

## Policy Action Tracker

The Policy Action Tracker is an open-source digital tool which aims to assist policy analysts and other users in extracting and filtering relevant information from public documents.

The manual extraction of relevant information from text documents is a time-consuming task for any policy analysts. As the amount and length of public policy documents in relation to sustainable development (such as National Development Plans and Nationally Determined Contributions) continuously increases, a major challenge for policy action tracking – the evaluation of stated goals and targets and their actual implementation on the ground – arises. Luckily, Artificial Intelligence (AI) and Natural Language Processing (NLP) methods can help in shortening and easing this task for policy analysts.

For this purpose, the United Nations Sustainable Development Solutions Network (SDSN)<sup>1</sup> and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH<sup>2</sup> collaborated in the development of this AI-powered open-source web application which helps find and extract relevant information from public policy documents faster to facilitate evidence-based decision-making processes in sustainable development and beyond.

This tool allows policy analysts and other users the possibility to rapidly search for relevant information/paragraphs in the document according to the user's interest, classify the document's content according to the Sustainable Development Goals (SDGs), and compare climate-related policy documents and NDCs across countries using open data from the German Institute of Development and Sustainability's (IDOS) NDC Explorer<sup>3</sup>.

To understand the functionalities of the application and to learn more about the project, see the attached concept note. We hope you like our application 😊

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<sup>1</sup> For more information, please visit [Sustainable Development Solutions Network \(unsdsn.org\)](https://unsdsn.org).

<sup>2</sup> For more information, please visit [Startseite \(giz.de\)](https://www.giz.de).

<sup>3</sup> For more information on the tool, please visit [NDC Explorer \(idos-research.de\)](https://www.idos-research.de).

## 2 App Functionalities: How?

### Choose Functionality and Upload Document

First, the user is asked to choose between the desired functionality (Search, SDG Analysis or NDC Comparison) and upload the policy document they would like to analyze or select a pre-loaded example document (such as Ethiopia's 10-Year Development Plan or South Africa's Low Emission Strategy). For this purpose, the application offers an easy-to-use drag-and-drop or drop-down menu functionality on the left-hand side of the screen. Alternatively, you can browse files on your drive using the designated button. The upload functionality allows you to upload documents of a size up to 200 MB in Adobe PDF, Open text, or Microsoft Word-format. Subsequently, your document is automatically cleaned and split into paragraphs with a maximum length of 120 words using a Haystack preprocessing pipeline. The chosen length of 120 words is an empirically based value which should reflect the length of a given context and limit the paragraph length deviation in most cases.

### Functionality 1: Search

First, the application allows its user to perform a keyword/keyphrase search based on two options: a lexical search (exact matches) and semantic bi-encoder search (similar context/meaning). The difference between both approaches is quite straightforward; while the lexical search only displays paragraphs in the document with exact matching results, the semantic search shows paragraphs with meaningful connections (e.g., synonyms) based on the context/meaning as well. For only showing exact matches, please tick the respective box. Alternatively, the semantic search (pre-chosen option) allows for a personalized experience in using the application based on an open-text box in which the user can plug in their own interest. Both methods employ a probabilistic retrieval framework in its identification of relevant paragraphs and only display the top-10 results based on the calculated relevancy score. The results in the text are highlighted using a red color highlighting. Furthermore, the application allows the user to search for pre-defined keywords from different thematic buckets. The following buckets are currently available to the users:

Thematic bucket	Keywords
Climate	Climate, adaptation, mitigation, decarbonization, carbon neutrality, net zero emissions
Food	Food security, nutrition, diets, food loss
Implementation	Implementation, transformation, reform, integration, strategy, policy
Nature	Nature, nature-based solutions, biodiversity, degradation
Social	Indigenous, local community(ies), rural livelihoods, minority, just transition
Gender	Gender, women empowerment, women economic power, gender bias

## Functionality 2: SDG Analysis

Second, the application analyzes the uploaded document according to the first 15 of the 17 United Nations Sustainable Development Goals (SDGs). SDG 16 “Peace, Justice and Strong Institutions” and SDG 17 “Partnerships for the Goals” are excluded from the analysis due to their broad nature which could potentially inflate the results. The summary of the analysis is presented in a pie chart with a blue color shading at the beginning of the page. Next, the application extracts relevant keywords/keyphrases under the most prominent SDGs and displays them in a table. The keywords are extracted using a TF-IDF<sup>4</sup> model, which is an easy-to-use keyword extraction technique to identify keywords and keyphrases that are most similar to another corpus (or sample text). The length of the extracted keyphrases (n\_gram\_range) is set to two words each. As the list can get quite long, please make sure to scroll through the table using your computer’s trackpad. Lastly, the application extracts the most relevant paragraphs under each SDG relying on a probabilistic retrieval framework as mentioned above. Based on the framework, each paragraph in the text can be assigned to one SDG only. Again, the results are displayed in a table including the number of the SDG and the respective text of the assigned paragraph. As the text in the paragraph is quite long, please make sure to scroll through the table using your computer’s trackpad. The SDG classification uses open-source training data from OSDG.ai<sup>5</sup> which is a global partnerships and growing community of researchers and institutions interested in the classification of research according to the Sustainable Development Goals.

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### Functionality 3: NDC Comparison

Third, the application provides an experimental comparison a policy document and a country's (Intended) Nationally Determined Contribution (INDCs/NDCs) using open-source data from the German Institute of Development and Sustainability's (IDOS) NDC Explorer<sup>6</sup>. The user can select a country context via the drop-down menu on the left-hand side of the application. Subsequently, the user is given the opportunity to manually upload another policy document or to select a pre-loaded example document. Thereafter, the user can choose between two categories to compare both documents: climate change adaptation and climate change mitigation. Based on the selected information, the application identifies relevant paragraphs in the uploaded document and assigns them to the respective indicator from the NDC Explorer. Currently, the NDC Explorer has 20 indicators under climate change mitigation (e.g., fossil fuel production, REDD+) and 22 indicators under climate change adaptation (e.g., sea level rise, investment needs). The assignment of the paragraph to a corresponding indicator is based on vector similarities in which the top-3 results are displayed to the user.

### 3 App Results: What?

We trust the results to help in time-consuming (climate-related) policy analysis tasks and rapid understanding of (climate-related) policy document linkages. As none of the uploaded documents are stored, we encourage the users to try the application in any work or national policy context. For now, the application works best with climate-related policy documents such as INDGs/NDCs, National Adaptation Plans or National Development Plans. In the future, we intend to broaden the scope of the application and add functionalities based on the users' feedback. If you would like to provide feedback on the application, please feel free to send a message to Erik Lehmann ([erik.lehmann@giz.de](mailto:erik.lehmann@giz.de)) or Manuel Kuhm ([manuel.kuhm@giz.de](mailto:manuel.kuhm@giz.de)). The application will be provided as open-source Github repository for the users to join our community of developers and provide code-based feedback too. We hope you like our application and look forward to collaborating in the future.

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