# MATH2270/MATH2237/MATH2404 Assignment 3

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## Assignment URL

<https://0a38og-eran-dodampe0gamage.shinyapps.io/assessment_3_storytelling_with_open_data/>

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## Assignment Code

## app.R

# Global Energy Transition Dashboard

# Author: Eran Dodampe Gamage

# Data Source: Our World in Data

library(shiny)

library(shinydashboard)

library(plotly)

library(dplyr)

library(readr)

library(sf)

library(scales)

library(tidyr)

# Data Preparation

energy\_raw <- read\_csv("data/owid-energy-data.csv", show\_col\_types = FALSE)

world <- st\_read("data/world-countries.json", quiet = TRUE)

region\_map <- world %>%

st\_drop\_geometry() %>%

select(iso = iso\_a3, region = region\_un)

energy <- energy\_raw %>%

select(

country, iso\_code, year,

renewables\_share\_elec, renewables\_electricity,

fossil\_electricity, nuclear\_electricity,

energy\_per\_capita, greenhouse\_gas\_emissions,

gdp, population

) %>%

left\_join(region\_map, by = c("iso\_code" = "iso")) %>%

mutate(

total\_electricity = fossil\_electricity + renewables\_electricity +

coalesce(nuclear\_electricity, 0),

co2\_intensity = case\_when(

total\_electricity > 0 ~ greenhouse\_gas\_emissions \* 1e6 / total\_electricity,

TRUE ~ NA\_real\_

),

renewables\_share\_elec = pmin(renewables\_share\_elec, 100)

) %>%

filter(!is.na(renewables\_share\_elec), !is.na(region), year >= 2000)

# Unser Interface

ui <- dashboardPage(

title = "Global Energy Transition",

skin = "black",

dashboardHeader(

title = "Global Energy Transition Dashboard",

titleWidth = 250

),

dashboardSidebar(

width = 250,

sidebarMenu(

id = "tabs",

menuItem("Current State", tabName = "current", icon = icon("globe-americas")),

menuItem("Evolution", tabName = "evolution", icon = icon("chart-line")),

menuItem("Impact Analysis", tabName = "impact", icon = icon("chart-area"))

),

div(class = "dashboard-description",

p("Explore the global transition to renewable energy sources and their impact on carbon emissions from 2000 to present.")

),

div(class = "year-container",

h5("Select Year"),

sliderInput("year", NULL,

min = 2000,

max = max(energy$year),

value = max(energy$year),

sep = "",

animate = FALSE,

width = "100%",

ticks = TRUE),

actionButton("playBtn",

label = "",

icon = icon("play"),

class = "btn-play-slider")

),

div(class = "metric-container global-average",

h5("Global Average"),

div(class = "metric-value", textOutput("globalAvgText")),

div(class = "metric-label", "Renewable Energy")

),

div(class = "sidebar-footer",

p("Data: Our World in Data"),

p("Dashboard: Eran Dodampe Gamage")

)

),

dashboardBody(

tags$head(

tags$link(rel = "stylesheet", type = "text/css", href = "style.css"),

tags$script(HTML("

$(document).ready(function() {

$('body').css('overflow', 'hidden');

// Play button functionality

var playing = false;

var interval;

$(document).on('click', '#playBtn', function(e) {

e.preventDefault();

if (!playing) {

playing = true;

$(this).find('i').removeClass('fa-play').addClass('fa-pause');

// Get slider instance

var slider = $('#year').data('ionRangeSlider');

if (!slider) return;

var currentVal = slider.result.from;

var maxVal = slider.result.max;

var minVal = slider.result.min;

// Reset to start if at end

if (currentVal >= maxVal) {

slider.update({from: minVal});

}

// Animate through years

interval = setInterval(function() {

var current = slider.result.from;

if (current < maxVal) {

slider.update({from: current + 1});

} else {

clearInterval(interval);

playing = false;

$('#playBtn').find('i').removeClass('fa-pause').addClass('fa-play');

}

}, 2000);

} else {

// Pause

playing = false;

clearInterval(interval);

$(this).find('i').removeClass('fa-pause').addClass('fa-play');

}

});

});

")),

tags$style(HTML("

\* {

font-family: 'Gill Sans', sans-serif !important;

}

"))

),

tabItems(

# Current State Tab

tabItem(

tabName = "current",

fluidRow(

column(12,

div(class = "section-header",

h3("Global Renewable Energy Distribution"),

div(class = "section-subtitle",

"Percentage of electricity generated from renewable sources by country"

),

div(class = "section-description",

"This map visualizes the current state of renewable energy adoption worldwide. Countries with higher renewable shares appear in darker green, indicating greater progress in the energy transition.")

)

)

),

fluidRow(

style = "margin-bottom: 30px;",

column(12,

div(class = "main-viz-container",

plotlyOutput("worldMap", height = "600px")

)

)

),

fluidRow(

column(4,

div(class = "stat-box",

div(class = "stat-value", textOutput("statCountries")),

div(class = "stat-label", "Countries Tracked")

)

),

column(4,

div(class = "stat-box",

div(class = "stat-value", textOutput("statLeaders")),

div(class = "stat-label", "Above 50% Renewable")

)

),

column(4,

div(class = "stat-box",

div(class = "stat-value", textOutput("statGrowth")),

div(class = "stat-label", "Year-over-Year Change")

)

)

)

),

# Evolution Tab

tabItem(

tabName = "evolution",

fluidRow(

style = "margin-bottom: 15px;",

column(12,

div(class = "section-header",

h3("Energy Transition Timeline"),

p("Tracking renewable energy adoption in major economies from 2000 to present"),

p(class = "section-description",

"This timeline reveals how different countries have progressed in their renewable energy journey. Key policy events marked below have significantly influenced global energy transitions.")

)

)

),

fluidRow(

style = "margin-bottom: 15px;",

column(8,

div(class = "viz-container",

plotlyOutput("timeSeriesPlot", height = "350px")

)

),

column(4,

div(class = "viz-container compact",

h4("Progress Since 2000"),

plotlyOutput("progressPlot", height = "200px")

)

)

),

fluidRow(

column(12,

div(class = "events-strip",

h4("Key Global Energy Policy Events"),

div(class = "events-grid",

div(class = "event-card",

div(class = "event-year-card", "2011"),

div(class = "event-title-card", "Fukushima Disaster"),

div(class = "event-desc-card", "Nuclear disaster led to decisions to phase out nuclear by 2022. Massive acceleration in solar and wind investment.")

),

div(class = "event-card",

div(class = "event-year-card", "2014"),

div(class = "event-title-card", "China Energy Strategy"),

div(class = "event-desc-card", "National Energy Strategy Action Plan: Cap on coal use, solar/wind targets, major policy shift.")

),

div(class = "event-card",

div(class = "event-year-card", "2015"),

div(class = "event-title-card", "Paris Agreement"),

div(class = "event-desc-card", "Global climate accord uniting nations in commitment to limit warming to well below 2°C.")

),

div(class = "event-card",

div(class = "event-year-card", "2021"),

div(class = "event-title-card", "China Carbon Pledge"),

div(class = "event-desc-card", "Carbon neutrality pledge targeting net zero by 2060; strong acceleration in solar/wind since.")

),

div(class = "event-card",

div(class = "event-year-card", "2022"),

div(class = "event-title-card", "US IRA"),

div(class = "event-desc-card", "Inflation Reduction Act: $370B in climate and energy investments — the largest climate legislation in US history.")

)

)

)

)

)

),

# Impact Analysis Tab

tabItem(

tabName = "impact",

fluidRow(

column(12,

div(class = "section-header",

h3("Renewable Energy and CO₂ Emissions"),

p("Examining the relationship between renewable energy adoption and carbon intensity of electricity generation"),

div(class = "note-box",

icon("info-circle"),

"Countries with higher renewable shares typically show lower CO₂ intensity.

Bubble size represents per capita energy consumption. The trend line demonstrates the inverse relationship between renewable adoption and emissions."

)

)

)

),

fluidRow(

column(8,

div(class = "viz-container",

plotlyOutput("scatterPlot", height = "450px")

)

),

column(4,

div(class = "viz-container",

h4("Regional Averages"),

plotlyOutput("regionalPlot", height = "450px")

)

)

),

fluidRow(

column(12,

div(class = "insights-container",

h4("Key Insights from the Analysis"),

div(class = "insight-box",

p("• ", strong("Accelerating Global Transition:"), " The global average renewable energy share has increased from 17.3% in 2000 to over 30% in recent years, with acceleration particularly notable after the Paris Agreement (2015)."),

p("• ", strong("Policy Impact:"), " Major policy interventions show clear correlations with renewable energy uptake. Germany's EEG (2000) and China's strategic shift (2014) demonstrate how targeted policies drive transformation."),

p("• ", strong("Emissions Reduction:"), " Countries achieving >50% renewable electricity show 60-80% lower CO₂ intensity compared to fossil-dependent nations, validating renewable energy as a climate solution."),

p("• ", strong("Regional Variations:"), " Europe and South America lead with 40%+ renewable shares, while Asia shows the fastest growth trajectory despite starting from a lower base.")

)

)

)

)

)

)

)

)

# Server Logic

server <- function(input, output, session) {

# Color palettes

gg\_colors <- scales::hue\_pal()(6)

watercolor\_palette <- paste0(gg\_colors, "80")

country\_colors <- c(

"China" = "#FF998080",

"United States" = "#99CCFF80",

"Germany" = "#99FF9980",

"India" = "#FFCC9980",

"Brazil" = "#FF99CC80",

"Norway" = "#CCCCFF80",

"Japan" = "#FFFF9980"

)

region\_colors\_palette <- scales::hue\_pal()(6)

# Reactive data

yearData <- reactive({

filter(energy, year == input$year)

})

# Global average

output$globalAvgText <- renderText({

avg <- yearData() %>%

summarise(avg = mean(renewables\_share\_elec, na.rm = TRUE)) %>%

pull(avg)

paste0(round(avg, 1), "%")

})

# Statistics

output$statCountries <- renderText({

nrow(yearData())

})

output$statLeaders <- renderText({

sum(yearData()$renewables\_share\_elec > 50, na.rm = TRUE)

})

output$statGrowth <- renderText({

if (input$year > 2000) {

prev\_year <- filter(energy, year == input$year - 1)

curr\_year <- yearData()

prev\_avg <- mean(prev\_year$renewables\_share\_elec, na.rm = TRUE)

curr\_avg <- mean(curr\_year$renewables\_share\_elec, na.rm = TRUE)

growth <- curr\_avg - prev\_avg

paste0(ifelse(growth > 0, "+", ""), round(growth, 1), "%")

} else {

"N/A"

}

})

# World map

output$worldMap <- renderPlotly({

df <- yearData()

colors <- list(

c(0, 0.2, 0.4, 0.6, 0.8, 1),

c("#FFE5CC", "#FFD4A3", "#B8E6B8", "#8FD68F", "#66C266", "#2E8B2E")

)

plot\_geo(data = df, locationmode = 'ISO-3') %>%

add\_trace(

type = 'choropleth',

locations = ~iso\_code,

z = ~renewables\_share\_elec,

text = ~paste0(country, "\n", "Renewable: ", round(renewables\_share\_elec, 1), "%"),

hoverinfo = "text",

colorscale = colors,

reversescale = FALSE,

marker = list(line = list(width = 0.5, color = 'rgba(255,255,255,0.5)')),

colorbar = list(

title = list(text = "% Renewable", font = list(family = "Gill Sans, sans-serif", size = 12)),

thickness = 12,

len = 0.6,

x = 0.98,

tickfont = list(family = "Gill Sans, sans-serif", size = 10)

)

) %>%

layout(

geo = list(

projection = list(type = "natural earth"),

showframe = FALSE,

showcoastlines = TRUE,

coastlinecolor = "rgba(100,100,100,0.3)",

bgcolor = "rgba(245,245,245,0.3)",

showocean = TRUE,

oceancolor = "rgba(173,216,230,0.3)",

showlakes = TRUE,

lakecolor = "rgba(173,216,230,0.3)"

),

margin = list(l = 0, r = 0, t = 0, b = 0),

font = list(family = "Gill Sans, sans-serif")

) %>%

config(displayModeBar = FALSE)

})

# Time series plot

output$timeSeriesPlot <- renderPlotly({

countries <- c("China", "United States", "Germany", "India", "Brazil", "Norway")

df <- filter(energy, country %in% countries)

events <- data.frame(

year = c(2011, 2014, 2015, 2021, 2022),

label = c("Fukushima", "China\nStrategy", "Paris\nAgreement", "China\nNet Zero", "US\nIRA"),

y\_pos = c(85, 90, 85, 90, 85),

color = "#66666640"

)

p <- plot\_ly()

# Event lines

for(i in seq\_len(nrow(events))) {

p <- p %>%

add\_trace(

x = c(events$year[i], events$year[i]),

y = c(0, 100),

type = 'scatter',

mode = 'lines',

line = list(color = events$color[i], width = 1, dash = 'dash'),

showlegend = FALSE,

hoverinfo = 'skip'

) %>%

add\_annotations(

x = events$year[i],

y = events$y\_pos[i],

text = events$label[i],

showarrow = FALSE,

font = list(size = 10, color = "#666666", family = "Gill Sans, sans-serif"),

bgcolor = "rgba(255,255,255,0)",

bordercolor = "rgba(0,0,0,0)",

yanchor = "bottom",

yshift = 5

)

}

# Country lines

last\_year\_data <- df %>%

group\_by(country) %>%

filter(year == max(year)) %>%

ungroup()

for(i in seq\_along(countries)) {

df\_country <- filter(df, country == countries[i])

p <- p %>%

add\_trace(

data = df\_country,

x = ~year,

y = ~renewables\_share\_elec,

name = countries[i],

type = 'scatter',

mode = 'lines',

line = list(width = 3, color = country\_colors[countries[i]]),

opacity = 0.9,

hovertemplate = paste0(countries[i], "<br>Year: %{x}<br>Renewable: %{y:.1f}%<br><extra></extra>"),

showlegend = FALSE

)

}

# End labels

p <- p %>%

add\_trace(

data = last\_year\_data,

x = ~year,

y = ~renewables\_share\_elec,

text = ~country,

type = 'scatter',

mode = 'text',

textposition = 'middle right',

textfont = list(

size = 11,

color = sapply(last\_year\_data$country, function(c) country\_colors[c]),

family = "Gill Sans, sans-serif"

),

showlegend = FALSE,

hoverinfo = 'skip'

)

p %>%

layout(

xaxis = list(

title = "Year",

gridcolor = "rgba(240,240,240,0.5)",

font = list(family = "Gill Sans, sans-serif", size = 12),

range = c(2000, max(df$year) + 2)

),

yaxis = list(

title = "Renewable Energy Share (%)",

range = c(0, 100),

gridcolor = "rgba(240,240,240,0.5)",

font = list(family = "Gill Sans, sans-serif", size = 12)

),

margin = list(l = 60, r = 100, t = 20, b = 40),

plot\_bgcolor = "rgba(255,255,255,0.8)",

paper\_bgcolor = "white",

font = list(family = "Gill Sans, sans-serif")

) %>%

config(displayModeBar = FALSE)

})

# Progress plot

output$progressPlot <- renderPlotly({

countries <- c("China", "United States", "Germany", "India", "Brazil", "Japan")

df\_comparison <- energy %>%

filter(country %in% countries, year %in% c(2000, input$year)) %>%

select(country, year, renewables\_share\_elec) %>%

pivot\_wider(names\_from = year, values\_from = renewables\_share\_elec, names\_prefix = "year\_") %>%

mutate(

change = get(paste0("year\_", input$year)) - year\_2000,

country = factor(country, levels = country[order(change)])

)

bar\_colors <- sapply(as.character(df\_comparison$country), function(c) country\_colors[c])

plot\_ly(df\_comparison) %>%

add\_trace(

x = ~change,

y = ~country,

type = 'bar',

orientation = 'h',

marker = list(

color = bar\_colors,

line = list(color = 'rgba(255,255,255,0.5)', width = 1)

),

opacity = 0.9,

text = ~paste0(round(change, 1), "%"),

textposition = "outside",

textfont = list(size = 10, family = "Gill Sans, sans-serif"),

hovertemplate = paste0("%{y}<br>Change: %{x:+.1f}%<br><extra></extra>")

) %>%

layout(

xaxis = list(

title = "Change (%)",

gridcolor = "rgba(240,240,240,0.5)",

font = list(family = "Gill Sans, sans-serif", size = 10)

),

yaxis = list(

title = "",

font = list(family = "Gill Sans, sans-serif", size = 10)

),

margin = list(l = 80, r = 40, t = 10, b = 30),

plot\_bgcolor = "rgba(255,255,255,0.8)",

paper\_bgcolor = "white",

font = list(family = "Gill Sans, sans-serif")

) %>%

config(displayModeBar = FALSE)

})

# Scatter plot

output$scatterPlot <- renderPlotly({

df <- yearData() %>%

filter(!is.na(co2\_intensity), co2\_intensity > 0) %>%

filter(co2\_intensity < quantile(co2\_intensity, 0.95, na.rm = TRUE))

fit <- lm(log10(co2\_intensity) ~ renewables\_share\_elec, data = df)

x\_range <- seq(0, 100, by = 1)

y\_pred <- 10^predict(fit, newdata = data.frame(renewables\_share\_elec = x\_range))

# Define watercolor palette for regions

region\_colors <- c(

"Africa" = "rgba(255, 179, 186, 0.7)", # Soft pink

"Americas" = "rgba(186, 225, 255, 0.7)", # Soft blue

"Asia" = "rgba(255, 223, 186, 0.7)", # Soft peach

"Europe" = "rgba(186, 255, 201, 0.7)", # Soft mint green

"Oceania" = "rgba(221, 186, 255, 0.7)" # Soft lavender

)

p <- plot\_ly() %>%

add\_trace(

x = x\_range,

y = y\_pred,

type = 'scatter',

mode = 'lines',

line = list(color = 'rgba(100,100,100,0.5)', width = 2, dash = 'dash'),

showlegend = FALSE,

hoverinfo = 'skip'

)

# Add each region as a separate trace to maintain consistent colors

for(region\_name in names(region\_colors)) {

df\_region <- df %>% filter(region == region\_name)

if(nrow(df\_region) > 0) {

p <- p %>%

add\_trace(

data = df\_region,

x = ~renewables\_share\_elec,

y = ~co2\_intensity,

type = 'scatter',

mode = 'markers',

name = region\_name,

marker = list(

size = ~sqrt(energy\_per\_capita),

sizemode = 'area',

sizeref = 2,

color = region\_colors[region\_name],

line = list(color = 'rgba(255,255,255,0.8)', width = 1)

),

text = ~paste0(country, "\n",

"Renewable: ", round(renewables\_share\_elec, 1), "%\n",

"CO₂: ", round(co2\_intensity, 0), " t/TWh"),

hoverinfo = "text"

)

}

}

p %>%

layout(

xaxis = list(

title = "Renewable Energy Share (%)",

range = c(-5, 105),

gridcolor = "rgba(240,240,240,0.5)",

font = list(family = "Gill Sans, sans-serif", size = 12)

),

yaxis = list(

title = "CO₂ Intensity (tonnes per TWh) - Log Scale",

type = "log",

gridcolor = "rgba(240,240,240,0.5)",

font = list(family = "Gill Sans, sans-serif", size = 12)

),

legend = list(

title = list(text = "Region", font = list(family = "Gill Sans, sans-serif", size = 11)),

font = list(family = "Gill Sans, sans-serif", size = 10),

bgcolor = "rgba(255,255,255,0.8)",

bordercolor = "rgba(200,200,200,0.5)",

borderwidth = 1

),

margin = list(l = 80, r = 20, t = 20, b = 60),

plot\_bgcolor = "rgba(255,255,255,0.8)",

paper\_bgcolor = "white",

font = list(family = "Gill Sans, sans-serif")

) %>%

config(displayModeBar = FALSE)

})

# Regional plot

output$regionalPlot <- renderPlotly({

df <- yearData() %>%

group\_by(region) %>%

summarise(

renewable\_avg = mean(renewables\_share\_elec, na.rm = TRUE),

.groups = 'drop'

) %>%

arrange(desc(renewable\_avg))

# Use same watercolor palette as scatter plot

region\_colors <- c(

"Africa" = "rgba(255, 179, 186, 0.7)", # Soft pink

"Americas" = "rgba(186, 225, 255, 0.7)", # Soft blue

"Asia" = "rgba(255, 223, 186, 0.7)", # Soft peach

"Europe" = "rgba(186, 255, 201, 0.7)", # Soft mint green

"Oceania" = "rgba(221, 186, 255, 0.7)" # Soft lavender

)

plot\_ly(df,

x = ~renewable\_avg,

y = ~reorder(region, renewable\_avg),

type = 'bar',

orientation = 'h',

marker = list(

color = sapply(df$region, function(r) region\_colors[r]),

line = list(color = 'rgba(255,255,255,0.5)', width = 1)

),

opacity = 0.9,

text = ~paste0(round(renewable\_avg, 1), "%"),

textposition = "outside",

textfont = list(size = 10, family = "Gill Sans, sans-serif"),

hovertemplate = paste0("%{y}<br>Average: %{x:.1f}%<br><extra></extra>")

) %>%

layout(

xaxis = list(

title = "Average Renewable %",

range = c(0, 60),

gridcolor = "rgba(240,240,240,0.5)",

font = list(family = "Gill Sans, sans-serif", size = 11)

),

yaxis = list(

title = "",

font = list(family = "Gill Sans, sans-serif", size = 11)

),

margin = list(l = 80, r = 40, t = 20, b = 40),

plot\_bgcolor = "rgba(255,255,255,0.8)",

paper\_bgcolor = "white",

font = list(family = "Gill Sans, sans-serif")

) %>%

config(displayModeBar = FALSE)

})

}

# Run Application

shinyApp(ui, server)

## style.css

/\* Global Energy Transition Dashboard \*/

/\* Base Settings \*/

\* {

box-sizing: border-box;

}

html, body {

height: 1080px;

width: 1920px;

overflow: hidden;

margin: 0;

padding: 0;

font-family: 'Gill Sans', sans-serif;

font-size: 14px;

color: #333333;

background-color: #ffffff;

}

/\* Layout Structure \*/

.wrapper {

height: 1080px !important;

width: 1920px !important;

overflow: hidden !important;

}

.content-wrapper, .right-side {

height: 1080px !important;

overflow: hidden !important;

margin-left: 250px !important;

background-color: rgba(250, 250, 250, 0.5);

}

/\* Header \*/

.main-header {

position: fixed;

width: 100%;

z-index: 1000;

}

.main-header .logo {

background-color: rgba(255, 255, 255, 0.95) !important;

color: #333333 !important;

font-weight: 400;

font-size: 19px;

letter-spacing: 0.5px;

border-bottom: 1px solid rgba(224, 224, 224, 0.5);

font-family: 'Gill Sans', sans-serif;

}

.main-header .navbar {

background-color: rgba(255, 255, 255, 0.95) !important;

margin-left: 250px !important;

border-bottom: 1px solid rgba(224, 224, 224, 0.5);

box-shadow: 0 2px 4px rgba(0, 0, 0, 0.05);

}

/\* Sidebar \*/

.main-sidebar {

height: 1080px !important;

position: fixed !important;

overflow-y: auto !important;

overflow-x: hidden !important;

background: linear-gradient(to bottom, rgba(248, 248, 248, 0.95), rgba(245, 245, 245, 0.9)) !important;

padding-top: 50px;

border-right: 1px solid rgba(224, 224, 224, 0.5);

}

.sidebar-menu > li > a {

color: #333333 !important;

padding: 12px 20px !important;

font-size: 14px;

font-weight: 400;

transition: all 0.3s cubic-bezier(0.4, 0, 0.2, 1);

font-family: 'Gill Sans', sans-serif;

}

.sidebar-menu > li.active > a,

.sidebar-menu > li > a:hover {

background-color: rgba(255, 255, 255, 0.9) !important;

border-left: 3px solid rgba(141, 211, 199, 0.9) !important;

padding-left: 17px !important;

transform: translateX(2px);

}

.sidebar-menu > li > a i {

margin-right: 10px;

font-size: 14px;

opacity: 0.7;

transition: opacity 0.3s ease;

}

.sidebar-menu > li:hover > a i {

opacity: 1;

}

/\* Dashboard Description \*/

.dashboard-description {

padding: 15px 20px;

margin: 10px 15px;

background-color: rgba(255, 255, 255, 0.7);

border-radius: 8px;

font-size: 13px;

line-height: 1.6;

color: #555555;

font-family: 'Gill Sans', sans-serif;

animation: fadeIn 0.8s ease-out;

}

/\* Content Area \*/

.content {

padding: 70px 20px 20px 20px !important;

height: calc(1080px - 50px) !important;

overflow: hidden !important;

}

.tab-content {

height: calc(100% - 20px) !important;

overflow: hidden !important;

}

.tab-pane {

height: 100% !important;

overflow: hidden !important;

}

/\* Year Container with Slider \*/

.year-container {

padding: 20px;

margin: 15px;

background-color: rgba(255, 255, 255, 0.85);

border: 1px solid rgba(224, 224, 224, 0.5);

border-radius: 8px;

box-shadow: 0 2px 6px rgba(0, 0, 0, 0.08);

animation: slideIn 0.6s ease-out;

position: relative;

}

.year-container h5 {

margin: 0 0 15px 0;

font-size: 12px;

font-weight: 600;

text-transform: uppercase;

letter-spacing: 0.5px;

color: #666666;

font-family: 'Gill Sans', sans-serif;

}

/\* Play button positioning \*/

.btn-play-slider {

position: absolute;

bottom: 20px;

left: 20px;

width: 35px;

height: 35px;

border-radius: 50%;

background-color: rgba(141, 211, 199, 0.8) !important;

border: 2px solid rgba(255, 255, 255, 0.9) !important;

color: white !important;

display: flex;

align-items: center;

justify-content: center;

cursor: pointer;

transition: all 0.3s cubic-bezier(0.4, 0, 0.2, 1);

box-shadow: 0 2px 6px rgba(0, 0, 0, 0.15);

padding: 0 !important;

font-size: 14px;

}

.btn-play-slider:hover {

background-color: rgba(141, 211, 199, 1) !important;

transform: scale(1.1);

box-shadow: 0 4px 12px rgba(0, 0, 0, 0.2);

}

.btn-play-slider:active {

transform: scale(0.95);

}

.btn-play-slider:focus {

outline: none !important;

box-shadow: 0 4px 12px rgba(0, 0, 0, 0.2) !important;

}

/\* Metric Container with light green for global average \*/

.metric-container {

padding: 20px;

margin: 15px;

background-color: rgba(51, 51, 51, 0.9);

color: #ffffff;

border-radius: 8px;

box-shadow: 0 3px 8px rgba(0, 0, 0, 0.12);

transition: all 0.3s ease;

animation: pulseIn 0.8s ease-out;

}

.metric-container.global-average {

background: linear-gradient(135deg, rgba(152, 251, 152, 0.25), rgba(144, 238, 144, 0.35));

color: #2d5a2d;

border: 1px solid rgba(152, 251, 152, 0.4);

}

.metric-container h5 {

margin: 0 0 10px 0;

font-size: 12px;

font-weight: 400;

text-transform: uppercase;

letter-spacing: 0.5px;

opacity: 0.8;

font-family: 'Gill Sans', sans-serif;

}

.global-average h5 {

color: #2d5a2d;

}

.metric-value {

font-size: 42px;

font-weight: 300;

line-height: 1;

margin-bottom: 5px;

font-family: 'Gill Sans', sans-serif;

animation: countUp 1s ease-out;

}

.metric-label {

font-size: 12px;

opacity: 0.8;

font-family: 'Gill Sans', sans-serif;

}

/\* Sidebar Footer \*/

.sidebar-footer {

position: absolute;

bottom: 120px;

left: 0;

right: 0;

padding: 15px 20px;

border-top: 1px solid rgba(224, 224, 224, 0.3);

background-color: rgba(255, 255, 255, 0.5);

}

.sidebar-footer p {

margin: 2px 0;

font-size: 11px;

color: #888888;

font-family: 'Gill Sans', sans-serif;

}

/\* Section Headers - Compact \*/

.section-header {

margin-bottom: 15px;

padding-bottom: 10px;

border-bottom: 1px solid rgba(224, 224, 224, 0.5);

animation: fadeInDown 0.6s ease-out;

}

.section-header h3 {

margin: 0 0 5px 0;

font-size: 24px;

font-weight: 400;

color: #333333;

font-family: 'Gill Sans', sans-serif;

}

.section-subtitle {

font-size: 15px;

color: #444444;

font-weight: 500;

line-height: 1.4;

margin-bottom: 6px;

font-family: 'Gill Sans', sans-serif;

}

.section-header p {

margin: 0 0 3px 0;

font-size: 13px;

color: #666666;

line-height: 1.4;

font-family: 'Gill Sans', sans-serif;

}

.section-description {

font-size: 12px !important;

color: #555555 !important;

font-style: italic;

margin-top: 6px !important;

background-color: rgba(245, 245, 245, 0.5);

padding: 8px 12px;

border-radius: 6px;

border-left: 3px solid rgba(141, 211, 199, 0.3);

}

/\* Note Box \*/

.note-box {

margin-top: 10px;

padding: 14px 20px;

background: linear-gradient(135deg, rgba(245, 245, 245, 0.6), rgba(240, 248, 255, 0.4));

border-left: 3px solid rgba(141, 211, 199, 0.7);

font-size: 13px;

color: #555555;

line-height: 1.7;

border-radius: 6px;

font-family: 'Gill Sans', sans-serif;

animation: slideInLeft 0.6s ease-out;

}

.note-box i {

margin-right: 8px;

opacity: 0.8;

color: rgba(141, 211, 199, 0.9);

}

/\* Visualization Containers - Compact \*/

.main-viz-container,

.viz-container {

background-color: rgba(255, 255, 255, 0.92);

border: 1px solid rgba(224, 224, 224, 0.3);

border-radius: 10px;

padding: 15px;

margin-bottom: 10px;

box-shadow: 0 4px 12px rgba(0, 0, 0, 0.08);

position: relative;

overflow: hidden;

animation: zoomIn 0.7s ease-out;

}

.viz-container.compact {

padding: 12px;

}

.viz-container h4 {

margin: 0 0 10px 0;

font-size: 14px;

font-weight: 600;

color: #333333;

text-transform: uppercase;

letter-spacing: 0.5px;

font-family: 'Gill Sans', sans-serif;

}

.viz-container h4 {

margin: 0 0 15px 0;

font-size: 16px;

font-weight: 600;

color: #333333;

text-transform: uppercase;

letter-spacing: 0.5px;

font-family: 'Gill Sans', sans-serif;

}

/\* Stat Boxes \*/

.stat-box {

background: linear-gradient(135deg, rgba(255, 255, 255, 0.9), rgba(250, 250, 250, 0.8));

border: 1px solid rgba(224, 224, 224, 0.3);

border-radius: 10px;

padding: 30px;

text-align: center;

margin-bottom: 20px;

box-shadow: 0 3px 10px rgba(0, 0, 0, 0.08);

transition: all 0.4s cubic-bezier(0.4, 0, 0.2, 1);

animation: bounceIn 0.8s ease-out;

}

.stat-box:hover {

background: linear-gradient(135deg, rgba(141, 211, 199, 0.15), rgba(141, 211, 199, 0.08));

border-color: rgba(141, 211, 199, 0.4);

transform: translateY(-5px);

box-shadow: 0 8px 20px rgba(0, 0, 0, 0.12);

}

.stat-value {

font-size: 36px;

font-weight: 300;

color: #333333;

margin-bottom: 5px;

font-family: 'Gill Sans', sans-serif;

transition: color 0.3s ease;

}

.stat-box:hover .stat-value {

color: #2d5a2d;

}

.stat-label {

font-size: 13px;

color: #666666;

text-transform: uppercase;

letter-spacing: 0.5px;

font-family: 'Gill Sans', sans-serif;

}

/\* Events Timeline Strip \*/

.events-strip {

background: linear-gradient(to right, rgba(245, 245, 245, 0.8), rgba(250, 250, 250, 0.8));

border-radius: 10px;

padding: 20px;

margin: 15px 0;

box-shadow: 0 2px 8px rgba(0, 0, 0, 0.06);

animation: expandIn 0.8s ease-out;

}

.events-strip h4 {

margin: 0 0 20px 0;

font-size: 16px;

font-weight: 600;

color: #333333;

text-transform: uppercase;

letter-spacing: 0.5px;

font-family: 'Gill Sans', sans-serif;

text-align: center;

}

.events-grid {

display: grid;

grid-template-columns: repeat(auto-fit, minmax(250px, 1fr));

gap: 15px;

padding: 0 10px;

}

.event-card {

background: rgba(255, 255, 255, 0.9);

border-left: 4px solid rgba(141, 211, 199, 0.8);

border-radius: 6px;

padding: 15px;

box-shadow: 0 2px 4px rgba(0, 0, 0, 0.05);

transition: all 0.3s ease;

animation: fadeInUp 0.6s ease-out;

}

.event-card:hover {

transform: translateY(-2px);

box-shadow: 0 4px 8px rgba(0, 0, 0, 0.1);

background: rgba(141, 211, 199, 0.1);

}

.event-year-card {

font-size: 14px;

font-weight: 700;

color: #2d5a2d;

margin-bottom: 4px;

font-family: 'Gill Sans', sans-serif;

}

.event-title-card {

font-size: 13px;

font-weight: 600;

color: #333333;

margin-bottom: 6px;

font-family: 'Gill Sans', sans-serif;

}

.event-desc-card {

font-size: 12px;

color: #555555;

line-height: 1.5;

font-family: 'Gill Sans', sans-serif;

}

/\* Insights Container - Compact \*/

.insights-container {

background: linear-gradient(135deg, rgba(255, 255, 255, 0.95), rgba(245, 250, 245, 0.9));

border: 1px solid rgba(224, 224, 224, 0.3);

border-radius: 10px;

padding: 15px 20px !important;

margin-top: 10px;

box-shadow: 0 4px 12px rgba(0, 0, 0, 0.08);

animation: fadeInUp 0.8s ease-out;

}

.insights-container h4 {

margin: 0 0 10px 0;

font-size: 15px;

font-weight: 600;

color: #2d5a2d;

text-transform: uppercase;

letter-spacing: 0.5px;

font-family: 'Gill Sans', sans-serif;

text-align: left;

}

.insight-box {

background-color: rgba(255, 255, 255, 0.7);

padding: 10px 15px;

border-radius: 8px;

border: 1px solid rgba(141, 211, 199, 0.2);

}

.insight-box p {

margin: 0 0 8px 0;

font-size: 13px;

line-height: 1.5;

color: #444444;

font-family: 'Gill Sans', sans-serif;

}

.insight-box p:last-child {

margin-bottom: 0;

}

.insight-box strong {

color: #2d5a2d;

font-weight: 600;

}

.conclusion {

margin-top: 20px !important;

padding-top: 20px;

border-top: 1px solid rgba(141, 211, 199, 0.3);

font-style: italic;

}

/\* Slider Styling - Enhanced with ruler marks \*/

.irs--shiny {

font-family: 'Gill Sans', sans-serif;

height: 75px;

margin-bottom: 20px;

}

.irs {

margin-top: 25px;

}

.irs-bar {

background: linear-gradient(to right, rgba(255, 200, 100, 0.6), rgba(141, 211, 199, 0.8)) !important;

border: none !important;

height: 8px !important;

top: 30px !important;

border-radius: 4px;

}

.irs-bar-edge {

background: rgba(141, 211, 199, 0.8) !important;

border: none !important;

border-radius: 4px 0 0 4px;

}

.irs-handle {

background: rgba(141, 211, 199, 0.95) !important;

border: 3px solid rgba(255, 255, 255, 0.95) !important;

box-shadow: 0 3px 8px rgba(0, 0, 0, 0.25) !important;

width: 26px !important;

height: 26px !important;

top: 21px !important;

cursor: grab;

transition: all 0.2s ease;

}

.irs-handle:hover {

background: rgba(141, 211, 199, 1) !important;

transform: scale(1.1);

}

.irs-handle:active {

cursor: grabbing;

transform: scale(0.95);

}

.irs-single {

background: rgba(141, 211, 199, 0.9) !important;

color: #ffffff !important;

font-size: 13px !important;

padding: 4px 10px !important;

font-family: 'Gill Sans', sans-serif;

border-radius: 4px;

font-weight: 600;

top: 0px !important;

}

.irs-grid {

height: 27px !important;

}

.irs-grid-pol {

background: rgba(150, 150, 150, 0.4) !important;

height: 10px !important;

width: 1px !important;

top: 37px !important;

}

.irs-grid-pol.small {

height: 5px !important;

top: 40px !important;

}

.irs-grid-text {

color: #555555 !important;

font-size: 11px !important;

font-family: 'Gill Sans', sans-serif;

bottom: 15px !important;

font-weight: 500;

}

/\* Box Styling \*/

.box {

border: none !important;

box-shadow: none !important;

background-color: transparent !important;

margin-bottom: 0 !important;

}

.box-header {

display: none !important;

}

.box-body {

padding: 0 !important;

}

/\* Remove Plotly Modebar \*/

.plotly .modebar {

display: none !important;

}

/\* Scrollbar \*/

::-webkit-scrollbar {

width: 10px;

height: 10px;

}

::-webkit-scrollbar-track {

background: rgba(245, 245, 245, 0.5);

border-radius: 5px;

}

::-webkit-scrollbar-thumb {

background: linear-gradient(to bottom, rgba(141, 211, 199, 0.6), rgba(141, 211, 199, 0.4));

border-radius: 5px;

border: 1px solid rgba(255, 255, 255, 0.3);

}

::-webkit-scrollbar-thumb:hover {

background: linear-gradient(to bottom, rgba(141, 211, 199, 0.8), rgba(141, 211, 199, 0.6));

}

/\* Watercolor effect overlays \*/

.main-viz-container::before,

.viz-container::before {

content: '';

position: absolute;

top: -50%;

left: -50%;

right: -50%;

bottom: -50%;

background-image:

radial-gradient(circle at 20% 80%, rgba(141, 211, 199, 0.08) 0%, transparent 50%),

radial-gradient(circle at 80% 20%, rgba(255, 220, 180, 0.06) 0%, transparent 50%),

radial-gradient(circle at 40% 40%, rgba(190, 186, 218, 0.06) 0%, transparent 50%);

pointer-events: none;

z-index: 1;

transform: rotate(-5deg);

}

/\* Content should be above watercolor overlay \*/

.main-viz-container > \*,

.viz-container > \* {

position: relative;

z-index: 2;

}

/\* Animations \*/

@keyframes fadeIn {

from {

opacity: 0;

}

to {

opacity: 1;

}

}

@keyframes fadeInDown {

from {

opacity: 0;

transform: translateY(-20px);

}

to {

opacity: 1;

transform: translateY(0);

}

}

@keyframes fadeInUp {

from {

opacity: 0;

transform: translateY(20px);

}

to {

opacity: 1;

transform: translateY(0);

}

}

@keyframes slideIn {

from {

opacity: 0;

transform: translateX(-20px);

}

to {

opacity: 1;

transform: translateX(0);

}

}

@keyframes slideInLeft {

from {

opacity: 0;

transform: translateX(-30px);

}

to {

opacity: 1;

transform: translateX(0);

}

}

@keyframes zoomIn {

from {

opacity: 0;

transform: scale(0.95);

}

to {

opacity: 1;

transform: scale(1);

}

}

@keyframes bounceIn {

0% {

opacity: 0;

transform: scale(0.3);

}

50% {

opacity: 1;

transform: scale(1.05);

}

70% {

transform: scale(0.95);

}

100% {

transform: scale(1);

}

}

@keyframes expandIn {

from {

opacity: 0;

transform: scaleX(0.8);

}

to {

opacity: 1;

transform: scaleX(1);

}

}

@keyframes pulseIn {

0% {

opacity: 0.6;

transform: scale(0.98);

}

50% {

opacity: 0.8;

transform: scale(1.02);

}

100% {

opacity: 1;

transform: scale(1);

}

}

@keyframes countUp {

from {

opacity: 0;

transform: translateY(10px);

}

to {

opacity: 1;

transform: translateY(0);

}

}

/\* Apply staggered animations to elements \*/

.stat-box:nth-child(1) { animation-delay: 0.1s; }

.stat-box:nth-child(2) { animation-delay: 0.2s; }

.stat-box:nth-child(3) { animation-delay: 0.3s; }

.event-compact:nth-child(1) { animation: fadeInUp 0.6s ease-out 0.1s both; }

.event-compact:nth-child(2) { animation: fadeInUp 0.6s ease-out 0.2s both; }

.event-compact:nth-child(3) { animation: fadeInUp 0.6s ease-out 0.3s both; }

.event-compact:nth-child(4) { animation: fadeInUp 0.6s ease-out 0.4s both; }

.event-compact:nth-child(5) { animation: fadeInUp 0.6s ease-out 0.5s both; }

.event-compact:nth-child(6) { animation: fadeInUp 0.6s ease-out 0.6s both; }

.event-compact:nth-child(7) { animation: fadeInUp 0.6s ease-out 0.7s both; }

/\* Responsive adjustments for 1920x1080 \*/

.row {

margin-left: -10px;

margin-right: -10px;

}

.col-sm-1, .col-sm-2, .col-sm-3, .col-sm-4, .col-sm-5, .col-sm-6,

.col-sm-7, .col-sm-8, .col-sm-9, .col-sm-10, .col-sm-11, .col-sm-12 {

padding-left: 10px;

padding-right: 10px;

}

/\* Clean table styling \*/

.table {

font-size: 13px;

border: 1px solid rgba(224, 224, 224, 0.3);

font-family: 'Gill Sans', sans-serif;

}

.table-striped > tbody > tr:nth-of-type(odd) {

background-color: rgba(250, 250, 250, 0.5);

}

.table-hover > tbody > tr:hover {

background-color: rgba(141, 211, 199, 0.1);

}

/\* Ensure plotly plots fill their containers \*/

.plotly {

width: 100% !important;

height: 100% !important;

}

/\* Additional polish \*/

h3, h4, h5 {

text-shadow: 1px 1px 2px rgba(0, 0, 0, 0.05);

}

/\* Make sure all text uses Gill Sans \*/

\* {

font-family: 'Gill Sans', sans-serif !important;

}

/\* Final touches for publication quality \*/

.main-viz-container,

.viz-container {

backdrop-filter: blur(2px);

}

/\* Smooth transitions for all interactive elements \*/

a, button, input, select, .stat-box, .event-compact {

transition: all 0.3s cubic-bezier(0.4, 0, 0.2, 1);

}

/\* Print-ready adjustments \*/

@media print {

.main-sidebar, .main-header {

display: none !important;

}

.content-wrapper {

margin-left: 0 !important;

}

\* {

animation: none !important;

transition: none !important;

}

}