**Appendix 1**

**1 Topic interpretation**

It is critical to consider the reliability and validity of topic modelling output in the interpretation process to guarantee the soundness of results (Grimmer & Stewart, 2013). While computational approaches are reliable in the sense that they will produce the same results each time, validity needs further consideration. As explained in section 4.3 in the manuscript, two authors interpreted the topics independently based on the 20 most probable terms of a topic as well as consulting the 10 most probable documents associated with each topic. Interpreting topic output with these two steps is an intrinsic part of the interpretation process. In addition, consulting the documents words as a validation step for semantic coherence. As two authors independently looked into both of these sources and gave a tentative label to each topic, the authors were able to compare and double-check their findings for semantic coherence. Cases of ambiguity (mostly having to do with the topic exhibiting two issue areas) were discussed among the researchers. Finally, they decided upon the final label to be given for each topic. In Table 1, we provide further evidence on the semantic validity of our results by illustrating the interpretation process. The examples show how we labelled i) topics that only exist in one of the corpora, ii) similar topics and iii) cases of ambiguity.

**Table 1** Examples of topic interpretation procedure.

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| --- | --- | --- | --- |
| **Example** | **Top 10 words** | **Extracts from most related documents** | **Topic label as assigned by authors** |
| **Topic in pre-corpus** | climate, change, development, policy, action, support, carbon, research, management, sustainable | “The Global Climate Change Alliance (GCCA) (…) strives to support those poorer countries and regions most vulnerable to climate change by building the human, technical and financial capacity needed to mount — and surmount — the challenge.”  From: *Integrated Climate Strategies to Climate Finance Effectiveness*  “Coordinated by the European Commission, the GCCA provides technical and financial support to developing countries to help them integrate efforts to tackle climate change into their policies and budgets.” From: *Adaptation Factsheet 2014* | External climate support |
| **Topic in post-corpus** | option, options, costs, eu, cost, european, level, current, annual, national | “The European Commission today launches a public consultation on the preparation of a legislative proposal on the effort of Member States to reduce their greenhouse gas emissions to meet the European Union's emission reduction commitment in a 2030 perspective. It concerns the continuation in the period 2021-2030 of the current Decision 406/2009/EC on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020.” From: *Member States’ Consultation Documents on ESD* | Consultation on Effort Sharing Decision (ESD) |
| **Same topic label in pre and post-corpus** | *Pre-corpus:* nuclear, safety, data, protection, waste, risk, management, monitoring, activities, technical  *Post-corpus***:** nuclear, safety, waste, management, storage, site, fuel, national, power, protection | *Pre-corpus:* “It is important to consider the challenge posed by radioactive waste since its management is, and will remain, a long-term issue. Even over the timescale for which surveillance of short-lived wastes is required national borders might change. This, together with potential cross-border impacts means that an international context for radioactive waste management becomes increasingly relevant with the passage of time.” From: *Sixth Situation Report on Radioactive waste and Spent Fuel management In the European Union*  *Post-corpus:* “Article 35 of the Euratom Treaty requires that each Member State shall establish the facilities necessary to carry out continuous monitoring of the levels of radioactivity in air, water and soil and to ensure compliance with the Basic Safety Standards1. Article 35 also gives the European Commission (EC) the right of access to such facilities in order that it may verify their operation and efficiency.” From: *Art. 35 Technical Report – LU 15-04* | *Pre-corpus:* Nuclear safety and radioactivity management  *Post-corpus:* Nuclear safety and radioactivity management |
| **Same theme but different topic label in pre and post-corpus** | *Pre-corpus:*energy, efficiency, electricity, consumption, sector, demand, european, industry, primary, generation  *Post-corpus:*buildings, energy, building, renovation, performance, residential, construction, requirements, public, measures | *Pre-corpus:*“Pursuant to Article 24(1) of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC, each Member State must by 30 April of each year starting in 2013 report on the progress achieved towards national energy efficiency targets.” From: *Sweden’s annual report pursuant to Article 24 (1) of Directive 2012/27/EU*  *Post-corpus:* “The existing building stock is the sector providing the greatest potential for achieving energy savings, as buildings account for just over one third of all energy consumed. The Energy Efficiency Directive therefore lays down that Member States should establish a long-term strategy for mobilising investments in the renovation of the national building stock in order to increase the rate of building renovation.” From: *Slovenia’s Long-Term Strategy for Mobilising Investments in the Energy Renovation of Buildings, 2015.* | *Pre-corpus: Ener*gy efficiency strategy  *Post-corpus:* Member State strategy for energy renovations in buildings |
| **Case of ambiguity whereby the topic contains two themes** | united, aviation, france, kingdom, germany, air, operator, spain, european, italy | ”Amending Regulation (EC) No 748/2009 on the list of aircraft operators which performed an aviation activity listed in Annex I to Directive 2003/87/EC on or after 1 January 2006 specifying the administering Member State for each aircraft operator.” From: *Commission Regulation (EU) 2018/336*  ”The list of the projects of common interest (PCIs) by country – the (third) Union list of PCIs.” From: *Regulation (EU) No 347/2013* | Aviation compliance to GHG reduction and Projects of Common Interest (PCIs) |

**Appendix 2**

**Table 2** Topic labels with 10 most probable words. Order of topics insignificant.

|  |  |  |  |
| --- | --- | --- | --- |
| Pre: Topic label with top 10 keywords | | Post: Topic label with top 10 keywords | |
| 1 | **Nuclear safety and radioactivity management**  nuclear, safety, waste, management, storage, site, fuel, national, power, protection | 1 | **Nuclear safety and radioactivity monitoring**  nuclear, safety, data, protection, waste, risk, management, monitoring, activities, technical |
| 2 | **Natural gas issues**  gas, eu, european, commission, market, supply, infrastructure, security, europe, countries | 2 | **Gas and security of supply**  gas, price, market, prices, storage, supply, eu, oil, capacity, natural |
| 3 | **Internal energy market**  price, market, electricity, prices, total, gas, demand, generation, chp, power | 3 | **Internal energy market**  capacity, market, generation, demand, price, power, cross, markets, electricity, border |
| 4 | **Operational regulations**  law, oil, environment, act, gas, activities, economic, financial, authority, section | 4 | **EU energy regulation networks and cooperation**  article, commission, directive, regulation, european, union, ec, energy, eu, council |
| 5 | **Smart grid development**  smart, system, grid, network, data, market, information, management, systems, transmission | 5 | **Energy consumers and smart grid**  electricity, energy, smart, consumers, system, distribution, network, grid, demand, market |
| 6 | **Member state energy efficiency plans**  allocation, commission, directive, allowances, plan, national, installations, emissions, decision, total | 6 | **Member state energy efficiency achievements**  energy efficiency, savings, measures, consumption, public, article, implementation, saving, measure |
| 7 | **Energy efficiency strategy**  energy, efficiency, electricity, consumption, sector, demand, european, industry, primary, generation | 7 | **Member states strategy for energy renovations of buildings**  heat, heating, cooling, potential, demand, electricity, district, chp, gas, efficiency |
| 8 | **Energy efficiency directive in public buildings**  energy, savings, efficiency, measures, consumption, measure, public, sector, saving, buildings | 8 | **Energy efficiency infrastructure**  energy, heating, system, consumption, buildings, heat, electricity, systems, primary |
| 9 | **Nearly zero emissions buildings**  energy, buildings, building, performance, requirements, residential, heating, renewable, national, article | 9 | **Energy Efficiency and CHP**  energy, heat, consumption, gross, electricity, plants, chp, final, data, generation |
| 10 | **Technical security**  information, requirements, assessment, report, national, protection, safety, design, risk, response | 10 | **CHP and efficient heating and cooling systems**  buildings, energy, building, renovation, performance, residential, construction, requirements, public, measures |
| 11 | **Vehicle emissions policy**  emissions, vehicles, km, cars, average, vehicle, target, reduction, diesel, manufacturers | 11 | **Transport fuel quality**  fuel, fuels, diesel, directive, oil, quality, report, biofuels, transport, content |
| 12 | **Emission reduction implementation in vehicles**  fuel, vehicle, vehicles, emissions, transport, consumption, test, type, cars, road | 12 | **Emissions standards for light vehicles**  vehicle, vehicles, emissions, cars, mass, fuel, reduction, data, average, km |
| 13 | **Aviation regulation**  allowances, aviation, account, period, trading, operators, operator, volume, emissions, national | 13 | **Aviation compliance to GHG reduction and Projects of Common Interest**  united, aviation, france, kingdom, germany, air, operator, spain, european, italy |
| 14 | **Achievements of Kyoto objectives**  emissions, eu, climate, change, countries, measures, european, kyoto, greenhouse, emission | 14 | **Implementing Paris Agreement's GHG targets**  eu, energy, emissions, policy, targets, policies, climate, sector, ghg, emission |
| 15 | **Member states’ GHG inventories**  emissions, gas, ghg, emission, report, greenhouse, data, inventory, reporting, carbon | 15 | **Member state's GHG inventories**  reporting, emissions, data, ms, report, review, reported, eu, monitoring, national |
| 16 | **Member state support and guidance for emissions reduction**  production, installations, heat, installation, united, allocation, product, emissions, operator, ets | 16 | **Consultation on Effort Sharing Decision**  option, options, costs, eu, cost, european, level, current, annual, national |
| 17 | **Renewable energy promotion and use**  energy, renewable, res, support, national, sources, electricity, scheme, plan, development | 17 | **Renewable energy promotion and use**  renewable, energy, res, electricity, support, sources, production, wind, grid, biofuels |
| 18 | **Member state climate policy assessment**  energy, measures, government, efficiency, tax, policy, ministry, national, sector, electricity | 18 | **Mainstreaming climate policy into EU structural funds**  climate, change, action, support, programme, programmes, development, actions, management, specific |
| 19 | **Improving the ETS**  eu, emissions, cost, option, ets, cost, options, market, impact, carbon | 19 | **Revision of the ETS**  ets, carbon, eu, allowances, allocation, emissions, free, costs, installations, revenues |
| 20 | **Future emissions reduction scenarios**  scenario, costs, cost, baseline, analysis, scenarios, potential, impact, model, reduction | 20 | **Auctioning of emissions allowances**  volume, allowances, price, average, total, market, period, trading, month, successful |
| 21 | **Electricity generation**  electricity, power, sources, plants, production, renewable, plant, mw, energy, capacity | 21 | **Biomass and biofuel use and production**  production, biomass, emissions, eu, land, ghg, carbon, biofuels, energy, supply |
| 22 | **Sustainable land-use**  biomass, heat, production, land, energy, heating, wood, waste, potential, fuel | 22 | **Sustainable land-use**  land, mitigation, agricultural, emissions, policy, management, potential, agriculture, action, cap |
| 23 | **External climate support**  climate, change, development, policy, action, support, carbon, research, management, sustainable | 23 | **Financing Projects of Common Interest**  energy, project, projects, european, investment, development, financial, investments, finance, eu |
| 24 | **Energy regulation and directives**  article, directive, commission, european, ec, union, regulation, accordance, referred, official | 24 | **Implementing regulation on energy issues**  values, test, regulation, power, fuel, speed, input, european, type, consumption |
| 25 | **Energy measurement vocabulary**  kwh, water, gwh, kg, plan, mw, power, total, temperature, air | 25 | **Energy labelling and eco-design for products**  energy, products, total, product, air, water, space, efficiency, heat, heating |
| 26 | **Monitoring and verification**  data, monitoring, verification, reporting, section, operator, report, guidance, activities, eu | 26 | **Household energy prices and costs**  energy, data, eu, consumption, countries, households, share, country, european, sector |
| 27 | **Modelling methodologies**  data, directive, model, policy, level report, sector, approach, factors, results | 27 | **Economic analysis of energy policies and technologies**  cost, costs, scenario, model, scenarios, analysis, energy, impact, technology, results |
| 28 | **Roadmap vocabulary**  eu, transport, ghg, carbon, ets, scenario, reference, policies, growth, energy | 28 | **Scenarios for transport energy use and emissions**  energy, transport, electricity, gas emissions, oil, generation, res, total, gross |
| 29 | **Common energy terminology**  energy, transport, gas, oil, gross, electricity, generation, nuclear, indicators, consumption | 29 | **Competitiveness of transport sector**  eu, costs, market, evaluation, cost, impacts, study, impact, legislation, competitiveness |
| 30 | **Project language**  project, projects, development, financial, funding, capacity, support, eur, financing, implementation | 30 | **Emissions monitoring, verification and accreditation from maritime transport**  information, relevant, system, data, requirements, article, monitoring, operator, compliance |