

Feedback is welcome

[Working title] How is geothermal energy visually framed in the news? A comparative visual analysis

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1. Access to the image clusters - [Miro board link](#)

2. Additional details of the methods section

1.1. Selection of news outlets

Three different news outlets were selected from the four distinct countries – Philippines, Kenya, Germany and Australia ensuring the study captures a wide variety of national and editorial visual narratives. A sample size of N=50 articles per outlet was used to create a robust and comprehensive collection of unique images forming the corpus. These selection warrants breadth and depth of the image cluster per country which is the unit of analysis in the study. The iconic image cluster analysis focuses on the cluster's emergent structure and meaning, not on individual images. Moreover, the focus is to compare across countries, not across news outlets.

Table 1. Background of selected news media outlets

Country	News outlets	Format	Key Characteristics
Philippines	Philippine Daily inquirer	Print and digital	Among the most trusted newspapers in the Philippines Source: Mediameter
	Rappler	Digital	Independent online news platform
	ABS-CBN News	Broadcast and digital	Major broadcast network with strong national reach
Germany	Bild	Print and digital	One of the most visited news portal in Germany; tabloid style Reference: Media ownership monitor Deutschland
	Spiegel	Print and digital	SPIEGEL ; the world's first news magazine; online news portal quickly developed into one of the leading news websites in the German-speaking world.
	Deutsche Welle	Broadcast and digital	Germany's international broadcaster and one of the most successful international media outlets.
Kenya	Nation.Africa	Digital	Most read news website in Kenya; comprehensive coverage and in-depth

			analysis of national and international events make it a trusted source for readers.
	The Standard	Print and digital	Known for its incisive political analysis and investigative journalism.
	Tuko	Digital	Focuses on human-interest stories, entertainment, lifestyle, and trending topics.
Australia	ABC News	Broadcast and digital	Public broadcaster; national and local coverage (similar with BBC)
	SBS News	Broadcast and digital	Public broadcaster with multilingual, culturally diverse focus
	News.com.au	Digital	Major commercial news platform with general news coverage.

1.2. News search and collection of images

A trial search was conducted in the NexisUni database in May 2025 using the term “geothermal energy” and applied the following filters - country: Philippines; language: English; subject: newspapers; source name: Philippine Daily Inquirer (PDI) and sort by relevance. English was the chosen language since news in the Philippines are typically written in English, and it is one of the official languages of the country. The search generated 114 articles; however, we discovered that NexisUni only provides the article texts without the images. A manual search in the PDI website was done to collect the images from the first 50 articles. We noted which articles lacked images and which have multiple images. Upon learning that other Philippine-based news websites Rappler and ABS-CBN News were not in the NexisUni database, we resorted to doing a manual search for the rest of the news websites. To ensure a consistent and sufficient composition of image clusters, images were gathered from the first 50 relevant articles from the news websites. While the news search was conducted between May and June 2025, the earliest record dated back from 2008.

1.3. Image cluster analysis/comparative visual analysis

While previous studies often analyse individual images or predefined frame categories, this study adopts an exploratory clustering approach inspired by the method by Müller (2024). Analysis was conducted in two phases: (1) country-specific workshops between the first author and a local researcher to capture regional nuances, and (2) two collective sessions where all countries were primary-coded to maintain a unified analytical framework. This strategy captured the cultural nuance in each country. Our analysis began inductively, allowing recurring visual patterns to emerge from the data. The first stage in the workshop involved grouping similar type of images that make up a cluster within the corpus of images of each country. We assigned the photos to a theme and/or sub-theme (e.g. geothermal power plants, people, environment). Secondly, we discussed relationships or narratives of how one cluster relates to another cluster. We then took note of symbolic meanings that go beyond expressive possibilities of individual images. Lastly, we select representative images from each category/theme to facilitate the discussion (Bruns and Sommer, 2021).

Based on this initial inductive phase, an analytical framework (Table 2) was subsequently developed to systematically interpret and compare image clusters without imposing a priori themes. The clusters were reanalysed using a deductive approach (themes were cross-examined with pre-defined media frames from literature).

Table 2. Analytical framework

Frame Dimension	Operational Definition	References	Visual indicators
Renewable energy frame	Frames geothermal energy as a sustainable, locally available source of renewable heat and electricity along with other renewables (e.g., solar, wind, etc.) that contribute to the energy transition.	(Benighaus and Bleicher, 2019; Romanach et al., 2015; Wolf et al., 2026)	renewable energy infrastructures - wind turbines, solar panels, geothermal plants
Energy security frame	Geothermal energy as an abundant source of energy, contributing to energy self-sufficiency of the country.	(Trisiah et al., 2022)	electricity infrastructures, homes being warm and electrified
Political frame	Geothermal energy as a politically-relevant issue shaped by power, legitimacy and state authority.	(Haigh, 2010; Mbah, M., 2021; Wolf et al., 2026)	Local/national leaders in agreements, partnerships or tensions
<i>Relevant actors</i>	Political actors and ministries are often cited as responsible for enabling this transformation.	(Stauffacher et al., 2015; Wolf et al., 2026)	politicians, world leaders, politicians speaking in a conference, in meetings
Emerging technology frame	Geothermal systems are portrayed as complex and promising but not yet fully mature. The feasibility of implementation is sometimes questioned, particularly regarding deep geothermal energy.	(Romanach et al., 2015)	infographs about geothermal energy or any other related energy source, scientific data, maps, scientific conferences
<i>Relevant actors</i>	Scientific institutions, industry, and technical experts are assigned responsibility in these frames	(Benighaus and Bleicher, 2019; Djerf-Pierre et al., 2016)	researchers in the field, scientists in action

Economy frame	Geothermal energy appears as both a financial opportunity providing job opportunities, boosting the local and national economy.	(Benighaus and Bleicher, 2019; Djerf-Pierre et al., 2016; Trisiah et al., 2022)	money, banks, symbols of wealth
<i>Relevant actors</i>	Local governments, municipal actors, and regional authorities are framed as key decision-makers.	(Romanach et al., 2015)	industry actors, national leaders, politicians, international agencies (e.g., UN) engaging, handshaking gestures
Environmental frame	Geothermal energy having ecological benefits such as reduced CO2 emissions, low land use demand, technology is low risk and balance of nature is well maintained.	(Benighaus and Bleicher, 2019; Trisiah et al., 2022)	nature and human interaction, environmental elements, biodiversity -flora and fauna
<i>Relevant actors</i>	Scientists, political authorities, and project developers	(Benighaus and Bleicher, 2019; Stauffacher et al., 2015)	researchers in the field, scientists in action, environmental organisations
Social frame	Support or resistance from local citizens. Frames the communication and the role of acceptance towards this energy source. Industries' contribution to community development programs.	(Djerf-Pierre et al., 2016; Haigh, 2010; Trisiah et al., 2022)	community advocacies or protests
<i>Relevant actors</i>	Local citizens/residents, environmental activists, unions, NGOs, other actors	(Djerf-Pierre et al., 2016; Wolf et al., 2026)	community actors in the streets, protesting citizens

Risk frame	Associated risks, including seismic activity or damages to buildings, often linked to specific incidents like Basel or Staufen.	(Benighaus and Bleicher, 2019; Stauffacher et al., 2015)	harmful impacts, destructive images
<i>Relevant actors</i>	Scientists, political authorities, and geothermal developers	(Benighaus and Bleicher, 2019; Stauffacher et al., 2015)	researchers or scientists in the field, industries engaging with the community

Source: Developed by the first author, based on the references cited

Working draft

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