

Facilitating research and innovation for energy transition

INTRODUCTION: EUROPEAN POLICY

Tackling climate and environment-related challenges is the worldwide overarching priority. Europe is a global leader in this process. On 11 December 2019, the European Commission (EC) presented the European Green Deal – a new growth strategy that aims to transform the European Union (EU) into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases (GHG) in 2050 and where economic growth is decoupled from resource use [1]. It covers all sectors of the economy, notably transport, energy, agriculture, buildings, industries, taxation and social benefits, and includes the initial roadmap of the necessary key policies and measures. The Green Deal is supported by the Sustainable Investment Plan [2] aimed to mobilise private and public investments.

Supplying clean, affordable and secure energy is one of the main pathways to achieve envisaged sustainable future. The EU energy policy is laid down in the Energy Union's strategy [3] and is supported through the recent adoption (2018 and 2019) of the well-known Clean Energy for All Europeans Package, which covers all five closely interlinked dimensions of Energy Union:

- Energy security, solidarity and trust – working closely with the Member States (MS) to diversify Europe's sources of energy and ensure energy security;

- A fully integrated European energy market – enabling the free flow of energy in the EU through adequate infrastructure and without technical or regulatory barriers;

- Energy efficiency contributing to moderation of demand – improved energy efficiency will reduce dependence on energy imports, lower emissions, and drive jobs and growth;

- Decarbonising the economy – putting in place policy and legislation to cut emissions by at least 40% from 1990 levels, moving towards a low carbon economy and fulfilling EU's commitments to the Paris Agreement;

- Research, Innovation and Competitiveness – supporting breakthroughs in low-carbon and clean energy technologies by prioritising research and innovation to drive the energy transition and improve competitiveness.

Research and innovation (R&I) are key pillars of the EU's energy policy and areas where concrete action can be strengthened in the short term [4]. It is underpinned by the Strategic Energy Technology Plan (SET Plan), which has confirmed its role as the key EU energy research and innovation initiative that serves the Energy Union goals and delivers the innovations necessary to achieve the European transition to climate-neutrality by 2050 [5]. Although not a funding mechanism *per se*, the SET Plan can be instrumental in this regard by promoting a more targeted and efficient spending, and by mobilising additional finance both from national and

private sources [6]. Therefore, it has brought together detailed Implementation Plans in key priorities, described briefly under the headlines: renewables, consumers in energy systems, efficient energy systems, sustainable transport, carbon capture, utilisation and storage, and nuclear safety.

At the same time, Smart Specialisation Strategies for R&I were created on the regional level. The Smart Specialization Strategy (RIS3) is a place-based approach, meaning that it builds on the assets and resources available to regions and MS and on their specific socio-economic challenges in order to identify unique opportunities for development and growth [7]. It enables the prioritisation of R&I investment under cohesion policy (RIS3 is a prerequisite for receiving funding from the European Regional Development Fund (ERDF)) in a number of EU policy areas, including energy.

Despite the target set in 'Europe 2020: A Strategy for Smart, Sustainable and Inclusive Growth' [8] to invest 3% of Gross Domestic Product (GDP) on research and development (R&D), the EU is still investing less than other major international trading partners, like USA, Japan and South Korea [9]. Within the EU, gross domestic expenditure on R&D as a percentage of GDP varies considerably from country to country with Sweden, Austria and Denmark spending a high percentage of their GDP on R&D, and Eastern and Southern European countries lagging behind with lower expenditure [9]. While the gap between Europe and other advanced countries decreases slowly, the internal gap between EU MS keeps increasing [10]. Hence, facilitating R&D investment growth and raising effectiveness of spending in lagging countries and regions are the major pathways for sustainable innovation-led growth. The key challenges in this process, as identified in communication on 'Strengthening Innovation in Europe's Regions' [11], are the following: further reform of research and innovation systems within regions; increasing cooperation in innovation investment across regions; leveraging research and innovation in less developed and industrial transition regions; harnessing synergies and complementarities between EU policies and instruments.

PANTERA APPROACH: OBJECTIVES, MAIN ELEMENTS AND METHODOLOGY

PANTERA (Pan-European Technology Energy Research Approach) is a Horizon 2020 coordination support action aiming at setting-up a European forum composed of a wide range of stakeholders active in the field of smart grids, storage and local energy system. The long-term objective of PANTERA is to strengthen R&I activities throughout Europe with special focus on the countries that appear to be less involved and thus build solidarity and trust for a well-functioning and resilient European energy system.

Obviously, the grids of today will not support the energy goals of the future, including integrating a large share of increasingly decentralised and variable generation from renewable energy sources (RES), increasing consumer participation in ensuring system reliability services by active demand response and providing storage facilities, growing penetration of plug-in vehicles and enabling vehicle to grid technologies and achievement of higher levels of energy efficiency across the value chain. Smart grids in a broader term may be considered as a sustainable energy system core enabler, as these provide an opportunity to link technological, societal, financial, regulatory and policy objectives of energy system development [12].

Likewise, the gap in the total R&D spending between different EU MS, the involvement and expenditure on R&D and demonstration projects in the smart grid domain is not distributed equally [13]. Those countries that are spending less than the EU average are considered as PANTERA initiative's target countries (Latvia, Estonia, Lithuania, Bulgaria, Romania, Greece, Cyprus, Malta, Poland, Slovakia, Czech Republic, Hungary, Croatia, Italy, Ireland, Portugal).

Furthermore, the R&I efforts of EU MS correlate with their activity in the related international initiatives. According to the European Technology and Innovation Platform Smart Networks for Energy Transition (ETIP SNET) Report [14], the countries participation in European initiatives is not even: the most active countries are present in virtually all instances, while others are absent from the panorama.

Hence, the priority is to develop the single pan-European research and innovation network

with possibly equal engagement of all MS, inter alia Baltic countries. It is worth mentioning that the energy transition is based both on technological innovation and the so-called, none-technical institutional innovation. That is why the cooperation between all categories of stakeholders, including not only energy sector experts and researchers, but also utilities, governmental authorities, standardisation organisations, regulators and consumers, is vitally important.

Considering the above, the main dimensions of PANTERA initiative were defined:

- Setting up an **interactive multidimensional platform** of pan-European status and influence;

- Establishing **PANTERA Desks**, aiming to find ways of supporting energy R&I activities in the target countries;
- Operating ad hoc **Working Teams**, aiming to join efforts of a wide range of stakeholders from academic and industrial cycles operating under the ETIP-SNET umbrella;
- Organising of dedicated **workshops** on regional and pan-European level to facilitate exchange of experiences and strengthen synergies.

The key objective of the PANTERA **interactive multidimensional platform** (Fig. 1) is to connect the R&I community of EU to enhance collaboration, wider interest and use of the project results.

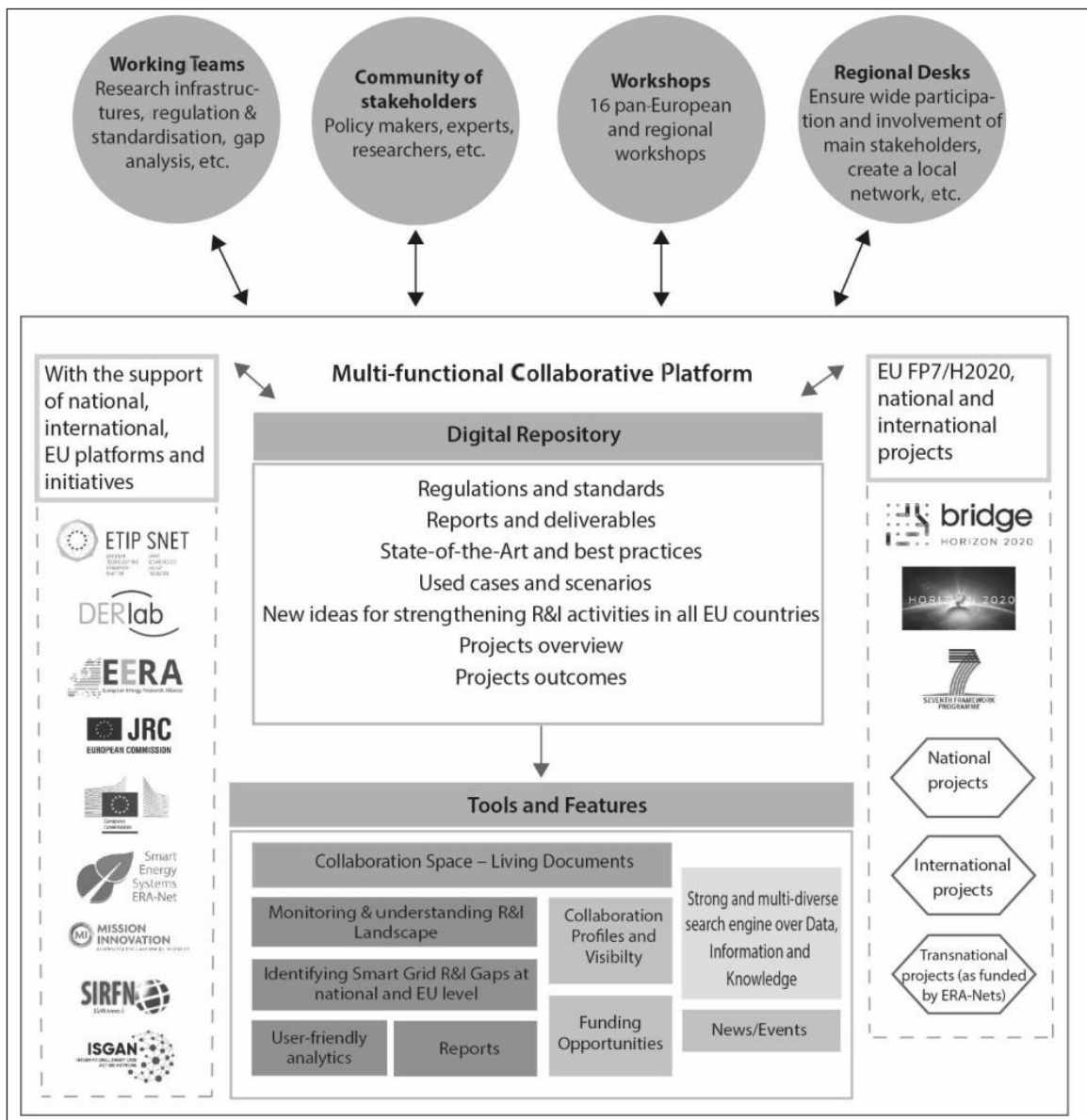


Fig. 1. Multidimensional PANTERA platform

It will be developed with the aim to provide different functionalities, including the collection of project-related data from other well-known and established platforms. The platform will also provide working teams' area, discussion forum, event calendar, policy area and versatile reports.

The mission of **Working Teams**, established in collaboration with the widely acknowledged platform – ETIP SNET, is to bring together professionals from different EU countries and representatives of exciting initiatives in order to identify future smart grid R&I priorities and political framework, based on extensive case-studies and gap analysis.

In order to be closer to the national stakeholders, **PANTERA Desks** and the relevant PANTERA 6+1 working framework were established. Six regional Desks committed to target countries

which appear to have a lower rate of smart grid investment and one Best-practice Desk elaborating on gathering and systemising good experience in projects and R&I governance system from more successful countries were launched (Fig. 2). The term 'regional' describes the way the work is organised within the consortium rather than geographical division: relevant PANTERA partner is responsible for the host country and for the closer, the so-called associated, countries.

PANTERA Desks' vision is to become a driver for increasing smart grid R&I activities by:

- engaging interested stakeholders to participate in the platform, workshops and Working Teams;
- gathering and analysing case-studies in order to identify gaps in national research and innovation systems;

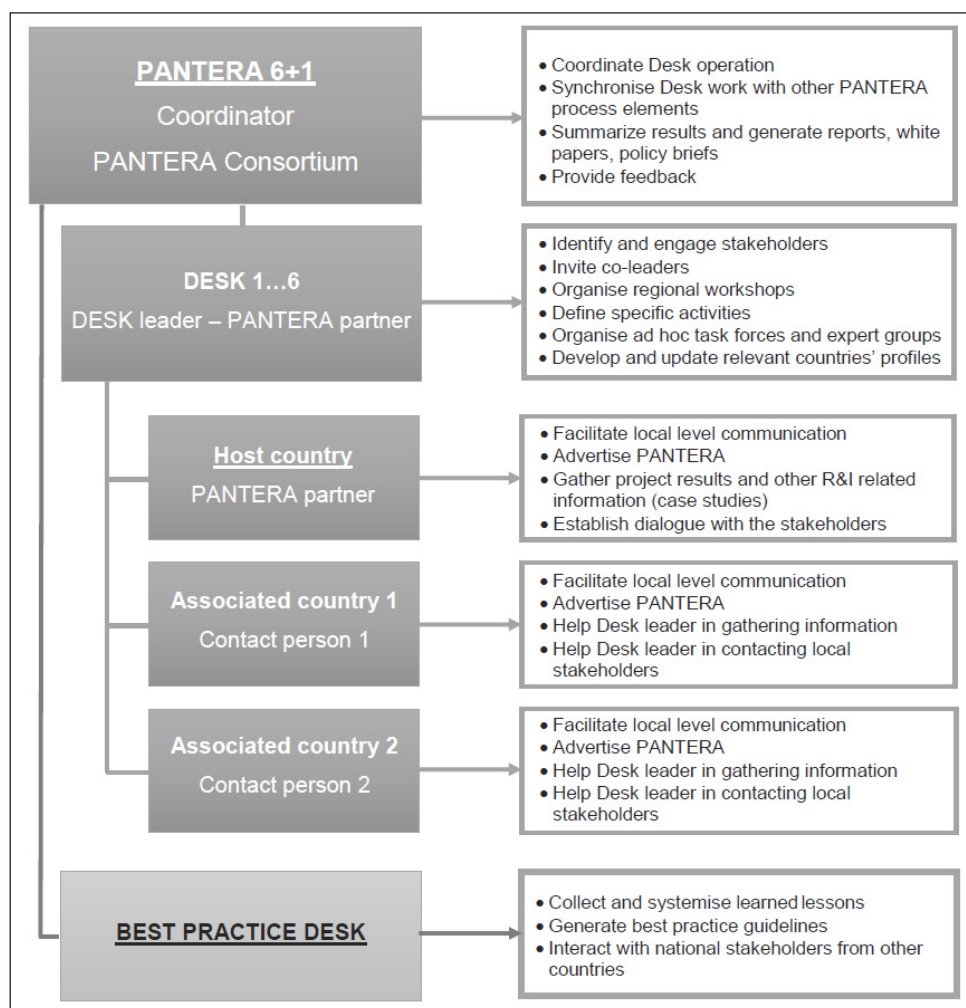


Fig. 2. Structure and scope of the work of PANTERA Desks

- facilitating discussion between policy makers, industry and academia in order to improve national research and innovation climate;
- fostering the interaction between national stakeholders and existing European organisations and strategically important initiatives in order to improve international cooperation.

In order to initiate an effective dialogue between all stakeholders, PANTERA activities are designed according to both European targets and individual stakeholder needs, e.g. top-down and bottom-up (Fig. 3).

The European R&I strategy, which defines the main areas of R&I efforts, is based on the overarching EU strategic priorities. Similarly, national R&I strategies, which define national goals and guide national funding and support schemes, reflect country-specific political targets, strengths and available resources. The alignment between European R&I thematic priorities (specifically Horizon 2020 and future Horizon Europe framework program) and national/regional RIS3 priority are-

as might provide additional opportunities to plan and exploit the existing potential efficiently since the Horizon program develops a specific expertise and would create a greater impact in combination with other investment sources such as ERDF or national instruments. Moreover, political incentives might facilitate or slow business investments. Thus, network operators clearly indicate that regulatory risk and political uncertainty are the main factors in making investment decisions [15].

Standardisation also plays an important role in meeting EU targets by promoting the best practices, improving energy efficiency and safety, and providing tools to optimise installations and systems [16]. Standardisation contributes to a successful transfer of research results into innovative products and processes by applying critical design constraints, helping the commercial exploitation of innovative ideas and increasing consumer confidence.

So, understanding the impact of policy, regulation and standardisation, PANTERA activities

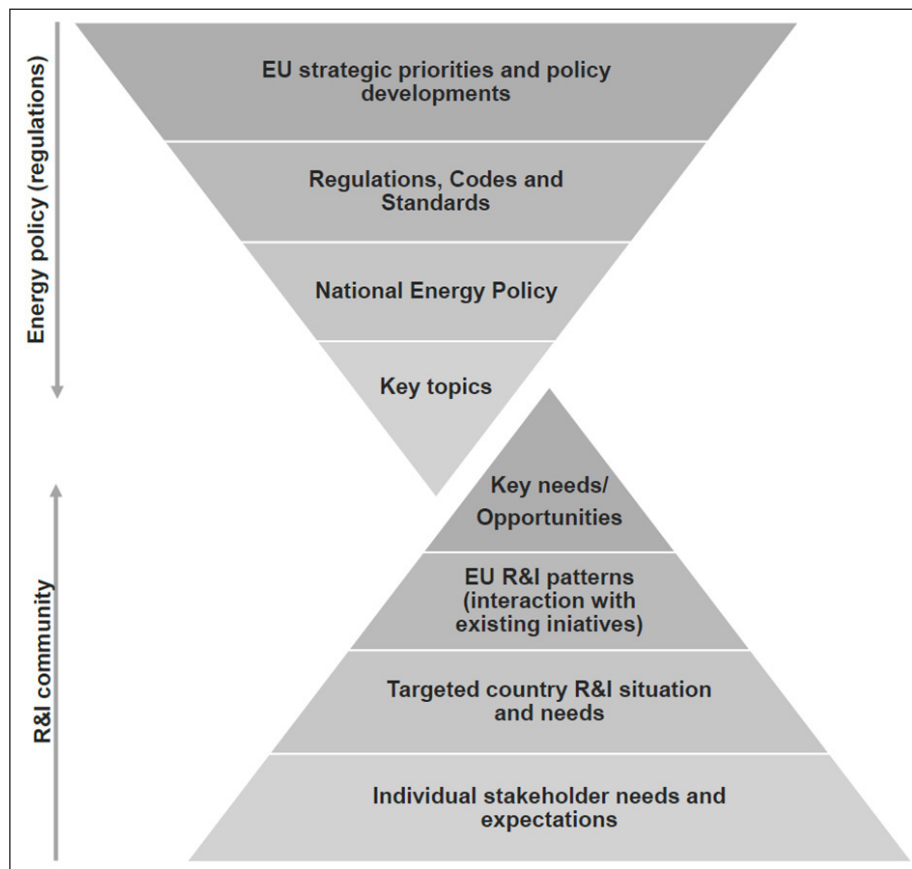


Fig. 3. Top-down and bottom up-approach

include reviewing these and, what is even more important, collaboration on the top level with leading European organisations and instruments in governing of common R&I efforts.

The bottom-up-approach includes the analysis of a specific country's situation in respect to EU sustainable targets and interacting with national stakeholders by organising thematic workshops and consultations to identify local needs and expectations and competitive advantages that might be popularised through the PANTERA platform.

LITHUANIAN ENERGY AND CLIMATE STRATEGY

The Lithuanian revised National Energy Independence Strategy (hereinafter – the Strategy) [17] was adopted in 2018. It includes the country's key energy targets for 2030 and defines the guidelines for energy development until 2050. It sets ambitious goals as regards RES penetration: by 2030 45% of electricity and as much as 90% of heat energy will be produced from RES. Furthermore, all electricity and heat consumed in Lithuania will be produced from renewable and other clean sources by 2050. RES will account for 80% of Lithuania's total energy consumption. Moreover, the Strategy supports liberalisation of electricity market and mass roll-out of smart metering.

Currently, Lithuania is on track to meet its climate change objectives for 2020 but is at risk of missing its 2030 targets [18]. It needs to pull together more efforts in meeting GHG emissions targets, reaching 45% share of RES as set in the Strategy and improving energy efficiency by 2030. While performing in general well towards 2020 climate and energy objectives, the government's goal of 1.9% R&D intensity by 2020 will most likely not be reached (in 2018 investment in R&D amounted to 0.88% of GDP, well below the EU average) [18].

As for R&D in the energy sector, according to the Strategy [17] Lithuanian energy companies, business enterprises and science and study institutions have accumulated exclusive competences in the field of solar energy, biomass, geothermal energy, LNG and other areas, which need to be maintained, further developed and strength-

ened. Still, it is necessary to achieve that R&D in Lithuania and the resulting products acquire industrial production and become part of Lithuanian exports, thus contributing to the country's economic growth. The Strategy identifies nine strategic directions for R&D in energy, including developing technologies related to distributed generation, smart networks and storage technologies. At the same time, eleven actions to achieve the use of energy expertise and the results of R&D in other areas of the economy have been listed. These include increasing synergies among the broad categories of stakeholders by promoting various forms of cooperation, using fiscal measures to stimulate investments in the technological development of RES, promotion of the production of storage technologies, assessment of opportunities for the offshore wind development, promotion of IT solutions and strengthening the status of Lithuania as the largest excellence centre and exporter of solar technology in the Baltic and Nordic region.

COOPERATION AS THE WAY FORWARD

By engaging in PANTERA activities, Lithuanian stakeholders might benefit from additional networking opportunities, learning from the best-practices and exchanging experience with the colleagues from other countries, disseminating own project results on the European level and increasing visibility of national research capacities and, as a result, raising attractiveness for international cooperation, the improvement of which is vitally important for stimulating research and innovation activities in Lithuania.

The PANTERA thematic regional workshop 'Energy Transition in the Baltic States: Funding Opportunities for Smart Energy Research and Innovation' will take place in Riga on 6 October 2020.

The workshop will explore the performance and challenges in R&I in the Baltic States that could be facilitated through the PANTERA initiative. The invited experts and stakeholders will share their experience in the projects' implementation. The EC representatives will give insights into the newest funding opportunities and support instruments. All participants together will discuss the possibility of developing a shared vision and strategy for cooperation between the Baltic

States in the upcoming R&I activities and work to identify strong points for building a competitive advantage.

More information about PANTERA: <https://pantera-platform.eu/>



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References

1. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2019:640:FIN>
2. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020:21:FIN>
3. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2015:80:FIN>
4. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52016DC0763>
5. https://setis.ec.europa.eu/sites/default/files/setis%20reports/set_plan_report_2019_online.pdf
6. https://setis.ec.europa.eu/sites/default/files/setis%20reports/2017_set_plan_progress_report_0.pdf#page=10
7. <https://s3platform.jrc.ec.europa.eu/faqs-on-ris3>
8. <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A52010DC2020>
9. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017SC0264&from=LT>
10. https://s3platform.jrc.ec.europa.eu/documents/20182/0/JRC111888_Addressing+the+innovation+gap-Lessons+from+the+Stairway+to+Excellence+%28S2E%29+project.pdf/d09a1174-bc1c-4446-b329-149385c26c02
11. https://ec.europa.eu/regional_policy/sources/docoffic/2014/com_2017_376_2_en.pdf
12. https://www.iea.org/publications/freepublications/publication/smartgrids_roadmap.pdf
13. https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106796/sgp_outlook_2017-online.pdf
14. <https://www.etip-snet.eu/wp-content/uploads/2019/03/European-And-International-Initiatives-Towards-Energy-Transition.pdf>
15. https://cdn.eurelectric.org/media/1870/dso_investment_final-2014-030-0328-01-e-h-FFE9D909.pdf
16. https://www.cenelec.eu/News/Publications/Publications/CEN-CENELEC_WP_2020_EN.pdf
17. https://enmin.lrv.lt/uploads/enmin/documents/files/Nacionaline%20energetines%20nepriklausomybes%20strategija_2018_EN.pdf
18. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020SC0514&from=EN>

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