EC Project 610829

A Decarbonisation Platform for Citizen Empowerment and Translating

Collective Awareness into Behavioural Change

D6.2.2: Earth Hour Report 2015

06 October 2015

Version: 1.0

Version history

Version	Date	Author	Comments
0.1	14/08/2015	C. Meili	Initial version
0.2	10/09/2015	M. Fernandez	Version including advanced analysis
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Executive Summary

This deliverable summarizes the campaign activities of WWF Switzerland and DecarboNet for the Earth Hour 2015 campaign.

For Earth Hour 2015 WWF Switzerland tried to put pressure on politics regarding CO2-reduction targets. Call to action was to sign the climate petition on www.wwf.ch/earthhour. Engagement was higher than expected. More than 20'000 people did sign the petition and more than 40% of the visitors gave permission to send further information about the work of WWF.

In addition to this initiative the DecarboNet team engaged the public by creating specific installations of the software that is being developed within the project. In particular we released the first version prototype of the DecarboNet Citizen Engagement platform (D5.2), which was visited by over 100 users (see D5.3.1). Additionally, a specific Earth Hour installation of the MWCC to provide users with the capability to analyse the event at run-time (including activity, lexical and geographical analysis) was created.

An offline analysis of the social media impact of the camping was also conducted by analysing more than 90K tweets collected during the campaign. We observed, that posts that are followed by an engagement action tend to have a picture attached, come from older accounts, and include one or more hashtags, but no URLs. They also tend to be longer, slightly more complex and come from accounts that have a higher number of followers and are following more accounts. By performing a manual analysis, we showed that posts with images that received a high engagement response follow one or more of these three characteristics: (i) are original/funny, (ii) come from a user with high popularity and, (iii) reflect the content of the textual message.

By analysing the topics of these tweets we observed that posts were clustered around earth hour, climate, change, the celebration associated with the campaign and the symbolic action of turning off the lights. In this sense, and as opposed to last year were celebrities, super heroes and promoters like Durex drove a big part of the social media conversations, this year, the discussions have focused on the main themes that Earth Hour and WWF aim to promote, generating a more climate topic-focused engagement.

The Earth Hour campaign for 2016 will be very social media focused, which brings the work of DecarboNet to the centre of the campaign. We are now in talks with the campaigning team of global Earth Hour to establish collaboration and to create a mutual support plan and mechanism.

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1. Introduction

The global movement for the environment called Earth Hour is determined to be the large-scale collective awareness campaign that is analysed in this project. As WWF Switzerland, consortium partner in DecarboNet is a local franchise of WWF International, a special focus of the analysis lies on the Earth Hour -campaign activities in Switzerland

Figure 1: Teaser to join the global Earth Hour movement in 2015.

This document provides:

- Background information on the global and Swiss national Earth Hour movements.
- Details and evaluation regarding the national campaign of WWF Switzerland for Earth Hour 2015.
- News and Social Media Coverage for the Swiss Earth Hour campaign.
- Engagement statistics for the national and global Earth Hour campaigns.
- Advanced analysis of social media interactions around global Earth Hour

2. Earth Hour Global

2.1. Movement

In 2007 WWF initiated Earth Hour as a way of engaging a broad section of the society in environmental issues, challenging citizens across the world. WWF embraced the idea of an open sourced campaign that would allow communities and organisations to become part of a global movement to protect our planet.

Every last Saturday in March between 8:30 and 9:30 p.m., Earth Hour celebrates the symbolic "lights off" hour, which has grown from a one city initiative to a mass global event involving more than 172 countries with over 620'000 actions taken to change climate change.[1] The movement is collectively supported by millions of individuals, organisations and governments.

Undoubtedly as many sceptics point out, attendance and participation in a social activity, or turning lights out, for an hour on a Saturday night do not necessarily reduce carbon emissions. As Cox[2] previously pointed out in his discussion of the Step It Up campaign, events, citizen mobilization, lobbying need to be part of an integrated strategy that has a clear goal, "mobilization that enables a certain end.[3]

As of 2015, WWF's Earth Hour has grown to become the world's largest grassroots movement for the environment. While the global lights out remains an impactful visual call-out, its true impact is starting to be seen in areas and communities fighting climate change on an everyday basis. Each locally supervised sub-campaign today has a so-called "Beyond the Hour" action that aims to provide long-lasting improvement for the environment.

[1] http://www.earthhour.org/sites/default/files/Earth-Hour-2015-Global-Stats-Report.pdf, online, 17.08.2015

[2] Cox, J. R. (2010). Beyond frames: Recovering the strategic in climate communication. Environmental Communication, 4: 122–133.

[3] Sison, Marianne D. (2013). Creative Strategic Communications: A Case Study of Earth Hour; International Journal of Strategic Communication, 7: 227–240.

2.2. Campaign

A detailed description of the global Earth Hour campaign can be found at www.earthhour.org and in the Earth Hour 2015 Report[1] and short video[4] respectively. Following some information extracted from the report:

Climate change is the planet's biggest environmental challenge. Earth Hour, as WWF's mass engagement platform, inspires and mobilizes people around the world to use their power to change climate change.

From promoting climate awareness and garnering support for critical WWF conservation projects to driving legislative changes, Earth Hour harnesses the power of the crowd to make real change.

"Climate change is a people problem. People cause climate change and people suffer from climate change. People can also solve climate change. WWF's Earth Hour shows what is possible when we unite in support of a cause."

Ban Ki-moon
UN Secretary-General

As one of the world's largest conservation organizations, WWF plays a crucial role in the global efforts on climate, acting as a policy and technical advisor to governments and as a civil society representative. However given the role of people in causing, experiencing and solving climate change, WWF believes it is equally critical that people join the discussions and be a part of the solution. Earth Hour engages with the crowd at a grassroots level and helps people to play a role in changing climate change.

By making climate facts relatable, accessible and understandable, Earth Hour enables people to connect the dots between science and reality. It takes the discussions on climate from conference rooms to living rooms, believing that each individual can make a difference.

So how does Earth Hour help Change Climate Change?

Since the very first Earth Hour, the movement has stood testament to the power of people. It has harnessed the power of the crowd to drive concrete climate action in countries like Russia, Argentina and Ecuador where Earth Hour powered WWF efforts to achieve climate-friendly legislation on protection of forests, marine areas and a ban on the use of plastic in the Galapagos Islands, a UNESCO World Heritage site.

Building on this momentum, WWF's Earth Hour once again leveraged its massive reach and millions of supporters to spark concrete action on climate in 2015. From online crowdfunding for climate and conservation projects to locally relevant climate campaigns and school/community outreach programmes across seven continents,

[4] www.ehour.me/impacts15, online, 17.08.2015

Earth Hour teams around the world led initiatives to drive public awareness and action on key climate issues.

2.2.1. Powering climate friendly policy

As a grassroots movement, Earth Hour works as a push and pull force for climate-friendly policy and legislation. It provides a platform to influence public interest and action, harnessing the power of the crowd to make a difference. In 2015, Earth Hour mobilized support to encourage policy on locally-relevant climate issues such as fighting deforestation (Uganda), a 10-year freeze on new oil projects in the Arctic (Russia), creation of a national park (Malaysia), reduction in energy usage (Brunei Darussalam) and stronger climate change legislation (Scotland and Switzerland).

2.2.2. Driving awareness on sustainable food & agriculture

Agriculture and food production are highly vulnerable to changes in climate variability, seasonal shifts, and rainfall patterns caused by climate change. Experts predict that changes in temperature, rainfall and seasonal trends will impact production of staples and crops like corn, beans, cocoa, and even coffee, which require certain conditions for cultivation.

In 2015, WWF and Earth Hour teams around the world drove awareness on the impact of climate change on agriculture and how consumers, businesses and communities can each take action. From spreading awareness on consuming wisely to sustainable dinners on the night of Earth Hour (the UK, Finland and France) and creating the world's first-ever Earth Hour recipe book *Planet to Plate* with recipes by 52 celebrity chefs in Australia, sustainable food and agriculture was a major theme for Earth Hour 2015.

2.2.3. Promoting access to renewable energy

To avoid the worst impacts of climate change, the world needs to transition from its current unsustainable energy paradigm to a future powered by entirely renewable energy. WWF's ground-breaking study - The Energy Report - shows that this future is within our reach, and the Earth Hour movement demonstrates how small individual actions can contribute towards this vision.

Earth Hour 2015 worked to promote renewable energy by working with governments to provide subsidised solar power for urban residential use (Nepal), bridging the gap between the suppliers and consumers of renewable energy (India), creating awareness on renewable energy (China, Sweden) and using the power of the crowd on the Earth Hour crowdfunding platform to provide families in off-grid communities with access to solar power (India and the Philippines).

2.2.4. Uniting People FOR THE PLANET

In 2014, Earth Hour developed a crowdfunding and crowdsourcing platform for the planet to harness the collective effort of individuals and bring them together to help fund or add their voice to support on-the-ground environmental and social projects.

In 2015, the platform empowered people to take action to protect forests in Portugal, Indonesia, Uganda and New Caledonia, support communities impacted by climate change in Colombia, provide access to renewable energy in India and the Philippines and protect endangered wildlife in Southeast Asia. Over 350 donors came together for the cause while thousands added their voice to crowdsourcing petitions for climate action around the world.

2.3. Campaign activities of DecarboNet

All partners showed their support for the Earth Hour campaign through their social media accounts, especially on twitter. Also, a first version of the WP5 Citizen Engagement platform with limited functionality was launched just prior to Earth Hour 2015. The preliminary platform provided multiple functionalities, such as energy dilemma, links to Earth Hour pages and tags, news articles from WP3 Media Watch application, and links to the Energy Toolkit developed in year 1 (see D1.2). A description of the preliminary portal can be found in D5.2, and the latest WP platform, which will be deployed for COP21 is described in D5.3.1.

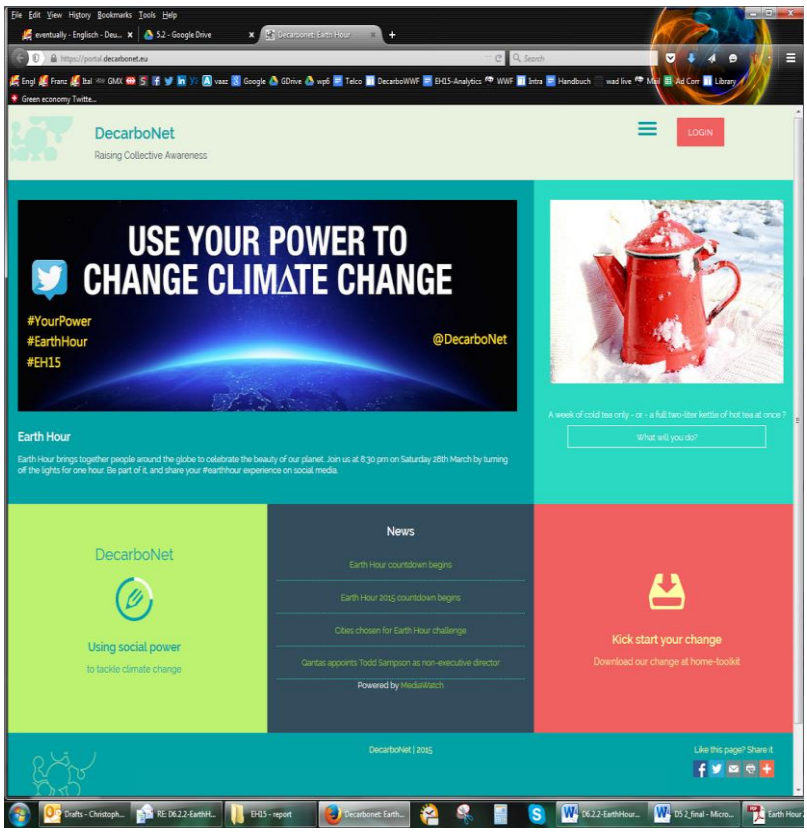


Figure 2: Screenshot of early version of the DecarboNet's Citizen Engagement Platform https://portal.decarbonet.eu/, further described in D5.2: Energy Trial Application and the new version is described in D5.3.1.

Links to the platform were provided in social media messages and over 100 unique users visiting the platform site. Although a small number, but better than expected given the late launch of the platform, and the simplicity of its functionality. The new version of the platform is far more powerful and due to be launched late October for COP21. We distributed GEO smart energy monitoring devices to 150 UK users, with another 100 save for the final year of the project. In total, 381 users registered their interest in participating in DecarboNet energy trials. Further detail on the Citizen Engagement Platform, and user recruitments, is provided in D5.3.1.

3. 3 Earth Hour Switzerland

3.1. Movement

Switzerland joined the global Earth Hour campaign in 2009. Like the years before, WWF Switzerland decided for 2015 to create “Beyond the Hour”- actions that are especially aligned to its change maker strategy.

3.1.1. Paris 2015 / COP21

In 2015, France will be hosting and presiding the 21st Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21/CMP11), otherwise known as “Paris 2015” from November 30th to December 11th. COP21 will be a crucial conference, as it needs to achieve a new international agreement on the climate, applicable to all countries, with the aim of keeping global warming below 2°C. France will therefore be playing a leading international role to ensure points of view converge and to facilitate the search for consensus by the United Nations, as well as within the European Union, which has a major role in climate negotiations. Importance regarding new international targets on reduction of CO2-emissions, WWF Switzerland decided not only to use Earth Hour to talk about climate change but rather to run a yearlong campaign on climate change (cf. Figure 3)

Figure 3: Schedule for yearlong climate campaign of WWF Switzerland

Public awareness and the Earth Hour movement were used to galvanise politicians with a “petition for fair climate politics”. This petition was launched together with the climate alliance, a group of 50 Swiss organisations. Core message was: climate politics are urgent. Switzerland, like all other nations need to act right now!

3.2. Goals and Scope

3.2.1. Mobilisation

- 20’000+ signatures for the petition of the climate alliance;
- 4’000 new E-Mail addresses with permission to send the WWF Newsletter.
- All bigger CH-Cities stay on board for the light-out celebration

3.2.2. Programmatic impact:

Put pressure on politicians (especially Switzerland's minister for energy and environment, Mrs. Doris Leuthard) regarding Switzerland's CO2-reduction targets.[5]

Create a first buzz for the yearlong climate campaign of WWF Switzerland. The Petition aims to help WWF's lobbyist to demand more ambitious CO2 reduction targets for Switzerland at COP21.

3.3. Messages and visuals

Core Message: "Municipalities and individuals set a sign for climate protection"

Call-to-action: „Sign the climate petition" www.wwf.ch/earthhour

Visuals have to be aligned to WWF Corporate Design (CD) & Corporate Identity (CI). The climate alliance used visuals that are a bit cheeky to put pressure on politicians. They created a visual for the good conscience of Switzerland's minister for energy and environment Mrs. Doris Leuthard. The avatar was called "St. Doris" (see Figure 4). As the cheeky way of talking to politicians is contradicting WWF's CD & CI, WWF created four different visuals to support the petition during Earth Hour 15 (cf. Figure 5).

Figure 4: Visual of Climate Alliance to support the climate petition, not used by WWF during Earth Hour

These visuals were used in social media and on the WWF-landing page www.wwf.ch/earthhour.

[5] http://www.bafu.admin.ch/klima/13877/14510/index.html?lang=en, Online 15.09.2015

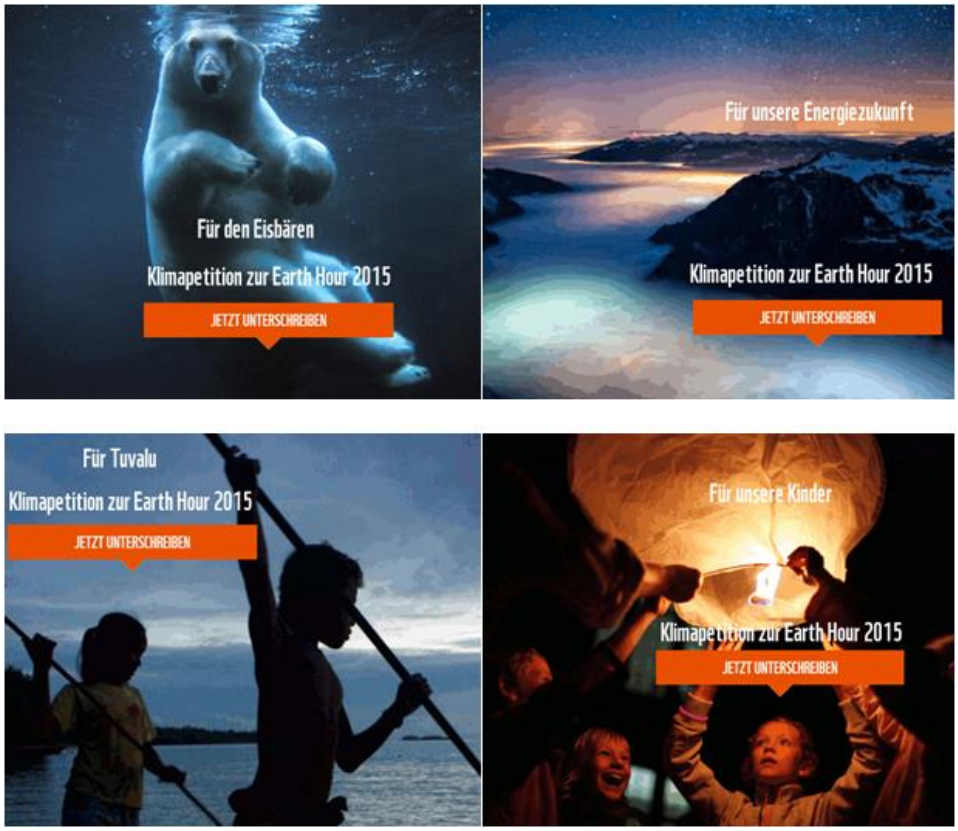


Figure 5: CD/CI conform Key-Visual / WWF Mobilisation Tool: 4 alternating Landing pages: 1. „For the ice bear“, 2. “For our future energy supply”, 3. “For Tuvalu”, 4. “For our children” – “Climate Petition at Earth Hour 2015 - Sign now”

To guide engaged people to a slightly adapted version of the WWF mobilisation tool described in Deliverable D6.1 the visuals were equipped with a button “sign the petition now” (cf. Figure 5). After clicking on the button, a microsite including the entry-mask to sign the petition appears. This microsite contained two informal sub-pages answering the questions: “What is Earth Hour?” and “Why sign a petition?”

3.3.1. Dissemination

To reach the public, information on the Earth Hour -topic was placed in the owned channels like the WWF-Magazine, the Newsletter (February and March), a Teaser on the general WWF.ch-website, a sub-/landing- page on WWF.ch (wwf.ch/earthhour) and a Google grants branded campaign. Additional to the owned there is earned communication through two media releases[6] and several posts in social media (Twitter and Facebook).

[6] Media release1: https://www.wwf.ch/de/aktuell/medien/medienmitteilungen/?1904/Klimaschutz-Schweiz-muss-sechs-Mal-mehr-tun

3.4. Results & Discussion

3.4.1. Engagement Statistics overview

A quantitative overview on Earth Hour 15 engagement is given in Table 1.

Table 1: Quantitative Overview of Earth Hour online campaigning success (source: Google analytics)

Earth Hour 2015 24.2.15 - 23.4.15	Reach		Petition (Signatures)		Permissions	
	Impress-ions (quantity)	Visits (quantity)	Signa-tures (quantity)	Signa-tures (Rate)	Permissions (quantity)	Permissions (Rate)
Newsletter		11,194	8,779	78.4%	5,342	47.7%
Direct		1,758	1,244	70.8%	485	27.6%
Referral		197	74	37.6%	33	16.8%
Facebook		n.a	1,480	n.a.	n.a.	n.a.
Twitter		132	102	77.3%	43	32.6%
Thunderclap		218	73	33.5%	24	11.0%
organic search		430	282	65.6%	133	30.9%
Facebook- Ads	221,277	n.a.	2,530	n.a.	n.a.	n.a.
Google Grants	1,148	96	44	45.8%	21	21.9%
Total		19,743	14,663	74.3%	8,223	41.7%

During the two months before and after Earth Hour, WWF Switzerland collected nearly 15,000 online plus 9,000 written signatures for the petition of the climate alliance (goal: 20,000 in total).

More than 8,000 people gave their E-Mail address with a request for the WWF Newsletter (goal: 4,000).

30 cities (including all major cities, except of Winterthur) took part in the light out celebration. Several cities did celebrate in elaborate events. However there was no support for WWF's beyond the hour campaign, as it comprised a political action (demand to sign a petition).

The engagements per visit on www.wwf.ch/earthhour, measured in conversion- and permission-rate (74.3% and 41.7% respectively) were, compared to earlier campaigns much better (cf. Table 2).

Media release2: https://www.wwf.ch/de/aktuell/medien/medienmitteilungen/?1917/Earth-Hour-In-der-Schweiz-ist-das-Licht-ausgegangen

Table 2: Comparison of conversion and permission rate for campaigns of WWF since March 2014 (source: Google Analytics)

Campaign	Earth Hour 14	Dreckstrom	Foodwaste	Earth Hour 15
Date	Mar 2014	Jun 2014	Oct 2014	Mar 2015
Conversion-Rate	7.7%	66.5%	49.8%	**74.3%**
Permission-Rate	4.2%	29.6%	23%	**41.7%**

Comment: In 2015, many followers already reached with the earlier campaigns returned to participate again in the Earth Hour campaign.

3.4.2. Social Media Engagement statistics

From February 24th until March 30th, 15 posts were disseminated on Facebook and Twitter, each in German, French and Italian (formerly agreed internal goal: create 10 posts).

Impressions (166,160) and number of interactions (e.g. 3,060 likes) was much higher than for Earth Hour 14 with only 98,964 views and 1,805 likes.

To increase the visibility of the posts, WWF generated a thunderclap[7] joined by 258 Supporters generating 83,244 impressions.

[7] www.thunderclap.it, Online, 15.09.2015

Table 3: Social media coverage and engagement on Facebook and Twitter(source: Brandwatch)

Item	Count
Number of Posts (in German, French and Italian)	15
Impressions, organic	127,780
Impressions, paid	38,380
Likes	3,060
Comments	247
Shares	824
Clicks on links	1,701
Interactions per View [%]	3.5

Comment: WWF Switzerland tested thunderclap already for a campaign on food waste, also with great success in autumn 2014. Therefore, this measure will from now on, be used as default to start campaigns.

In Table 4, the German versions of all 15 posts mentioned in Table 3 are listed in more detail.

Table 4: Facebook and Twitter posts WWF_Schweiz before and during Earth Hour 2015 (source: Brandwatch)

Nr.		Date	Views	Likes	Comments	Shares	Clicks
1	Earth Hour: Du und die grösste Umweltaktion der Welt	24.02.2015	13,200	108	1	37	88
2	Earth Hour Erfolge: India goes solar!	25.02.2015	3,918	73	1	10	4
3	Earth Hour Erfolge: Ein EH-Wald für Uganda	26.02.2015	3,906	70	1	6	-
4	Bad news: Klimaziele kriegen Note 2 bis 3	27.02.2015	7,124	78	9	25	50
5	Earth Hour Erfolge: Argentinien schützt sein Meer	02.03.2015	6,544	164	2	20	10
6	Von wegen klimamüde: Die Welt hat richtig losgelegt!	04.03.2015	3,938	38	6	11	15
7	Für den Eisbären: Damit wir	06.03.2015	11,016	181	9	53	140

	nicht jede dritte Art verlieren.						
8	Für Tuvalu: Damit ihre Welt nicht untergeht.	09.03.2015	5,110	62	1	20	51
9	Für die Energiewende: Wir sagen dem Erdöl Tschüss	18.03.2015	33,544	402	37	91	366
10	Das Eis wird dünn: Arktis so klein wie noch nie	20.03.2015	2,576	35	7	11	19
11	Für unsere Kinder: Damit sie nicht unsere Fehler ausbaden	23.03.2015	4,070	50	1	5	20
12	Der Panda macht mit – und du?	24.03.2015	38,832	326	41	132	238
13	Wir machen Dunkel, damit der Welt ein Licht aufgeht.	27.03.2015	4,520	64	4	11	19
14	Earth Hour: Die Welle rollt	28.03.2015	11,008	185	27	39	173
15	Alles so schön dunkel hier! Das war die Earth Hour 2015 in Bildern rund um die Erde und darüber hinaus.	30.03.2015	5,224	43	1	5	17
	Total		154,530	1’879	148	476	1’210

Comment: Share of posts in French and Italian is less than 10% of total reach and therefore not listed in detail.

Figure 6 shows the social media coverage for posts in German on Twitter and Facebook. Posts No. 12 “The Panda takes part, what about you?” (24.03.) and No. 9 “For the Energy turnaround: We say goodbye to fossil fuel” (18.03.) had the biggest reach. Least successful was post No. 10 “Ice is getting thinner: Arctic smaller than ever.”

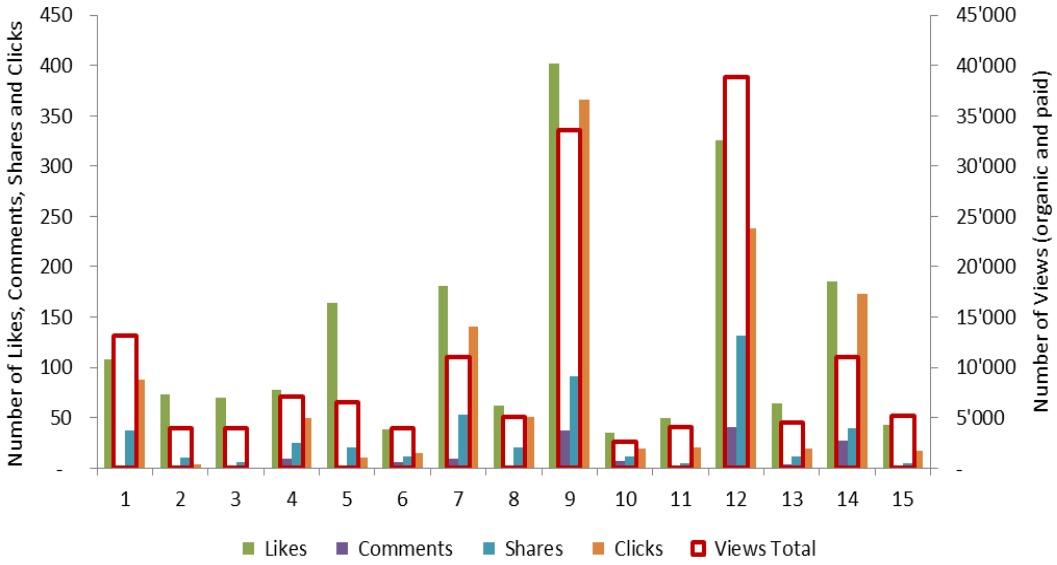


Figure 6: Social media coverage for post in German on Twitter and Facebook: Likes, Comments, shares and clicks on primary axis (left), Views on secondary axis (right) (Source: Facebook insights

3.4.3. News media coverage

The first media release (24.2.15, “Switzerland need to do six times more”) was no success (only 5 Clippings, not on the list of the governmental news agency).

The second media release (27.3.15, “Tomorrow in Switzerland the light will go out”) worked much better: 215 Clippings, many radio interviews and online-stories (background stories on energy savings, public lighting, own research).

3.5. Concept Evaluation and next steps (WWF)

3.5.1. Concept evaluation

Learning and Concept evaluation for the campaign are summarized in Table 5 and

Table 6:

Table 5: Petition-Concept

Positive	**Negative**
Simple Headline, strong Images, understandable messages: “For our children”, “for the ice bear”, etc. Emotional pictures fit nicely to the	Difficult to unite 3 “different” topics: • Explain Earth Hour • Cities light out celebration

background of the campaign of Earth Hour global	• Petition People expect proposal for personal experience events like candle light dinners, etc

Table 6: Marketing-Concept

Positive	**Negative**
Experience shows, that Facebook & Google Ads work well for advocacy campaigns. Evaluation of Earth Hour 15 confirms this	E-Mail with appreciation for the signature contained too many CTAs (Call To Actions) Content, Tonality and look of the campaign were not always identical on all channels.

3.5.2. Next steps

In December 2015 the United Nations Climate Change Conference, COP21 (also CMP11) will be held in Paris. The overarching goal of the Convention is to reduce greenhouse gas emissions to limit the global temperature increase to 2 degrees Celsius above current levels.

For environmental causes this is a major milestone because politicians all over the world have the possibility to vote for more stringent climate targets and commitments for their nations.

EH2016 is the 10th Earth Hour and plans are already underway to design it strongly around climate once again as we look at the 'Road through Paris' – EH 2016 will be a few months after Paris and could serve as an important tactical element in our mass mobilization efforts around climate especially in the urban context of cities. EH2016 will have a very strong focus on social media, to leverage this popular media to support the campaign, and to create viral actions of solidarity againt climate-change.

DecarboNet will support discussions around COP21 as well as the global Earth hour by providing useful information on how to engage more people for WWF's causes not only through social media but also through the various functionalities and initiatives of the DecarboNet platform.

4. Advanced Campaign Analysis

This year the team has been closely integrating the work of different work packages for the analysis of the Earth Hour 2015 campaign.

In order to track the online coverage about Earth Hour we prepared a specific installation of the Media Watch (D3.2.1)[8] that was launched a few days before the campaign and disseminated at various events (including the CAPS consultation meeting that was celebrated in conjunction with the Net Futures 2015 event[9]), and via different channels, in particular the different social media accounts of DecarboNet. This installation was visited by 576 unique users between 15/03/2015 and 15/04/2015, approximately 15 days before and after EH15.

In addition to the real time monitoring and analysis of the event we also prepared a set of specific research questions in collaboration with WWF. These research questions have been investigated in an off-line mode based on the data collected by the previous Media Watch on Climate Change (MWCC) installation.

The following sections describe the Earth Hour installation of the Media Watch on Climate Change and the different visualisations that were provided to the public to monitor the event in real time. We also provide a description of the data collected by this installation, which constitutes the base of the conducted offline analysis.

This offline analysis aims to answer specific questions about engagement by analysing users, content and topics that emerged within the social media discussions around the campaign. Specifics about the data collected, the analysis methods and the obtained results are reported in the following sections.

4.1. Real Time Analysis of Earth Hour 2015

The Media Watch on Climate Change (MWCC),[10] (see Figure 7), is a publicly accessible news and social media aggregator on climate change and related environmental issues. Its dashboard provides access to large archives of Web content from various online sources. The system integrates multilingual content from English, French and German online sources, including: social media (Twitter, Facebook, Google+ and YouTube) and the websites of news channels Fortune 1000 companies, municipalities and environmental NGOs.

Automated document enrichment services then transform the gathered information into a contextualised information space spanning geospacial, temporal and social dimensions. Analysing this information space reveals information flows and provides indicators for assessing the impact of environmental campaigns and public outreach activities.

[8] http://www.ecoresearch.net/climate/search/topic/8/165/EarthHour, Online: 15.09.2015
[9] http://netfutures2015.eu/, Online: 15.09.2015
[10] http://www.ecoresearch.net/climate/, Online: 15.09.2015

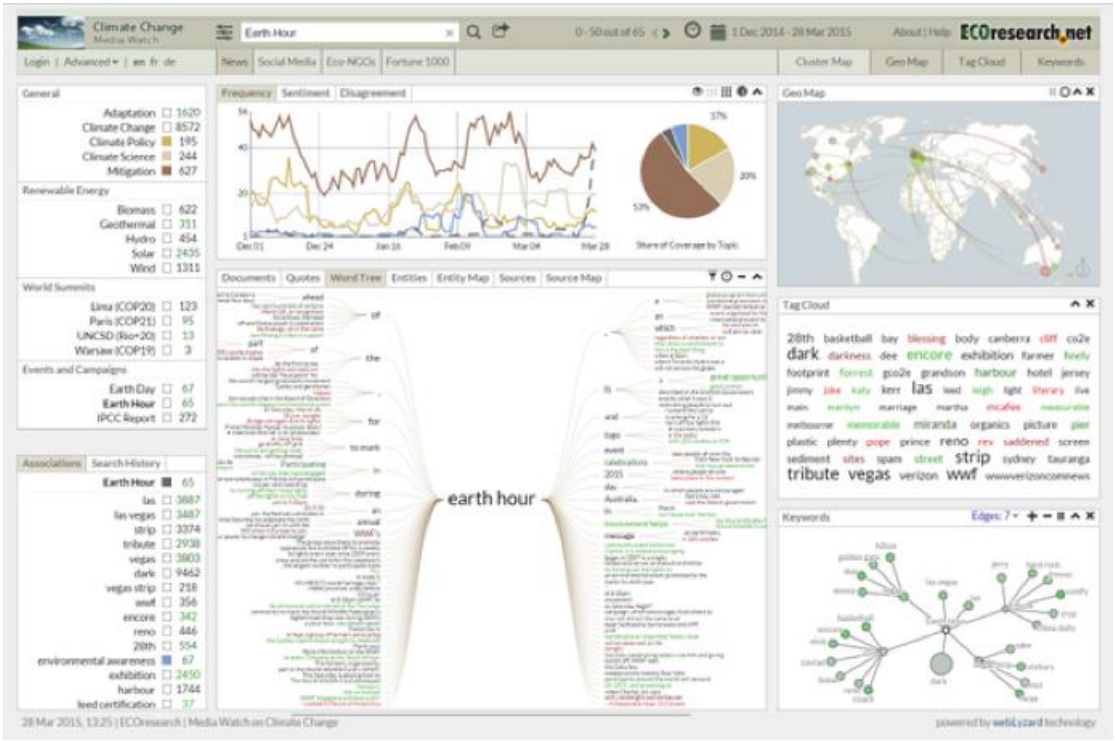


Figure 7: Screenshot of the Media Watch on Climate Change Earth Hour Installation.

Figure 7 presents a screenshot of the MWCC Earth Hour installation. The different visualisations provided by this dashboard revealed interesting trends during the event. The technical aspects of these visualisations are explained in D3.2.1. In the following sections we summarise these visualisations and explain the different insights that were extracted about the Earth Hour 2015 event based on them.

4.1.1. Activity Evolution Analysis

The following visualisation gives the stakeholder a quick insight on the level of activity around the campaign. As we can see in Figure 8, the earth hour topic started gaining popularity after the 22nd of March and obtained its maximum degree of popularity the day of the campaign. This activity decayed significantly the days after the campaign, although some discussions were still active until mid April. Along with Earth Hour, we can also see the popularity within the media discussions about three important landmarks that switched off their lights during Earth Hour[11] (Eiffel Tower - Paris, Golden Gate - San Francisco, and Buckingham Palace - London). As we can see, during the day of the campaign, as well as the days before and after, the Eiffel Tower was the landmark that attracting the most attention. This is due to the efforts of WWF to raise awareness on renewable energy and climate change leading up to the Paris COP 21.

[11] http://www.earthhour.org/60-iconic-landmarks-switch

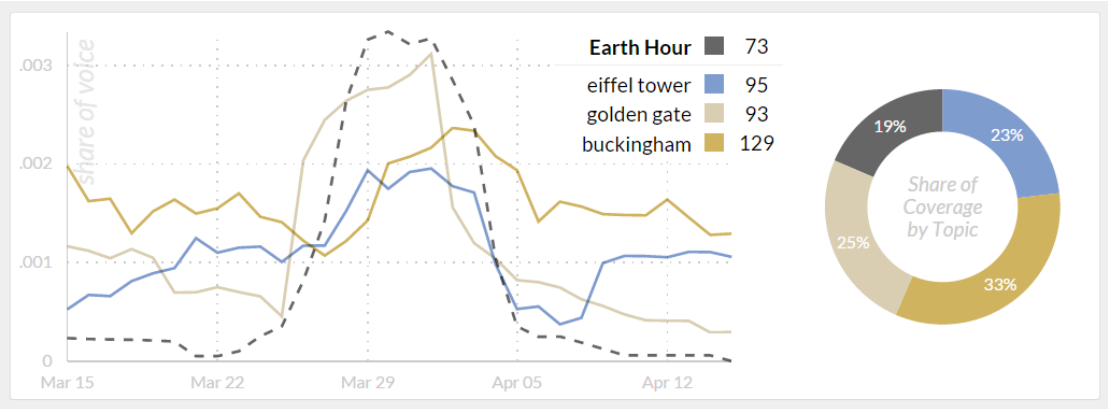


Figure 8: Visualisation of Activity and sentiment evolution.

4.1.2. Lexical Analysis

The following visualisation displays the word-tree of the Earth Hour 2015 campaign. The root of the tree is the search term (in this case earth hour). The left part of the tree displays all the sentence parts that occur before the search term (prefix tree) and the right part those that follow the search term (suffix tree). These branches (left and right) help users to spot repetitions in contextual phrases that precede or follow the search term.

Figure 9 presents the Word Tree visualisation at a particular point of the campaign. As we can see in this figure, nodes such as (*WWF* or *support)* group multiple conversations around the campaign. This reflects the relevance of WWF as organisers of the event, as well as the request for support and the display of support showed by users and organisations participating in the campaign. Among the popular prepositions and conjunctions grouping information about Earth Hour 2015 we can highlight (*for/to*) which summarise the type of activities (make a pledge /donate /celebrate /switch off) that are encouraged during the campaign as well as the type of users (staff / students / families) that the campaign aims to involve. Another popular preposition grouping information is *in,* which groups the locations in which Earth Hour is taking place or gaining popularity.

Figure 9: Word Tree representation of online coverage about the Earth Hour 2015

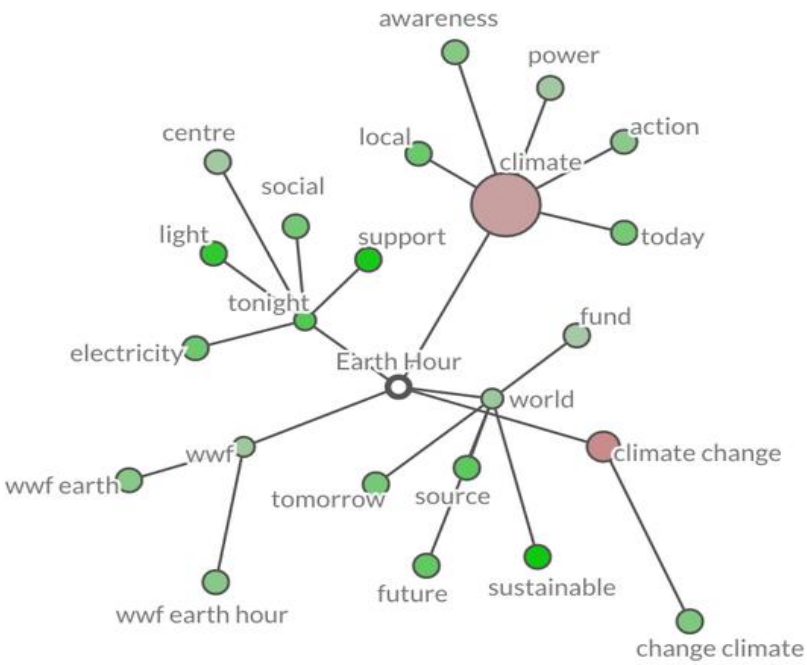


Figure 10: Keyword Diagram of online coverage about the Earth Hour 2015

Figure 11: Tag Cloud about Earth Hour 2015

The word-tree is complemented by the Tag Cloud and Keyword diagrams, which rather than focusing on the analysis of sentences they focus on displaying the most popular terms, and the most popular co-occurrences between terms respectively. As we can see by Figure 10 and Figure 11, popular terms in the campaign include WWF, world, climate and tonight. *WWF* co-occurs, or appears in the context of terms such as WWF or earth hour, reflecting the important role of WWF as organiser of the event. Conversations within the campaign group around terms such as *climate* and climate change, its awareness, and the actions that can be done locally and today. Conversations around *tonight* focus more on the campaign, the social support received, and on the symbolic action of switching off the lights. Finally, conversations around the term *world* focus on more on a sustainable future.

4.1.3. Geospacial Analysis

The Geospacial analysis, as described in D3.2.1, shows the distribution of Web coverage (in this case reference to locations co-occurring with the term “WWF”), as shown in Figure 12. The position of the circles is determined by the geographic coordinates of these references and their size is proportional to the number of documents (posts, news articles) referring to a specific position. Locations that appear in posts/articles talking positive about WWF are green, locations that appear in posts/articles talking negative about WWF are red, the grey ones are neutral (or controversial, i.e., half positive and half negative). The arrows always originate (i.e. the thin end) in the country centre (US, Canada, UK, AU, NZ) and then go towards

the marker that represents the locations referenced in the article(s). i.e. the direction is shown by the thickness of the line – thin = source; broader = target location.

Figure 12: Word Tree representation of online coverage about the Earth Hour 2015

4.2. Offline analysis of Earth Hour 2015

In addition to the real-time monitoring of the Earth Hour 2015 campaign via the specific MWCC installation we have also performed several offline analyses to measure engagement towards the campaign. This analysis includes an in depth study of the different factors (user and content attributes) that influence social engagement as well as the topics that were prominent amongst the discussions around the Earth Hour 2015 campaign.

4.2.1. State of the Art

Recent years have seen a large body of research on measuring and predicting engagement across social media platforms. Engagement has been measured in different forms (e.g., retweets, replies to comments, popularity of posts and answers) in search for a better understanding of engagement dynamics and the features that influence engagement. For retweets, which is the main indicator of engagement used in this work, it was found that content features were more influential than social features for determining whether a tweet will be retweeted or not [2][6][7][12]. For example, the presence of URLs and hashtags in the tweets were often found to be good indicators of retweetability [8][12]. Some social features, such as number of followers, followees and account age were also found to have some impact, although less than content features [12].

The role of topics in attention generation has also been investigated. It has been found that people are less likely to retweet on topics that they themselves tweet about [7], and that tweets on topics of general interest are more likely to be retweeted [8].

While these works have focused on understanding the different factors that influence engagement dynamics in different social networking platforms, little research has focused on understanding engagement towards the campaigns launched by social movement organisations, and specifically those around climate change and sustainability issues.

In [1] Campbell provides a comparative study of three climate change campaigns' Twitter accounts. This study observes that EH builds anticipation and momentum for the annual culmination of the campaign and engage followers by sharing user-generated content such as photos. Kazakoza [5] also studies the EH campaign construction and its symbolism. In this study she highlights the different modes of communication used within the campaign including – persuasion, rhetoric, images, advertising, news stories and other modes of symbolic action. While these studies analyse the characteristics of the EH campaign and the mechanisms used to engage with the public, these works do not assess the effect of those mechanisms and their impact on public engagement.

In the household context, the following works studied engagement towards the EH campaign in terms of reduction levels in energy consumption [11][13]. While electricity reduction is a countable metric, it only helps assessing engagement towards the campaign in a short period of time. It is also difficult to assess whether the actual reduction in energy is produced as a consequence of the campaign or because of other external factors.

Our work aims to complement the previous works by assessing the impact of the EH campaigns in public engagement [16,17]. With this purpose, we investigate the different factors that trigger or influence engagement actions towards the messages and topics of the campaign in Twitter.

4.2.2. Social Media Data Collection

Our pipeline considers the information collected by the Media Watch installation as the base dataset for the offline analysis. This installation collected a dataset of 90,792 Twitter posts coming from 64,747 users between 27/03/2015 and 23/05/2015 by using the Twitter Streaming API. As specified by Twitter,[12] the public streaming API caps the number of messages sent to a particular client to a small fraction of the total volume of tweets at any given moment. To enhance these data, we made use of the Twitter search API. The collection process is therefore divided in two steps:

- In a first step we use the data collection techniques developed by WP2 to filter the Twitter stream, obtaining posts in real time around Earth Hour. These posts are pre-processed and stored.

[12] https://dev.twitter.com/docs/faq, Online: 15.09.2015

- In a second step, we enriched the previously collected dataset by recursively adding the parent tweets of replies and retweets. By performing this process we enriched the dataset to 97,695 posts coming from 68,554 users

The architectural diagram of our data collection solution is shown in Figure 13. As we can see the collector extracts data for four main units of information and stores them in a database. These units include: posts, replies/retweets/favourites, tags and users.

- **Posts:** This table contains information regarding the posts, including its own identifier, its author, its text, and the date it was created. As an addition with respect to the analysis conducted in previous years we are now considering whether the post contains a media item (i.e., an image) and its specific URL.

- **Replies/Retweets/Favourites -** This table contains information about the messages that have been retweeted, favorited or replied by other Twitter users. A message with a high number of replies, favourites and retweets indicates that the message is popular and is therefore engaging users in the conversation.

- **Tags -** This table stores information about the set of hashtags mentioned in the tweets. Hashtags provide an indication of the topics that have been posted around the campaign.

- **Users -** This table contains information about those users who participated in the 2015 Earth Hour campaign in Twitter, including their geographical location, their description, their time on the platform, etc.

While the collection was restricted to the English language, an offline analysis of the content revealed that English posts constitute 71% of the collected data. 21% are in Indonesian. A small number of posts are in Tagalog (Filipino), Dutch, Swedish, and other languages. Note that when using the Twitter streaming API to collect data, the filtering mechanisms are not as accurate as when using the search API, since they require a faster processing of the data. By recollecting information using the search API we were able to provide a better language filtering.

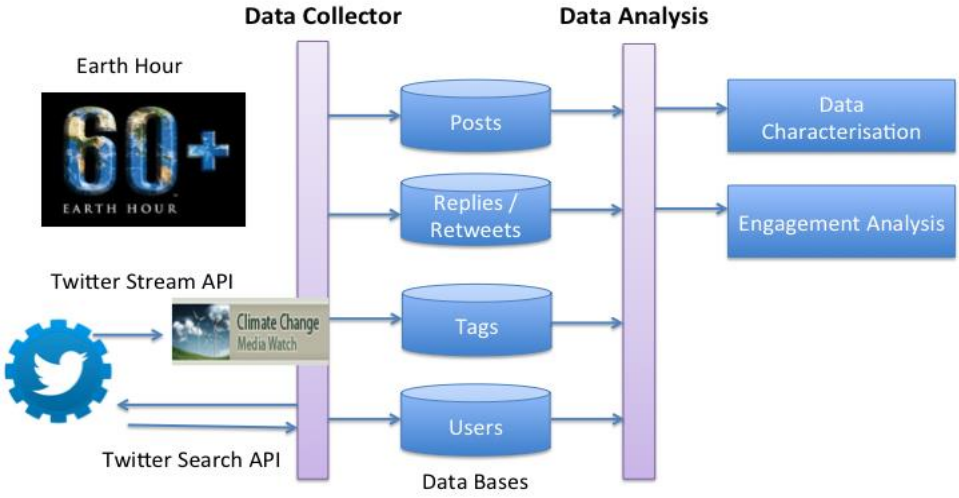


Figure 13: Pipeline for the data collection and analysis

English-language tweets only were used for the engagement analysis presented in the following section. The distribution of the posts with respect to time and language is illustrated in Figure 14. The distribution is consistent with a high volume of posts around the local earth hour time.

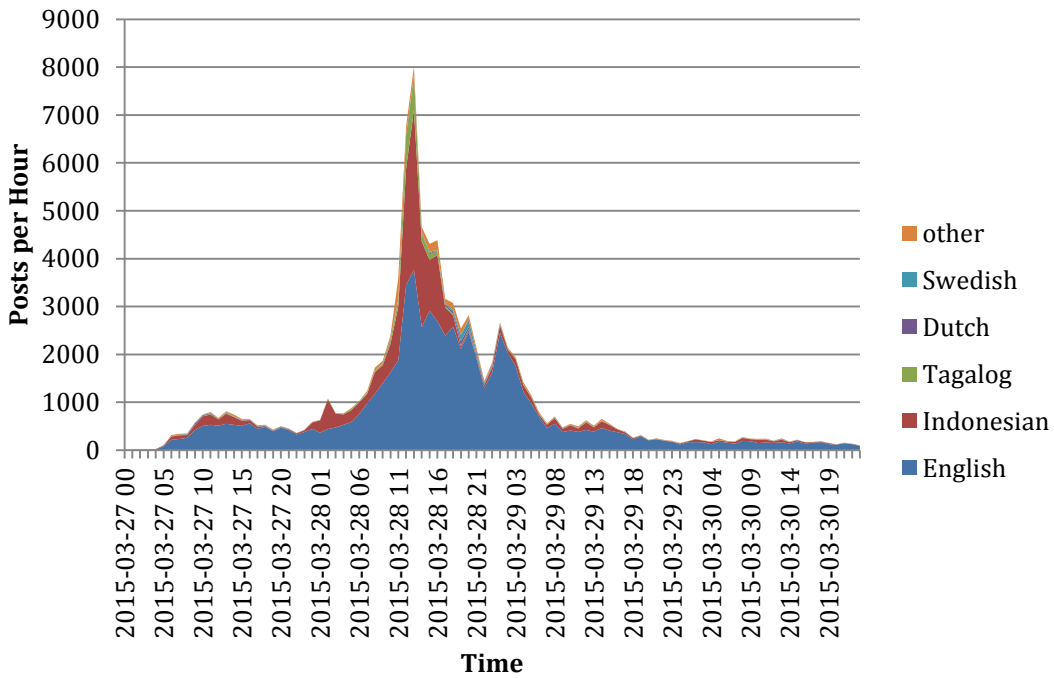


Figure 14: Posts per hour from 27/03/15 00h to 30/03/15 24h (UTC)

After discarding retweets (which are distinguished by their text starting with “RT @”) we analysed the 58,421 remaining tweets (60% of the total dataset) and we observed that: (i) about 4% of tweets were retweeted 9 or more times, and 76% were never retweeted (see Figure 15).

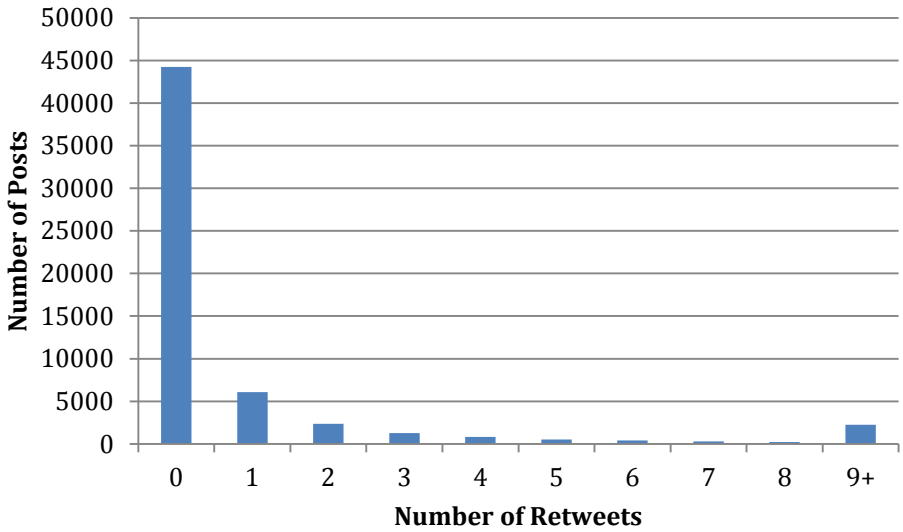


Figure 15: Number of posts with a given number of retweets.

4.2.3. Characterising Engagement

Once the data has been collected, our goal is to characterise engagement towards the Earth Hour campaign in Twitter and to study which factors influence engagement. As for last year’s campaign we consider retweeting as the strongest engagement indicator. Table 7 presents a quick overview of the top tweets in our dataset that have received a high number of retweets.

Table 7: Top 10 retweeted posts around Earth Hour 2015

Post	Retweets
Join #EarthHour this Saturday, switch off the lights at 8:30 pm local time: http://t.co/HYW0dhi7O4 http://t.co/TGXN8oAPfO	**1979**
It's not about what country you're from, it's about what planet you're from. Join the world for #EarthHour http://t.co/yPV88RQFKM	**1979**
Are you ready to celebrate #EarthHour 2015? RT if you will be partying with us! http://t.co/Sm1Ad8avAk	**1514**
Earth Hour is tonight! http://t.co/zMTCMAjPkS	**1201**
The world’s biggest celebration for our planet is this Saturday! RT if you will join #EarthHour at 8:30pm. http://t.co/Ig6jWg25xU	**1169**
Retweet for a @TimexUK ladies watch, favourite for a men's! In celebration of Earth Hour on 28th March! #timetoglo http://t.co/nvMYY8Heka	**1151**
#EarthHour: If the whole world can come together for 1 night, there’s nothing we	**1029**

can't do! RT if you agree. http://t.co/EfU8WQ2fub	
Come join us March 28th for #ISFEarthHour ! Share your Earth Hour pictures with us have a conversation about... http://t.co/RTazyzYZ6I	**864**
Join me for #EarthHour tonight at 8:30 PM! Use #YourPower to make the world a better place. @earthhour http://t.co/RKSEomv8hf	**837**

4.2.4. Feature engineering

In D6.2.1 we described the set of factors (features) used to analyse the Earth Hour 2014 campaign. These factors were extracted from relevant literature in the area and included features reflecting characteristics of the users posting the messages as well as how the posts were written and when they were published. In this section we summarised these features and describe the ones that have been added this year to perform a more extensive analysis.

User Features

- *In-degree*: This feature measures the number of incoming connections to the user.
- *Out-degree*: This feature measures the number of outgoing connections from the user.
- *Post Count*: Measures the number of posts that the user has made over her/his life in the system.
- *User Age*: Measures the length of time that the user has been a member of Twitter.
- *Post Rate*: Measures the number of posts made by the user per day.

Content Features

- *Post length*: Number of terms in the post.
- Complexity: Cumulative entropy of terms within the posts to gauge the concentration of language and its dispersion across different terms. Let n be the number of unique terms within the post p and fi the frequency of the term t within p. Therefore, complexity is given by:

$$complexity(p) = \frac{1}{n}\sum_{i=1}^{n} f_i(long_n - \log f_i)$$

- *Readability*: This feature gauges how hard the post is to parse by humans. To measure readability we use the Gunning Fox Index[13] using average sentence length (ASL) and the percentage of complex words (PCW).

$$0.4*(ASL+PCW)$$

- *Referral Count*: number of hyperlinks (URLs) present in the posts.
- *Mentions*: number of mentions to other users within the posts.

[13] http://en.wikipedia.org/wiki/Gunning_fog_index

- *Informativeness*: The novelty of the post's terms with respect to the other posts. We derive this measure using the Term Frequency-Inverse Document Frequency (TF-IDF) measure, which is commonly used in Information Retrieval:

$$\sum_{t \in p} tf_{t,p} \times idf_t$$

- *Polarity*: Average polarity (sentiment) of the post. We are computing sentiment by using SentiStrength,[14] a state of the art method for analysing sentiment in social media data.
- *Time of the day*: Time when the tweet was posted (e.g., 20:00)
- *Media*: whether the post contains a media item (picture) or not
- *Tags*: whether the post contains at least one hashtag or not

The last two content features (Media and Tags) have been added this year with the aim of studying: (i) if including media items helps to attract attention and which type of images attract higher/lower attention levels, (ii) if messages containing hashtags (therefore specifying particular topic(s) of interest) are more likely to attract attention than those ones without hashtags.

4.2.5. Engagement Analysis

To identify the key characteristics of the posts that are retweeted (generating attention), we have performed two different analyses:

- Our first goal is to identify the characteristics of those tweets that are followed by an engagement action (retweet). We call these tweets the seed posts.

- Our second goal is to identify the characteristics of those seed posts that are followed by a high level of engagement (high number of retweets)

4.2.4.1 Classification of Tweets

To identify the characteristics of those tweets that are followed by an engagement action (retweet), we used the CHAID tree algorithm with bagging to train a model that predicts the engagement action. The model is based on the 37,151 English-language tweets from between 27/03/15 00h and 30/03/15 24h (UTC). The data was randomly split into a training set and a test set of equal size. The model achieves an accuracy of 75% on data that was not used for training (test set). The confusion matrix is given in Table 8.

Table 8: confusion matrix for the predictive model

[14] http://sentistrength.wlv.ac.uk/

		prediction: retweeted	
		no	**yes**
retweeted	**no**	10394	3277
	yes	1098	2670

Apart from the predictive model, the algorithm also provides an indication of which features are most useful for prediction. The algorithm identified *media*, *user age, tags and referral count* as the most predictive features; followed by *length*, *complexity*, *indegree* and *outdegree*.

Posts that are followed by an engagement action tend to have a media attached, come from older accounts and include one or more hashtags, but no URLs. They also tend to be longer, have a higher number of unique terms and come from accounts that (1) have a higher number of followers, and (2) are following more accounts.

To illustrate how the relevant features differ among seed posts (retweeted >=1) and posts that are not followed by a retweet (retweeted=0), we list the means for Boolean (yes/no) variables (media, tags) and referral count (were the number of URLs is hardly 1 or 0 for most cases and very rarely larger than 2) in Table 9.

Table 9: Difference in mean among relevant Boolean features

Feature	**Mean: (non seed posts)**	**Mean: (seed posts)**
media (1=has media)	0.105	0.294
tags (1=has tags)	0.362	0.557
referral count	0.603	0.420

To visualise how the rest of relevant features differ between seeds and non-seed posts we are using boxplot visualisations (see Figure 16).

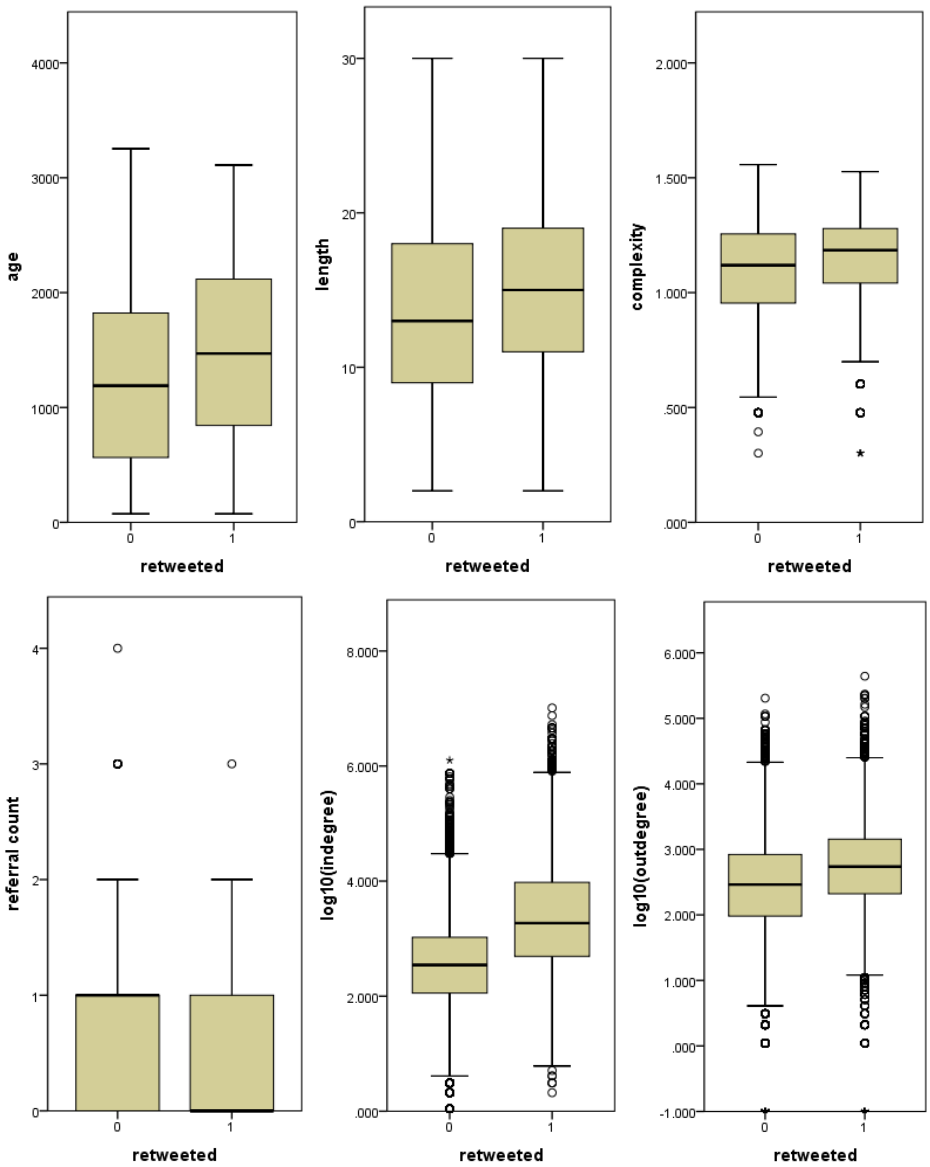


Figure 16: Difference in distributions among features (seed vs. non-seed posts)

4.2.4.2 Attention Levels

We used linear regression to determine the characteristics of those seed posts that are followed by a high level of engagement. Engagement was measured by the number of retweets. We used the logarithm of the number of retweets as the dependent variable, because the number of retweets of the seed posts spans many orders of magnitude and we expect marginal changes in the independent variables to have a multiplicative effect on the number of retweets. For example, we expect that having a media (picture) will increase the number of retweets by a certain percentage, rather than by a constant.

We transformed the three independent variables spanning many orders of magnitude (indegree, outdegree, and post rate) by the logarithm function as well, as we found that this better reveals their association with high engagement.

Posts with high engagement are strongly associated with a high number of followers of the author. They are more likely to have a media item (picture) attached. They are also more likely to include one or more hashtags, but less likely to include a URL. The post rate of their authors tends to be lower. In summary, both user features and content features are important predictors of engagement.

Table 10: Standardized Coefficients (Beta) and Significance

	Beta	**Significance**
indegree (log)	+0.638	0***
media	+0.155	0***
tags	+0.097	0***
referral count	-0.096	0***
postrate (log)	-0.094	0***
age	-0.081	0***
informativeness	-0.049	0***
outdegree (log)	-0.045	0***
mentions	-0.034	0.001**
complexity	+0.070	0.101
timeDay	-0.009	0.327
readability	+0.007	0.468
polarity	+0.003	0.766
length	-0.001	0.987
Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’		

4.2.4.3 Top Users

As concluded in the previous section, the popularity (in-degree) of the users played an important role when engaging the public in the Earth Hour campaign. In this section we present a brief overview of those Twitter users that were identified as highly engaging. We consider three different criteria when selecting these users:

1. *Number of retweets*: By using this criteria we select users that have received a really high number of retweets (independently on the amount of posts that they generated about the Earth Hour campaign)

2. *Number of tweets retweeted*: By using this criteria we select those users that got a higher number of their posts retweeted (even if those posts were not retweeted a large amount of times). These users were active during the campaign and also actively followed.

3. *Retweeted other users*: By using this criterion we select those users that actively retweeted other users during the campaign. These users are highly engaged and try to actively spread the word.

Table 11: Top users

Num Retweets Acquired	**Num of Tweets retweeted**	**More engaged (retweeted other users)**
earthhour	Earthhour	Sheratonsub
WWF	Ehindonesia	WWFScotland
World_Wildlife	Mellberr	EasaDhari
UN	Johnspatricc	Fahethi
AstroSamantha	EM_UBOfficial	Layankoh
Independent	EHSurabaya	LangBanks
mashable	WWFScotland	Ehmakassar
Ehindonesia	EHPalu	Ehjogja
thewatchhut	Smitharyy	EarthhourGIB
LifeCheating	WWF	Iszub

Among the users who generate a larger number of retweets we have: (i) the organisers, Earth Hour international and Indonesian, WWF international and US, (ii) international organisations such as the United Nations, (iii) news organisations, such as the Independent and mashable. (iv) commercial brands, such as thewatchhut, or LifeCheating and, (v) relevant individuals, such as AstroSamantha, an astronaut posting for Earth Hour from space.

Among the users that got a large number of tweets retweeted we have: (i) the campaign organisers Earth Hour international, Indonesia, Indonesia (Palu), Indonesia (surabaya), WWF international and Scotland; (ii) local organisations such Brawijaya University in Indonesia (EM_UBOfficial) and (iii) celebrities, such as: Patricia Johnson (Johnspatricc), Mary Smith (smitharyy) and Mellisa B. (mellberr)

Among the users more compromised on spreading the message of the campaign by retweeting other users' posts we have several local Earth Hour and WWF local

organisations: (i) makassar (Indonesia), jogja (Indonesia) Gibraltar (UK) and Scotland (UK), as well as the director of WWFScotland (LangBanks), (ii) private organisations, such as the Sheraton Surabaya hotel in Indonesia and (iii) individuals (activist by their Twitter accounts): Iszub (Ismail Zubair), EasaDhari (Easa Dhari), Fahethi (Dheythin Fahethi) and Layankoh.

4.2.4.4 Top Images

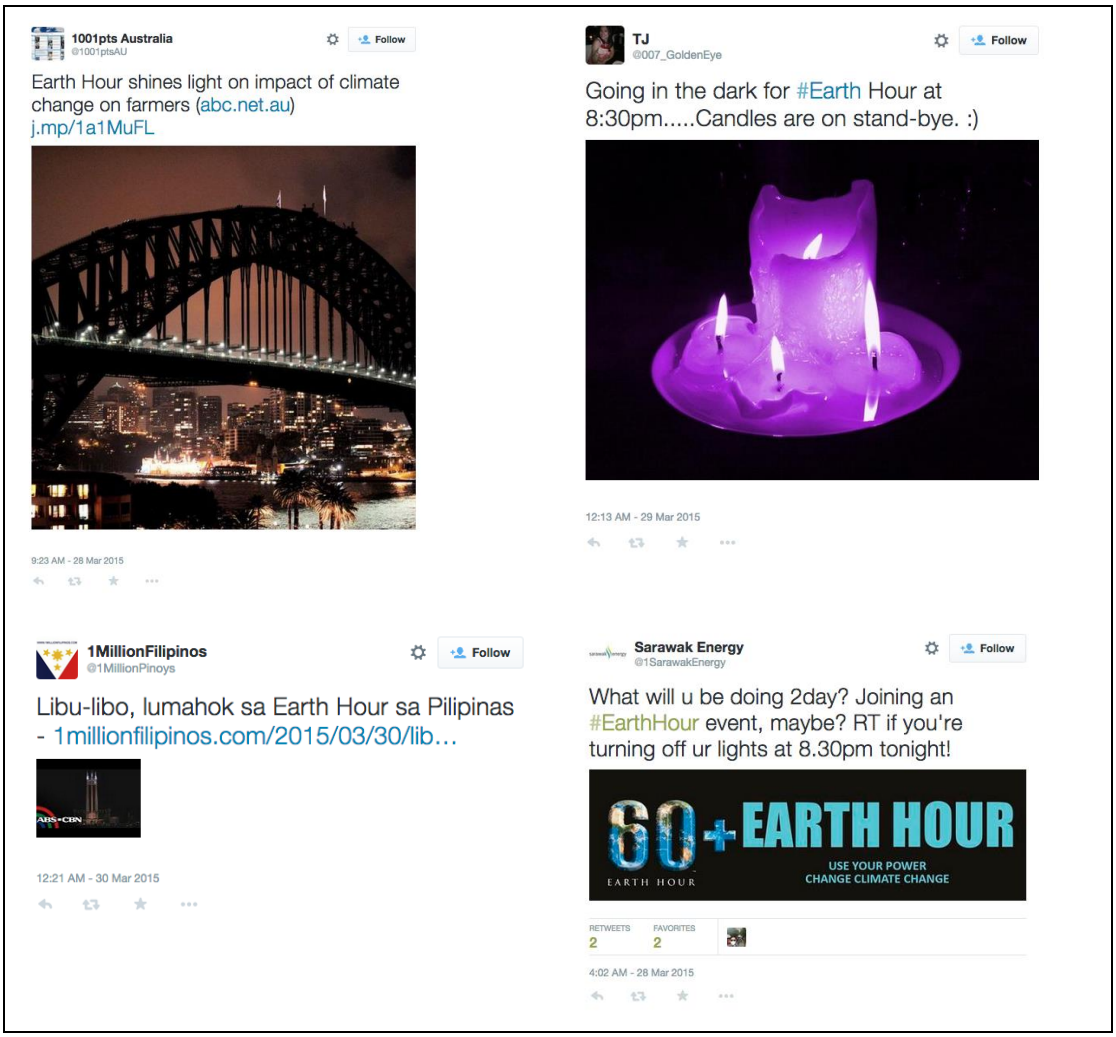
Images were identified as a relevant content feature for tweets to generate engagement. In this section we briefly describe those images that were associated with a high engagement response vs. those images that received very few, or no retweets.

As we can see in Table 12 and Table 13, posts containing images receiving a high engagement response follow one or more of these three characteristics: (i) are original/funny, (ii) come from a user with high popularity (in-degree), (iii) go in consonance with, i.e., reflect, the textual message.

On the other hand, messages containing images that received a low engagement response either: (i) contain sensitive material, and are censored by Twitter, (ii) do not contain a clear message in consonance with the image, (iii) do not come from users with high popularity and, (iv) images tend to be blurry or of bad quality.

Table 12: Images that received a high engagement response.

Table 13: Images that received no, or very low, engagement response.



4.3. Topic Analysis

The following section aims to analyse the key topics of interest around the Earth Hour campaign, i.e., the topics and themes that kept users more engaged with the campaign. To extract these topics we have followed three main approaches:

- The first approach aims to analyse the hashtags contained within the tweets. Hashtags are keywords preceded by the # symbol that users include in the tweets to express their main themes.

- The second approach uses semantic annotators to process the text of the tweet and to identify the key entities (places / products / companies, etc.) that appear in the tweets under analysis.

- The third approach uses Latent Dirichlet Allocation (LDA) to analyse which topics (keyword/document distributions) are discussed by Twitter users during the Earth Hour campaign.

4.3.1. Hashtag Analysis

The tag cloud displayed in Figure 17 shows the main Hashtags appearing in our Global English Earth Hour dataset. The size of the hashtag is an indication of its frequency within the dataset. The colours are for better visualisation but do not convey any meaning. Note that we have removed the main hashtags (#earthhour and #earthhour2015) for a better visualisation, since its frequency is significantly higher than the one of the other hashtags. As we can see, the main hashtags of interest during the campaign include:

- yourpower: This Hashtag represent the campaign slogan “use your power to make change a reality[15]”
- iniaksiku is a term used during the campaign in Indonesia. It means 'ini aksiku, mana aksimu' (this is my action, what is ours). It is the Indonesian version of IWIYW (I will if you will)

These two tags were also highly important during the 2014 campaign. Hashtags that acquired relevance during the 2015 campaign include:

- Hashtags related with climate change, climate, earth, energy, lights and sustainability, which are the main messages associated to campaign.
- Hashtags related to the prohibition in Maldives to switch the light for Earth Hour[16] and the campaign that follow in order support the liberation of president Nasheed, globally known for his advocacy against climate change
- Hashtags related to the organisers of the event (WWF, EarthHour, EarthHourUK, etc.
    - Hashtags related to the competition organised around the Earth Hour 2015 campaign to motivate Young Energy Savers (@YES_SaveEnergy)https://twitter.com/YES_SaveEnergy

Figure 17: Top hashtags within the English Global Earth Hour datasets

[15] http://www.earthhour.org/

[16] http://minivannewsarchive.com/politics/dont-switch-off-lights-for-earth-hour-says-home-ministry-95071#sthash.kWv1guLO.dpbs

4.3.2. Semantic Analysis

Additionally to the analysis of Hashtags (which are keywords explicitly expressed by the users) we have processed the posts with a semantic annotator, in this case TexRazor[17] with the purpose of identifying the key entities and concepts extracted from our dataset. TextRazor offers a text analysis infrastructure. It combines state-of-the-art natural language processing techniques with semantic knowledge bases to extract the key entities and concepts from documents.

Table 14: Top 20 entities of the Earth Hour 2015 campaign

http://en.wikipedia.org/wiki/Earth_Hour
http://en.wikipedia.org/wiki/Earth
http://en.wikipedia.org/wiki/Climate_change
http://en.wikipedia.org/wiki/Hour
http://en.wikipedia.org/wiki/Planet
http://en.wikipedia.org/wiki/Climate
http://en.wikipedia.org/wiki/Energy
http://en.wikipedia.org/wiki/Eiffel_Tower
http://en.wikipedia.org/wiki/World_Wide_Fund_for_Nature
http://en.wikipedia.org/wiki/Tower
http://en.wikipedia.org/wiki/Twitter
http://en.wikipedia.org/wiki/Toronto
http://en.wikipedia.org/wiki/Tonight_at_8:30
http://en.wikipedia.org/wiki/Candle
http://en.wikipedia.org/wiki/Electricity
http://sv.wikipedia.org/wiki/Earth_Hour
http://en.wikipedia.org/wiki/Pakistan
http://en.wikipedia.org/wiki/Indonesia http://en.wikipedia.org/wiki/Maldives

[17] https://www.textrazor.com/

As we can see in Table 14 the top 20 identified entities around the Earth Hour 2015 campaign include: (i) entities around the event and its organisers (Earth Hour, WWF), (ii) entities reflecting the main themes of the campaign (climate change, energy), (iii) entities reflecting the symbolic action of the campaign (switching off the lights for one hour) electricity, candle, (iii) entities reflecting relevant landmarks switching off its lights, such as the Eiffel Tower or the city of Toronto and (iv) countries actively engaged with the campaign, such as Pakistan or Indonesia, and (v) the case of Maldives, where a political protest around the campaign emerged.

As opposed to last year, where celebrities, super heroes and promoters (such as Durex) drove a big part of the social media conversations around the campaign, this year, the conversations have focused mainly on climate change and sustainability, which are the main messages that this campaign aims to convey. In this sense, this year's campaign has managed to propagate the right message. Users engaged in the campaign were not discussing parallel or irrelevant topics, but were mostly discussing and spreading information about climate change and sustainability.

4.3.3. Latent Topics Analysis

In addition to the hashtag and entity-based topic analysis we have also performed a keyword/topic analysis to understand what are the key terms emerging during the campaign, how these terms correlate with each other, and how these terms describe the social media conversations around the campaign.

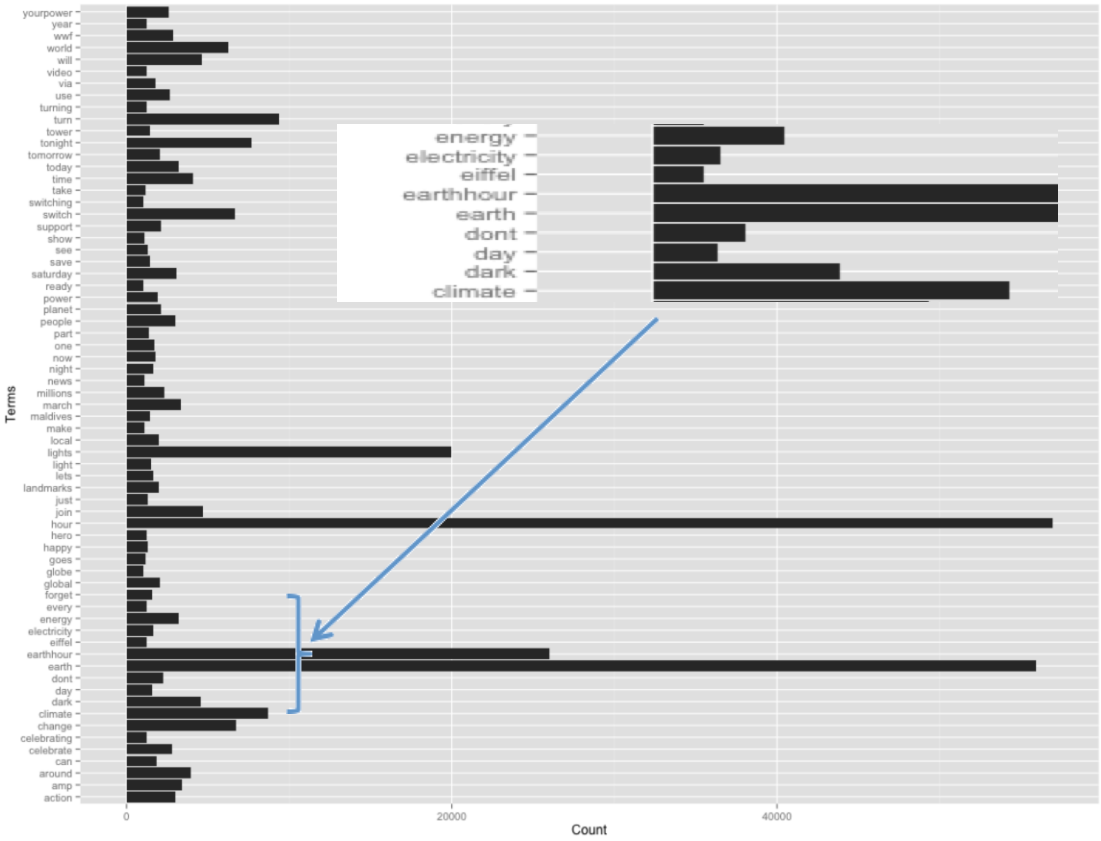


Figure 18: Most popular terms around the Earth Hour 2015 campaign

Figure 18 and Figure 19 show the most popular terms around the campaign and how they group in different clusters. In particular, Figure 18 shows those terms appear more than a thousand times within our dataset with its associated frequency. Not surprisingly, the terms hour, earth, earthhour and lights are the most popular within our dataset. Figure 19 shows how these terms group in different thematic clusters according to the co-occurrence of words within the tweets. As we can see by the image (earth, hour) / (earthhour) / lights and (climate, change) constitute clusters on their own. Besides these four distinctive thematic clusters we have 2 additional ones, the first one focused on the celebration associated to the campaign and on the symbolic action of turning off the lights, the second one discussing the effects on this campaign (from the effect on the landmarks, to the future effects in climate change and sustainability).

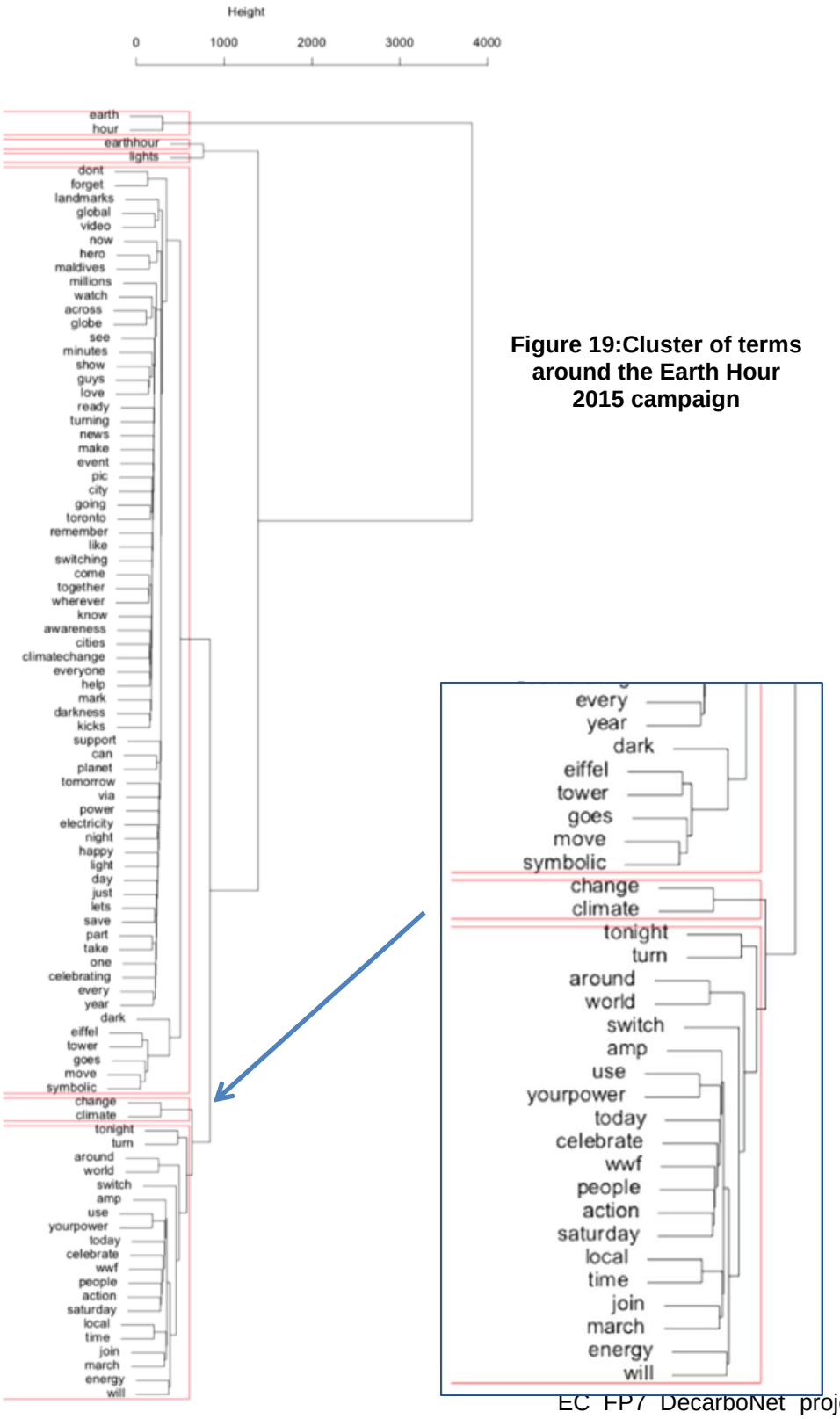


Figure 19:Cluster of terms around the Earth Hour 2015 campaign

To further understand how words and tweets group together around conversations we have performed Latent Dirichlet Allocation (LDA) with 10 topics. The goal of this analysis is to observe what are the relevant topics emerging from the Earth Hour 2015 Twitter conversations. LDA generates topics as bags of words where each topic is represented by a distribution of words. In the following figure we can observe the 10 topics extracted and how many documents (tweets) fall in each particular topic. As already reflected in the previously performed clustering analysis, the most popular topics are Topic 2, which focuses around the action of switching of the lights, followed by topic 3, which focuses on the conversations around climate change and the use of “yourpower” to stop climate change.

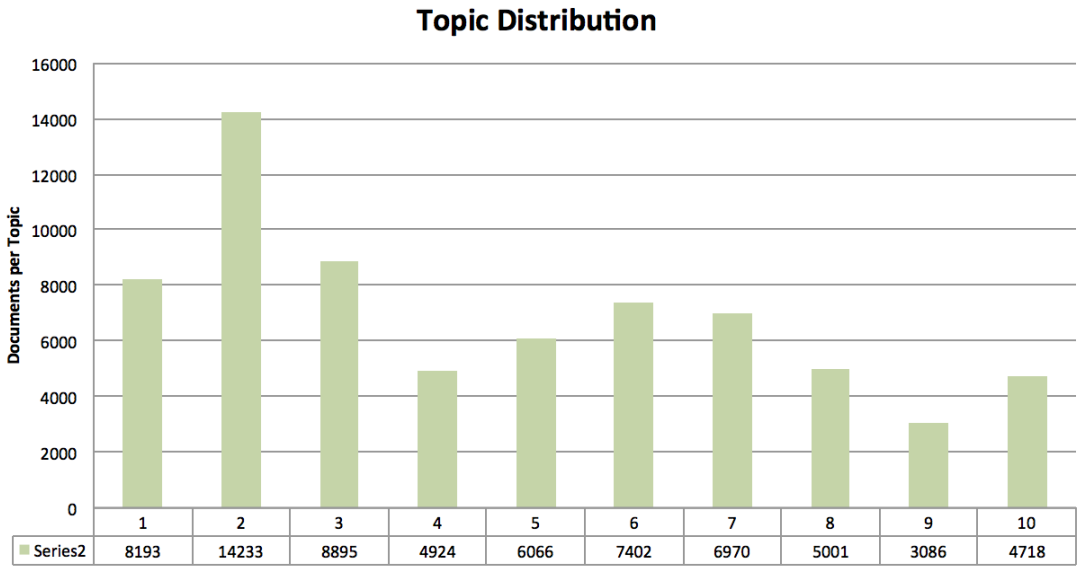


Figure 20: LDA Topic Distribution for the Earth Hour 2015 campaign

5. Future Work

The outcome of our analysis of Earth Hour 2014 and 2015 have been provided to WWF Singapore, and we are currently in discussion with Earth Hour Global to identify directions for collaboration and further analysis of the impact of the Earth Hour 2016 (EH16) campaign on social media. Earth Hour 2016 is heavily based on social media, in recognition of the impact of such media on gaining public engagement and support.

After the EH16 event is completed, we will collect all social media posts around the event. Next we will compare the outcome of our analysis across EH14, EH15, and EH16, to reach a better understanding of the evolution of public engagement with these events over time. Additionally, we will run an analysis over tweets from Greenpeace and their followers, in search of any factors that could differentiate the Greenpeace engagement style and community from those of WWF.

Additionally, for Earth Hour 2016, we will launch two applications, (1) Climate Challenge (WP3) installation with questions tuned for Earth Hour, and (2) the Citizen Engagement platform from WP5 (D5.3.1).

6. Conclusions

This deliverable reports on the project activities surrounding the Earth Hour 2015 campaign. WWF Schweiz put in place a national campaign with the goal of putting pressure on politics regarding CO2-reduction targets. A petition was launched together with the climate alliance, a group of 50 Swiss organisations. Core message was: climate politics are urgent. Switzerland, like all other nations need to act right now! During the two months before and after Earth Hour, WWF Switzerland collected nearly 15,000 online plus 9,000 written signatures for the petition of the climate alliance.

The DecarboNet team put in place specific installations of the software that is being developed during the project to attract attention towards the global Earth Hour event and to monitor it. In particular we released the first version of the DecarboNet Citizen Engagement platform (WP5), and a specific Earth Hour installation of the MWCC (WP3) to provide users with the capability to analyse the event at run-time (including activity, lexical and geographical analysis).

In addition, the team performed an offline analysis of more than 90K tweets collected during the campaign with the goal of investigating engagement. We observed, that posts that are followed by an engagement action tend to have a media attached, come from older accounts and include one or more hashtags, but no URLs. They also tend to be longer, slightly more complex and come from accounts that (a) have a higher number of followers and (b) are following more accounts. By performing a manual analysis of those media items (i.e., images) attracting attention we showed that posts containing images receiving a high engagement response follow one or more of these three characteristics: (i) are original/funny, (ii) come from a user with

high popularity (in-degree), (iii) go in consonance with, i.e., reflect, the textual message.

By analysing the topics of these tweets we observed that posts were clustered around earth, hour, lights and climate, change as main topics of discussion. Besides these distinctive thematic clusters posts were also grouped around the celebration associated to the campaign and the symbolic action of turning off the lights, and around discussing the effects on this campaign (from the effect on the landmarks, to the future effects in climate change and sustainability). In this sense, and as opposed to last year were celebrities, super heroes and promoters like Durex drove a big part of the social media conversations, this year, the discussions have focused on the main themes that Earth Hour and WWF aim to promote, generating a more valuable engagement.

Our plans for analysing the next year's campaign include comparing the different engagement strategies used by WWF vs. Greenpeace to observe any differences in their communication style and its impact on public engagement. We also aim to track the user profiles of some of this year's participants in order to study the evolution of environmental awareness among campaigns.

A. List of Figures

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C. List of Abbreviations

Abbreviation	Explanation
API	Application programming interface
CD	Corporate Design
CI	Corporate Identity
COP21	21th Conference of the Parties to the United Nations Framework Convention on Climate Change
EC	European commission
EH	Earth Hour
GEO	Green Energy Options
LDA	Latent Dirichlet Allocation
MWCC	Media Watch on Climate Change
NGO	Non-governmental organization
RT	Retweet
UK	United Kingdom
URL	Uniform Resource Locator
UTC	Coordinated Universal Time
WP	Work package
WWF	World Wide Fund for nature

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