screening Curve Analysis.ssc ==#
# Author: Yihsu Chen, email: yschen@jhu.edu #


#== Calculate Exisitng Capacity ==#
name.inv <- paste("c:/my stuffs/my research/epa/capacityexpansion/data/Inventory_FOR.txt")
data.inv <- read.table (name.inv, na.string="NA",sep="\t", header=T, skip=0)[,-c(1)]
lse.list <- c(5487, 829, 733, 14015, 5580, 4922, 11249, 9267, 9273, 17633, 1692, 3542, 3218) #

data.ecar <- data.inv[data.inv$NERC.OPER==3|is.element(data.inv$PCA, lse.list), ] #|data.inv
      $NERC.OPER==1,] # select ECAR=1 and MAAC=3 data #
data.ecar.existing <- data.ecar[ data.ecar$PM.860=="HY"|data.ecar$PM.860=="NB"|data.ecar$PM.860
      =="NP"|data.ecar$START.YR > 1965,]
ext.cap <- sum(data.ecar.existing$SumOfSUMMER.CAP*(1-data.ecar.existing$FRATE)) # Assumption:
      50 yrs usage and Nuclear and Hydro not retire #

#== Read New Capacity Cost Information ==#
name.s <- paste("c:/My stuffs/My Research/EPA/capacityexpansion/data/screening curve analysis
      data.txt")
data.s <- read.table (name.s, na.string="NA",sep="\t", header=F, skip=1)

#== Read Annual Load Adjusted for NEMS Load Shape ==#
name.NEMS <- paste("c:/my stuffs/my research/epa/capacityexpansion/data/PJM_ECAR_load_90_55_05
      _NEMS_allyear1201.txt", sep="")
data.NEMS <- read.table(name.NEMS, sep="\t", header=F)
data.NEMS[,29] <- apply(data.NEMS[, c(1,3,5,7,9,11,13,15)], 1, mean) #average over 90s#
data.NEMS[,30] <- data.NEMS[, 2]
data.NEMS[,31] <- apply(data.NEMS[,  c(17,19,21,23,25,27)], 1, mean) # average over 50s #
data.NEMS[,32] <- data.NEMS[, 2]



year <- c(1991:1998, 2050:2055, "90s","50s")

name <- c("Scr.Coal","IGCC","IGCC.Carb","Cov.Gas.CC","Ad.Gas.CC",
      "Ad.CC.Carb","Con.CT","Ad.CT","Fuel.Cell","Ad.Nuke","DG.B","DG.P","Bio","MSW","Geo","W
      ind","Solar","PV")
CF <- data.s[,1]
data.s <- data.s[, -c(1)]
names(data.s) <- name
for ( y in 15:15) #length(year))
{
      exp.cap <- 90570
      data.NEMS.yr <- as.data.frame(data.NEMS[, 2*y-1]/1000-ext.cap/1000)  # in GW substract existing
      capacity#
      data.NEMS.yr <- cbind(c(1:8760)/8760, data.NEMS.yr)
      names(data.NEMS.yr) <- c("hours","load")
      load.fac <- sum(data.NEMS.yr$load)/(max(data.NEMS.yr$load)*8760)

#== Plot 1: Screening Curve ==#
      matplot (data.NEMS.yr$hours, data.NEMS.yr$load, type= "l", lty=1, col=1,ylim =c(0,120), xlim=c
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    (0,1), xlab="Capacity Facor (mean output/capacity)", ylab="Load [GW]",lwd=3)

    #limit.tech <- c(1:length(name))
    limit.tech <- c(1, 2, 4,5,7,8,10) # subset of available technologies
    for (s in limit.tech)
    {
        lines(CF, data.s[,s], type="l", lty=s, col=s, lwd=4)

    }
    legend(0.15, 120, lty=limit.tech, col=limit.tech, legend=name[limit.tech], lwd=4)#, ncol=2)
    lines(c(0,8760), c(0,0), type="l")
# == Intrapolate Intersection Points ==#
approx.load <- approx(data.NEMS.yr$hours, data.NEMS.yr$load, c(0.084615, 0.095652, 0.311538,
    0.508889))$y*1000 #0.4862040134))$y*1000
capacity <- c(max(data.NEMS.yr$load)*1000-approx.load[1], approx.load[1]-approx.load[2], approx.load
    [2]-approx.load[3], approx.load[3]-max(approx.load[4],0), max(approx.load[4],0))
capacity <- cbind(name[c(7,8,4,5,2)], as.data.frame(capacity))
lines(data.NEMS.yr$hours, data.NEMS[, 31]/1000-ext.cap/1000, type="l", col=3, lwd=3, lty=2)
}
```