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TRANSITION PLANS: A TOOL FOR RISK PROTECTION

The credibility of Oil&Gas plans

POLICY BRIEFING

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EXECUTIVE SUMMARY

The global landscape is dominated by growing geopolitical instability and regulatory uncertainty, challenges intensified by interventions such as US protectionist trade policies. These dynamics have raised operational and strategic concerns across supply chains and cast doubt on future investment decisions. In this climate, European companies are faced with the need to reinforce the credibility of their industrial and financial strategies to attract capital and ensure medium to long-term operational sustainability.

Transition Plans (TPs) are emerging as essential tools for ensuring coherence, credibility and innovation in corporate strategy amid mounting regulatory and geopolitical uncertainty. This is because they enable investors to assess exposure to climate and transition risks and guide capital allocation decisions, which is particularly important in the context of the ongoing energy transition. TPs also play a key role in the macroeconomic monitoring of transition and physical risks, both in the financial system and in the real economy. For businesses, TPs are critical for defining competitive, resilient and responsible strategies that meet the growing demands of stakeholders, regulators and markets alike.

In this scenario, the European Union must remain committed to the path set by the Green Deal, strengthening its regulatory framework to provide certainty and ensure competitiveness across the economic system. However, the effectiveness and credibility of TPs are currently being undermined by conflicting regulatory developments, most notably the Omnibus I proposal introduced by the European Commission itself.

Weakening the role of TPs within the sustainable finance framework would expose Europe's financial and industrial systems to increased uncertainty, undermine the ability to distinguish between robust strategies and structural risks, and compromise efforts to effectively monitor systemic risks linked to climate change.

TPs remain among the most effective tools for directing investment toward companies with credible strategies that are aligned with climate targets. Their absence or weakness would leave markets without a compass, heightening the risk of financial instability, delays in the energy transition and misalignment with international climate scenarios.

To be truly effective, TPs must move beyond declarations of intent; they must be credible. This credibility should be based on transparency requirements, internal consistency of objectives, feasibility of planned actions, thorough climate risk management, alignment with international climate goals and geographical dependence. **A genuinely credible TP should be based on mature, economically viable technologies that can tangibly reduce emissions in both the short and long-term.**

Currently, oil and gas companies benefit from financial guarantees and well-established regulatory systems that risk funnelling resources into strategies and technologies (the main ones being the ongoing reliance on gas, CCS technology, biofuels, hydrogen and offsets) that are, in practice, risky, immature and not materially effective for decarbonisation. As such, they lack credibility. The risk is twofold: slowing the economic transition in countries where these

companies operate and exert their influence, and failing to adapt to potential shifts in market conditions or a faster-than-expected transition.

In this context, the TPs published by Italy's leading oil and gas companies (Eni and Snam) exhibit significant shortcomings, particularly in the quantitative analysis of risks, the planned reduction in hydrocarbon production, and transparency around geographic and regulatory dependencies. For these plans to be credible, they must go beyond simple reporting, incorporating rigorous analysis and a clear governance strategy that reduces uncertainty and decisively channels investment toward truly sustainable solutions.

1 TRANSITION PLANS

The return of the Republican administration in the United States brought with it a wave of deregulation affecting key transition tools. Policies such as the withdrawal from the Paris Agreement, the 'drill, baby drill' approach that gives the green light to greater investment in oil and gas, and the dismantling of the Biden administration's Inflation Reduction Act (IRA) are creating heightened market uncertainty, with the risk that companies already on the path towards decarbonisation may not be able to access transition-related investments. While investing in the hydrocarbon sector may seemingly be beneficial for short-term economic gains, it carries significant long-term risks for the energy transition. Oil companies themselves have highlighted the risk that overproduction could cause prices to fall again, similar to the downturns seen in 2014 and 2020. Such outcomes could result in significant economic losses and further hinder investments in the energy transition. Similarly, regulatory and policy shifts may increase uncertainty, making it more difficult for investors to assess the long-term viability of projects.

The European Central Bank notes a growing consensus among policymakers and regulators that climate change poses real financial risks. These risks take the form of physical risks, related to extreme weather events, and transitional risks, related to regulatory, technological and market changes that can jeopardise the profitability and sustainability of investments. For this reason, financial supervisors such as the ECB are requiring companies to have credible TPs which allow them to clearly and reliably assess how companies intend to manage and mitigate these risks over time, thus enabling them to make more informed investment choices and protect themselves from financial risks.

TPs are, in fact, emerging as a key tool for assessing the robustness and credibility of corporate strategies in a context of profound uncertainty. In particular, they enable investors to measure the risks associated with their exposure to fossil fuels and to orient their allocation decisions in light of the ongoing energy transition. Weakening their effectiveness and transparency means depriving investors of an essential tool for distinguishing between credible strategies and structural risks, at a time when contradictory policies and regulatory signals are increasing market uncertainty.

As already highlighted in a previous ECCO/E3G report, interest in climate transition planning and the resulting outputs - Transition Plans - has grown significantly in recent years, both as a tool for businesses to articulate their strategies and as a tool for the financial sector to manage climate-related risks. When properly implemented and appropriately integrated into regulatory frameworks and corporate governance, TPs provide a strategic and operational framework that guides companies' activities, ensuring alignment between internal policies, investment choices and emissions reduction targets, both domestically and globally. Moreover, these tools are increasingly used by shareholders, investors and regulators to understand companies' climate strategies and how they intend to achieve their emission reduction targets.

In this context, **TPs inform investment decisions and support macroeconomic monitoring of transition and physical risks, across the financial system and in the real economy. At the same time, they are an indispensable tool for companies to innovate to remain competitive,**

resilient and accountable in a rapidly changing energy landscape, while responding to growing pressure from stakeholders, regulators and the market.

Regulators and policymakers should monitor transition finance flows to ensure that they are in line with Net Zero objectives, thereby mitigating risks to financial stability. TPs are crucial in this regard, as they provide an evidence base for the credibility of transition finance and assurance that the funds raised will indeed be used in a manner consistent with climate goals. To this end, regulators can take steps to ensure that the climate-related information architecture integrates TPs, transition taxonomies and decarbonisation pathways, and associated information and data.

2 THE EUROPEAN REGULATORY FRAMEWORK FOR TRANSITION PLANS: THE SUSTAINABLE FINANCE FRAMEWORK

The European Union has recently made progress in creating a regulatory framework for sustainable finance (EU Sustainable Finance Framework), with the objective of mobilising and directing financial flows towards investments aimed at the decarbonisation of value chains. This includes **'transition finance'** understood as *"financing of investments compatible with and contributing to the transition, that avoids lock-ins, including: investments in undertakings or economic activities with a credible transition plan at the level of the undertaking or at activity level."*

Corporate Sustainability Reporting Directive

The **Corporate Sustainability Reporting Directive** (CSRD), adopted in 2022, redefined the transparency framework for large companies, listed firms and financial institutions, requiring them to report on the environmental and social impacts of their activities, as well as on the associated financial risks and opportunities. In particular, under the **mandatory European Sustainability Reporting Standard** (ESRS), introduced in 2023 by the European Commission, companies must also publish their own TP for climate change mitigation (as per ESRS E1). The purpose of this requirement is to provide a clear view of the strategy implemented by the company to ensure that the business model and corporate strategy are compatible with the transition to a sustainable economy, in full compliance with the goal of limiting global warming to 1.5° C – as outlined in the Paris Agreement – and achieving climate neutrality by 2050 (European Climate Law). Already in 2025, the first CSRD/ESRS-compliant sustainability reports started to be published by large, listed companies[1] , including their initial TPs.

However, the CSRD is limited to reporting obligations and does not mandate the actual implementation of the strategies outlined in the plans. Furthermore, the CSRD operates on the principle of materiality, which allows companies to omit a TP if they determine that climate change is not material to its activities. **This means the CSRD only partially addresses the need**

[1] The companies subject to this obligation are listed companies with more than 1,000 employees and a turnover of more than 50 million euros or total assets of more than 25 million euros. These thresholds are now being discussed at European level (Omnibus I package).

for an effective tool to guide the transition, leaving room for discretion and potential gaps in the adoption of such plans.

Corporate Sustainability Due Diligence Directive (CSDDD)

In this context, the Corporate Sustainability Due Diligence Directive (CSDD), adopted in 2024, is a necessary and more stringent complement to the CSRD. Under Article 22, the CSDD imposes a more concrete obligation on large companies and financial institutions based in the EU[2] to adopt and implement ('put into effect') a TP for climate change mitigation. Unlike the **CSRD**, which requires only the disclosure of the Plan without guaranteeing its implementation, **the CSDD in its current form mandates the actual implementation of the plans, ensuring that the measures adopted do not remain purely on paper, but are translated into actual actions for decarbonisation.**

Credible TPs have thus become one of the key tools for companies to access transition finance, as defined in Commission Recommendation (EU) 2023/14251: *"clearly integrating transition targets and related transition finance needs in a credible transition plan, financial intermediaries and investors can more easily understand, compare and benchmark transition financing opportunities."*

The Omnibus I proposal, introduced by the European Commission at the beginning of 2025, includes a provision to align the CSDD requirements on TPs for climate mitigation with those of the CSRD, thus removing the obligation to 'put into effect' TPs and reducing them back to mere reporting requirements. Such a change would significantly weaken the regulatory framework, introducing the risk that companies could declare the absence of a TP for bureaucratic or timing-related reasons - an option permitted under the CSRD - without any real commitment to implementation. This proposal could undermine the overall effectiveness of the Transition Plans.

3 THE CREDIBILITY OF TRANSITION PLANS

According to the ATP-Col[3] , the credibility of a TP is based on five pillars: i) compliance with disclosure requirements, ii) consistency[4] , iii) feasibility, iv) climate risk management and v) alignment of ambition with international climate goals. To these, a study by the Joint Research Centre (JRC) adds a sixth: geographical dependence, understanding how external dependencies are sensitive to the geographical characteristics of the assets where the plan will be implemented.

[2] Companies subject to the CSDD obligations are those with more than 1,000 employees and a turnover of 450 million euros.

[3] Assessing Companies Transition Plans Collective, a working group of 90 experts from 40 organisations that aims to collectively develop a consensus framework with guidance on how to assess the credibility of companies' transition plans.

[4] For example, the consistency of transition plan objectives with relevant sectoral and national decarbonisation pathways.

A credible TP should, in fact, consider the external factors that influence the implementation of decarbonisation levers, such as regulatory frameworks, industrial strategy and capital availability, and characterise these factors geographically. This means verifying whether these factors support decarbonisation levers within the specific geographical context where the company operates. Geographic dependencies can significantly impact the feasibility of executing decarbonisation strategies in a TP, thus influencing the emission reduction targets a company can achieve. Accurately identifying these dependencies, alongside transparent reporting, can provide stakeholders with useful information on how to support the company in achieving its TP goals. Credible TPs that incorporate geographic dependencies can also provide new and valuable inputs for shaping industrial policies across different levels of governance (EU, Member States or regional level). Conceptually, this implies a shift from a company-focused perspective to a jurisdictional one, and from the idea of 'dependence' to 'interdependence' between companies and public bodies.

The clear trajectory of decarbonisation, which sees a shift from fossil fuels to clean energy, combined with geopolitical turmoil that has increased volatility in energy markets, has led to the proliferation of various narratives and industrial strategies built around technological neutrality [5]. These strategies often rely on a multiplicity of technologies, some not yet mature, to achieve decarbonisation goals. However, **a TP is only credible if it relies on well-defined, mature and economically viable technologies that contribute to the decarbonisation of economic systems in the short and long-term. Only with these characteristics is it possible to reduce the risk of allocating capital to projects or companies that might become stranded assets, fail to meet emission reduction targets, or struggle to find a viable market.**

Regulatory fluctuations – as exemplified by policy shifts under the second Trump administration and which make the legislative framework less predictable – amplify the regulatory risk for one of the sectors most exposed to the risks of the transition: the oil and gas sector. While investing in the hydrocarbon sector may seemingly be beneficial for short-term economic gains, it carries significant risks for the long-term energy transition. Oil companies themselves have highlighted the risk that overproduction could cause another drop in prices, similar to those experienced in 2014 and 2020. This would result in substantial economic losses, further hampering investments in the energy transition. Similarly, changes in regulations or policies may create uncertainty and make it more difficult for investors to assess the long-term viability of their projects.

[5] The discussion paper 'Technology-neutral vs Technology-specific Policies in Climate Regulation: The Case for CO2 Emission Standards' by ECCO and Agora investigates the potential risks of technology-neutral approaches to decarbonisation in the automotive sector. The paper points out that weakening policies and standards at the European level would send a negative signal on the robustness and credibility of climate policy as a whole. This loss of credibility would undermine Europe's ability to meet its climate targets and reduce cost-effectiveness, as companies and consumers might postpone profitable investments in the long-term if they do not trust the stability of the regulatory framework.

4 MINIMUM REQUIREMENTS FOR A CREDIBLE TRANSITION PLAN FOR OIL & GAS COMPANIES

Drawing on the analysis of the European ESRS standards – currently the mandatory framework companies must follow under the CSRD[6] – as well as the Transition Plan Taskforce (TPT) Disclosure Framework[7], which underpins recently published IFRS guidance, the UN-mandated report 'Integrity Matters' and the Corporate Net-Zero Standard Criteria of the Science Based Targets initiative (SBTi), the following have been identified as the minimum elements (or milestones) that should serve as **key requirements for developing and adopting a credible, effective and climate-aligned TP for oil and gas companies.**

These 25 indicators are organised into six milestones:

1. **science-based targets and ambition:** a TP must be based on robust, credible and science-based decarbonisation targets. These targets form the foundation of any TP, guiding the progressive reduction of the entity's greenhouse gas emissions in line with global climate goals. **In particular, for oil and gas, companies should commit to ending the development of new oil and gas production, setting short and medium-term targets to phase out existing production, as well as decommissioning or repurposing midstream infrastructure, such as pipelines and LNG terminals[8],**
   a. **complete carbon inventory:** targets must be based on a complete carbon footprint using internationally recognised frameworks such as the GHG Protocol, covering all greenhouse gases and scopes: Scope 1, direct emissions related to the company's own activities; Scope 2, indirect emissions generated by the purchase of electricity, steam and district heating; and Scope 3, all additional indirect emissions generated along the company's value chain;
   b. **short and medium-term targets**: TPs must set clear emission reduction targets that are both immediate (e.g. 2 to 5 years) and forward-looking (e.g. 10 years);
   c. **absolute emission targets:** targets must focus on absolute emissions, i.e. the total amount of gas emissions, regardless of business growth or other intensity indicators, the total amount of emissions must decrease over time; intensity targets - which express emissions in relation to factors such as turnover or production - can be complementary but not substitutes;
   d. **alignment with global emission targets:** targets must be consistent with long-term global and sectoral emission trajectories that keep global warming below 1.5°C, aiming for net zero emissions by 2050;

[6] The European Sustainability Reporting Standards (ESRS) outline the technical criteria for constructing a credible transition plan that is compatible with the climate goal of limiting global warming to 1.5 degrees. They require information on metrics and targets, implementation strategies (decarbonisation levers and financial allocation) and governance issues. This includes information on climate mitigation metrics and targets, the company's implementation strategy, decarbonisation levers and financial allocation to achieve them, and governance processes.
[7] The TPT is a Task Force launched at COP26 by the UK government, created with the objective of producing a reference standard for transition plans.
[8] Although the ESRS does not include specific requirements on this point, it is essential that a TP incorporates this dimension as it is closely and directly related to the lock-in potential of emissions from fossil assets - which the ESRS requires an assessment of.

e. **methane emissions:** considering the key role of methane in global warming and the sector's responsibility, targets must include specific commitments to reduce methane emissions;
f. **target baseline year:** targets must be set in relation to the most recent year for which data is available, unless that year is unrepresentative of normal operations;
g. **target applicability:** targets must cover all operations and jurisdictions in which the entity is active, including those in geographically distant areas. Targets must also cover non-operated assets[9] and those held in joint ventures, accounting for the company's proportional share of income, expenses, assets and liabilities.

2. **Decarbonisation action plan:** TPs must define specific actions needed to achieve short, medium and long-term targets. For oil and gas companies, this must necessarily start with the gradual reduction of fossil fuel production and the decommissioning or conversion of midstream infrastructure, such as pipelines and LNG terminals. Actions to reduce emissions must also be prioritised on the basis of a carbon inventory to identify the main sources of emissions along the value chain.
   a. **Value chain coverage:** a TP must set out actions for reducing emissions across the entire value chain, as outlined in the carbon inventory;
   b. **emission reductions coverage:** the quantitative contribution of each action to total emission reductions must be quantified, and the total projected abatement must match the emission abatement targets at the corresponding time points;
   c. **emissions lock-in[10]**: as already required by ESRS, companies must assess and disclose the potential GHG emissions that can be generated by their assets, ensuring that strategies are in place to manage high-carbon assets;
   d. **asset closure and recovery:** when gradually reducing production, the company should close and recover assets, rather than selling them. Recovery in the case of decommissioning should remain the responsibility of the operating company;
   e. **defined timelines:** each action should have a clear timeline, specifying start and end dates;
   f. **exclusion of carbon offsets:** offsets should only cover residual emissions once the 90% reduction has been achieved and should not be used to achieve intermediate or long-term targets.

3. **Financial planning (CapEx/OpEx):** a TP must demonstrate that sufficient resources – both capital (CapEx) and operational expenditure (OpEx) – are allocated to implement the decarbonisation measures outlined in the plan.
   a. **Investment requirements:** each action must have clear estimates of CapEx and OpEx. Major acquisitions or divestments, and therefore closures, must align with the transition targets and be transparently reflected in financial reporting;
   b. **integration with strategic plans:** the TP must be integrated into the entity's strategic and industrial plans. Annual budgets should be regularly reviewed to adapt to financial realities, with expenditures for each action clearly reported in the private budgets;

[9] Assets in which the company holds an equity stake but is not the main operator.
[10] This refers to estimates of future GHG emissions that are likely to be caused by the company's activities or products sold during their operational lifetime.

c. **absence of harmful investments:** TPs must ensure that no new investments are allocated to carbon-intensive activities and that participation in carbon-intensive projects is progressively reduced.

4. **Risk and opportunity analysis:** a thorough analysis of climate-related risks and opportunities is crucial for effective TP management. TPs should be recognised as a strategic tool to identify and mitigate physical and transition risks.
   a. **Financial exposure assessment:** companies must assess their exposure to climate-related financial risks and opportunities. This analysis should be conducted in accordance with recognised frameworks such as ESRS, IFRS or TCFD, providing a strategic view of the entity's exposure to climate-related risks;
   b. **integral analysis:** the assessment should integrate physical climate risks (e.g. floods) and transitional risks (e.g. policy or market changes).

5. **Governance of the TP:** clear governance structures should oversee the development, approval and execution of the TP.
   a. **Board-level oversight:** entities must establish responsibility and oversight for climate-related issues and the implementation of the TP must lie at the board level. The competence of the board of directors and senior management on the topic should be regularly verified.
   b. **Qualified leadership:** those responsible for implementing and reviewing the plan must have the necessary skills and experience to manage the transition.
   c. **Stakeholder engagement:** ongoing engagement with key stakeholders, such as suppliers, industry representatives, trade unions, public institutions and civil society, is essential for reviewing and updating the TP. It also provides information on how this engagement contributes to achieving the transition plan and global climate targets.
   d. **Just transition:** the TP should include a clear timeline to phase out all fossil fuel assets by 2030 for operations in countries whose economies are less dependent on fossil fuel extraction, and by 2050 for operations in more dependent countries. This plan should include elements of a just transition, including dialogue with local communities and the sector's workforce.

6. **Monitoring and reporting:** according to CSRD, continuous monitoring and reporting are essential for tracking progress and ensuring the TP remains on track.
   a. **Annual updates and reporting:** TPs should be updated annually and made public, with revisions in response to significant changes in the context.
   b. **Milestones and KPIs:** clear key performance indicators (KPIs) should be defined for monitoring progress, including GHG and financial metrics, covering actual versus expected results.

These are the minimum elements that the leadership of oil and gas companies should include in their TPs to close the information and transparency gap and to remain competitive.

5 ANALYSIS OF THE MAIN TRANSITION CHOICES IN THE ITALIAN O&G SECTOR

- **Use of gas, especially LNG** (increasingly in the hydrocarbon exploration and production sector – upstream)

If the transition accelerates to meet the pathways of "well below 2°C" (WB2C) or scenarios with net zero emissions by 2050 (NZE2050), the danger of stranded assets becomes real for many hydrocarbon producers. By modelling the cost of delayed action in the transition to NZE, IRENA concludes that the total value of stranded assets in the upstream sectors of electricity generation, industry and construction, will be $20 trillion in the delayed action scenario, compared to only $10 trillion in the scenarios with accelerated adoption of renewable energy by 2050. In particular, **the upstream segment of the energy sector, or the allocation of investments in upstream infrastructure, could risk stranded assets of $7 trillion and about $3 trillion, respectively.**

An analysis by Carbon Tracker examined the extent to which Export Credit Agencies (ECAs), including SACE for Italy, are supporting the development of assets that risk becoming economically obsolete as the energy transition progresses. The analysis found that several oil and gas projects supported by ECAs are incompatible even with slow or moderate transition scenarios. These assets, mostly concentrated in developing countries, are at risk of becoming uncompetitive as future demand declines and are therefore more exposed to the risk of becoming financially unviable. Among the six projects taken into consideration, three assets financed by SACE are at risk of becoming uncompetitive as demand declines and, as a result, are more likely to become financially worthless[11].

The study concludes that market conditions for new LNG projects are becoming increasingly challenging**.** With over 100 bcm of capacity under construction over the next two years[12] , global LNG markets are expected to be oversupplied by the end of this decade. In fact, supply from already approved LNG projects is sufficient to meet future demand even in a slow transition scenario. This confirms the findings of the International Energy Agency (IEA), which indicate that in a moderate transition scenario, two-thirds of projects currently under construction risk failing to recover their initial investment.

In short, **there is no room for new LNG projects even in a slow transition scenario. Therefore, all new LNG projects risk generating returns below the minimum acceptable rate, even if demand were to follow a business-as-usual trajectory.**

- **Carbon Capture and Storage (CCS)**

Carbon Capture (Utilisation) and Storage (CCUS/CCS) does not remove CO_2 efficiently, allowing oil and gas production to continue. After decades of development, some 40 commercial capture plants are currently in operation globally, with a total annual capture capacity of 45

[11] The three assets are: Sakarya Natural Gas Offshore Phase 1 in Turkey, Mero 4 FPSO Platform in Brazil and Sakarya Natural Gas Offshore Phase 2 in Turkey.
[12] MBS consulting data

million tonnes of CO_2, equivalent to 0.12% of global energy-related emissions in 2022[13]. Of this 0.1%, only 19% is captured for geological storage. The remaining 81% is used in Enhanced Oil Recovery (EOR)[14] to extract and produce more oil. In fact, according to the contribution of Working Group III to the IPCC Sixth Assessment Report on Climate Change Mitigation, "CCS deployment will increase the share of fossil fuels" across all policy scenarios.

When comparing CO_2 savings from potential CCUS projects to those achievable through renewables, globally installed renewables in 2019 reduced CO_2 emissions by 137 million tonnes, more than three times the total savings achieved by all existing CCUS projects worldwide.

Experience and scientific evidence suggest that to date, CCUS technologies cannot be considered as quantitatively relevant or economically competitive emission reduction solutions. Except in a few very limited cases, they offer fewer prospects for development than decarbonisation solutions that eliminate emissions at source, through the development of renewable energy and innovation in production processes.

Opting for CO_2 capture and storage over significant emissions reduction at the source **implies relying on a complex system, not only technologically, but also from a governance perspective**. Such a system demands delicate management involving careful calculations, quantitative verification and technical procedures. Before investing in and implementing these systems, it is essential to establish accountability in the case of capture failure, inadequate storage, or leakage of stored CO_2. The inviolability of monitoring systems at storage sites is crucial to safeguard decades of work and investment in capture and storage, and to avoid the risk that any emptying could reverse progress in a relatively short time.

Moreover, even when controls and responsibilities are properly defined and assigned, **a cost-benefit analysis is needed to quantify the contribution of CCS technologies towards meeting climate targets, alongside the associated management costs**. This analysis must identify an appropriate time horizon given that, ideally, CO_2 should remain stored underground 'forever'. In this context, management risks and costs are effectively shifted indefinitely onto future generations. While avoided CO_2 emissions do not carry the risk of reappearing due to technical errors or lack of oversight, and do not generate maintenance costs, the same cannot be said for CO_2 that is produced, captured and stored.

In a potential future where CO_2 capture facilities are in operation, geological storage remains the most likely option for most of the captured CO_2, as shown by the IEA scenarios. Suitable locations for permanent storage of CO_2 include depleted reservoirs (especially gas reservoirs) and saline aquifers. According to analyses conducted by Eni, depleted oil and gas fields in Italy have a storage potential of about 750 million tonnes of CO_2. As for saline aquifers, complete data is lacking, with estimates ranging from 2,152 to 5,000 Mt[15]. These estimates, taken from the

[13] According to the IEA report (2023), global energy-related CO2 emissions grew by 0.9% or 321 million tonnes in 2022, reaching a new high of over 36.8 billion tonnes.

[14] Process involving the injection of CO_2 into oil fields in such a way as to increase the overall pressure within the field itself and facilitate the extraction of oil.

[15] Data reported in the draft Integrated National Energy and Climate Plan of June 2023.

scientific literature, have not yet been validated by operators and require in-depth analysis through dedicated studies. Although Italy's storage potential is significant, it must be stressed that **storage volumes are limited** and that widespread use of CO_2 storage could lead to the saturation of available volumes.

In economic comparisons between CCS and other technologies, it is also important to consider secondary environmental objectives not directly related to the priority of CO_2 reduction. For example, Italy has the highest number of premature deaths linked to air pollution in the EU, with an average of over 53,000 preventable premature deaths annually. **CO_2 capture technologies do not reduce the pollution impact from the use of fossil fuels in industry and energy or hydrogen production.** Furthermore, a there is no mitigation of fugitive emissions related to the use of methane, as capture plants lend themselves to being installed at large sites and thus cannot capture emissions along the entire natural gas value chain.

Using CCS alongside fossil fuels does not reduce Europe's dependence on imports of these resources. It also entails a high risk of lock-in within fossil fuel investments, as CO_2 storage plants and infrastructure require large capital investments with a payback time too long to be aligned with climate targets.

- **Biofuels as a strategy to decarbonise the downstream sector, highlighted as an alternative solution to traditional refineries.**

The potential role of biofuels in decarbonising transport is reflected in the IEA's scenarios. In the Net Zero scenario aligned with the 1.5°C target, the alternative to fossil fuels for road transport is not biofuels but electric power, with electricity produced from renewable sources already available on a large scale and expected to grow significantly in the coming years. Market data on the electrification of road vehicles confirm the trajectory projected by the IEA's net zero scenario.

By 2030, the NZE scenario predicts three times more biofuel consumption than in 2021, representing around 10% of total transport energy consumption. This demand would be absorbed by road transport, with a smaller share for aviation and shipping. Looking ahead to 2050, things change dramatically. The lack of ambition in the commitments announced by governments for the electrification of road transport (APS scenario) would lead to a 50% growth in total biofuel consumption by 2030, entirely absorbed by this sector. In contrast, the forecast of biofuel consumption in the NZE scenario to 2050 remains almost identical to that of 2030 and is completely absorbed by the aviation and maritime sectors. Therefore, in a scenario compatible with the ambitions of net zero by 2050, the alternative to fossil fuels in road transport is electric power from renewable sources, which is already available on a large scale and expected to grow significantly in the coming years.

One of the risks of overestimating the potential of biofuels for the decarbonisation of transport is that they may divert attention from more effective solutions. While biofuels can play a transitional role in reducing emissions from combustion-engine vehicles, in the medium to long-term electrification of these vehicles is the most efficient and sustainable solution to achieve transport decarbonisation goals.

Electric technologies, in fact, are widely considered to be the most sustainable and scalable solution to reduce transport emissions and are now the main market choice in major economies across Asia, America and Europe. Supporting biofuels as an alternative solution for mobility risks excluding the Italian system from progress in production, innovation and infrastructure that requires urgent development.

Economists point out that a technology-neutral regulatory approach to decarbonising road transport could lead to market failures in climate policies, with repercussions on European competitiveness in the global automotive market. Therefore, biofuel use should remain confined to sectors where electrification is more challenging, such as aviation and maritime.

- **Hydrogen**

Transition Plans typically include targets for hydrogen production and the subsequent repurposing of pipelines for its transport. Hydrogen is a strategic vector for decarbonisation, particularly in hard-to-abate sectors such as refining, steel, chemicals and heavy transport. In fact, IEA scenarios confirm that hydrogen use remains concentrated in the industrial sector and in refining, where its use has been established for decades. In contrast, emerging uses, such as in heavy industry, long-distance transport and energy storage, account for less than 1% of global demand.

However, on the infrastructural and regulatory side, several critical issues remain transport and distribution networks are mostly experimental or inadequate, the European regulatory framework is still being defined, and liquid and transparent renewable hydrogen markets do not yet exist. Moreover, the use of hydrogen in inefficient sectors (such as domestic heating or light transport) risks generating energy waste and diverting resources away from more effective solutions, such as direct electrification.

In addition to the technical difficulties of producing and repurposing hydrogen, significant economic considerations remain in developing a real hydrogen market. At present, costs are very high: both to build new dedicated infrastructures and to convert existing ones. Added to these costs is the issue that hydrogen demand is still too low to make these investments economically viable or to realise economies of scale that would reduce prices.

- **Carbon credits and REDD+ (Reducing Emissions from Deforestation and Forest Degradation) projects**

Carbon credits are a way for companies to offset greenhouse gas emissions by investing in projects that reduce or eliminate them elsewhere. Among these, REDD+ projects, developed under the United Nations Framework Convention on Climate Change (UNFCCC) can generate carbon credits, which represent a reduction or avoidance of greenhouse gas emissions from deforestation. These credits can be purchased by companies to offset their emissions (offsets).

However, REDD+ has raised several concerns. If overexploited, these offsets could lead to land grabbing in countries such as Zambia, Tanzania and Congo, where land rights are often unrecognised or violated. According to a study by the Global Forest Coalition, REDD+ projects in these areas may also threaten local food security. The REDD+ programme could in fact generate an increased demand for land, with negative consequences for food security and land

inequality. An additional problem is measurement: emission reductions from REDD+ projects are calculated based on projections (made by the project owner) of the total volume of emissions that would have been generated if the project had not been implemented.

Achieving net zero through emission offset projects could become a distraction and delay rapid emission reductions. Offsets should only cover residual emissions once the 90% reduction has been achieved and should not be used to achieve intermediate or long-term targets, as indicated by industry standards - Corporate Net Zero Standard Criteria of the Science Based Targets initiative (SBTi), and at the European level by ESRS.

CONCLUSIONS

Today, oil and gas companies benefit from financial guarantees and well-established regulatory frameworks that risk concentrating resources on technological strategies and options, such as continued gas expansion, which are misaligned with climate objectives and international commitments. First and foremost is the COP28 agreement in Dubai to begin 'transitioning away from fossil fuels'. These strategies may be risky or technologically immature and carry the risk of either slowing down the economy's transition, thus increasing climate-related losses and damages, or leaving companies unprepared for new market demands or a faster-than-expected transition.

For this reason, a **credible TP for oil and gas companies should integrate a realistic assessment of technological maturity, an evaluation of economic sustainability and a timely assessment of regulatory and geopolitical variables**. Only in this way can a TP provide investors with clear information on where to allocate capital, reduce the risk of stranded or devalued investments and enable more transparent, robust and long-term capital decisions.

The TPs published to date by oil and gas companies lack the foundational and credible elements identified for the sector, although they do contain some positive elements such as reporting and setting short, medium and long-term emission targets, and establishing clearly defined governance frameworks. On the risk side, both reports highlight physical and transitional risks related to climate change. However, this is only a qualitative assessment of all risk types, thus lacking a quantification of the expected financial effects of these risks.

The decarbonisation measures included in these TPs are not based on the gradual reduction of hydrocarbon production, instead envisaging substantial new investments in oil and gas, nor do they include plans for the decommissioning of midstream infrastructures, such as pipelines and LNG terminals, which is a prerequisite for the credibility assessment according to ATP-Col. In contrast, the achievement of climate neutrality by 2050 is justified through the use of climate-neutral, risky, marginal and immature solutions and technologies.

Given the specific weight of leadership in determining the strategic direction of oil and gas companies, and in a context where such companies are publicly owned, as in Italy, a key role in the adoption of a credible and effective TP for the Italian oil and gas sector will be played by the appointment of the top management of the associated companies, appointments that fall under the remit of the majority shareholder, namely the Government, and thus, ultimately, of politics.

IL THINK TANK ITALIANO PER IL CLIMA

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The opinions expressed in this policy briefing are solely those of ECCO – the Italian climate change think tank, the author of this research.

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