A5 Report

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1) Motivation

Problem

Climate policy reporting often requires comparing a reference country (Austria) to other countries to communicate patterns clearly to a broad audience. Data journalists need a tool that supports fast comparisons, highlights contradictions in policy signals, and provides both overview and explainable detail.

Users and tasks (from A4)

This implementation targets the **Data Journalist** user group and supports the tasks defined in A4:

- **J1 — Compare Austria's climate-change indicators to other countries.**
- **J2 — Compare discrepancy between environmental taxes and environmental protection expenditures (taxes − expenditures).**
- **J3 — Analyze the relationship between fossil fuel subsidies and environmental taxes across countries.**

Selected design and why

I implemented **Dashboard (Data Journalists) — Design 3** from A4 (also consistent with the DJ_final sketch): a **single-page 2×2 linked dashboard** with:

1. Scatter plot: subsidies vs taxes
2. Indicator comparison panel (small multiples)
3. Discrepancy line chart (taxes − expenditures)
4. Detail bar chart (taxes vs expenditures for a selected year)

Why this design:

- It maps directly to **J1–J3** without requiring complex interactions.
- It fits the A5 constraints: **no scrolling**, **no tabs**, **no pop-up views**, and it avoids dropdowns/sliders unless justified.
- It supports journalistic "overview → select → explain" workflows through linked views.

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2) Prototyping / Design process

Implementing the sketch on real data led to concrete changes driven by data availability, usability constraints, and A4 feedback.

What can be found in the data using the dashboard

With the linked views, users can:

- Identify countries that look contradictory in policy signals (e.g., relatively high **subsidies** together with high **taxes**) using the scatter plot.
- Compare Austria's trajectories (temperature anomaly, disasters, taxes) against a selected country or the world average to find diverging trends.
- Inspect whether the **tax–expenditure gap** widens or narrows over time, and select a year to explain the gap using raw tax/expenditure values.

Data issues encountered (and how they changed the design)

(1) Different coverage across datasets and years

- Real data has missing values and inconsistent time spans across countries and across indicators.
- **Design consequence:** missing values are treated as missing (not plotted as zero). Lines and scatter points are only shown when values exist.

(2) Choosing a single year for the scatter plot

- The sketch implies a “single-year comparison”, but the “latest year” is not always shared by both taxes and subsidies.
- **Design consequence:** the dashboard chooses a scatter year automatically by selecting the year that maximizes the number of countries that have **both** subsidies and taxes in that year (ties prefer the latest year). The chosen year is shown in the scatter subtitle.

(3) Small-multiples readability on real screen sizes

- A 2×2 dashboard is space constrained; legends and axes can overlap.
- **Design consequence:** legends were moved out of each SVG into a top bar to prevent overlap. Axis tick density adapts to available width.

Visualization ideas that didn’t work (or were intentionally excluded)

- **CO_2 emissions** were mentioned in A4 ideation for the DJ dashboard, but the provided A5 data folder does not include a CO_2 dataset. To keep the implementation consistent with available data, I used **disaster frequency** as the third indicator in the indicator panel.
- **Sea-level change** was considered (A4 mentioned it as optional), but Austria is landlocked and including sea-level would create frequent “no data” comparisons that reduce clarity for the Austria-centered journalistic narrative.
- **Animation** (auto-playing years) was avoided because it is not required for J1–J3 and is easy to overuse without strong justification (an A5 pitfall).

Changes made from A4 design/report (what, how, why)

These changes were made explicitly to incorporate A4 feedback and to meet A5 “common pitfalls” requirements:

1. **Country selection: dropdown → search + direct click**

- **What changed:** instead of a dropdown, the dashboard uses a search/autocomplete input (top-left) and clicking on scatter points.
- **How:** typing filters a short suggestion list; selecting a suggestion sets the global selected country; clicking a dot does the same.
- **Why:** A4 feedback noted dropdowns become cumbersome with many countries, and A5 warns against dropdown menus without strong justification. Search supports known-item lookup efficiently.

2. **Guidance for the workflow (making usage self-explanatory)**

- **What changed:** a short “Tip” line is visible in the header describing the intended interaction flow.
- **How:** the header text updates based on whether a country is selected.
- **Why:** A4 feedback emphasized making the workflow obvious and avoiding situations where users must read a lot to understand what to do.

3. **Legend placement to avoid overlap**

- **What changed:** legends were moved outside the plot areas (into a top bar) for the indicator panel and lower charts.
- **How:** the SVGs only contain axes and marks; legends render in HTML above.
- **Why:** improves readability and prevents label/legend overlap in tight layouts.

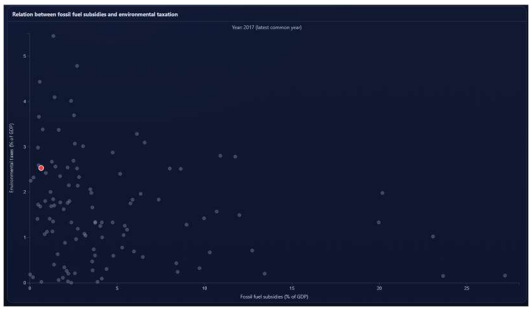
4. **Time-window control for indicator readability (no slider)**

- **What changed:** added quick window buttons (20y/30y/35y/Full) for the indicator panel.
- **How:** the indicator lines are clipped to the selected recent window.
- **Why:** supports reading recent trends without introducing a slider (an A5 pitfall) and improves interpretability on small screens.

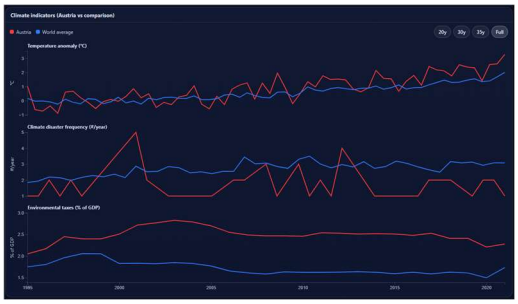
5. **Reset behavior (consistent state)**

- **What changed:** Reset clears country selection, year selection, and restores indicator window to Full.
- **How:** a single store reset updates all views.
- **Why:** predictable “overview mode” return supports rapid journalistic exploration.

https://abdo.at/uni/25_WS_VIS/A5/

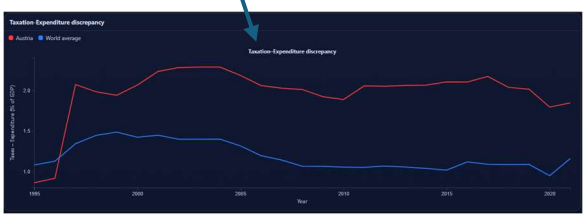


A) Scatter plot — Relation between fossil fuel subsidies and environmental taxes

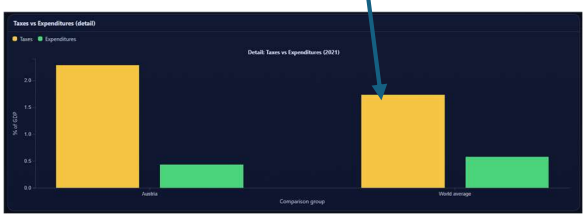


B) Climate indicators panel

Figure 1: Final dashboard



C) Discrepancy view



D) Detail bar chart

3) Implementation details

Visible views (A–D) and their functionality

A) Scatter plot — Relation between fossil fuel subsidies and environmental taxes

- Encodes each country as a dot:
    - x-axis: fossil fuel subsidies (% of GDP)
    - y-axis: environmental taxes (% of GDP)
- Austria is highlighted; a selected country is highlighted.
- Hover tooltip shows country name and exact values.
- Click selects a country and updates panels B–D.
- **Supports:** J3 (primary), J1 (contextual positioning of Austria)

B) Climate indicators panel — small multiple line charts (Austria vs comparison)

- Compares Austria against **World average** (overview) or against a **selected country** (detail) for:
    - temperature anomaly (°C)
    - climate-related disaster frequency (#/year)
    - environmental taxes (% of GDP)
- Time window buttons (20y/30y/35y/Full) to improve readability.
- Hover shows exact year/value.
- **Supports:** J1

C) Discrepancy view — Taxes − Expenditures line chart

- Shows the derived discrepancy over time for Austria and the comparison group.
- Click on the chart selects a year (visual marker) and updates panel D.
- Hover shows discrepancy values.
- **Supports:** J2 (primary), J1 (policy context)

D) Detail bar chart — Taxes vs Expenditures for a selected year

- Shows raw values (taxes and expenditures) for Austria and the comparison group for the selected year.
- Updates on country selection (panel A/search) and year selection (panel C).
- Hover shows exact values.
- **Supports:** J2 (detail-on-demand explanation)

How the implementation addresses the tasks

J1:

- Panel B provides indicator trend comparisons (Austria vs world average / selected country).
- The comparison group updates immediately based on selection (search or scatter click).

J2:

- Panel C encodes the time-series discrepancy (taxes − expenditures).

- Clicking in panel C selects a year; panel D shows the underlying taxes and expenditures for that year to support explanation.

J3:

- Panel A encodes cross-country relationship between subsidies and taxes.
- Austria is visually emphasized; selection is linked to the other panels.

Technical decisions

- **Technology:** D3.js (v7) with Vite for bundling.
- **Data model:** CSV "wide format" years are parsed into {year, value} series per country.
- **World baseline:** computed as an unweighted mean across countries with available values for each year.
- **Comparability:** financial indicators are shown as **% of GDP** (taxes, expenditures, subsidies), matching the selected unit in the datasets.
- **Missing values:** never shown as 0; marks are omitted when data is missing.

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4) Discussion

What I learned

- Sketches hide real issues: data completeness and mismatched time coverage strongly affect what "default" views should show.
- Readability is a design constraint: legends, axis density, and responsive layout decisions can be as important as the chosen chart types.
- Linked views improve narrative: selecting a country and a year supports a journalist's need to move from overview to explainable evidence quickly.

What I would do differently next time

- Provide a clearer data-coverage indicator (e.g., number of countries represented in the scatter year).
- Consider a weighted world baseline (e.g., by population or GDP) if appropriate for the reporting context.
- Add a controlled multi-country comparison mode (limited to 2–3) for story framing, while keeping the UI simple.

Can users solve the defined tasks?

- **Yes for J1–J3:** all tasks are supported with direct interactions (select country, select year, hover for details), and the charts are linked so the workflow remains coherent.

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5) Conclusion

This project implemented a single-page, linked 2×2 dashboard for data journalists to compare Austria's climate-policy and climate indicators against other countries. The system supports J1–J3 via coordinated multiple views (scatter, indicator trends, discrepancy trend, and year-level detail), while explicitly avoiding common A5 pitfalls such as scrolling, tabs, dropdowns/sliders, and misleading handling of missing values.

AI usage statement

AI (GitHub Copilot) was used in this assignment for exploring ideas, iterate on usability issues, help with D3 difficulties and for organizing text