The ESG-Innovation Disconnect: Evidence from Green Patenting

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We are in the midst of an unprecedented worldwide coalescence around combatting the global problem of climate change. A central question we face involves how we get from here — not having the tech we need to fully implement climate change mitigation — to there? While it's a straightforward question, the answer unfortunately is not simple. Capital markets have taken up this mantle, however, and have amalgamated around the idea of "ESG" investing.

Environmental, Social, and Governance (ESG) is *the* buzz-acronym of the financial sector — with, by some measures, over 50 percent of new assets flowing into the space tied to ESG motives. From an investment perspective, though, there is no consensus on the best metric to assess a company's or industry's ESG-related efforts. So far, for the environmental aspect in particular, most efforts have focused on pollution, as some of its components are easy to measure, and that seems like the "right thing" to do. To better address this problem, we propose an alternative tack in which we begin by identifying who have been the architects of the most impactful environmental innovation, and then giving these actors the visibility and capital to help us come to the quickest possible comprehensive environmental solution.

In the process of defining what ESG investing looks like, it has been easier to define what ESG is not. Following this logic, energy companies have been automatically disqualified from the ESG agenda for things like easily measurable and available carbon emission metrics. This ignores their possible efforts, innovations, and investments within the green space. Our review of the *universe* of "green" (environmental) patents granted by the US Patent and Trademark Office over the last 40 years shows an important and strong trend in stark contrast with what ESG-aligned investment offers today. We find that traditional energy firms are in many ways spearheading green patenting, and have been for decades. For

instance, four supermajors are within the top 50 green patent producers: ExxonMobil, Shell, BP, and Chevron.

Even more surprisingly, energy firms' green patents receive more citations than the average green patent, suggesting higher quality from an innovation point of view. Energy-producing firms are significantly more likely to produce blockbuster green patents than other firms — specifically in climate mitigation technology. We also find that energy firms are not green patenting simply to block other firms from innovating in the space, or to shelve the patents. Energy firms are investing substantial amounts in alternative energy projects. They are significant global producers of alternative energy tied to their blockbuster patents and are central investors in some of the largest renewable-energy projects worldwide. Moreover, their innovative ideas are cited specifically by alternative energy firms *outside* of the traditional energy industry. Put differently, these patents appear important for all innovators in the space. Moreover, this isn't a new trend; energy companies have been green patent leaders since the 1970s —long before ESG was institutionalized.

To summarize, current ESG metrics stressing things that are easy to measure miss the fundamental purpose of ESG investing. We conduct the first large-scale study documenting the landscape of green innovation — its most active patentors, their patent quality, and capital allocation. The findings raise important questions as to whether the current exclusions of many ESG-focused policies — along with the increasing incidence of explicit divestiture campaigns — are optimal, or whether reward-based incentives would lead to more efficient innovative outcomes. Our findings suggest that to solve the growing environmental crisis, engaging with the energy industry as part of the solution-conversation — as opposed to wholesale penalizing it based on data that is easy to gather but unhelpful from an innovative perspective — should be considered.