

Action for climate Datatelling Methodology

The Action4Climate Datatelling Methodology is developed as part of the Action4Climate.eu initiative, a collaborative effort **to empower youth and climate communicators with effective tools to combat misinformation and drive action for climate solutions**. This methodology provides practical guidance on **how to turn raw climate data into compelling, fact-based narratives that engage audiences and inspire change**.

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Project number: 2024-1-ES02-KA210-YOU-000253895



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List of abbreviations

This section provides a list of abbreviations used in the Action4Climate Datatelling Methodology to ensure clarity and ease of reference.

General Abbreviations

- CO₂ – **Carbon Dioxide**
- IPCC – **Intergovernmental Panel on Climate Change**
- NASA – **National Aeronautics and Space Administration**
- NOAA – **National Oceanic and Atmospheric Administration**
- UNDP – **United Nations Development Programme**
- UNEP – **United Nations Environment Programme**
- UNFCCC – **United Nations Framework Convention on Climate Change**
- EU – **European Union**
- EACEA – **European Education and Culture Executive Agency**
- GIZ – **German Corporation for International Cooperation**
- MoEPP – **Ministry of Environment and Physical Planning**
- EEA – **European Environment Agency**
- GHG – **Greenhouse Gas**
- SDGs – **Sustainable Development Goals**
- WHO – **World Health Organization**
- WWF – **World Wide Fund for Nature**

Data & Visualization Tools

- GIS – **Geographic Information System**
- Power BI – **Microsoft Business Intelligence Tool**
- Tableau – **Data Visualization Software**
- Python – **Programming Language for Data Analysis**
- Matplotlib – **Python Library for Data Visualization**
- Seaborn – **Statistical Data Visualization Library**
- Flourish – **Online Data Visualization Platform**
- Google Earth Engine – **Satellite Data Analysis Tool**



- Carbon Mapper – **Emissions Tracking Platform**
- CODAP – **Common Online Data Analysis Platform**
- Datawrapper – **Online Data Visualization Tool**

Projects & Initiatives Referenced

- #SkopjeSeZagreva – **Open-Source Climate Data Platform in Skopje**
- Youth Climate Declaration – **Youth-led Climate Advocacy**
- Satélites DIY – **Citizens Measuring Climate Data**
- TRANSFORM – **Gamifying garbage disposal and awareness**
- Challenger App – **Digital Gamification for Sustainable Actions**
- Reverse Vending Machines – **Recycling Incentive System**
- Another Way Film Festival – **Cinema for Climate Awareness**
- The Future is Now – **Youth Consultations for Policy Impact**
- BIVO Movement – **Community Energy Innovation**
- Inspiring Young Minds (CONNECT Project) – **Science-Based Storytelling for Schools)**
- From Nature to Art (Youth Festival) – **Environmental Education through Creative Arts)**
- Perception of Climate Change Survey – **Public Awareness Study in North Macedonia**
- Climate Stripes – **Temperature Visualization Initiative**
- Climate Time Machine – **NASA's Interactive Climate Change Visualization**
- The Guardian's Investigation on Wildfires – **Journalistic Data Storytelling)**
- Patagonia's 'The Art of Activism' – **Emotional Appeal Storytelling**



Executive Summary

Climate change affects everyone, but the way we communicate climate data determines how people engage with it. The Action4Climate Datatelling Methodology equips young climate communicators, activists, and policymakers with the tools to transform raw data into compelling, fact-based stories that inspire action.

Imagine a young activist who wants to raise awareness about rising temperatures in their city. Instead of sharing complex graphs, they tell the story of a woman living on the top floor of an old apartment building who struggles to sleep during heatwaves because her home turns into an oven at night – and then support it with real climate data. This combination of storytelling and data makes the message more relatable, impactful, and persuasive.

This methodology provides a clear, step-by-step guide to:

- **Helping young people tell data-driven climate stories** – Ensuring their perspectives and experiences influence climate action.
- **Finding and verifying reliable climate data** – Combating misinformation with fact-based storytelling.
- **Turning numbers into engaging narratives** – Using proven storytelling techniques like the Hero's Journey and Problem-Solution storytelling.
- **Making climate data accessible and engaging** – Helping young people and the public visualize climate information in ways that are easy to understand and interact with.



Key Sections

- Section 1: What is Data Storytelling? – How it helps debunk misinformation, engage audiences, and drive action.
- Section 2: Data in Storytelling – Where to find reliable climate data, how to fact-check it, and how to interpret trends.
- Section 3: Turning Data into a Story – Techniques to create compelling, action-driven climate stories.
- Section 4: Visualizing Data – Best practices for making climate data more understandable through visuals and interactive tools.
- Section 5: Step by Step guide turning Data into a Story
- Section 6: Data Storytelling Toolkit – Ready-to-use templates, exercises, and tools for crafting impactful climate narratives.

Through real-world case studies—like SkopjeSeZagreva and the Perception of Climate Change in North Macedonia—this methodology highlights how youth-led projects and open data visualization can influence policy, raise awareness, and drive change.

By integrating youth voices into climate storytelling, we can bridge the gap between climate science and public understanding—making data not just informative, but transformative.

1. What is Data Storytelling?

1.1 Definition of Data Storytelling

At its core, data storytelling is the process of turning climate data into compelling, fact-based narratives that people can understand, relate to, and act upon. It bridges the gap between scientific findings and public engagement by combining three key elements:

- **Data** – The facts, numbers, and statistics that provide evidence.
- **Narrative** – A clear, structured story that gives context and meaning to the data.
- **Visualization** – Charts, maps, and images that make complex information easier to grasp.

For example, instead of simply stating that global temperatures have risen by 1.2°C since pre-industrial times, a well-crafted story might describe how this increase has led to more extreme heatwaves, affecting specific communities. This transformation of raw numbers into meaningful stories makes climate science more accessible and actionable.

1.2 Why Use Data Storytelling?

Data storytelling is not just about presenting numbers—it's about using data to change minds, clarify misconceptions, and drive real-world action. **In climate communication, it plays a vital role in making complex information more accessible and actionable.**

1.2.1 Debunking Misinformation

Misinformation about climate change spreads quickly, making it difficult for people to distinguish between credible information and false claims.

Data storytelling helps counter this by:

- Providing verifiable facts **in a structured and engaging way**.
- Making scientific findings accessible **to the general public**.
- Encouraging critical thinking **by linking data with real-world events**.

Example:

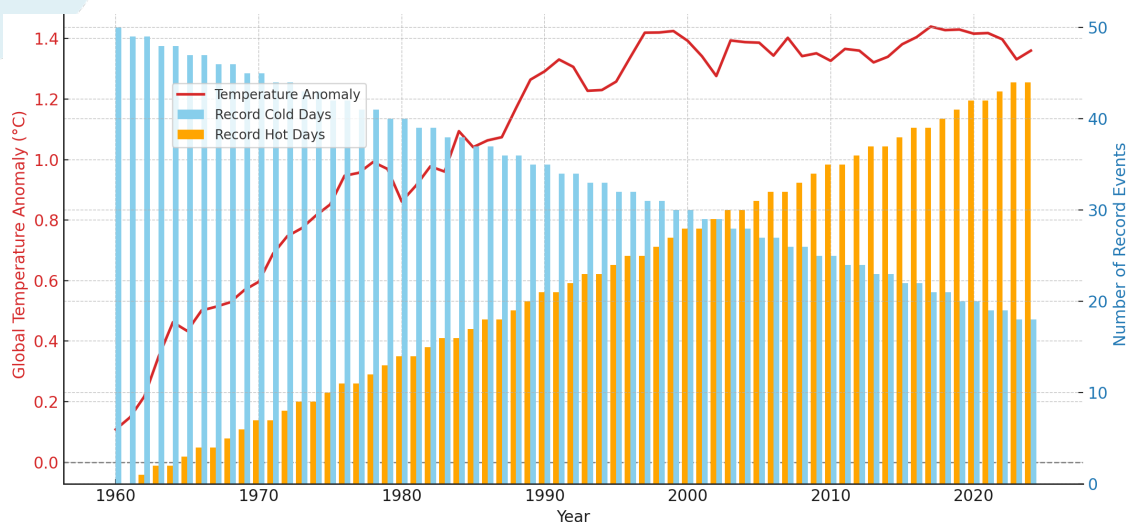
Misleading Claim: "Global warming is a myth—winters are still cold."

Data Storytelling Response: A story + visual trend analysis **showing that while extreme cold events still happen**, global temperatures have consistently increased over decades.

"In January 2023, a city in Eastern Europe experienced a rare cold snap, with temperatures dropping to -15°C . Headlines quickly claimed that "global warming must be a myth." But climate scientists explained: **a few cold days don't disprove decades of warming** — just like one rainy day doesn't mean the desert isn't dry.

To put it simply: **cold weather still happens**, but it's becoming **less frequent and less intense**, while **record-breaking heatwaves are becoming the new normal**."

Graph 1: Global Temperature Rise vs. Record Temperature Events



How Data Storytelling Helps:

- Simplifies complex climate data **so it's harder to manipulate.**
- Uses real-life examples and case studies **to make facts more relatable.**
- Frames data in a way that is accessible **to people without scientific backgrounds.**

1.2.2 Engage Your Audience

People are more likely to connect with a personal story than a list of statistics.

Data storytelling helps frame climate change in ways that feel immediate and personal.

Example: **A report says that** sea levels have risen by 3.3 mm per year since 1993.

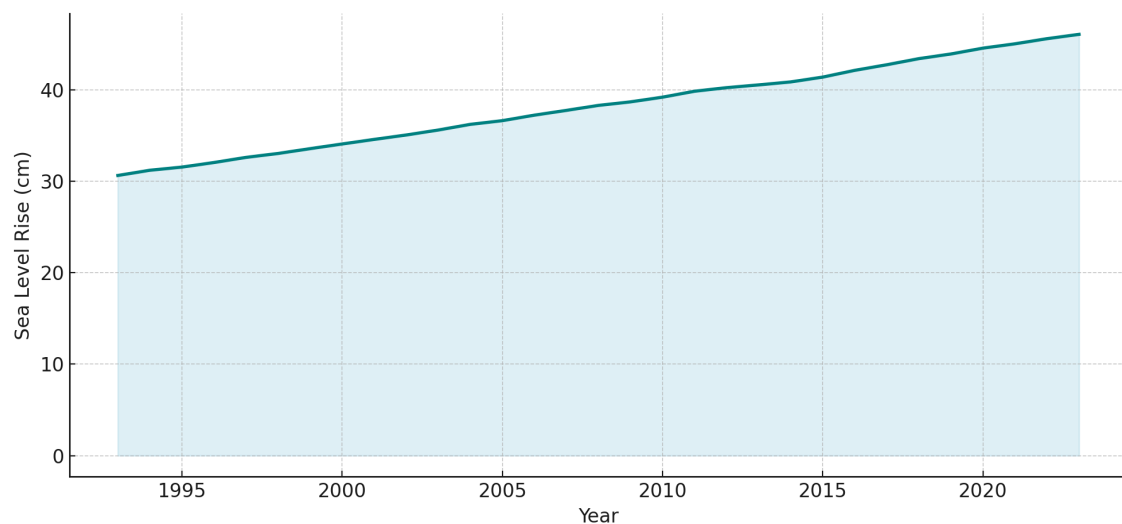
Data Storytelling Alternative: **“Meet Maria**, a 24-year-old from the Maldives. For generations, her family lived in a small coastal village where the ocean was part of daily life — a source of food, culture, and connection. But over the past decade, things began to change.

Each year, the tides crept higher. First, their garden flooded. Then their drinking water became salty. And finally, one monsoon season, a storm surge swept through their home, forcing Maria's family to evacuate.

Now, they live inland — not by choice, but by necessity. Maria studies environmental science, driven by a personal mission: to make sure her story isn't repeated.

Her story is not just about one island or one family — it's about a global crisis already reshaping life."

Graph2: Sea Level Rise in the Maldives (1993–2023, Mock Data)



How Data Storytelling Helps:

- Appeals to emotions—**people care more when they see the human impact.**
- Makes abstract numbers tangible **by linking them to real-world consequences.**
- Encourages deeper engagement—**people are more likely to share stories than graphs.**

1.2.3 Get People to Act

Facts alone rarely drive change. People are more likely to act when they see the human impact behind the numbers. **Data storytelling turns climate insights into compelling calls to action by:**

- Presenting solutions, not just problems.
- Showing the effectiveness of climate action through real-world examples.
- Empowering individuals with knowledge on how they can contribute.

Example:

Meet Marko, a 21-year-old university student in Skopje who was always passionate about climate action but unsure how to make a difference in his daily life. One day, he took part in a sustainability challenge on campus: eat plant-based meals for 30 days.

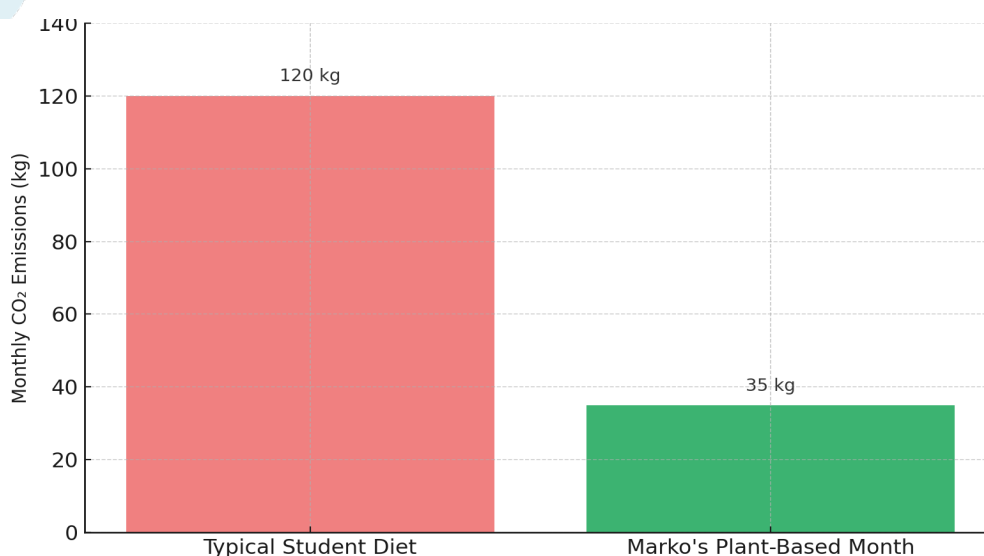
At first, he was sceptical — would it be too expensive or too complicated? But he quickly discovered that local beans, lentils, fresh veggies, and pasta made for easy, delicious meals.

He even started cooking with friends, turning it into a weekly activity. At the end of the challenge, participants used an app to calculate their climate impact.

Marko **alone saved an estimate 85 kg of CO₂ in just one month** — about the same as leaving his laptop running non-stop for an entire year.

More importantly, he felt empowered: “It’s not about perfection. It’s about progress — and knowing that my plate can be part of the solution.”

Grp3: Monthly Dietary CO₂ Emissions: Marko's Climate Challenge



How Data Storytelling Helps:

- Shows actionable solutions **instead of overwhelming people with problems.**
- Inspires behavioural change **by making solutions feel achievable.**
- Mobilizes movements **by giving climate advocates powerful communication tools.**

1.3 Data Visualization vs. Data Storytelling

Although data visualization and data storytelling are closely related, they serve different purposes.

Feature	Data Visualization	Data Storytelling
Goal	Presents data in a structured visual format	Transforms data into a compelling story
Approach	Static, analytical	Dynamic, emotional, and action-driven
Engagement	Focuses on clarity and precision	Focuses on emotional connection, persuasion and impact
Tools	Charts, graphs, infographics	Narrative structures + visual elements

Example:

- Data Visualization: **A line graph showing rising CO₂ emissions**
- Data Storytelling: **A multimedia story showing how increased CO₂ has affected a specific community, including personal testimonies and before-after imagery.**

Think of Data Visualization as the ‘What’ and Data Storytelling as the ‘Why.’
Visualization makes data readable. Storytelling makes data impactful.

2. Data in Storytelling

Data is the backbone of any credible climate story. However, not all data is created equal. Understanding where to source accurate, unbiased, and up-to-date data is critical for avoiding misinformation and ensuring reliability.

This section guides you through primary and secondary data sources, techniques for research and verification, and best practices for interpreting climate data accurately.

2.1 Where Do We Get Our Data From?

Before crafting a compelling data story, we need accurate and credible data. There are two main types of data sources:

Type	Definition	Examples
Primary Sources	Data collected directly from first-hand research.	Interviews, surveys, field experiments, citizen science.
Secondary Sources	Data that has already been collected and analysed by others.	Climate reports, scientific papers, government databases, media articles.

2.1.1 Primary Data Sources

Primary data is collected firsthand and is often more specific to your storytelling needs. It allows for greater control over quality but requires more effort.

Examples of Primary Data Collection for Climate Storytelling:

- Interviews – Talking to local farmers about drought effects.
- Surveys – Gathering public opinions on air pollution.
- Experiments – Measuring temperature variations in urban vs. rural areas.
- Citizen Science – Engaging communities in tracking plastic pollution.

Example: A journalist interviews a small island community facing rising sea levels, turning personal testimonies into a data-driven narrative about displacement.

2.1.2 Secondary Data Sources

Secondary data is pre-existing data that provides a broader context for your story. It is often collected by governments, research institutions, and NGOs.

Table 1. Reliable Secondary Sources for Climate Data

Source	What it provides	How to use it in Storytelling
NASA (climate.nasa.gov)	Global temperature trends, satellite imagery, CO ₂ levels	Use visual graphs of temperature rise over decades to support warming trends
IPCC Reports (ipcc.ch)	Scientific assessments of climate change and projections	Cite expert-reviewed findings on emissions and policy recommendations



UNEP (unep.org)	Environmental reports, biodiversity loss, pollution data	Highlight connections between human activity and environmental impact
NOAA (ncdc.noaa.gov)	Historical climate data, ocean and weather patterns	Show changing weather trends and their effects on local communities
European Environment Agency (eea.europa.eu)	Data on air quality, greenhouse gas emissions in Europe	Compare pollution levels between different regions using real-time data
World Bank Open Data (data.worldbank.org)	Climate finance, energy use, development indicators	Illustrate how climate change disproportionately affects developing nations
Climate Watch (climatewatchdata.org)	Country-level emissions, climate targets, policies	Show how different countries are progressing toward climate commitments
Google Earth Engine (earthengine.google.com)	Satellite-based environmental monitoring	Use before-and-after images of deforestation or urban expansion
Carbon Brief (carbonbrief.org)	In-depth climate policy and scientific analysis	Use fact-checked reports to debunk misinformation
Local Government & Meteorological Agencies	Regional climate trends and weather events	Provide localized data for community-based climate stories
Scientific Journals (Nature, Science, PNAS, etc.)	Peer-reviewed climate research and studies	Use cutting-edge science to explain climate phenomena
Our World in Data (ourworldindata.org)	Interactive climate graphs, CO ₂	Embed dynamic visualizations to



	emissions, renewable energy data	support sustainability narratives
Climate Feedback (https://science.feedback.org)	Fact-checking climate-related news	Verify claims and debunk climate misinformation



Example: **A storyteller might use** NASA temperature data **to back up a** story about heatwaves, **linking the statistics with** human experiences of extreme heat.

2.1.3 Checklist for Reliable Data Sources

Before using data, **verify its reliability by asking:**

- ✓ Who collected the data? (Is the source reputable?)
- ✓ Is the data recent? (Outdated data can be misleading.)
- ✓ What methodology was used? (Check for bias or errors.)
- ✓ Are there conflicts of interest? (Watch for corporate or political influence.)
- ✓ Can the data be cross-checked? (Compare with other sources.)

Example: If you find a news article stating, “Climate change is not real”, check:

- Who published it? (Is it a known misinformation source?)
- Does it cite scientific studies or anonymous opinions?
- Can it be verified using NASA, IPCC, or peer-reviewed research?

2.2 How Do You Research & Verify Data?

To ensure credibility, follow a structured approach to data collection and fact-checking.

Step-by-Step Guide to Researching Climate Data

1. **Define Your Topic** – What climate issue are you covering? (e.g., wildfires, air pollution)
2. **Identify Data Sources** – Look for government reports, scientific studies, and expert opinions.
3. **Check for Bias & Credibility** – Who funded the research? What are their motivations?
4. **Compare Multiple Sources** – Cross-check data across 2–3 independent sources.
5. **Look at the Full Dataset** – Avoid cherry-picking data that fits only one side of the story.
6. **Check Data Accuracy** – Does the data align with known trends and expert analyses?
7. **Use Fact-Checking Tools** – Websites like Climate Feedback help verify climate claims.

Example:

A social media post claims, “Wind turbines kill thousands of birds every year, making them worse than fossil fuels”.

- Step 1: Check a peer-reviewed study on wind turbine impacts.
- Step 2: Compare with data from environmental agencies.
- Step 3: Fact-check using Climate Feedback or a scientific database.
- Conclusion: Wind turbines do kill birds, but at a much lower rate than fossil fuels (which contribute to habitat destruction and climate-driven species loss).

2.3 How Do You Interpret Data?

Once you have reliable data, interpreting it correctly is crucial to avoid misinformation.

Trends, Patterns & Correlations

- Look for long-term trends, not single events.
- Identify seasonal patterns (e.g., heatwaves increasing over decades).
- Find correlations, but don't mistake them for causation.



Avoid Misleading Interpretations: Causation vs. Correlation A common mistake in data storytelling is confusing correlation with causation.

Example:

- A graph shows rising global temperatures and an increase in ice cream sales.
- Misleading Interpretation: "Ice cream causes global warming."
- Reality: Both are influenced by a third factor—hot weather.

Guidelines for Correct Data Interpretation:

- ✓ **Does the pattern repeat over time?** (One heatwave $\neq$ global warming)
- ✓ **Are there other possible explanations?** (Economic factors, policy changes, etc.)
- ✓ **Is the comparison fair?** (Comparing a hot year to a cold year can be misleading.)

3. Turning Data into a Story



Once you have the right data, the next challenge is turning it into a compelling story. A well-structured narrative helps make data more relatable and memorable. Whether you want to inspire activism, inform policymakers, or educate the public, storytelling structures can enhance your impact.



This section explores different storytelling approaches, case studies of successful climate narratives, and a step-by-step guide to crafting impactful data stories.

3.1 Case Studies of Impactful Climate Stories

Real-world examples demonstrate the power of climate storytelling. Here are three successful cases:

1. Greta Thunberg's Story (The Hero's Journey)
 - A teenager starts a school strike for climate change in Sweden.

- Her story spreads globally, inspiring millions of students to join Fridays for Future.
 - Why it worked: Personal journey, emotional connection, clear message.
2. The Great Pacific Garbage Patch (Problem–Solution Narrative)
- Scientists discovered a massive plastic waste accumulation in the ocean.
 - The story led to global awareness and initiatives like The Ocean Cleanup Project.
 - Why it worked: Presented a clear problem (ocean pollution) and a solution (cleaning efforts).
3. Australia’s 2019 Bushfires (Emotional Appeal)
- News agencies shared images of injured animals and destroyed homes.
 - Social media amplified stories of survivors and rescue efforts.
 - Why it worked: Evoked strong emotions, leading to mass donations and policy discussions.

3.2 Case Studies from Partner Countries

As part of the Action4Climate initiative, project partners from North Macedonia, Spain, and Cyprus contributed real-world stories demonstrating the power of climate storytelling to drive awareness and change. These stories show how young people, communities, and creative campaigns have brought climate topics closer to the public through personal narratives, participatory initiatives, and artistic expressions.

3.2.1 🇲🇰 North Macedonia

- 🇲🇰 **Youth Climate Declaration** (Youth-led Climate Advocacy)

Story: Young activists in North Macedonia drafted the **Youth Climate Declaration, advocating for** youth-led climate policies. **Their storytelling**



approach used compelling data, personal testimonies, and a clear call for systemic change.

Why It Worked:

- ✓ Policy-focused storytelling – **Framed as** a youth movement backed by scientific data
 - ✓ Strong engagement – **Mobilized** hundreds of young people through workshops and social media
 - ✓ Real impact – **Contributed to national discussions on climate education.**
- 

- 🇲🇰 **Challenger App** (Gamifying Climate Action)

Story: The Challenger App in North Macedonia **gamifies sustainable behaviour, encouraging users to complete** eco-friendly challenges (e.g., **reducing plastic waste, saving energy**). **The app integrates** live data tracking, **leaderboards, and** storytelling-driven engagement.

Why It Worked:

- ✓ Data-driven storytelling – Users saw their CO₂ impact decrease in real-time
 - ✓ Behavioural change through storytelling – **Combined** narrative elements **with** scientific facts
 - ✓ Youth-centred approach – **Designed to engage** Gen Z audiences **through digital storytelling.**
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- 🇲🇰 **Reverse Vending Machines** (Recycling Incentives)

Story: A campaign in Skopje introduced reverse vending machines, **rewarding users for** depositing plastic bottles **with discounts or public transport credits.** **The** data storytelling aspect **showed** visual dashboards of collective recycling impact, **making the** story of local action tangible.

Why It Worked:

- ✓ Tangible climate action – **Real-world tracking of** plastic reduction in kg.
- 

- ✓ Visual & interactive storytelling – **Used** infographics and data dashboards **to engage users.**
- ✓ Scalable model – **Could be replicated in other cities based on** measurable impact stories.

3.2.2 🇪🇸 Spain

- 🇪🇸 **Another Way Film Festival** (Cinema for Climate Awareness)

Story: The 6-person team organises several movie screenings and showcases **all around Spain, both online and in person formats, with the topic of** climate development and sustainability **as their main focus. Their cycles also create spaces for** discussion, supplementary activities and the development of positive-change ideas through citizen participation.

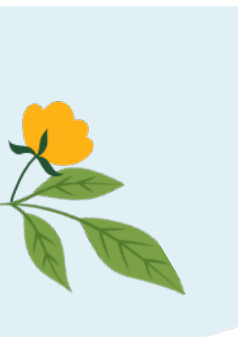
Why it worked:

- ✓ Popular approach to technical topics – **By using movies produced by** professionals and climate activists, **they can explain the climate narrative and action possibilities in an easier way.**
- ✓ Focused engagement – **They search to ally themselves with** specific citizen groups, corporations and governments **to reach out to different clusters of people. In the case of youngsters, they have allied several times with the** Fridays for Another Future **organization.**
- ✓ Impact promotion – **While just exploring climate action through a form of art, the collective has given several tools to engage in it with** programmed activities and participation.

- 🇪🇸 **The Future is Now** (Youth Consultations for Policy Impact)

Story: A group of over 13.000 young Spanish people **were inquired and promoted to contribute in a public participation process (surveys, focus groups, citizen meetings...), in order to** elevate their concerns regarding climate change and action to public agencies.

Why it worked:

- 
- ✓ Policy-focused storytelling – **Stated as a way to** unite the youth movement with politicians all across the State **and being backed by scientific methodologies.**
 - ✓ Engagement – **It has gathered the opinion, feelings and ideas of** thousands of youngsters, **and transformed them into feasible and practical results.**
 - ✓ Youth-centred actions – **While trying to influence both policies and policy-makers, all actions have been created with young people at their centre; bringing the former to Gens Y and Z offline and online spaces, such as** podcasts or festivals.
- 

- **BIVO Movement** (Community Energy Innovation)

Story: The BIVO movement tries to promote both responsible and alternative energy consumption by creating gadgets, machines and collective power generators in the capital of Spain. **The movement also promotes this alternative access to energy as a way to alleviate climate emergencies.**

Why it worked:

- 
- ✓ Simple solutions to bigger problems – **By using dynamos and generators in bicycles or fitness equipment (just to name a few) BIVO has created a** collaborative network among the citizens of Madrid, **where some people produce free energy that others in need may need.**
 - ✓ Active participation – **The leading group is** opened to anyone and any idea, **as long as it contributes to a better world, the preservation of life and environment, and the creation of devices that anyone can use.**
 - ✓ Community-oriented – **Young people are highly valued in the movement for their ideas, but also to establish** durable changes within the urban space. **Therefore,** they encourage all people from 18-30 **to create and use their devices as a way of promoting a different and more sustainable lifestyle.**
- 

3.2.3 🇨🇵 Cyprus

- 🇨🇵 **Inspiring Young Minds (CONNECT Project)** (Science-Based Storytelling for Schools)

Story: On November 2nd, 2023, the Youth Empowerment Foundation visited Agios Andreas K.B. Primary School in Nicosia as part of the **CONNECT project** ("Cyprus ON a mission to Engage, inspire and Connect with citizens through the European Researchers' Night"), led by the **Research and Innovation Foundation (IδEK)**. The visit was part of a broader initiative **to celebrate World Cities Day** and introduce the role of researchers to young students.

Through interactive storytelling and visual materials, students learned how science and research **help address real-world problems**, such as climate change, urban sustainability, and pollution. The team **encouraged students to explore how they can contribute to building greener cities** whether through recycling, protecting biodiversity, or simply asking questions and staying curious.

Why It Worked:

- ✓ Making science relatable – **By connecting research to real-life urban and environmental challenges, students could clearly see how science affects their world.**
- ✓ Hands-on youth engagement – **The session involved storytelling, Q&As, and open discussions, helping children actively participate rather than passively listen.**
- ✓ Seeding behavioural change – **Teachers noted increased interest in environmental topics. Students also started identifying "problems" in their neighbourhoods and brainstorming creative solutions.**

-  **From Nature to Art (Youth Festival)** (Environmental Education through Creative Arts)

Story: On September 23rd, 2023, as part of the 7th Up to the Youth Festival in Nicosia, the **Youth Empowerment Foundation organized a creative environmental activity to help children connect with nature in a playful and meaningful way.** Set in a local park, the activity **invited children to collect natural materials** like leaves, small branches, and stones, which they then used **to paint rocks and create eco-collages.**

This hands-on, nature-based approach offered children an opportunity to engage with environmental themes while stimulating their creativity. The initiative **encouraged both reflection and action** – using only what nature provides, without waste, and transforming it into meaningful art.

Why It Worked:

- ✓ Nature-based storytelling – **Children expressed their thoughts and feelings about nature through art made from natural materials, turning environmental awareness into something personal and tangible.**
- ✓ Youth-centred festival setting – **Being part of the Youth Festival ensured high participation, a joyful atmosphere, and strong community engagement.**
- ✓ Environmental education through creativity – **Without lectures or slides, the activity offered a first step into climate awareness for young children by engaging their senses and imagination.**

✓

3.3 Choosing the Right Narrative Structure

Different stories require different structures. Here are four effective narrative approaches:



Narrative structure	Best for...	Example
The Hero's Journey	Empowering individuals	Greta Thunberg's activism, The Youth Climate Declaration
The Problem-Solution Narrative	Highlighting challenges & solutions	The Ocean Cleanup Project, Reverse Vending Machines
The Data-Driven News Story	Presenting facts with objectivity	IPCC Climate Reports, Challenger App
The Emotional Appeal Story	Making an emotional impact	Australia's Bushfires, Plastic Pollution Awareness Campaigns



3.4 Breakdown of Narrative Structures

1. The Hero's Journey (Empowering Individuals)

The Hero's Journey follows a central character who faces obstacles, learns, and emerges stronger.

Example: A Climate Activist

- 
- Call to Action: **A young student discovers how plastic waste is harming local marine life.**
 - The Challenge: **She struggles to convince her school to eliminate single-use plastics.**
 - The Transformation: **With persistence, she creates a campaign that leads her school to adopt sustainable policies.**

Why it works: Inspires individuals to take action, showing that one person can make a difference.

Another Example: The Youth Climate Declaration, where young activists-built momentum for policy changes through grassroots climate storytelling.

2. The Problem-Solution Narrative (Challenges & Solutions)



This structure presents a clear issue and a proposed solution.

Example: Climate Adaptation in Cities

- The Problem: **Rising urban temperatures lead to deadly heatwaves.**
 - The Solution: **Cities introduce** cool roofs, tree planting, and water retention systems.
 - The Impact: **The initiative lowers city temperatures and improves air quality.**
- 

Why it works: Shows that solutions exist and can be implemented with effort.

Another Example: Reverse Vending Machines use data to incentivize recycling. The solution is immediate and measurable, making it easy for people to take action.

3. The Data-Driven News Story (Journalistic Approach)

This is an objective, fact-based approach that explains climate trends.

Example: Climate Migration

- Introduction: **1.2 billion people may become climate refugees by 2050.**
 - Data & Evidence: **Reports from IPCC, UNHCR, and local case studies.**
 - Conclusions: **The need for stronger climate adaptation policies and international cooperation.**
- 

Why it works: Provides credibility and appeals to decision-makers.

Another Example: The Challenger App, which uses data storytelling to show real-time CO₂ reductions, engaging audiences in a fact-based yet action-driven way.

4. The Emotional Appeal Story (Human Experiences)

Emotion-driven stories create deep connections.





Example: Families Affected by Climate Change

- The Character: **A farmer in sub-Saharan Africa struggling with drought.**
 - The Struggle: **Crop failures lead to food insecurity and forced migration.**
 - The Call to Action: **Readers are urged to support climate adaptation efforts.**
- 

Why it works: People relate to personal experiences more than abstract data.

Another Example: The Youth Climate Declaration, where young leaders' personal stories connected with policymakers, making their advocacy more powerful.

4. Visualizing Data

Visuals are powerful tools in data storytelling. Studies show that **people process visuals 60,000 times faster than text, making them essential for effective communication.**

This section covers **how to match data visualization with storytelling goals, select the right charts and infographics, and avoid common visualization mistakes** that could distort your message.

4.1 How Do We Communicate Data Narratives?

A well-designed visualization helps:

- ✓ Simplify complex information – **makes data accessible to broader audience**
 - ✓ Highlight key insights – **focuses attention on the most critical data points.**
 - ✓ Enhance engagement – **focuses attention on the most critical data points.**
 - ✓ Increase credibility – **shows clear, evidence-backed claims.**
- 



✦ Example: **Instead of stating, "Deforestation in the Amazon increased by 30% last year,"** a before-and-after satellite image **of the Amazon makes the message far more compelling.**

4.2 Matching Visualization with Storytelling Goals

The type of visualization should align with the story you're telling **and the** audience you're targeting.

Storytelling Goal	Best Visualization type	Example
Show trends over time	Line graph, bar chart	Rising global temperatures over 100 years
Compare categories	Bar chart, grouped columns	CO ₂ emissions by country
Show geographic impact	Maps (heatmaps, choropleth)	Deforestation areas in the Amazon
Demonstrate cause & effect	Flowchart, Sankey diagram	How fossil fuel subsidies impact carbon emissions
Illustrate scale differences	Infographics, treemaps	Carbon footprint of meat vs. plant-based diets
Engage audiences emotionally	Photos, GIFs, animations	Melting glaciers over decades

Example:

A simple line graph **might show** global CO₂ concentration over decades, **while a** time-lapse animation of a melting glacier **can** visually emphasize urgency.

4.3 What Chart, Map, Infographic, or Animation?

Choosing the right format depends on the data type and the message.

 **Charts** (Best for Trends & Comparisons)

- Line Chart – **Tracking global temperature rise over time.**

- Bar Chart – **Comparing CO₂ emissions by country.**
- Scatter Plot – **Showing the relationship between CO₂ levels and temperature increases.**

Maps (Best for Geographic Data)

- Choropleth Map – **Air pollution levels by country.**
- Heatmap – **Areas most affected by rising sea levels.**
- Google Earth Engine – **Satellite imagery of deforestation.**

Infographics (Best for Scale & Proportion)

- Pie Charts/Treemaps – **Sources of greenhouse gas emissions.**
- Illustrated Infographics – **Step-by-step impact of climate policies.**

Animations & Interactive Data (Best for Engagement)

- GIFs – **Time-lapse of Arctic ice loss.**
- Sankey Diagram – **Visualizing energy flow from fossil fuels to CO₂ emissions.**
- Interactive Dashboards – **Allowing users to explore climate trends.**

Example:

Instead of saying "80% of deforestation is linked to agriculture," an interactive treemap **can show how** different agricultural commodities (soy, beef, palm oil) contribute to deforestation.

4.4 Case Study: SkopjeSeZagreva – Data-Driven Climate Visualization

Overview

The #SkopjeSeZagreva project is an **innovative initiative** that **leverages open data and interactive visualization to combat air pollution** in Skopje. Created in response to serious pollution levels, this open-source dashboard provides



real-time insights into household heating habits, allowing both policymakers and the public to make data-driven decisions.

Background: Identifying the Problem

In January 2017, **a comprehensive field study was conducted** by UNDP, the City of Skopje, and the Ministry of Environment and Physical Planning to understand **how households heated their homes**. The study covered 5,044 households across Skopje and revealed that **household heating was the single largest contributor to air pollution in the Skopje Valley**.

Specifically:

- A large percentage of homes relied on solid fuels (wood, coal), **significantly increasing harmful emissions**.
- **Socio-economic factors influenced energy choices**, with lower-income households more likely to use polluting heating sources.
- **There was a clear need for targeted policy measures**, such as subsidies for cleaner energy solutions and more efficient urban heating systems.

The Visualization Approach: Turning Data into Action



SmartUp took on the **challenge of transforming this complex dataset** into an **accessible, interactive visualization**. Using **Microsoft Power BI**, the team developed an **open-access dashboard** that allows users to:

- **Filter heating data** by demographics, municipality, heating source and household income.
 - **Compare different heating scenarios** to assess their contribution to air pollution.
 - **Identify areas in need of targeted interventions**, such as subsidies or infrastructure improvements.
 - **Enable policymakers to develop data-backed air pollution strategies**.
- 



The interactive visualization not only presented raw data but allowed for scenario modelling, giving stakeholders **a dynamic tool for informed decision-making**.

Impact & Policy Implications

Since its launch, #SkopjeSeZagreva **has played an** important role in policy formation and environmental awareness, **providing essential insights for:**

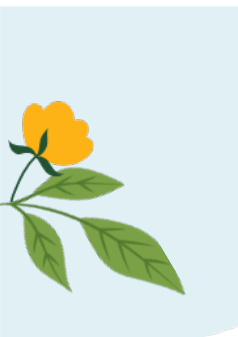
- **City-wide Pollution Reduction Strategies** – Policymakers now have access to real-time data on household heating habits, helping them prioritize neighbourhoods for intervention.
- **Subsidy Allocation** – By filtering the data, officials can target financial support towards low-income households using high-pollution heating methods.
- **Public Engagement & Education** – Citizens can explore the impact of heating choices, fostering awareness and behavioural change.
- **Climate Resilience Planning** – The platform offers long-term insights into how air quality policies evolve over time.

Why This Approach Works

- ✓ **Data-Driven Storytelling** – Instead of overwhelming users with raw statistics, the visualization presents a clear, engaging, and interactive narrative about heating and pollution.
- ✓ **Transparency & Open Data** – Ensuring that everyone—from policymakers to concerned citizens—has access to the same data for informed decision-making.
- ✓ **Scenario-Based Decision Making** – Allows for simulations of different policy interventions, helping leaders assess potential outcomes before implementation
- ✓ **Replicability & Scalability** – The methodology and visualization tools used in this project can be replicated in other cities facing similar air pollution challenges.

Example Use Cases

- **Targeting Subsidies More Effectively** – Policymakers can filter by municipality to see where wood and coal heating are most prevalent,
- 



ensuring that subsidies for cleaner heating solutions reach the households that need them the most.

- **Tracking Policy Impact Over Time** – Environmental agencies can monitor trends and adjust policies as new data becomes available.
 - **Engaging Communities in Data-Driven Advocacy** – Local activists can use the platform to push for better climate policies by showing evidence-backed pollution trends.
- 

Read more about the project here: [SkopjeSeZagreva](#)

How to Apply This to Your Storytelling:

- For policy advocacy → **Use** interactive dashboards **to** visualize policy impact and demand action.
- For public engagement → **Allow users to** interact with data **to make it** personal and actionable.
- For climate activism → **Show** real-time regional pollution data **to drive awareness and mobilization.**

4.5 Case Study: Understanding Public Perception of Climate Change in North Macedonia

Overview



UNDP and the Ministry of Environment and Physical Planning (MoEPP) **conducted the Perception of Climate Change (2021) survey** to assess public awareness, behavioural trends, and engagement with climate-related issues in North Macedonia. The survey, completed by 3,089 respondents, provided **critical insights into how the public perceives climate risks, the effectiveness of climate communication strategies, and the role of various stakeholders in climate action.**

Key Findings from the Survey

Climate Change as a Priority Issue



- **The** lack of clean drinking water **(60%) and** climate change (59%) **ranked as** bigger societal threats than crime, corruption, or infectious diseases.
- 96% of respondents recognized the importance of climate action, **with many seeing it as a** collective responsibility of government, businesses, and citizens.

Awareness & Behavioural Gaps

- 11% of respondents **stated they are** not sufficiently informed about climate change impacts.
- 18% lacked knowledge on how to take climate action, **highlighting a need for** better outreach and engagement strategies.
- 27% of respondents did not know how to adapt to climate change, **showing a gap in education on** resilience and adaptation measures.

Role of Digital Communication

- **The internet and social media** were the most common sources of climate information, while **traditional media (TV, newspapers)** had lower engagement.
- Government websites and specialized climate portals (klimatskipromeni.mk) **were underutilized as information sources**, suggesting a need for stronger digital visibility and outreach.

Public Perception of Stakeholder Engagement

- **Respondents** felt that neither the government, local authorities, nor businesses were doing enough **for climate change action**.
- Private corporations (68%) and the central government (62%) **were seen as the least engaged actors in fighting climate change**.
- NGOs and international organizations (UNDP, USAID, GIZ) **were** recognized as leaders **in climate awareness campaigns**.

The Visualization Approach: Interactive Online Data Platform



To enhance accessibility and engagement, survey results were made available through an interactive online platform ([Perception of Climate Change 2021](#)).

This platform enables:

- ✓ **Filtering survey responses** by age, gender, location, and employment sector.
- ✓ **Comparing different behavioural trends** to tailor climate policies and campaigns.
- ✓ **Identifying gaps in public awareness and areas** for targeted communication efforts.

Impact & Policy Implications

Since its launch, the survey data has informed multiple climate action strategies, including:

- Targeted Awareness Campaigns → **Addressing** knowledge gaps on climate adaptation **by focusing outreach on** citizens who feel uninformed.
- Green Transition Measures → **Data helped shape** subsidy programs for clean heating, energy efficiency, and renewable energy adoption.
- Climate Education Initiatives → **Survey findings** highlighted the lack of climate education in schools, **leading to** recommendations for curriculum updates.

Why This Approach Works

- ✓ Data-Backed Storytelling – **The survey findings are** quantified and visualized, **making the insights** compelling for decision-makers
 - ✓ Interactive Visualization – **The online platform allows** customized data exploration, **enhancing accessibility**.
 - ✓ Behavioural Insights – **Understanding** who is most (and least) informed about climate change **enables** more effective outreach strategies.
- 

Example Use Cases

- **Enhancing Climate Communication** – The survey identified that social media is the best platform for youth engagement, while structured reports work better for policymakers.
- **Improving Public Participation** – Data revealed a growing interest in climate action, suggesting that interactive citizen participation tools could enhance involvement.
- **Shaping Climate Education Policies** – Results showed a lack of climate topics in education, leading to proposals for integrating sustainability into school curriculums.

Read more about the project here: [Perception of Climate Change 2021](#)

How to Apply This to Your Storytelling

- For audience engagement → **Use** behavioural insights from surveys **to tailor** storytelling approaches.
- For policy advocacy → **Present survey data** in compelling, interactive formats **to influence** policy discussions.
- For education & awareness → **Use real public perception trends** to design targeted awareness campaigns.

4.6 Case Study: Satélites DIY – Citizens Measuring Climate Data

Overview

The Satélites DIY is a project driven by a small group of people that tries to unite both the knowledge around several climate factors and topics, and the participation of citizens interested in them. **The main aim of the project is to allow people to know how to measure aspects such as CO2 levels, acoustic contamination, etc., while creating ‘cansats’: satellites the size of a soda can.**



The information gathered by these little satellites is later transformed into useful information **that can be used in decision-making processes.**

Background: Identifying the Problem

The project was created in 2018 in Madrid, after taking into account two main factors: firstly, the information regarding the environment **that could be gathered in the city was not always on demand, and the devices in charge of measuring it was not always operative due to malfunctions and disconnections. Secondly, that the** public visualization models are not always the most adequate ones, **creating illiteracy situations where people would not understand the data they were looking at.**

With these two key issues on hand, the group decided to focus on the following proposals:

- The study of data that could be used to help citizens to know how well their city is in terms of environmental coverage and climate action, **comparing them to the levels exposed in treaties, climate and sustainability conventions, etc.**
- **The clear target of** filling the data-voids that some of the public devices have created, **with special focus on contamination, as well to create narratives that can be understood by anyone.**

The Visualization Approach: Turning Data into Action

Satélites DIY started giving an education to those who wanted to participate: **not only in how to create these little satellites, but also** coding and data visualization. **Using Open-source software, the team has developed a way to transform usual data results into more digestible ones, allowing any collaborator to:**

- ✓ Transform into a graph or scale the results given by their satellite. Compare their environmental asset levels to both the official results and historic ones.
- 

- 
- ✓ Identify areas with worse levels with mapping technology, **such as pollution or acoustic contamination zones.**

The interactive visualization **enforces easiness over raw data, encouraging the use of** maps and GIS **to create the most dynamic way of viewing the results given by the satellites. As a bonus, the project itself promotes the upload of the results to the transparency websites of the city.**



Impact & Policy Implications

Even if it's a community-oriented program, **Satélites DIY plays an important role regarding data and technology democracy, since it has proved that there is no need for a huge investment of complicated processes in order to obtain quality results. Some of the uses that those results have been used for are:**

- **District-wide Pollution Strategies** – Since there is more data, and especially since it is gathered by citizens, there are now more possibilities to engage in social change and to promote a more positive-climate solutions within the urban area.
 - **Public Engagement & Education** – Citizens can explore their neighbourhoods and city as a professional would watch, promoting empowerment and the chance to influence the urban development.
 - **Democracy though data**– The project allows people to compare and see for themselves if their public offices are working on what is needed or if their focus are sifted towards something else.
- 

Why This Approach Works

- ✓ **Action-Reaction** – The project not only offers data, but the data is a consequence of the own actions of the people participating. This kind of engagement has been proven more useful countless of times, making the people participating researchers of their own.
- 

- ✓ **Transparency & Open Data** – Ensuring that everyone—from policymakers to concerned citizens—has access to the same data for informed decision-making.
- ✓ **Replicability** – The project is constantly being promoted both in their website and in public spaces. There is also enough feedback through the group that anyone can replicate one of these satellites without participating directly in the project.

Example Use Cases

- Targeting Issues More Effectively
- Tracking Data Over Time
- Engaging Communities in Data-Driven Advocacy
- Community Participation

Read more about the project here: [Satelites DIY](#)

4.7 Case Study: TRANSFORM – Gamifying garbage disposal and awareness

Overview

The TRANSFORM project is a European initiative aimed at **involving citizens in political decision-making through innovative participatory methodologies**. In Mollet del Vallès, Catalonia, a citizen science pilot was implemented **to improve the municipal selective waste collection system**. A digital game called **"Dilemma R" was co-created** to educate citizens about innovative waste collection systems (smart containers and door-to-door collection) and to gather their preferences and barriers to implementation. Sixty students from four local educational centers participated, along with their families and other citizens, contributing 402 valid responses. The results helped identify trends and guide the city council in decision-making regarding the new waste collection system.

Background: Identifying the Problem

The project was created in 2021, after reviewing the waste data of the city. The selective waste collection rate in Mollet del Vallès was 39%, far below the European target of 55% by 2025. This gap **highlighted the need for a more efficient and community-accepted system.**

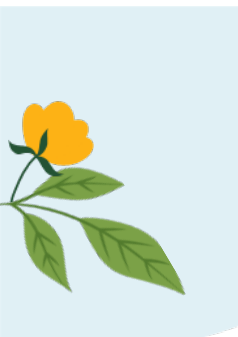
To ensure the success of any changes in the waste collection model, the Mollet del Vallès City Council sought to integrate citizen input from the design phase, avoiding potential resistance and increasing the effectiveness of the new system. There were two main ideas regarding the project:

- Citizen science methodology **was considered ideal for gathering data in a participatory and educational way, fostering public engagement in waste management.**
- The project also aimed to align with European regulations **and circular economy principles, promoting waste reduction and reuse at the municipal level.**

The Visualization Approach: Turning Data into Action

The data collected through the "Dilemma R" game was analyzed and presented in a detailed report and through the very same game that included:

- ✓ Statistics **on citizens' preferences regarding different waste collection systems.**
- ✓ Identification of barriers **and resistance to the implementation of new models.**
Recommendations **to improve acceptance of innovations in the waste collection system.**
- ✓ **Proposals for informational and educational campaigns to** raise public awareness. **The City Council used this data to develop policies**



tailored to local needs, ensuring a smoother implementation of the new waste collection system.

The visualization and interaction of the project, using a videogame that all people knew since the beginning of it, granted even better results than with the regular paper or report. It also created another advantage with the youngest people, since it could be use as a learning tool in schools, and not only as a way to improve the garbage disposal system.



Impact & Policy Implications

The main impact of the project was the increased citizen knowledge regarding environmental awareness, which also includes the promotion of habit changes, waste separation and healthier lifestyles through a better environment.

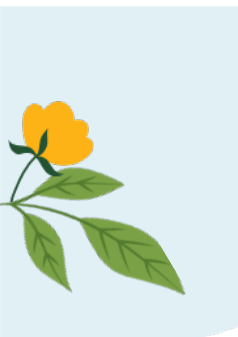
It also fostered an active dialogue between the administration and the population, strengthening trust in institutions and commitment to sustainability policies. The City Council approved a new cleaning and waste collection contract based on the project's results, establishing the implementation of smart containers and recycling control systems.



Other results were:

- **Concrete objectives were set to achieve a 60% selective collection rate by 2030, aligning with European circular economy goals.**
 - **The experience served as a model for other municipalities looking to improve their waste management systems through citizen participation.**
- 

Why This Approach Works

- 
- 
- ✓ Participation and collaboration– **A methodology that involved various stakeholders from the outset, ensuring decisions were based on real citizen preferences and needs.**
 - ✓ Education and awareness – **Use of educational tools such as "Dilemma R," which facilitated understanding of different collection models and encouraged critical reflection on their implications.**
 - ✓ Transparency – **All data and results were presented in a well-rounded way, without technicalities, increasing the credibility of the process and facilitating the adoption of new measures.**

Example Use Cases

- Improving already built systems
- Promote education **and sustainability from an early age**
- Engaging Communities and making them the researchers
- Serve as a reference to international standards

Read more about the project here: [TRANSFORM](#)

4.8 Common Visualization Mistakes to Avoid



Even the best data can lose impact if visualized poorly. Avoid these common pitfalls:

- ⊘ Overloading with Too Much Data
 - ✓ **Keep it simple—one** main message per chart.
 - ⊘ Cherry-picking Data to Fit a Narrative
 - ✓ **Present** the full context, **not just selective points.**
 - ⊘ Confusing Color Schemes
 - ✓ **Use** color strategically (**e.g., red = warming, blue = cooling**).
 - ⊘ Misleading Scale & Axes
 - ✓ **Always** start axes at zero **to avoid exaggerating differences.**
- 



⊘ Ignoring Accessibility

✓ **Ensure** contrast and text readability **for colorblind users.**

📌 Example of Bad Visualization:

A bar chart comparing CO₂ emissions without adjusting for population size **may** mislead viewers **into thinking some countries are disproportionately responsible.**

4.9 Recommended Data Visualization Tools

Presenting data doesn't have to be boring – especially when young people are involved. **There are** various tools **available based on skill level and storytelling needs.**

1. Beginner-Friendly Tools (No Coding Required)

Perfect for students, youth groups, and educators.

- **Canva** – Design infographics, charts, posters, and social media content with templates.
- **Flourish** – Create animated and interactive data visualizations and stories.
- **Datawrapper** – Easily make clean charts, tables, and maps – great for journalistic stories.
- **Piktochart** – Build colorful infographics and reports that simplify complex info.

2. Creative Tools for Youth (Memes, Comics, Videos & More)

Ideal for young creators who want to combine humour, visuals, and storytelling.

- **Imgflip Meme Generator** – Create memes that highlight data distortions or climate topics with humour.
- **Storyboard That** – Build data-driven comics and short illustrated stories.
- **Biteable** – Make short animated videos using data facts, perfect for TikTok/Instagram.

- **Canva Video / Adobe Express Video** – Combine data, voice, and visuals to create quick explainers.
- **Powtoon** – Animated videos for storytelling with data, emotions, and fun characters.
- **Pixton** – Make comic strips that turn data into relatable classroom or community stories.

3. Image & Visual Storytelling Tools

Great for combining photography, illustrations, and data.

- **Genially** – Interactive presentations and storytelling with animated layers.
- **Pixlr** – Online image editor to stylize data visuals or edit infographics.
- **Remove.bg** – Quickly remove backgrounds from images to create clean visuals.
- **Google Slides / PowerPoint** – Use templates to tell stories through slide-based formats.

4. Advanced Tools (For Experienced Users)

For youth or educators with more technical skills.

- **Tableau** – Interactive dashboards for exploring data.
- **Power BI** – Detailed analytics and visualization for advanced learners.
- **Python Libraries** – Use Matplotlib, Seaborn, or Plotly for custom-made charts and graphs.

5. Climate & Science-Specific Tools

For those exploring environmental or scientific topics.

- **CODAP** – Analyze and visualize scientific data in classrooms.
- **Carbon Mapper** – View emissions from space-based data.
- **NASA Worldview** – Explore global climate maps and satellite imagery.

How to Choose the Right Tool:

- Just starting? Canva, Meme Generator, or Storyboard That are fun and easy.
- Want creative expression? Try Powtoon, Genially, or Pixton.



- Telling a climate story? Explore NASA Worldview or Google Earth Engine.
- Need depth or data analysis? Use Tableau, Power BI, or Python.
- Prefer video? Biteable or Adobe Express Video are great choices.

5. Step-by-Step Guide to Turning Data into a Story

To transform data into a compelling climate story, follow these five steps:

5.1 Identify Your Core Message

Every climate story should have one key takeaway that is clear, relatable, and actionable.

Ask Yourself:

- ✓ What is the main issue you want to highlight? (Example: **"Rising temperature causing severe droughts, threatening global food security"**)
- ✓ Who is your audience? (Youth, policymakers, activists, general public?)
- ✓ What action do you want people to take? (Change behaviour, advocate for policy, spread awareness?)

Audience Adaptation:

- For policymakers → **Focus on** data-backed conclusions (Example: **"Policy reports show drought frequency has tripled in the last 50 years."**)
- For youth activists → **Use** personal stories & social media-friendly formats (Example: **"Meet Sofia, a farmer whose village can no longer grow crops due to worsening droughts."**)

5.2 Find the Right Data

Your story must be rooted in credible sources **to** avoid misinformation.

Where to Source Data:

- ✓ Primary – **Interviews, surveys, citizen science projects**
- ✓ Secondary Data – **NASA Climate Reports, IPCC Data, UN Statistics, google Earth Engine**
- ✓ Behavioural Insights – **Climate Communication Strategy research**

(**Example:** Youth respond better to interactive storytelling).

Audience Adaptation:

- For community engagement → **Use** local data & real-world impact metrics.
- For policymakers → **Cite** structured reports and peer-reviewed studies **to** build credibility.
- For digital campaigns → **Use** real-time datasets **like** Carbon Mapper's emissions tracking.

5.3 Choose a Narrative Structure

Different audiences respond to different story formats. **Pick a structure that aligns with your** message and audience expectations.

Narrative structure	Best for...	Example
The Hero's Journey	Youth activism, social media	The Youth Climate Declaration
The Problem-Solution	Public campaigns, community initiatives	Reverse Vending Machines
The Data-Driven Story	Policymakers, journalists	NASA Climate Reports
Emotional Appeal	Mass awareness, fundraising	Australia's Bushfires

Audience Adaptation:

- For youth activism → Gamification & interactive storytelling (**Example: The Challenger App**).
- For local initiatives → Problem-Solution stories **tied to** community impact (**Example: Reverse Vending Machines in Skopje**).

- For decision-makers → Data-Driven reporting with visual analytics (Example: **NASA's CO₂ tracking dashboard**).

5.4 Craft the Story

Now, structure the story with engaging storytelling techniques.

Use This Formula:

1. Start with a powerful hook (**A real-life character or shocking statistic**).
2. Connect the data with the audience (**Why should they care?**).
3. Use clear visuals & analogies (**Graphs, maps, relatable examples**).
4. End with a strong call to action (**What should the audience do next?**).

Audience Adaptation:

- For policymakers → Keep it concise & action-oriented **with a focus on** policy recommendations.
- For social media campaigns → Short-form storytelling + visuals **for maximum shareability**.

5.5 Add Visuals & Publish

Your story is most effective when supported by visuals.

- Beginner-Friendly → **Canva, Flourish, Datavrapper**
- Advanced → **Google Earth Engine, Tableau, Python Data Viz.**
- Climate-Specific → **Carbon Mapper, NASA's Climate Time Machine.**

Example:

- **Instead of saying** "Deforestation increased by 30%", **show a** before-and-after satellite image.
- **Instead of listing CO₂ emissions by country**, **use** an interactive map showing real-time pollution levels.

Audience Adaptation:

- For interactive storytelling → Use real-time dashboards (Example: Carbon Mapper's methane tracking).
- For public campaigns → Use relatable, shareable infographics (Example: Climate Stripes by Ed Hawkins).

6. Data Storytelling Toolkit

To help you apply these principles, this toolkit provides ready-to-use templates, worksheets, and interactive exercises. **These resources will guide you through structuring stories, organizing data, and practicing real-world applications of data storytelling.**

This section includes story templates, data worksheets, interactive exercises, and a checklist **to ensure your climate stories are accurate, engaging, and action driven.**

6.1 Story Templates

Different climate stories require different structures. Use these templates as a starting point to shape your narrative.

6.1.1 The Hero's Journey (Empowering Individuals)

Best for: **Personal stories, activism, community impact.**

Template:

- Introduction: **Introduce the protagonist (e.g., a young activist, a community leader) facing a climate challenge.**
- Challenge: **Describe the problem they must overcome (e.g., rising temperatures, local pollution, policy inaction).**
- Journey: **Show the actions taken, struggles faced, and discoveries made.**
- Transformation: **Explain the impact of their work—how they grew and what changed.**

- Call to Action: **Encourage others to support, engage, or advocate.**

Example:

"When 16-year-old Greta Thunberg started striking from school every Friday, no one knew it would spark a global youth movement for climate action. But she refused to stay silent as CO₂ levels kept rising... (continue story)."

6.1.2 The Problem–Solution Narrative

Best for: **Policy discussions, innovations, scientific breakthroughs.**

Template:

- Problem: **Clearly define a climate issue using reliable data.**
- Why It Matters: **Explain the real-world impact, using case studies or testimonies.**
- Solution: **Present a concrete, data-driven solution.**
- Evidence & Results: **Show how similar approaches have worked elsewhere.**
- Call to Action: **Provide clear next steps for individuals, policymakers, or organizations.**

Example:

"Every year, urban heat islands lead to thousands of deaths. But what if cities could fight back? Data shows that tree-lined streets reduce temperatures by up to 3°C. Here's how urban forests are saving lives... (continue story)."

6.1.3 The Data–Driven News Story

Best for: **Reports, climate journalism, scientific communication.**

Template:

- Headline: **Make it engaging and fact-based.**
- Introduction: **Summarize the key climate trend or issue.**
- Data & Context: **Use statistics, graphs, and expert insights.**
- Real-Life Examples: **Connect data with human experiences.**

- Conclusion & Future Outlook: **Offer expert perspectives on what comes next.**

Example:

"A new NASA report confirms that 2023 was the hottest year on record. Scientists say heatwaves are becoming more frequent and severe. But data also shows that investing in renewable energy is slowing CO₂ emissions..."

6.1.4 Worksheets to Organize Your Story

Use these worksheets to structure and refine your climate story:

Question	Details
What is the key message?	Define the core takeaway of your story.
What data supports this message?	List sources and statistics.
Who is affected?	Identify communities, species, or industries impacted.
What solutions exist?	Provide evidence-backed climate solutions.
What visuals will enhance the story?	Choose charts, maps, or infographics.
Call to Action	Specify what action you want the audience to take.

Example (Deforestation Story):

- Key Message: **"Amazon deforestation is accelerating, threatening biodiversity."**
- Supporting Data: **"Satellite imagery shows a 20% increase in tree loss over 5 years (source: NASA)."**
- Affected Communities: **"Indigenous groups rely on these forests for survival."**
- Solution: **"Stronger policies + reforestation efforts have helped slow deforestation in some regions."**
- Visuals: **"Satellite time-lapse of deforestation."**



6.3 Interactive Exercises

To practice data storytelling, here are two interactive exercises:

6.3.1 Find the Story in this Dataset

Objective: **Given a real climate dataset, extract insights and build a short narrative.**

Example Dataset:

- Temperature records from 1950 to 2023 (**Global Warming Trends**).
- Deforestation rates by country (2000–2022).
- CO₂ emissions per capita (1970–2023).

Task:

1. **Identify a trend (e.g., "Global temperatures have risen by 1.2°C since 1880").**
2. **Find who/what is affected (e.g., "Increased wildfires, melting glaciers").**
3. **Craft a 1-paragraph story using the data.**

Example Answer:

"In the past 50 years, the Earth's average temperature has increased by nearly 1°C. Scientists warn that extreme weather events—like hurricanes and droughts—are intensifying as a result. The data is clear: If CO₂ emissions continue unchecked, global warming could exceed 2°C by 2050, leading to irreversible consequences."

6.3.2 Spot the Fake Climate Data

Objective: **Identify** misleading or false data claims **using fact-checking techniques.**

Task: **Given three climate-related statements, determine which are false.**



Example Statements:

1. "CO₂ levels have decreased in the last decade."
 2. "Electric cars produce more lifetime emissions than gasoline cars."
 3. "The Arctic could be ice-free in summer within decades."
- 

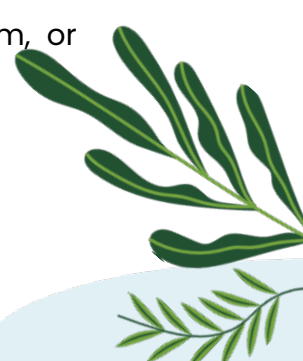
Fact-Check the Claims:

- Statement 1 is false – Data from NASA shows CO₂ levels continue rising.
- Statement 2 is misleading – While EVs have higher production emissions, lifetime emissions are lower due to clean energy use.
- Statement 3 is likely true – Scientific models predict an ice-free Arctic in summer by 2050 if warming continues.

Lesson: Always cross-check sources before sharing climate data.

6.4 Data Storytelling Checklist

Use this checklist before finalizing your climate story:

- 
- ✓ Trustworthy Data – **Are All facts sourced from credible institutions (IPCC, NASA, UN)?**
 - ✓ Strong Narrative – **Does the story follow a clear** structure (Problem-Solution, Hero's Journey, etc.)?
 - ✓ Emotional Connection – **Does it resonate with** real people and communities?
 - ✓ Visually Engaging – **Are there** clear graphs, maps, or images **to support the data?**
 - ✓ Fact-Checked – **Have claims been** verified using multiple sources?
 - ✓ Call to Action – **Does the story inspire** policy change, activism, or personal action?
- 

6.5 Storytelling Template Document

6.5.1 Choose Your Story Structure

Select one of the following storytelling structures for your climate narrative:

- ✓ The Hero's Journey (**Empowering Individuals**)
- ✓ The Problem-Solution Narrative (**Highlighting a challenge & Solution**)
- ✓ The Data-Driven News Story (**Objective Reporting**)
- ✓ The Emotional Appeal Story (**Connecting with Human Experiences**)

6.5.2 Story Planning Worksheets

Story component	Your input
What is the key message?	
What data supports this message?	
Who is affected?	
What solutions exist?	
What visuals will enhance the story?	
Call to Action	

6.6. Sample Climate Stories for Inspiration

Understanding successful climate data storytelling can help you refine your own approach. This section provides real-world examples from different mediums, analysing why they are effective and how you can apply similar techniques in your storytelling.



Case Study: Climate Stripes by Ed Hawkins (Data Visualization Storytelling)

Medium: **Infographic / Data Visualization**

Source: **Ed Hawkins, University of Reading**

Summary: **Climate Stripes is a simple yet powerful data visualization showing global temperature changes over time through color gradients (blue = cooler years, red = warmer years). It is widely shared across media, social platforms, and even used on clothing to raise climate awareness.**

Why It Works:

- ✓ **Instantly understandable** – No numbers, just colors conveying warming trends.
- ✓ **Visually striking** – The linear gradient tells a compelling story in seconds
- ✓ **Easy to share** – The simplicity makes it viral on social media.

How You Can Apply It:

- **Use** minimalist, high-impact visuals **to convey climate trends.**
- **Ensure your message is** easy to understand briefly.
- **Make your story** social media friendly.

See it here: showyourstripes.info



Case Study: The Guardian's Investigation on Wildfires (Journalistic Data Storytelling)

Medium: **Article with Interactive Maps & Charts**

Source: **The Guardian Climate Desk**



Summary: **This investigative story used satellite imagery, maps, and eyewitness accounts to show how climate change is making wildfires more frequent and severe worldwide.**

Why It Works:

- ✓ Combines real human stories with scientific data.
- ✓ Interactive maps make the data engaging.
- ✓ Strong call to action **urging policymakers to act.**

How You Can Apply It:

- **Blend** scientific analysis with human-centred storytelling.
- **Use** before-and-after images, maps, and statistics.
- **Provide a** clear call to action **for solutions.**

See an example: [The Guardian – Wildfire Data Story](#)



Case Study: NASA's 'Climate Time Machine' (Interactive Storytelling)

Medium: **Interactive Data Visualization**

Source: **NASA Climate Change Portal**



Summary: **NASA's 'Climate Time Machine' allows users to interactively explore changes in** sea levels, Arctic ice, CO₂ emissions, and global temperatures **over time through animations.**

Why It Works:

- ✓ User-driven engagement – **Readers explore at their own pace.**
 - ✓ Strong visual impact – **Real satellite imagery makes the change undeniable.**
 - ✓ Scientific credibility – **Uses authoritative NASA data.**
- 



How You Can Apply It:

- **Create** interactive or animated elements **in your storytelling**.
 - **Use** real-world comparisons (then vs. now) **to emphasize trends**.
 - **Allow audiences to** engage with data rather than just read it.
- 

Explore it here: [NASA Climate Time Machine](#)

Case Study: Patagonia's 'The Art of Activism' (Emotional Appeal Storytelling)

Medium: **Documentary & Social Media Campaign**

Source: **Patagonia (Environmental Brand)**

Summary: **Patagonia's short films showcase communities affected by climate change and their grassroots efforts to protect the environment. These stories connect climate data with** human emotions and real-life struggles.

Why It Works:

- ✓ Uses storytelling to drive social activism.
 - ✓ Emotionally connects audiences to the issue.
 - ✓ Encourages viewers to take action (donations, advocacy, lifestyle changes).
- 

How You Can Apply It:

- Feature real people and communities **in your climate stories**.
 - **Focus on** personal struggles and victories **over climate challenges**.
 - **Use** multimedia formats (**video, photography, social media**) **to amplify reach**.
- 

Watch it: **Patagonia Films**

How to Apply These Lessons to Your Own Storytelling

- ✓ **Use** visual storytelling **to simplify complex climate data**
- ✓ **Incorporate** interactive elements (**timelines, animations, maps**)
- ✓ **Bland** scientific data with human experiences.
- ✓ **Ensure** a strong call to action **to drive engagement.**

5.7 Hands-on Workshop or Live Feedback Session

Workshop Overview

This interactive workshop is designed to help participants apply data storytelling techniques to real-world climate data. By the end of the session, you will have created a compelling climate story, received feedback, and explored methods to enhance impact using visuals, interactivity, and engagement strategies.

1. Workshop Agenda

Time	Activity
10 min.	Introduction: Why Data Storytelling Matters in Climate Communication
15 min.	Case Study Review: Examples of Effective Climate Data Stories
20 min.	Hands-On Activity: "Find the Story in the Data"
20 min.	Story Development: Structuring a Climate Data Story
15 min.	Feedback Round: Group Review and Discussion
10 min.	Enhancing the Story: Adding Visuals & Calls to Action
10 min.	Closing & Next Steps

2. Hands-On Activity: "Find the Story in the Data"

Objective: **Participants will analyse a real climate dataset, identify a key message, and develop a short narrative using the Data Storytelling Template.**

Datasets Provided:

1. Global Temperature Trends (1880–2023) – **NASA & IPCC**
2. Deforestation Rates (2000–2022) – **Global Forest Watch**
3. CO₂ Emissions by Country (1970–2023) – **Global Carbon Atlas**

Task Instructions:

1. Select a dataset **from the options provided.**
2. **Identify** a key trend (**e.g., rising temperatures, declining forest cover**).
3. **Determine** who is affected **and why these matters.**
4. **Frame the data into** a short climate story **using a structured template.**
5. **Share your story with the group for discussion.**

Example Output:

"Since 1990, global CO₂ emissions have increased by 60%, fuelling record-breaking heatwaves and extreme weather. In 2023 alone, wildfires devastated 4 million hectares of forests. Scientists warn that without immediate carbon reduction, the planet could exceed 2°C of warming by 2050, triggering irreversible climate shifts."

3. Story Development: Structuring a Climate Data Story

Using the Data Storytelling Template, participants refine their narratives:



Step	Guiding questions
Message	What is the key climate issue you are addressing?
Data	What statistics or trends support your message?
Human Impact	Who is affected, and how does this data relate to them?
Call to Action	What should the audience do with this information?
Visuals	What charts, maps, or images will enhance your story?

4. Feedback Round: Group Review and Discussion

Each participant **presents their climate story in a 2-minute pitch**. Feedback will focus on:

- ✓ **Clarity** – Is the message easy to understand?
- ✓ **Impact** – Does the story connect emotionally and logically?
- ✓ **Credibility** – Are the data sources reliable?
- ✓ **Call to Action** – Does it encourage engagement or action?



5. Enhancing the Story: Adding Visuals & Calls to Action

Participants will explore how to improve engagement by:

- **Selecting** the right visualization tools (**Canva, Datawrapper, Flourish, etc.**)
- **Using** interactive maps, infographics, and before-after comparisons
- **Crafting** strong, action-oriented closing statements

Example: **Instead of saying: "Deforestation is increasing," use:**

- ✓ Before-and-after satellite images of the Amazon.
 - ✓ A graph showing tree loss over time.
 - ✓ A story about an Indigenous community affected by deforestation.
- 



6. Closing & Next Steps

- ✓ Final reflections and key takeaway
- ✓ How to refine and publish climate stories.
- ✓ Optional: Submit stories for expert feedback
- ✓ Suggested platforms for publishing stories (blogs, social media, online reports)



After the workshop, participants can submit their refined stories for a follow-up feedback session or publication.

5.9 Next Steps

Use this template to craft your own climate data story.

Apply a dataset (e.g., CO₂ emissions, global temperature trends, deforestation rates) to build a real-world narrative.

Prepare visuals (charts, maps, infographics) to enhance your story.





Closing Thoughts

Climate change is one of the most pressing challenges of our time, and data storytelling is a powerful tool to drive awareness, counter misinformation, and inspire action. By turning complex climate data into engaging, fact-based narratives, we can bridge the gap between science and public understanding.



Throughout this guide, we have explored:

- ✓ How to collect, **verify, and interpret data for storytelling.**
- ✓ Different storytelling structures to **make climate narratives impactful.**
- ✓ The role of visualization in **enhancing climate communication.**
- ✓ Practical exercises, case studies and hands-on learning **opportunities.**

Now, it's time to put these insights into action. **Whether you are an activist, researcher, journalist, or educator, you can use** data storytelling to inform, persuade, and empower audiences **to take meaningful steps toward climate action.**

How to Continue Your Data Storytelling Journey

1. Apply what you've learned – **Use the templates, datasets, and tools provided to create your own climate data stories.**
 2. Seek feedback & iterate – **Share your narratives with peers, mentors, and experts to refine them further.**
 3. Engage & share – **Publish your stories on** blogs, social media, or climate platforms **to reach wider audiences.**
 4. Keep learning – **Stay updated with** new climate data, storytelling methods, and emerging tools **to strengthen your communication skills.**
- 



Final Call to Action

Your climate story has the power to inform, engage, and inspire change. **Keep creating, keep sharing, and most importantly—**keep telling the truth about climate change **in a way that connects with people and motivates them to act.**



The next story that sparks climate action could be
yours. Let's make it count.