GREENING THE SUPPLY CHAIN: FINANCIAL TOOLS TO CATALYZE DECARBONIZATION BY SMALL BUSINESSES

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ABSTRACT

As the need to decarbonize grows more pressing and public law fails to unilaterally address this need, scholars and practitioners are increasingly seeking private-governance solutions to decarbonization's challenges. Their efforts have found strong support among many large multinational firms. Most large firms' emissions, however, originate within their supply chains, which often consist of small- and medium-sized enterprises (SMEs). SMEs are often left out of conversations about climate change—a massive blind spot in decarbonization efforts—likely because their individual-level emissions are so inconsequential. Notwithstanding their insignificant individual emissions, SMEs' collective impact is huge; aggregate emissions from SMEs account for half of all emissions in the United States annually. To their credit, many SMEs express interest in decarbonization, but they often cite insufficient capital and expertise as central barriers to their decarbonization efforts.

To help overcome these technical and financial barriers, this Article proposes integrating energy savings performance contracts (ESPCs) into large firms' supply chains, looking to sustainable supply chain financing (SSCF) for guidance in so doing. ESPCs allow firms to invest in energy efficiency upgrades with an experienced energy-services company that oversees the project and accesses financing for it by guaranteeing savings from the underlying efficiency upgrades. These arrangements have historically been limited, however, to large publicly owned properties. SSCF provides trade financing to SMEs when they meet sustainability metrics using their larger buyers' credit lines, but the financing is typically short term (roughly ninety days), preventing utilization for deep-decarbonization efforts. This Article argues for incorporating ESPCs into supply chain contracts by tying buyers' unit price of a procured good to the energy savings realized under the ESPC, which utilizes the buyers' higher creditworthiness (as in SSCF) to access low-cost financing for energy efficiency upgrades in SMEs. These "supply chain energy saving guarantees" could be integrated

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into ESPCs to help bring SMEs into the decarbonization conversation, reduce larger firms' Scope 3 emissions, and provide low-risk investment opportunities that reduce costs for all parties in the long run.

INTRODUCTION

In 2015, 196 countries adopted the Paris Climate Agreement, aiming to reduce global warming to less than 1.5 degrees Celsius above preindustrial levels.[1] To achieve this, signatories must reduce emissions to 45% below

1. *For A Livable Climate: Net-Zero Commitments Must Be Backed by Credible Action*, UNITED NATIONS, https://www.un.org/en/climatechange/net-zero-coalition (last visited Nov. 16, 2025).

2010 levels by 2030 and meet carbon neutrality by 2050.[2] Many nations have announced net-zero goals to aid this effort,[3] and corporate commitments to decarbonize will certainly play a pivotal role in reaching these goals as well.[4] If implemented across carbon-intensive industries, corporate climate pledges would reduce carbon emissions by 3.2 to 4.2 billion tons annually by 2030.[5] Corporate commitments and the discussion of the private sector's role in advancing environmental ends, however, often center on large global firms with the resources to invest in sustainability.

The historical exclusion of small businesses from sustainability policy and governance debates must give way to a more holistic view of what private environmental governance (PEG) looks like in firms large and small alike if decarbonization goals are to be met.[6] Estimates suggest small- and medium-sized enterprises (SMEs)—firms with less than 500 employees[7]—account for as much as half of all greenhouse gas (GHG) emissions in the United States annually.[8] Consequently, there is no viable path to net-zero that excludes these emitters, notwithstanding their seemingly *de minimis* individual contributions.[9]

Nonetheless, questions remain about how to bring smaller firms into the decarbonization fold. Applying the principles of PEG to SMEs offers an opportunity to strengthen the business case for environmental intervention

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2. *Id.*; *What Does Net Zero Emissions Mean?*, CLIMATE COUNCIL, https://www.climatecouncil.org.au/resources/what-does-net-zero-emissions-mean/ (last updated Nov. 3, 2025).

3. STEPHAN RAES ET AL., NO NET ZERO WITHOUT SMES: EXPLORING THE KEY ISSUES FOR GREENING SMES AND GREEN ENTREPRENEURSHIP 8 (OECD SME & Entrepreneurship Papers No. 30, 2021).

4. Oren Perez & Michael P. Vandenbergh, *Making Climate Pledges Stick: A Private Ordering Mechanism for Climate Commitments*, 50 ECOLOGY L.Q. 683, 685 (2023). Some, however, think the goals of the Paris Agreement are no longer attainable. *See e.g.*, J.B. Ruhl & Robin K. Craig, *4°C*, 106 MINN. L. REV. 191, 198 (2021) ("[D]espite the continued international homage to this mitigation goal, most contemporary evaluations of the progress of climate change indicate that the increase in global average temperature will exceed 2°C and probably exceed 3°C this century, with increases continuing beyond 2100."). Nonetheless, the marginal effects of increased warming still justify efforts to decarbonize to the largest extent possible.

5. Perez & Vandenbergh, *supra* note 4, at 685.

6. *See Hidden Heroes of Climate Action: How Small and Medium-sized Enterprises (SMEs) Can Lead Global Decarbonization*, ZEIGO 3 (2023), https://www.zeigo.com/wp-content/uploads/2023/10/Zeigo-Hidden-Heroes-of-Climate-Action.pdf (describing the historical focus on large firms' ability to lead sustainability efforts in the private sector while acknowledging an emerging recognition of small businesses' role in these efforts).

7. This is the definition used by the U.S. Small Business Administration, but common definitions vary across sectors and agencies. *See* DANIEL TROMBLEY, ONE SMALL STEP FOR ENERGY EFFICIENCY: TARGETING SMALL AND MEDIUM-SIZED MANUFACTURERS 2 (ACEEE Rep. No. IE1401, 2014) (summarizing different definitions of small business).

8. *Carbon Footprint of the US: SMEs' Role*, ECOHEDGE (Jan. 6, 2024), https://ecohedge.com/blog/carbon-footprint-of-the-us-smes-role/.

9. RAES ET AL., *supra* note 3, at 9.

by these smaller firms.[10] Business-to-business pressures, for example, create strong incentives for SMEs to undertake sustainability efforts consistent with the goals their larger buyers set forth in supply chain contracts.[11] The supply chain is a natural place for large firms to engage in PEG, leveraging their existing relationships with smaller suppliers to induce deep decarbonization in SMEs. Beyond the existing business relationship, the supply chain also binds firms in an environmental sense. As such, there is an increasing pressure for large companies to address not only the emissions they immediately control (e.g., those from the facilities they directly own) but also the emissions originating along their supply chains—emissions that amount to 80% or more of the total emissions associated with the firm in many sectors.[12]

But generating additional external pressure on SMEs may not do much to aid decarbonization in SMEs because it assumes a lack of motivation drives SMEs' limited sustainability efforts to date.[13] Although that may be the case in some instances, many SMEs report an eagerness to undertake sustainability efforts. The firms point to both the strong business case that already exists for such action, including business-to-business supply chain pressures, and the normative values these firms seek to embody.[14] Bringing SMEs into the sustainability dialogue likely requires less of a focus on the external motivations to decarbonize than on the external and internal limitations that prevent these firms from decarbonizing. SMEs frequently cite inadequate financing and expertise as barriers to their decarbonization efforts,[15] so an unfunded mandate enforced through a supply chain contract may do little to catalyze environmental action. Large firms must do more than compel decarbonization; they need to support SMEs in their sustainability efforts.

This Article centers on two financing mechanisms to help facilitate this

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10. *See infra* Part I.B.

11. *See infra* notes 94–98 and accompanying text.

12. Anne-Titia Bové & Steven Swartz, *Starting at the Source: Sustainability in Supply Chains*, MCKINSEY & CO. (2016), https://www.mckinsey.com/capabilities/sustainability/our-insights/starting-at-the-source-sustainability-in-supply-chains; MICHAEL P. VANDENBERGH ET AL., PRIVATE ENVIRONMENTAL GOVERNANCE 178 (2023).

13. RAES ET AL., *supra* note 3, at 12.

14. Julia Selig, *Small Businesses Are Prioritizing Climate Action, But They Need More Support*, SME CLIMATE HUB (Apr. 10, 2024), https://smeclimatehub.org/small-businesses-are-prioritizing-climate-action-but-they-need-more-support (noting the strong business case for sustainability but also that 63% of SMEs report undertaking sustainability efforts because they "believe taking climate action is the right thing to do").

15. *New Data Reveals Two-Thirds of Surveyed Small Businesses Concerned over Navigating Climate Action,* SME CLIMATE HUB (Feb. 23, 2022) [hereinafter *Small Businesses Concerned over Navigating Climate Actions*], https://smeclimatehub.org/new-survey-reveals-small-business-barriers-climate-action/ (describing barriers to climate action by SMEs).

end: sustainable supply chain financing (SSCF) and energy savings performance contracts (ESPC). These mechanisms should enable decarbonization in SMEs by increasing access to financial resources to fund decarbonization and sustainability knowledge to inform those efforts. Large buyers of goods and services establish SSCF programs with financial intermediaries to provide preferential trade financing to small suppliers when those suppliers satisfy sustainability criteria set by the buyer.[16] Such a program leverages existing supply chain relationships to incentivize sustainability in SMEs while providing necessary financing to support further investments in sustainability. Although SSCF programs focus on SMEs, their impact is limited by the short-term financing that they provide. SSCF's financing benefits arise from open account trade, which usually allows buyers only 60 or 90 days to pay outstanding invoices.[17]

ESPCs offer another means of financing sustainability investments in firms, but with a longer duration, enabling more expansive sustainability investments. ESPCs allow a firm (the customer) to contract with an energy service company (ESCO) to carry out an energy efficiency investment project on the firm's property.[18] Prior to initiating the project, the ESCO undertakes an energy audit of the property. The ESCO leverages its sustainability expertise, identifies investments that are expected to yield returns sufficient to cover the project's cost—essentially paying for energy efficiency investments today with tomorrow's energy savings.[19] The projected savings are often guaranteed by the ESCO through an energy savings guarantee provision in the ESPC, which shifts all technical performance risk associated with the project away from the customer and subsequently lowers the cost of financing the project.[20] The existing market for ESPCs focuses on large, usually publicly owned properties where large savings can offset transaction costs, leaving SMEs out of the market. Smaller ESCOs may try to serve this group of small businesses, but their collectively poor credit reduces the energy savings guarantee's impact on financing,

16. *See* Charlotte Bancilhon et al., *Win-Win-Win: The Sustainable Supply Chain Finance Opportunity*, BSR 9 (2017), https://www.bsr.org/en/reports/win-win-win-the-sustainable-supply-chain-finance-opportunity.

17. TRANSFORM TO NET ZERO, SUSTAINABLE SUPPLY CHAIN FINANCE: TRANSFORMATION GUIDE 8 (2024) (noting the time-based limitation).

18. *Energy Savings Performance Contract*, U.S. DEP'T OF ENERGY, https://betterbuildingssolutioncenter.energy.gov/financing-navigator/option/espc-financing (last visited Nov. 16, 2025).

19. *Id.*; U.S. DEP'T OF ENERGY, WHAT IS ENERGY SAVINGS PERFORMANCE CONTRACTING (ESPC)? (2014) [hereinafter WHAT IS ESPC?].

20. *ESCO Contracts*, IEA, https://www.iea.org/reports/energy-service-companies-escos-2/esco-contracts (last visited Nov. 16, 2025); *Energy Savings Performance Contract*, *supra* note 18.

making many projects nonviable.[21]

Both SSCF and ESPCs create value for the parties involved—small firms, large firms, ESCOs, and financial institutions—but their impact and inclusion of SMEs is mixed. In addition to exploring opportunities for altering these existing tools to overcome their limitations, this Article proposes a novel combination of the two. Leveraging the strong relationships defined by the supply chain contract, the "supply chain energy savings guarantee" (as this Article refers to them) will allow a large buyer to support its suppliers' access to the financing necessary for ESPCs and further strengthen the relationship between the buyer and suppliers. Rather than rely on large ESCOs to serve SMEs, which they have been hesitant to do thus far,[22] the supply chain energy savings guarantee will support new and smaller ESCOs. With this support, the new, smaller ESCOs can enter the market and serve SMEs without the financial burdens or financing consequences associated with taking on the energy savings guarantee themselves.

This Article proceeds as follows. Part I motivates the focus on SMEs and PEG as a driver of decarbonization in smaller firms before highlighting persistent barriers to decarbonization in SMEs.[23] This Part closes with a specific focus on the supply chain connection that ties large firms' emissions to that of their smaller suppliers, delving into normative questions about large firms' duties to their smaller counterparts in the climate context.[24] Part II describes SSCF and ESCPs, including discussion of not only the tools' benefits and limitations, but also opportunities for improving the tools' reach and impact.[25] Part III reflects on the lessons SSCF and ESPCs teach about the ingredients necessary to effectively support decarbonization efforts in SMEs before introducing the supply chain energy savings guarantee as a new tool for bringing ESPCs to SMEs through the supply chain.[26] A brief conclusion follows.

I. GREENING SMALL- AND MEDIUM-SIZED ENTERPRISES

Small- and medium-sized enterprises (SMEs) represent a significant blind spot in decarbonization efforts to date. But an increasing recognition of SMEs' cumulative impact on the environment and looming climate targets has begun to change this situation. This Part begins by motivating the reconceptualization of SMEs as a part of the climate solution and problem,

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21. *See* KARINE LAFFONT-ELOIRE ET AL., STUNNING, SUSTAINABLE BUSINESS MODELS FOR THE DEEP RENOVATION OF BUILDINGS 30–31 (2019).

22. *See id.*; *Energy Savings Performance Contract*, *supra* note 18.

23. *See infra* Part I.A–C.

24. *See infra* Part I.D.

25. *See infra* Part II.

26. *See infra* Part III.

as opposed to solely the former.[27] After motivating the focus on SMEs, this Part engages in a theoretical analysis of how, where, and why private environmental governance (PEG) applies to SMEs.[28] Notwithstanding the incentives PEG creates, this Part discusses lingering barriers to decarbonization in SMEs before applying lessons from PEG to understand how the supply chain relationship between large buyers and smaller suppliers can form the basis of further efforts to decarbonize SMEs.[29]

A. Small Business, Big Impact

Achieving net-zero carbon emissions is not attainable without bringing SMEs into climate change discourse; however, SMEs have been largely left out of this dialogue, skirting climate change scrutiny and missing opportunities to reduce operating costs.[30] On the surface that may not sound so bad. Conventional wisdom suggests, "They're just too small to be worth anyone's time."[31] But the tide may be turning on this conception of SMEs' limited role in decarbonization efforts.[32]

Even if an individual SME is "too small to be worth anyone's time,"[33] this position cannot be defended in light of the global climate's precarious state and the pitfalls of the "one percent problem."[34] This is especially true if one recalls the massive role that SMEs play in upholding the U.S. economy and other economies around the world.[35] SMEs account for 99.9% of all businesses in the United States—over 33 million firms.[36] They were responsible for almost two-thirds of the jobs created between 1995 and 2021 (63%), almost one-third of known export value (32.6%), and over 40% of

27. RAES ET AL., *supra* note 3, at 8; *see infra* Part I.A.

28. *See infra* Part I.B.

29. *See infra* Parts I.C., I.D.

30. RAES ET AL., *supra* note 3, at 10; Daniel Hill, *Small Business: The 'Neglected Middle' of Climate Change*, HUFFPOST (Feb. 7, 2015), https://www.huffpost.com/entry/small-business-the-neglec_b_6289210.

31. Hill, *supra* note 30.

32. *See, e.g.*, Jesper Brodin & Maria Mendiluce, *Comment: We'll Only Beat Climate Change if We Help Small Businesses Cut Emissions - and Fast*, REUTERS (Mar. 16, 2023), https://www.reuters.com/default/comment-well-only-beat-climate-change-if-we-help-small-businesses-cut-emissions-2023-03-16/.

33. Hill, *supra* note 30.

34. Kevin M. Stack & Michael P. Vandenbergh, *The One Percent Problem*, 111 COLUM. L. REV. 1385, 1388 (2011).

35. *Small and Medium Enterprises (SMEs) Finance*, WORLD BANK GRP., https://www.worldbank.org/en/topic/smefinance (last updated Oct. 7, 2025) ("[SMEs] are the backbone of most economies, representing around 90 percent of all businesses and accounting for more than half of global employment.").

36. *The State of Small Business Now*, U.S. CHAMBER OF COM. (Apr. 10, 2023), https://www.uschamber.com/small-business/state-of-small-business-now.

gross domestic product (43.5%).[37] In fact, nearly half of the private sector workforce is employed by an SME.[38] "By almost any measure, small businesses are a vital part of the American economy and workforce."[39] SMEs must play a role in efforts to decarbonize the economy commensurate with the central role SMEs play in the economy in all other respects.[40]

New data confirms that SMEs contribute significantly to carbon emissions. Estimates of SMEs' environmental impacts vary across place, time, and sector, but the estimates collectively support the conclusion that SMEs have a substantial cumulative impact on the environment more than sufficient to justify their taking on a role in decarbonization efforts.[41] While precise estimates of SMEs' environmental impact are sparse—likely a function of their ability to fly under the radar in climate discourse for so long—estimates that have been produced put into perspective the potential for deep decarbonization from SMEs.[42]

SMEs collectively account for around half of U.S. GHG emissions based on estimates from Ecohedge, an emissions accounting and consulting firm.[43] Another estimate suggests U.S. small businesses are responsible for nearly 500 million metric tons of carbon emissions annually—roughly the same as derived from powering half the homes in the country every year—according to estimates from Daniel Hill, Co-Founder and President of the Green Impact Campaign.[44] Data from the Energy Information Administration tells a similar story. In 2010, 57% of the energy consumed by the U.S. manufacturing sector was consumed by SMEs therein (though no analogous data exists for the commercial sector).[45] A study from the American Council for an Energy-Efficient Economy (ACEEE) further supports this narrative, reporting that small- and medium-sized manufacturing firms account for 90% of manufacturing facilities in the United States and 48% of the industry's energy consumption.[46]

One highly cited study on SMEs' environmental impacts sponsored by the European Commission concluded that SMEs produce 64% of industrial

37. *Id.*

38. *Id.*

39. *Id.*

40. *But cf. infra* Part I.D.3.

41. *See* RAES ET AL., *supra* note 3, at 9–11 ("SMEs on aggregate have a significant environmental footprint."). *But see infra* Part I.D.3.

42. *See* RAES ET AL., *supra* note 3, at 11.

43. *Carbon Footprint of the US: SMEs' Role*, *supra* note 8.

44. Hill, *supra* note 30.

45. Tina Fawcett & Sam Hampton, *Why & How Energy Efficiency Policy Should Address SMEs*, 140 ENERGY POL'Y 1, 2 (2020).

46. TROMBLEY, *supra* note 7, at 5–6. The report also highlights the geographic variation in this statistic. Small manufacturing firms account for more manufacturing-sector energy consumption in the Midwest (55.4%), for example, than in the south (43.5%). *Id.* at 6.

pollution in the European Union and that 40 to 45% of SMEs have a significant impact on the environment based on energy consumption, emissions, and waste-production metrics. The former conclusion was consistent with the prevailing estimates at the time that attributed 60 to 70% of industrial pollution to SMEs.[47] Using data from 2018, a more recent study found that, in the European Union, SMEs produce between 37 and 41% of GHG emissions in the business sector and 30 to 39% in the manufacturing sector.[48] Regarding energy consumption, the International Energy Agency has estimated that SMEs account for roughly 13% of energy use globally.[49] These statistics make clear that SMEs, whether domestic or international, are significant contributors to climate change that cannot continue operating at the periphery of climate change discourse.[50]

The historical rationale for disinterest in SMEs, notwithstanding the statistics' indication of their collective impact, is multifaceted, but the validity of the rationales underlying this disinterest varies. The business strategy point of view assumes that SMEs have little interest in environmental performance beyond regulatory compliance.[51] Recent research calls this assumption into question, finding that SMEs have much more nuanced views on environmental stewardship than previously believed, both as it relates to proactive pollution prevention[52] and greening product and service offerings and processes within the firm.[53]

Even if there was a strong desire to study SMEs, data on the firms' environmental impacts is typically harder to acquire than data on larger firms, as evidenced by the sparse and disparate studies cited above.[54] Although somewhat circular, the lack of public focus on SMEs has disincentivized research and advocacy aimed at bringing SMEs into sustainability

47. CALOGIROU CONSTANTINOS ET AL., PLANET WITH TEKNOLOGISK INSTITUT SMES AND THE ENVIRONMENT IN THE EUROPEAN UNION, vii, x, 57–58 (2010). In passing, a report from the International Trade Centre notes that "[s]mall firms generate more than 50% of jobs *and greenhouse gas emissions*"; however, the source for this statistic is not provided. INT'L TRADE CTR., SME COMPETITIVENESS OUTLOOK: EMPOWERING THE GREEN RECOVERY xii (2021) (emphasis added).

48. MARCO MARCHESE & JUANA MEDUS, OECD SME & ENTREPRENEURSHIP PAPERS, NO. 42, ASSESSING GREENHOUSE GAS EMISSIONS AND ENERGY CONSUMPTION IN SMES: TOWARDS A PILOT DASHBOARD OF SME GREENING AND GREEN ENTREPRENEURSHIP INDICATORS 16–18 (2023).

49. INT'L ENERGY AGENCY, ACCELERATING ENERGY EFFICIENCY IN SMALL AND MEDIUM-SIZED ENTERPRISES 14 (2015).

50. RAES ET AL., *supra* note 3, at 9 ("SMEs on aggregate have a significant environmental footprint.").

51. J. Alberto Aragón-Correa et al., *Environmental Strategy and Performance in Small Firms: A Resource-Based Perspective*, 86 J. ENV'T MGMT. 88, 89 (2008).

52. *Id.* at 98–99.

53. Brigitte Hoogendoorn et al., *What Drives Environmental Practices of SMEs?*, 44 SMALL BUS. ECON. 759, 775–77 (2015).

54. Aragón-Correa et al., *supra* note 51, at 89; RAES ET AL., *supra* note 3, at 8.

discourse.[55] Data-acquisition costs and limited public interest may have resulted in a self-fulfilling prophecy about engaging SMEs in decarbonization policy and governance debates. Legal scholars, policymakers, and advocates have devoted relatively little attention to SMEs, and the data demonstrating SMEs' role in perpetuating climate change has been difficult to collect. But better data on SMEs' climate impacts would likely spark public and scholarly interest in the subject, and greater scholarly interest would likely produce better data on SMEs' environmental impacts.

The SME blind spot, the collective willingness to overlook, ignore, or discount SMEs' carbon emissions in climate change discourse—whether willful (as when a mental model constrains beliefs such that small enterprises cannot be conceived of as polluters[56]), or incidental (as when a dearth of data prevents an appreciation of the scope of the problem[57])—is just another manifestation of the one-percent problem. [58] In the climate context, the one-percent problem describes a situation where numerous individually small-scale polluters escape scrutiny as a class notwithstanding the massive scale of their collective impact.

Problematic as this ignorance may be to realizing climate change–mitigation efforts, it is not always irrational; an economic rationale justifies deprioritizing small-scale polluters.[59] Decarbonization efforts are efficient where the benefits of reducing emissions exceed the associated costs. This efficiency is most common in situations where there are large polluters to focus decarbonization efforts on because economies of scale make decarbonization and any associated regulation highly workable in such

55. Aragón-Correa et al., *supra* note 51, at 89.

56. Michael P. Vandenbergh, *The Social Meaning of Environmental Command and Control*, 20 VA. ENV'T L.J. 191, 208 (2001) (theorizing that command and control of large, point-source polluters conveyed a message that "industrial polluters are the source of environmental problems, and individual citizens are enforcers allied with the government to stop them"). This cognitive limitation also helps explain why SMEs were conceived of as part of the climate change solution long before their role in contributing to the climate change problem was appreciated. *See* RAES ET AL., *supra* note 3, at 8 (discussing SMEs' role as part of the solution, through green entrepreneurship and eco-innovation programs, in early climate change debates).

57. *Cf.* Allen Rostron, *The Dickey Amendment on Federal Funding for Research on Gun Violence: A Legal Dissection*, 108 AM. J. PUB. HEALTH 865 (2018) (noting the chilling effect that the Dickey Amendment, which prohibited federal funding for gun-violence research that recommended restricting access to firearms, had on firearms research and the impacts of this dearth of research on policymaking).

58. *See* Stack & Vandenbergh, *supra* note 34, at 1386–88. "One percent" in this context does not literally refer to polluters that contribute more than one percent of total annual emissions but instead to "very small-share contributors, whether they are actually one percent, a bit more, or less." *Id.* at 1393.

59. *See id.* ("At its core, the one percent problem is generated by accepting efficiency arguments under conditions *where they are not justified*." (emphasis added)).

settings.[60] But it is unclear how applicable this rationale is in the case of SMEs. Empirical research suggests that engaging SMEs in decarbonization efforts can support significant efficiency gains; strategic efficiency investments can reduce small businesses' utility bills by 10 to 30% according to estimates from Energy Star.[61] "In fact, small businesses can usually save as much money and prevent as much carbon pollution, per square foot, as bigger companies."[62] As the effects of climate change are increasingly felt both at home and abroad, and aspirational (yet concrete) decarbonization targets loom in 2030 and beyond, the consequences of the one-percent problem as applied to SMEs—the SME blind spot—have steadily grown.[63] Alongside these growing consequences, and likely in response to them, renewed interest in the role SMEs play as both contributors *and* solutions to climate change has developed.[64]

B. Can Private Governance Help?

Even once the size and impact of SMEs' aggregated emissions become

60. *Id.* at 1393–94. Efficiencies can materialize because transaction costs are lower in these settings. Note, however, that this is not a result of the diminishing marginal returns to emissions reduction, or what then-Professor Stephen Breyer referred to as the "last ten percent problem" in the regulatory context. *See* STEPHEN BREYER, BREAKING THE VICIOUS CIRCLE: TOWARD EFFECTIVE RISK REGULATION 12 (1993); Stack & Vandenbergh, *supra* note 34, at 1394 n.29. Justice Breyer recognized that when faced with a problem, regulators tended to spend an inordinate share of resources reducing the final ten percent of risk associated with that problem—roughly ninety percent of resources were expended to address the last ten percent of risk. BREYER, *supra* note 60, at 12–13. That observation does not necessarily translate to this setting, however, because each firm (even a low-emissions firm) likely hosts some "low-hanging fruit" that could return cost-effective emissions reductions. Such an assumption underlies the proposed financial instrument presented in Part III below. *See also infra* note 62 and accompanying text.

61. *Small Businesses: An Overview of Energy Use and Energy Efficiency Opportunities*, U.S. ENV'T PROT. AGENCY: ENERGY STAR (2007), https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100TBJH.TXT ("Small businesses that invest strategically can cut utility costs 10 to 30 percent without sacrificing service, quality, style, or comfort, all while making significant contributions to a cleaner environment."); *see also Energy Star Action Workbook for Small Business*, U.S. ENV'T PROT. AGENCY: ENERGY STAR (2019), https://www.energystar.gov/ (outlining steps that SMEs can take to improve the energy efficiency of their businesses).

62. *Boost Savings and Sustainability Through Energy Efficiency*, BANK OF AM. (Aug. 18, 2024), https://business.bankofamerica.com/resources/savings-and-sustainability-through-energy-efficiency. Even something as simple as replacing incandescent lightbulbs with LEDs can have huge impacts. *Lighting Choices to Save You Money*, U.S. DEP'T OF ENERGY, https://www.energy.gov/energysaver/lighting-choices-save-you-money (last visited Nov. 16, 2025) ("LEDs use up to 90% less energy and last up to 25 times longer than traditional incandescent bulbs.").

63. *See* RAES ET AL., *supra* note 3, at 8 ("[W]ith climate mitigation ambitions and milestones becoming more concrete and more urgent (focused on 2030 as well as 2050) it has become increasingly clear that all actors in the economy must play a role and that, although the impact of individual entrepreneurs or SMEs may be limited, collectively they play an important role.").

64. *See* Hill, *supra* note 30, ("We need to include small business as part of the climate change conversation, not only as a contributor, but also as part of the solution.").

clear and the importance of SMEs' decarbonization efforts is recognized, the question remains how these firms can be induced to decarbonize. Should governments utilize incentives or the coercive power of the state? Or put differently, should they employ carrots or sticks? Do governments have the public support necessary to use these tools? Over the last half century, these questions have morphed from a policy dialogue about what should be done to a dialogue about what, if anything, can be done.[65] The limited and uncertain future of public environmental governance has spurred interest among academics and practitioners in developing PEG tools to fill in gaps and push decarbonization efforts beyond what governments alone could achieve.[66] PEG refers to situations in which "private organizations play the

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65. The federal government is handicapped by gridlock in Congress and flip-flopping in the executive branch every four years, preventing the development of long-term climate policy. Since 1991, Congress has only enacted one coercive environmental statute—the Lautenberg Chemical Safety for the 21st Century Act, which amended the 1976 Toxic Substances Control Act. Despite the potential benefits of the subsidy-based approach adopted by Congress in enacting the Inflation Reduction Act (IRA) and Infrastructure Investment and Jobs Act (IRJA), the second Trump Administration was (correctly) expected to be openly hostile to the myriad environmental subsidies included in the IRA and IIJA. *See* David Goldman, *What Just Happened? It Was the Economy, Stupid*, CNN, https://www.cnn.com/2024/11/06/economy/economy-trump-reelection/index.html (last updated Nov. 6, 2024); Kate Magill, *Trump Freezes IRA Funding*, UTILITY DIVE, https://www.utilitydive.com/news/president-trump-inflation-reduction-act-executive-order-ev-mandate/738001/ (last updated Jan. 23, 2025). The administrative state, in its efforts to modernize older coercive environmental laws like the Clean Air Act to address the environmental harms of the modern day, has been handicapped by the courts. *See* West Virginia v. EPA, 142 S. Ct. 2587 (2022); *accord* Loper Bright Enters. v. Raimondo, 144 S. Ct. 2244 (2024); Jonathan H. Alder, *Supreme Court Grants Certiorari in Nondelegation Case*, REASON: THE VOLOKH CONSPIRACY (Nov. 23, 2024), https://reason.com/volokh/2024/11/23/supreme-court-grants-certiorari-in-nondelegation-case/ (describing the Supreme Court's grant of certiorari in a case that could resurrect the nondelegation doctrine). Of course, more localized efforts in states or local governments remain viable, although their geographic reach limits their impact and the opposition to climate mitigation is pervasive in roughly half the states. While these efforts at using public governance to address climate change harms should continue to be pursued, "at a time when politics in the United States (and elsewhere) are dysfunctional and Congress is paralyzed, it doesn't seem wise to put all of your eggs in that broken basket." Lou Leonard, *Stranger Than Fiction? Business Drives a New System of Climate Governance*, THE FINREG BLOG (July 22, 2020) [hereinafter *Stranger Than Fiction*], https://sites.duke.edu/thefinregblog/2020/07/22/stranger-than-fiction-business-drives-a-new-system-of-climate-governance/. PEG is another basket worth exploring. It is worth noting, however, that Congress has never been particularly keen on regulating small-scale polluters, as evidence by numerous *de minimis* polluter exceptions in the environmental laws. *See* Stack & Vandenbergh, *supra* note 34, at 1395–96, 1417 (describing *de minimis* exceptions in federal environmental legislation); *see also* Vandenbergh, *supra* note 56, at 208 (describing second generation environmental problems and a social meaning of environmental law that conceptualized individuals as "enforcers allied with the government to stop" the large "industrial polluters who are the source of environmental problems"). As such, it is not obvious that even if functioning, public governance would be capable of effectively regulating the second-generation environmental problems created by SMEs—numerous individually *de minimis* polluters that collectively have an enormous environmental impact. *See id.* at 196.

66. *See* VANDENBERGH ET AL., *supra* note 12, at 3–4 ("PEG complements, spurs, and even competes with government environmental laws, policies, and programs."); Michael P. Vandenbergh,

standard-setting, implementation, monitoring, enforcement, funding, and/or adjudication roles traditionally played by government actors to address environmental concerns."[67] Just as the threat of sanction by the leviathan motivates compliance with public law, private motivations precipitate PEG.

The strength of these motivations likely differs between large firms and small firms, which changes how and when PEG will be effective across firms. Large firms have the capital, extrinsic motivation, and expertise to engage in sustainability, but they only indirectly control much of their value chains. SMEs, by contrast, permeate large firms' value chains but often lack much of the capital, extrinsic motivation, and expertise necessary to act on environmental goals as large firms do. Exploring the distinct circumstances facing large firms and SMEs in the PEG context illuminates disparities in their efforts to decarbonize, reveals potential synergies between the firms, and highlights differences in their extrinsic motivations for climate consciousness. The comparative PEG analysis informs efforts to accelerate SMEs' decarbonization efforts.

When private firms engage in PEG, several factors typically motivate their participation: public pressures, evolving norms, financial-system pressures, business-to-business pressures, and internal economic opportunities.[68] Larger firms' PEG efforts are chiefly due to public pressure from customers and employees and financial-sector pressures. To some extent, business-to-business pressure and norms also play a role. SMEs' motivations to undertake PEG are undertheorized,[69] but they seem to turn this motivational hierarchy on its head. That is, SMEs appear more heavily influenced by norms and business-to-business pressures than employee or financial-system pressures. As one might expect, the business case for sustainability is likely a universal motivator of PEG adoption—at least among for-profit entities.

Notwithstanding the polarization that has prevented meaningful action in Congress, large swaths of the public support environmental protection[70] and

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Private Environmental Governance, 99 CORNELL L. REV. 129, 197–98 (2013) (describing the potential for new PEG tools); *Stranger Than Fiction*, *supra* note 65 (noting how hyper fixation on public governance solutions to climate change at the expense of business-driven solutions is a contributing factor to humanity's failure to address the climate issue); *see also* Louis G. Leonard III, *Under the Radar: A Coherent System of Climate Governance, Driven by Business*, 50 ENV'T L. REP. 10546 (2020) [hereinafter *Under the Radar*].

67. VANDENBERGH ET AL., *supra* note 12, at 6.

68. *Id.* at 79.

69. *Cf*. Fawcett & Hampton, *supra* note 45, at 3 (regarding SMEs, concluding that "[t]here has been relatively little research on how energy use and the potential for change in organizations should be conceptualized" and that "this is a topic in need of further work").

70. Alec Tyson & Brian Kennedy, *Two-Thirds of Americans Think Government Should Do More on Climate*, PEW RSCH. CTR. (June 23, 2020), https://www.pewresearch.org/science/2020/06/23/two-thirds-of-americans-think-government-should-do-

seek out sustainable products for purchase.[71] As such, large, highly visible firms have an incentive to present themselves as environmentally friendly to cater to this demographic and ensure their operations remain socially legitimate (even if their actions are "legal").[72] Otherwise, consumers on their own or after prodding by advocacy organizations can initiate boycotts of certain products or even whole companies.[73] SMEs also green their product and service offerings in response to customer demand,[74] but this response depends on the ultimate customer. When SMEs serve end-use customers, their products are more likely to be sustainable than when they sell to other companies.[75]

SMEs' response to customer pressure is complex because their customer base is complex. Insofar as SMEs service individuals, their small size and individually small environmental impacts make them unlikely targets of the naming-and-shaming campaigns that large firms have been subject to.[76] Smaller firms are also more willing to differentiate themselves by aligning with social issues, like environmentalism, because they face less pressure to

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more-on-climate/ (cataloging support in the United States); *The World's Largest Survey on Climate Change Is Out–Here's What the Results Show*, UNITED NATIONS DEV. PROGRAMME (June 27, 2024), https://climatepromise.undp.org/news-and-stories/worlds-largest-survey-climate-change-out-heres-what-results-show (cataloging support abroad). For longitudinal data on Americans' views on environmental policy, see *Environment*, GALLUP, https://news.gallup.com/poll/1615/environment.aspx (last visited Nov. 16, 2025).

71. *Degree to Which Consumers' Purchasing Behavior and Choices Shifted Towards Buying More Sustainable Products Over the Past Five Years Worldwide in 2022*, STATISTA, https://www.statista.com/statistics/1377869/global-shift-to-buying-sustainable-products/ (last visited Nov. 17, 2025).

72. This social legitimacy is referred to as the "social license to operate." *See Under the Radar*, *supra* note 66, at 10553 ("[A]s public concern and societal prioritization of climate change grows, some argue that demonstrating adequate action has become a fundamental part of a company's 'social license' to operate, though the concept is at most softly applied in the United States."); Neil Gunningham et al., *Social License and Environmental Protection: Why Businesses Go Beyond Compliance*, 29 L. & SOC. INQUIRY 307, 308–10 (2004); *cf.* Michael P. Vandenbergh et al., *The Moral Boundary of the Firm*, 110 IOWA L. REV. 2169 (2025).

73. *See Under the Radar*, *supra* note 66, at 10553.

74. Hoogendoorn et al., *supra* note 53, at 775 ("SMEs' engagement in green products and services . . . seems to be largely independent of firm size.").

75. *Id.* (finding that "SMEs that serve customers are more likely to engage in greening their products and services than SMEs that serve other companies").

76. *See, e.g.*, Sarah King, *My Week on a Plastic Beach Helping Name and Shame Its Polluters*, GREENPEACE (Oct. 3, 2017), https://www.greenpeace.org/canada/en/story/741/my-week-on-a-plastic-beach-helping-to-name-and-shame-its-polluters-2/ (recounting efforts to collect and tally the sources of plastic pollution on beaches in the Philippines; highlighting Nestle, Unilever, Proctor & Gamble, Colgate-Palmolive, Coca-Cola, and Pepsi as major contributors; and describing an ongoing boycott of Coca-Cola); *cf.* Vandenbergh, *supra* note 56, at 208 (theorizing that command and control of large, point-source polluters conveyed a message that "industrial polluters are the source of environmental problems, and individual citizens are enforcers allied with the government to stop them").

appeal to the public generally.[77] As public resistance to socially progressive policies has grown among some groups, however, SMEs' willingness to differentiate themselves also enables them to succeed by aligning with that resistance.[78]

Beyond customers, public preferences are also reflected in the workforce, finding their way into the firms through employees. Younger generations increasingly report a preference for working with employers whose values, like sustainability, align with their own.[79] Refusing to engage with these values may threaten access to young talent and, consequently, the company's future competitiveness.[80] These pressures will be most salient for large companies that compete for the best and brightest talent on a national scale. When discussing employee pressure as a rationale for PEG, scholars and commentators' focus is often placed on "[t]op-ranked business school graduates" and technology-sector employees at companies including Amazon, Google, and Microsoft—some of the most valuable companies in the world.[81] Among SMEs that recruit locally and from regional universities, it is not obvious that firms use sustainability policy to distinguish themselves from other firms competing for talent in the same labor market.

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77. *See, e.g.*, Gabrielle Policella, *12 Sustainable Small Businesses to Support Without the Guilt*, SMILE.IO, https://blog.smile.io/12-sustainable-small-businesses-to-support-without-the-guilt/ (Apr. 18, 2023) ("[W]e've created this list of 12 sustainable small businesses that are doing great things for the environment. Whether they are selling eco-friendly products or using sustainable packaging, these are brands you can do some sustainable shopping at without guilt."). Many SMEs cite reputational benefits as a rationale for becoming more sustainable. *See* Selig, *supra* note 14.

78. *See* David Gelles, *Red Brands and Blue Brands: Is Hyper-Partisanship Coming for Corporate America?*, N.Y. TIMES (Nov. 23, 2021), https://www.nytimes.com/2021/11/23/business/dealbook/companies-politics-partisan.html. Greenhushing describes a similar phenomenon in organizations that are conscious of the potential costs of differentiating themselves along environmental dimensions and consequently underplay those efforts to avoid alienating customers who might object to such action because it is too environmental or inadequately environmental. *See* Kiley Price, *'Greenhushing' Is on the Rise as Companies Go Silent on Climate Pledges*, INSIDE CLIMATE NEWS (Mar. 17, 2024), https://insideclimatenews.org/news/17032024/todays-climate-greenhushing-companies-greenwashing/ ("On the other side of the aisle, right-wing politicians and thought leaders are speaking out against 'woke' eco-campaigns and business decisions made with climate change in mind . . . ."); Rob Fisher et al., *Greenwashing, Greenhushing and Greenwishing: Don't Fall Victim to These ESG Reporting Traps*, KPMG, https://kpmg.com/us/en/media/news/greenwashing-esg-traps-2023.html (last visited Nov. 17, 2025) ("*Greenhushing* refers to a company's refusal to publicize ESG information. The company may fear pushback from stakeholders who would find its sustainability efforts lacking or from investors who believe ESG undermines returns.").

79. *Under the Radar*, *supra* note 66, at 10553 n.51.

80. *Id.* at 10553 (describing calls to action from employees at Amazon, which led to a threatened strike and sweeping sustainability commitments to prevent it).

81. *See id.*; *see also* VANDENBERGH ET AL., *supra* note 12, at 86 (presenting the following fact in a hypothetical for discussion: "The production of the widgets requires a great deal of sophistication, so many of X Corp's employees are *recruited from top universities with strong computer science and data analytics programs*." (emphasis added)).

Employees may still influence SMEs' decision-making in other ways. Although no firm is truly a monolith, the word is a more accurate descriptor for a large corporation with disparate shareholders and a hierarchical leadership structure than a local manufacturing operation. The small, and potentially more intimately connected, group of employees in an SME may increase employee influence in the firm through employees' conveyance of social norms. This distinction suggests that SMEs are better suited to cultivating a culture of sustainability.[82] SMEs frequently cite their normative beliefs of what is right and wrong as a central motivation for becoming more sustainable.[83] Even in large firms, a centralized decision-making authority may aid responsiveness to norms; such seems to be the case with Patagonia—a private, family-owned corporation whose owners recently transferred all voting and common shares to a trust dedicated to combating climate change.[84] Something similar may take place in SMEs given their relatively small, less disparate pool of shareholders, making norms more salient among and between the firm's leadership and ownership.

Pressure from the financial system—through investors, lenders, and insurers—also plays an important role in motivating PEG; however, these effects appear to be concentrated in large firms.[85] SMEs' status as privately held may make norms more salient, but this characteristic constrains some opportunities for shareholder activism—through proxy fights, for example.[86] By contrast, activist investors consistently put pressure on large, publicly traded firms to adopt environmentally friendly business practices,[87] pressures that are likely amplified by the rise of ESG investing. Banks similarly

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82. *See* Fawcett & Hampton, *supra* note 45, at 4 ("Whereas the dominant narrative remains focused on business growth, productivity and employment, some researchers have observed a gradual increase in the degree to which climate change, energy conservation and environmental pollution have come to influence everyday practices in SMEs."); *Under the Radar*, *supra* note 66, at 10555 ("Such norm-shifting appears to be driven both by peer-to-peer influence among companies and within the culture of individual companies.").

83. *Small Businesses Concerned over Navigating Climate Actions*, *supra* note 15 ("[A]t 96%, SMEs overwhelmingly cited 'the right thing to do' as a key motivation for taking climate action.").

84. David Gelles, *Billionaire No More: Patagonia Founder Gives Away the Company*, N.Y. TIMES (Sept. 21, 2022), https://www.nytimes.com/2022/09/14/climate/patagonia-climate-philanthropy-chouinard.html (describing the Chouinard family's transfer of their 100% share of Patagonia's voting stock). Yvon Chouinard, the founder of Patagonia, was certainly an "environmental entrepreneur" by any measure. *See id.*; *Under the Radar*, *supra* note 66, at 10555 ("Some evidence indicates that 'environmental entrepreneurs' within companies, often driven by various motivations, can have a strong role in shaping sustainability decisions.").

85. *Under the Radar*, *supra* note 66, at 10553–54.

86. *See, e.g.*, Natalie Runyon, *New ESG Developments in 2024 Proxy Season Suggest Changes in Shareholder Engagements*, THOMSON REUTERS (Aug. 20, 2024), https://www.thomsonreuters.com/en-us/posts/esg/2024-proxy-season-engagement/ ("Climate change, corporate political influence, and artificial intelligence (AI) were among the top environmental, social & governance (ESG) issues showing up in shareholder proposals during the 2024 proxy season . . . .").

87. VANDENBERGH ET AL., *supra* note 12, at 79; *Under the Radar*, *supra* note 66, at 10553–54.

generate disparate PEG motives in large and small firms. Although large U.S. and global banks are heavily invested in the fossil fuel industry,[88] there is emerging evidence that these institutions are engaging in climate-conscious lending. They increasingly consider the physical and social risks of carbon-intensive investments and adopt standards, like the Equator Principles,[89] consistent with these considerations.[90] Conversely, community banks—central to small-business lending—rarely abide by the Equator Principles or other sustainable banking practices, likely because many of these community banks are SMEs themselves.[91] Pressures originating with insurers are likely to be felt by both large firms and SMEs more uniformly. While it appeared that insurers were content as passive observers of PEG's increasing prevalence as a catalyst for decarbonization efforts,[92] recent decisions by some insurers to leave markets and geographies exposed to significant environmental risk will likely have a noteworthy indirect effect on decarbonization efforts for firms large and small.[93]

Business-to-business pressures are another driver of PEG. Buyers can leverage their existing supply chain relationships or their purchasing power and procurement policies to mandate compliance with their sustainability practices.[94] This a practice that is becoming increasingly common: "A recent

88. *Under the Radar*, *supra* note 66, at 10554–55.

89. First adopted in 2003, "[t]he Equator Principles are a set of guidelines adopted by private lenders to ensure environmental and social risks, including climate change, are appropriately considered." *Id.* at 10554.

90. VANDENBERGH ET AL., *supra* note 12, at 16–17 (describing financial institutions' hesitancy to invest in oil and gas exploration in the Arctic National Wildlife Refuge); *see also infra* notes 168–171 and accompanying text (discussing different banks' involvement in supporting sustainable supply chain financing); *Under the Radar*, *supra* note 66, at 10554.

91. Eldar Beiseitov, *Small Banks, Big Impact: Community Banks and Their Role in Small Business Lending*, FED. RSRV. BANK ST. LOUIS (Oct. 20, 2023), https://www.stlouisfed.org/publications/regional-economist/2023/oct/small-banks-big-impact-community-banks-small-business-lending ("In 2022, 82% of small-business applicants were at least partially approved for loans from small banks. At larger banks, just 68% of small-business applicants received at least partial loan approval."); *Signatories & EPFI Reporting*, EQUATOR PRINCIPLES, https://equator-principles.com/signatories-epfis-reporting/ (last visited Nov. 17, 2025) (noting that only "130 financial institutions globally are Signatories to the Equator Principles"); *cf.* VANDENBERGH ET AL., *supra* note 12, at 173 ("All six major U.S. banks have announced climate commitments regarding their direct operational emissions.").

92. *Under the Radar*, *supra* note 66, at 10553.

93. *See* Elisabeth Buchwald, *Florida's Home Insurer of Last Resort Is in Serious Trouble. Will Milton Put it Over the Edge?*, CNN, https://www.cnn.com/2024/10/11/business/citizens-insurance-hurricane-milton/index.html (last updated Oct. 11, 2024); Cate Deventer & Shannone Martin, *Can Lawmakers Save the Collapsing Florida Insurance Market*, BANKRATE (Sept. 19, 2023), https://www.bankrate.com/insurance/homeowners-insurance/florida-homeowners-insurance-crisis/; Natalie Todoroff, *Limited Home Insurance Options in California as Major Carriers Pull Back*, BANKRATE (Aug. 12, 2024), https://www.bankrate.com/insurance/homeowners-insurance/carriers-exit-california-home-insurance/.

94. *Under the Radar*, *supra* note 66, at 10553.

study demonstrated that more than 80% of the largest firms in seven global sectors included environmental requirements in their supply chain contracting in 2020, up from roughly 50% in 2004."[95] Increased oversight of suppliers is understandable in light of the emerging empirical evidence that suggests moral culpability for environmentally harmful actions taken by a supplier is imputed onto the buyer by its customers.[96] Since SMEs are often suppliers to these large buyers and other PEG motivations have limited impact on SMEs, business-to-business pressure has emerged as a central motivator of PEG in SMEs.[97] Business-to-business pressures may manifest in large firms too when one firm with a competitive advantage in sustainability publicly calls on competitors to take greater climate action (likely at significant cost to those competitors), but this pressure is small compared to the supply chain pressures that SMEs experience.[98]

The public pressures, evolving norms, financial-system pressures, and business-to-business pressures described above all contribute to an economic case for PEG in large and small firms to varying degrees. Sustainability can independently create economic value for firms too. A 2014 study found firms with substantial sustainability policies in place outperformed competitors in both stock market and accounting performance over the long-term.[99] Similarly, research on carbon labeling suggests that the associated GHG emission assessments necessary for such labeling may help firms identify and address inefficiencies associated with their products.[100]

Some of the economic returns to sustainability efforts and PEG may be even greater in SMEs because of unique cost pressures that they face. For example, energy costs are a major concern for small businesses, bested only by healthcare costs and taxes.[101] Rightfully so, energy prices tend to fall with the size of the firm. The smallest SMEs, those with less than 100 employees,

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95. VANDENBERGH ET AL., *supra* note 12, at 178.

96. Vandenbergh, *supra* note 56.

97. *See* VANDENBERGH ET AL., *supra* note 12, at 178 ("These suppliers are often small companies that are not as often subject to NGO naming and shaming campaigns. Supply chain contracting initiatives are extending decarbonization pressure to these smaller companies and are an increasingly important component of the work of lawyers, managers, and advocates."); *Under the Radar*, *supra* note 66, at 10553 ("A company's supply chain largely consists of other private entities with whom it engages via contract. So, achieving a buyer company's supply chain target requires suppliers to address their own climate emissions.").

98. *See Under the Radar*, *supra* note 66, at 10552 & n.45.

99. Robert G. Eccles et al., *The Impact of Corporate Sustainability on Organizational Processes and Performance*, 60 MGMT. SCI. 2835, 2853 (2014); *Under the Radar*, *supra* note 66, at 10552.

100. Taufique et al., *Revisiting the Promise of Carbon Labeling*, 12 NATURE CLIMATE CHANGE 132, 136 (2022) ("One possible influence pathway involves making producers or intermediaries more aware of GHG-intensive inputs (that is, fossil fuel energy and fertilizers) that are being managed inefficiently. Thus, the mere assessment of GHG emissions from a product may draw attention to potential cost savings from reducing inefficiencies in product life cycles.").

101. TROMBLEY, *supra* note 7, at 6.

pay 7.5 cents per kilowatt-hour (kWh) for electricity on average compared to 5.6 cents per kWh for firms with over 500 employees. "On average, manufacturing facilities with fewer than 250 employees pay 30% more per kWh of electricity and 8% more per MMBtu of natural gas compared to larger facilities."[102] Tighter cashflow in SMEs exacerbates the consequences of energy insecurity and price volatility, which makes identifying inefficiencies even more valuable.[103]

C. Lingering Barriers to Decarbonizing Small Business

Notwithstanding the business-to-business pressures, social norms, public pressure, and economic benefits that incentivize decarbonization in SMEs, they face a series of barriers that prevent them from engaging in more pro-environmental behaviors. It is worth noting that many SMEs' difficulty reducing carbon emissions is not attributable to apathy about climate change. SMEs consistently report an interest in becoming more sustainable and describe an obligation to help reduce emissions to combat global climate change. Eight in ten SMEs consider emissions reductions a "high priority"—attempting to reduce energy consumption and waste, educate their employees, and upgrade inefficient equipment as a result.[104] Notwithstanding SMEs' interest in reducing their environmental impact and efforts to achieve this end, SMEs are less likely than their larger counterparts to engage in different sustainable practices. For example, 35% of SMEs report investing in energy efficiency compared to 60% of large firms.[105]

Various structural barriers explain the discrepancy between SMEs' stated preference for decarbonization and their actions supporting that end. First, SMEs frequently lack the technical expertise necessary to execute many sustainability projects.[106] This dearth of expertise is especially costly in some sectors—like manufacturing—where effective energy efficiency

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102. *Id.* "MMBtu" stands for million British thermal units (Btu). Btu are a measure of energy content distinct from volumetric measures of fuel, like cubic feet. The measure is useful when discussing natural gas because gas available at different locations may contain different amounts of energy per unit volume, so the energy-based unit aids comparability. An MMBtu is equivalent to roughly one thousand cubic feet (or 1 Mcf) of natural gas. *See Frequently Asked Questions: What Are Ccf, Mcf, Btu, and Therms? How Do I Convert Natural Gas Prices in Dollars per Ccf or Mcf to Dollars per Btu or Therm?*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/tools/faqs/faq.php?id=45&t=8 (last updated May 15, 2024); *How Natural Gas Is Measured*, TULSA GAS TECHS., https://www.tulsagastech.com/measure.html (last visited Nov. 26, 2025).

103. *Id.* at 7; *cf.* Taufique et al., *supra* note 100, at 136.

104. *Small Businesses Concerned over Navigating Climate Actions*, *supra* note 15 ("The most commonly-cited barrier to action is a lack of skills and knowledge, denoted by 63% of surveyed businesses . . . .").

105. RAES ET AL., *supra* note 3, at 12.

106. *Small Businesses Concerned over Navigating Climate Actions*, *supra* note 15.

upgrades require a detailed knowledge of how energy is principally consumed within that specific manufacturing subsector, or even that specific facility.[107] Even if the necessary technical expertise was theoretically available or learnable, many of the staff in SMEs lack the bandwidth to spearhead their firms' sustainability initiatives in addition to their other responsibilities.[108] Many SMEs also lack the excess revenues necessary to hire additional staff to lead sustainability efforts.[109] In fact, a lack of capital is the second most common barrier to climate action that SMEs cite, so even if a project were identifiable, the SMEs lack the financial resources to bring these projects to fruition.[110] The cumulative impact of SMEs' activities on the planet makes clear that SMEs must decarbonize if there is a realistic chance of hitting emission reduction targets. But it is also clear that SMEs cannot embark on that effort without support from external sources, whether they are governments, non-governmental organizations (NGOs), or larger and better-resourced firms.

D. Leveraging Supply Chain Connections

With the federal government plagued by gridlock, support for SMEs' decarbonization efforts will need to come from elsewhere. Business-to-business pressure is a significant driver of PEG in SMEs and offers a useful foundation for solutions to SMEs' technical and financial limitations to decarbonization. The supply chain contracts that define this pressure already link SMEs to large firms, but the supply chain is increasingly being used to couple buyers' and suppliers' emissions as well. Exploring this coupling and the emerging public and private law surrounding it helps illuminate the deep ties between large firms as buyers and SMEs as suppliers, which lays the groundwork for identifying potential cross-firm solutions to overcome barriers to decarbonization.

This Section first explores the regime governing the tracking of emissions across firms, both in-house emissions and those along a firm's supply chain. With a conceptual foundation laid, this Section then analyzes emission-disclosure regimes at varying stages of enactment, challenge, and repeal to highlight the complementary nature of public and private

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107. TROMBLEY, *supra* note 7, at 7–8.

108. *Small Businesses Concerned over Navigating Climate Actions*, *supra* note 15; Ashby Remley, *A Procurement Conundrum: Small Clean Energy Customers Encounter Roadblocks to Meeting Goals*, CLEAN ENERGY BUYERS ASS'N (Nov. 10, 2022), https://cebuyers.org/blog/a-procurement-conundrum-small-clean-energy-customers-encounter-roadblocks-to-meeting-goals/ ("SMBs with fewer staff have less time to devote to understanding the risks and benefits of potential procurement mechanisms.").

109. By contrast, large firms often have positions dedicated to sustainability.

110. *Small Businesses Concerned over Navigating Climate Actions*, *supra* note 15.

governance inherent in disclosure regimes. Finally, this Section explores the coupled climate destinies of SMEs and their larger counterparts, as well as the differentiated duties small and large firms owe each other to address their shared supply chain emissions.

1. Scoping Emissions

To better understand the sources of carbon emissions in the economy, the Greenhouse Gas Protocol (GHG Protocol) developed standards for tracking companies' emissions from different sources.[111] The GHG Protocol is an example of PEG; it is a widely adopted global standard developed by the World Resources Institute (a private global research organization) and the World Business Council for Sustainable Development (a consortium of sustainability-minded businesses).[112] Under the GHG Protocol, carbon emissions are broadly classified as Scope 1, Scope 2, or Scope 3. You cannot manage what you fail to measure,[113] and as such, the GHG Protocol's efforts to add structure to emissions reporting and standardize the practice represents a pivotal first step toward addressing corporate carbon emissions. While the two former categories capture emissions more directly within a firm's control, Scope 3 broadens the sphere of interest considerably by looking up and down a firm's value chain for further emissions.[114]

Scope 1 emissions are those emissions most directly attributable to the reporting firm—emissions produced in connection with property owned by the firm.[115] This typically includes emissions from company facilities and the company's vehicle fleet. Firms have slightly less control over their Scope 2 emissions, which are produced up their value chain. These are emissions associated with the electricity consumed by the firm and also includes heat or steam purchased for the firm's operations.[116] Scope 3 emissions seek to capture emissions associated with the reporting company's input goods and services as well as the use of the finished goods it produces.[117] As such,

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111. *About Us*, GREENHOUSE GAS PROTOCOL, https://ghgprotocol.org/about-us (last visited Nov. 17, 2025).

112. *Id.*; *see About Us*, WORLD RES. INST., https://www.wri.org/about (last visited Nov. 17, 2025); *Our History*, WBCSD, https://www.wbcsd.org/who-we-are/our-history/ (last visited Nov. 17, 2025).

113. WBCSD, WORLD RES. INST., FAQ: GREENHOUSE GAS PROTOCOL 2 (2022) [hereinafter GHG PROTOCOL FAQ]; VANDENBERGH ET AL., *supra* note 12, at 68.

114. *What Are Scope 3 Emissions (And Why Should I Care?)*, ZEIGO (Jan. 17, 2024), https://www.zeigo.com/2024/01/17/why-scope-3-emissions-matter-smes/.

115. GHG PROTOCOL FAQ, *supra* note 113, at 1.

116. *Id.*

117. *What Are Scope 3 Emissions and Why Do They Matter?*, CARBON TRUST, https://www.carbontrust.com/our-work-and-impact/guides-reports-and-tools/what-are-scope-3-emissions-and-why-do-they-matter (last visited Nov. 17, 2025); *Scope 1 and Scope 2 Inventory*

Scope 3 emissions capture emissions both up the value chain and down the value chain.

When the three categories are fleshed out in this way, it becomes clear that methods to combat one type of emissions would be ineffective at reducing emissions in other categories.[118] For example, installing energy efficient LED lighting in an oil major's corporate offices (Scope 1) will do nothing to address the much larger impact of end-users' combustion of gasoline (Scope 3). By contrast, research and development investments to increase the energy density of gasoline might reduce end-user emissions (Scope 3), even if it does nothing to reduce emissions from the oil-fueled boiler heating the research laboratory (Scope 2).

2. Scope 3 Disclosures

Reducing Scope 3 emissions has proven challenging in recent years. While the GHG Protocol includes disclosure guidelines for Scope 3 emissions, many of the firms that have adopted the GHG Protocol's accounting standards still do not report these emissions, instead focusing their efforts on Scope 1 and 2 emissions.[119] The lack of Scope 3 tracking and reporting is especially troubling given the relative size of the emissions across the three scope categories. An initial assessment by KraftFoods, for example, found that Scope 3 emissions comprised over 90% of the company's total emissions.[120] Other studies suggest that Scope 3 emissions account for 80% of the emissions from the typical consumer-goods company, an estimate applicable to companies in many sectors.[121]

The difficulty inducing Scope 3 tracking and reporting persists despite the numerous benefits of understanding these emissions: identifying risks and emission-reduction opportunities, enhancing engagement with supply

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Guidance, U.S. ENV'T PROTECTION AGENCY, https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance (last updated Apr. 23, 2025).

118. *See generally* GHG PROTOCOL FAQ, *supra* note 113.

119. *Id.* at 1.

120. *Id.*; *see* Kawal Preet, *Greening the Supply Chain to Beat Climate Change*, FORBES (Nov. 22, 2021), https://www.forbes.com/sites/fedex-express/2021/11/22/greening-the-supply-chain-to-beat-climate-change/.

121. Bové & Swartz, *supra* note 12, at 3 ("The typical consumer company's supply chain creates far greater social and environmental costs than its own operations, accounting for more than 80 percent of greenhouse-gas emissions and more than 90 percent of the impact on air, land, water, biodiversity, and geological resources. Consumer companies can thus reduce those costs significantly by focusing on their supply chains."); VANDENBERGH ET AL., *supra* note 12, at 178 ("Large companies are the targets of many persuasion campaigns and have the resources to participate in PEG initiatives, but 80% or more of the GHG emissions in many sectors arise from the value chain—the suppliers to these companies."); *What Are Scope 3 Emissions (And Why Should I Care?)*, *supra* note 114 ("Scope 3 emissions—the emissions that are represented up and downstream their supply chain—account for up to 75 percent of large companies' GHG emissions.").

chain partners, and reputational benefits associated with public disclosures.[122] Companies often cite the difficulty accurately measuring Scope 3 emissions as their basis for limiting their assessment to Scope 1 and 2. But the hesitation is expected for a more practical reason: polluting firms do not want to publicly out themselves as polluters. As minimally intrusive as disclosures may be, empirical research demonstrates the surprisingly large effects disclosure alone can have on behaviors subject to disclosure.[123] Even if voluntary disclosures are limited, Scope 3 disclosure requirements are one type of regulation where public and private governance work in concert—as is typical with public disclosure requirements.[124] The fate of existing emission disclosure requirements, however, remains uncertain.

When the Securities and Exchange Commission (SEC) first proposed a disclosure rule related to climate-related risks, it included disclosure requirements for Scope 1, 2, and 3 emissions. When the SEC promulgated the final rule in March 2024, it not only rolled back the Scope 1 and 2 emissions disclosure requirements but removed Scope 3 requirements altogether.[125] Notwithstanding the concessions, the watered-down rule's days appear numbered. Shortly after publishing the final rule, the SEC voluntarily stayed its implementation while litigation in the United States Court of Appeals for the Eighth Circuit is pending.[126] The rule is expected to face

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122. *What Are Scope 3 Emissions and Why Do They Matter?*, *supra* note 117. The tracking might also illuminate inefficiencies that the reporting firm could address, leading to potential cost savings. *See* Taufique et al., *supra* note 100, at 136. It is worth reraising the developing evidence of customer's attribution of culpability to downstream buyer firms for the actions of their upstream suppliers, strengthening the business case for this environmental link independent of the regulatory requirements associated with disclosure. *See* VANDENBERGH ET AL., *supra* note 12, at 179 (identifying this phenomenon experimentally).

123. Shameek Konar & Mark A. Cohen, *Information as Regulation: The Effect of Community Right to Know Laws on Toxic Emissions*, 32 J. ENV'T ECON. & MGMT. 109, 123 (1997); Stack & Vandenbergh, *supra* note 34, at 1432.

124. The Toxics Release Inventory (TRI) is one example where public governance's disclosure requirements aid private governance. The TRI requires entities that release sufficient quantities of specified toxic chemicals into the environment to report the releases publicly each year. In the public law context, the TRI is a regulatory tool leveraging the power of persuasion. VANDENBERGH ET AL., *supra* note 12, at 55–56. Private actors can then amplify disclosures' persuasive effect, like through a naming-and-shaming campaign (i.e., attacking a firm's reputation by spotlighting actions it has taken that harm the environment). *See id.* at 217–19. Public governance requires disclosure, and private governance gives disclosure teeth.

125. Lamar Johnson, *SEC Drops Scope 3 from Final Climate Rule, Takes Phased Approach to Scope 1 and 2 Reporting*, ESG DIVE (Mar. 6, 2024), https://www.esgdive.com/news/sec-final-climate-rule-scope-3-out-phased-approach-scope-1-scope-2/709420/; SEC. & EXCH. COMM'N, FACT SHEET: THE ENHANCEMENT AND STANDARDIZATION OF CLIMATE-RELATED DISCLOSURES: FINAL RULES; *see* The Enhancement and Standardization of Climate-Related Disclosures for Investors, 89 Fed. Reg. 21668 (Mar. 28, 2024).

126. In the Matter of the Enhancement and Standardization of Climate-Related Disclosures for Investors, Securities Act Release No. 11280, Exchange Act Release No. 99908, 89 Fed. Reg. 25804 (Apr. 4, 2024).

significant legal hurdles following the Supreme Court's decisions in *Loper Bright Enterprises v. Raimondo*,[127] which overturned the *Chevron* doctrine while the Eighth Circuit litigation was ongoing, and *West Virginia v. EPA*,[128] which formally introduced the major questions doctrine only a few years earlier.[129]

Setting aside these very real legal obstacles, it is unclear whether (or at least when) a merits ruling will come. With the Trump Administration set to assume power in January 2025 and restore Republican control of the SEC, it was assumed that the disclosure rule would be quickly repealed.[130] Through at least November 2025, however, the Trump-era SEC has yet to repeal or modify the rule. In July 2025, the SEC asked the Eighth Circuit to decide the case on the merits despite the Commission's inaction, having previously notified the court that it intended to withdraw its defense of the rule.[131] Nonetheless, the court rejected the invitation, ordering the proceedings "be held in abeyance . . . until such time as the Securities and Exchange Commission reconsiders the challenged Final Rules by notice-and-comment rulemaking or renews its defense of the Final Rules."[132] Ultimately, "[i]t is the agency's responsibility to determine whether its Final Rules will be rescinded, repealed, modified, or defended in litigation."[133] Even with the SEC disclosure rule's future uncertain, the combination of private governance-driven disclosures facilitated through NGOs and public requirements imposed by international and subnational governments may fill much of the gap.[134]

California is the state best positioned to fill the climate risk disclosure

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127. 144 S. Ct. 2244 (2024).

128. 142 S. Ct. 2587 (2022).

129. David A. Bell et al., *SEC Files Brief in Support of Climate Disclosure Rules*, HARV. L. SCH. FORUM ON CORP. GOV. (Sept. 1, 2024), https://corpgov.law.harvard.edu/2024/09/01/sec-files-brief-in-support-of-climate-disclosure-rules/.

130. Avery Ellfeldt, *SEC Climate Rule Unlikely to Survive a Trump Victory*, E&E NEWS: CLIMATE WIRE (Oct. 31, 2024), https://www.eenews.net/articles/sec-climate-rule-unlikely-to-survive-a-trump-victory/; Zoya Mirza, *The ESG, Climate Rules at Stake Under a Second Trump Term*, ESG DIVE (Nov. 7, 2024), https://www.esgdive.com/news/the-esg-climate-rules-at-stake-under-a-second-trump-presidency/732294/; Jesse Pound, *SEC Chair Gary Gensler Will Step Down Jan. 20, Make Way for Trump Replacement*, NBC (Nov. 21, 2024), https://www.cnbc.com/2024/11/21/sec-chair-gensler-will-step-down-jan-20-making-way-for-trump-replacement.html.

131. Sara Dewey & Sarah Hart-Curran, *Eighth Circuit Says SEC Must Defend or Revise Climate Risk Disclosure Rule*, HARV. L. SCH.: ENERGY & ENV'T L. PROG. (Oct. 8, 2025), https://eelp.law.harvard.edu/eighth-curcuit-says-sec-must-defend-or-revise-climate-risk-disclosure-rule/.

132. Iowa v. SEC, No. 24-1522 (8th Cir. Sept. 12, 2025) (order denying request to lift abeyance pending further agency action).

133. *Id.*

134. *See* Michael P. Vandenbergh, *Disclosure of Private Climate Transition Risks*, 63 WM. & MARY L. REV. 1695, 1744, 1750–57 (2022).

regulatory void left by the SEC and the second Trump Administration.[135] California's Climate Corporate Data Accountability Act, enacted in 2023, requires Scope 1, 2, and 3 disclosures for any large firm (i.e., those with annual revenues greater than $1 billion) that "does business in California."[136] Businesses must report Scope 1 and 2 emissions beginning in 2026, followed by additional Scope 3 emissions disclosures in 2027.[137] Not only would this disclosure law fill some of the void left by a SEC disclosure rule rollback of for firms that do business in California, but the law would also extend beyond the outer edges of the SEC's final rule since it covers Scope 3 emissions.

The California law can only have an impact if it survives challenges levied in federal court. Although the California Air Resources Board, the state agency charged with enforcing the state disclosure law, succeeded in defending the state law through the summary judgment phase of its litigation against the U.S. Chamber of Commerce and other business firms, the state law's future remains uncertain.[138] Although the Ninth Circuit denied a motion to enjoin enforcement of the law in November 2025 while the Chamber of Commerce's suit is pending,[139] ExxonMobil initiated a new lawsuit challenging the law in October 2025.[140]

Private governance offers firms the opportunity to leverage their resources and influence to complement or fill gaps left by public governance. Here too with Scope 3 disclosures, PEG could fill a void left by the SEC's retreat from Scope 3 and the potential nullification of California's disclosure law. The most apparent example of PEG in this space is the CDP, established in 2000 as the Carbon Disclosure Project and long predating the SEC or

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135. California is far from the only government filling the disclosure gap; New York, Illinois, New Jersey, Washington state, and thirty-five countries are "developing, refining, or implementing climate disclosure requirements for large companies that operate in their" jurisdictions. Bill Ainsworth, *The SEC Eliminated Climate Rules. Other Governments Are Doing the Opposite*, HARV. BUS. SCH.: INST. BUS. GLOBAL SOCIETY (July 1, 2025), https://www.hbs.edu/bigs/federal-climate-rules.

136. Raquel Fox et al., *State of Play: California Amends Climate Disclosure Rules*, SKADDEN (Oct. 28, 2024), https://www.skadden.com/insights/publications/2024/10/state-of-play-california-amends-climate-disclosure-rules; Brian V. Breheny et al., *California Poised to Adopt Sweeping Climate Disclosure Rules*, SKADDEN (Sept. 26, 2023), https://www.skadden.com/insights/publications/2023/09/california-poised-to-adopt-sweeping-climate-disclosure-rules; *see* CAL. HEALTH & SAFETY CODE § 38532 (West 2025).

137. Fox et al., *supra* note 136.

138. Zoya Mirza, *California's Climate Disclosure Laws Survive First Legal Challenge*, ESG DIVE (Nov. 12, 2024), https://www.esgdive.com/news/california-climate-disclosure-laws-survive-first-legal-challenge/732698/.

139. Zoya Mirza, *ExxonMobil Sues California over Climate Disclosure Laws, Alleging Free Speech Violations*, ESG DIVE (Oct. 31, 2025), https://www.esgdive.com/news/exxonmobil-sues-california-over-climate-laws-alleging-free-speech-violations-sb-253-261/804425/.

140. Zoya Mirza, *Federal Appeals Court Halts Implementation of California's Climate Disclosure Law*, UTILITY DIVE (Nov. 19, 2025), https://www.utilitydive.com/news/ninth-circuit-court-halts-implementation-of-california-climate-law-sb-261/805885/.

California policies discussed.[141] CDP is a non-profit NGO that operates a global emissions disclosure system for use by public and private entities. Thousands of companies report their emissions through CDP annually, and a growing number of buyers require their suppliers to report emissions to the buyers through CDP.[142] Even with an absence of coercive government pressure to track Scope 3 emissions, firms are utilizing CDP to do just that. This suggests a PEG motivator among large buyers may lead to disclosures for their smaller suppliers, even in the absence of public reporting mandates.

3. Common but Differentiated Responsibilities

Climate-risk disclosure laws only raise the stakes for private firms if public disclosure of their emissions increases public condemnation arising from the firm's emissions. But compelling firms to calculate their emissions, especially their Scope 3 emissions, creates non-reputational benefits as well. As the carbon-labeling literature has found, tracking emissions makes the climate risks and opportunities facing the company more salient, uncovering inefficiencies that might otherwise go unnoticed.[143] When assessing Scope 3 emissions, the firm and SMEs within the firm's supply chain may realize this same benefit. Again, the adage rings true, you cannot manage what you fail to measure.

Some skeptics of scoping highlight the fact that Scope 3 disclosures become redundant for firms up a reporting company's supply chain if the upstream firms report these emissions as their own Scope 1 or 2 emissions. This is less a bug than a feature of the GHG Protocol because scoping attributes emissions to firms that have the power to change them—even if that means emissions should not be summed across firms because of this double counting.[144] Overlapping emissions across scopes are less an indictment of emissions reporting than they are a lesson in properly interpretating the data that reporting generates.

The revenue threshold for reporting in the California disclosure law further illuminates the role tracking Scope 3 emissions serves. The California

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141. *About Us*, CDP, https://www.cdp.net/en/info/about-us (last visited Nov. 17, 2025) [hereinafter *CDP: About Us*].

142. *Id.* (highlighting that "$6.4 [trillion] of combined purchasing power among 270+ major buyers . . . asked their suppliers to disclose through CDP in 2025.").

143. Taufique et al., *supra* note 100; *CDP: About Us*, *supra* note 141 (highlighting the ability to "identify emerging environmental risks and opportunities that would otherwise be overlooked [and] to inform data-driven strategy" as benefits of carbon emissions reporting and disclosure).

144. GREENHOUSE GAS PROTOCOL, SCOPE 3 FREQUENTLY ASKED QUESTIONS 20–21 (2022) ("This type of double counting is an inherent part of Scope 3 accounting. Each entity in the value chain has some degree of influence over emissions and reductions. Scope 3 accounting facilitates the simultaneous action of multiple entities to reduce emissions throughout society.").

threshold means that in the absence of supply chain or other pressures, many small firms will not need to measure or disclose their emissions and expend scarce administrative resources in the process. Given these firms' significant emissions, is this a major gap in the disclosure requirements?[145] No, large buyers' Scope 3 emissions include SMEs' emissions. The larger buyers are better equipped technically and financially to undertake such reporting burdens. The GHG Protocol assumes both firms would be tracking and reporting emissions, notwithstanding double counting, because it "facilitates the simultaneous action of multiple entities to reduce emissions throughout society."[146] By contrast, the California law explicitly assigns to the large firm the responsibility for reporting emissions and, therefore, implicitly assigns the large firm the central role in tracking and (presumably) reducing those emissions.[147]

The relationship between SMEs with their tight operating margins, minimal sustainability expertise, and limited access to capital and large firms with their relatively deeper resource pools is reflective of other climate change mitigation relationships. The 1992 United Nations Framework Convention on Climate Change, for example, discusses the "common but differentiated responsibilities" of the world's many countries.[148] Even Pope Francis, in his 2015 encyclical Laudato Si', notes that "[w]e must continue to be aware that, regarding climate change, there are differentiated responsibilities" of rich and poor countries.[149] The world's nations may all

145. *See supra* Part I.A.

146. GREENHOUSE GAS PROTOCOL, *supra* note 144, at 21.

147. The same analysis is explicit in the Science Based Target initiative's approach to Scope 3 reporting. Under that initiative, SMEs track Scope 3 emissions but do not set Scope 3 goals. "Don't let that guidance fool you though. SMEs are critical to decarbonization efforts. Think about it—while SMEs are not required to set Scope 3 goals, larger enterprises are. And guess who's partially responsible for large enterprise's Scope 3, indirect carbon emissions? You guessed it—their SME vendors downstream." *What Are Scope 3 Emissions (And Why Should I Care?)*, *supra* note 114.

148. *See, e.g.*, Dipa Patel, *'Common But Differentiated Responsibilities': A Beacon of Realism*, LSE (July 29, 2020), https://blogs.lse.ac.uk/internationaldevelopment/2020/07/29/common-but-differentiated-responsibilities-a-beacon-of-realism/ ("The principle enshrined in Article 3(1) of the 1992 UNFCCC stipulates one of the foundational rules of international environmental law – that of 'common but differentiated responsibilities and respective capabilities.'").

149. *Encyclical Letter Laudato Si' of the Holy Father Francis on Care for Our Common Home*, VATICAN, https://www.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html (last visited Nov. 17, 2025) ("The poorest areas and countries are less capable of adopting new models for reducing environmental impact because they lack the wherewithal to develop the necessary processes and to cover their costs. We must continue to be aware that, regarding climate change, there are *differentiated responsibilities*."); *see* Stephanie Kirchgaessner, *Pope's Climate Change Encyclical Tells Rich Nations: Pay Your Debt to the Poor*, GUARDIAN (June 18, 2015), https://www.theguardian.com/world/2015/jun/18/popes-climate-change-encyclical-calls-on-rich-nations-to-pay-social-debt ("Pope Francis has called on the world's rich nations to begin paying their 'grave social debt' to the poor and take concrete steps on climate change, saying failure to do so presents an undeniable risk to a 'common home' that is beginning to resemble a 'pile of filth.'").

have a common goal, but each country's circumstances dictates their individual responses. So too in the corporate context, it is important to reflect on what differentiated responsibilities are appropriate: What duties do the large firms owe SMEs?

The supply chain is an obvious tie between SMEs and large firms, as evidenced by the recent push to require Scope 3 disclosures and some firm-level requirements that their suppliers track emissions.[150] Emission reporting requirements do not formally link large buyers and smaller suppliers in a legal sense, but they do highlight the environmental ties between SMEs and large firms through their pre-existing contractual relationships. The supply chain linkage, both contractual and environmental, forms a valuable relationship through which SMEs can forge deeper links with larger buyers through shared decarbonization goals, efforts, opportunities, and resources.

II. FINANCING DECARBONIZATION IN THE FIRM

With a heightened appreciation for the bonds formed through the supply chain, large firms are increasingly seeking out opportunities to support decarbonization in the small- and medium-enterprises (SMEs) that supply them. This Part explores two such financing vehicles: The first has strong ties to the supply chain and a strong focus on SMEs but uncertain environmental impact. The second principally focuses on improving environmental performance, but SMEs' uptake has been low and would require looking beyond existing supply chain relationships to reach them. Although neither instrument will eliminate SMEs' contributions to the climate crisis, both can yield substantial emissions reductions from a source category that is otherwise difficult to reach. Examining the instruments' structure and identifying their strengths and weaknesses will highlight additional opportunities for expanding their use and developing new instruments to achieve additional decarbonization in SMEs.

A. Sustainable Supply Chain Financing

Leaning heavily into the supply chain relationship, sustainable supply chain financing (SSCF) offers suppliers access to low-cost trade financing if they satisfy select sustainability metrics. The programs are frequently targeted at SMEs, who often supply the large buyers that establish SSCF programs, but these initiatives have had limited uptake and impacts to date. Growing awareness of this relatively simple financing tool, however, suggests SSCF may become much more widespread in the future. This

150. *See CDP: About Us*, *supra* note 141.

Section begins with a discussion of the mechanics of supply chain financing (SCF) generally and SSCF specifically, then provides an assessment of the benefits and limits of SSCF programs, and concludes with suggestions about how to amplify SSCF's reach and impact.

1. Mechanics

SCF is a funding mechanism that rose to prominence during the 2008 global financial crisis.[151] The 2008 recession brought to light the cash-flow issues that suppliers face when trying to collect on accounts receivable and that buyers face when waiting to discharge accounts payable.[152] This issue arises because of conflicting cash-flow priorities of suppliers and buyers. When a supplier receives an order and later delivers the goods or services associated with it, the supplier wants to be paid as quickly as possible. By contrast, after a buyer places an order, even after receiving the goods, the buyer wants to delay payment for as long as the supplier can bear.[153] Parties view this tug of war as a zero-sum game where both parties try to extract rents from the other party using what amounts to short-term loans.[154]

When set up correctly, SCF overcomes this tension, creating a win-win scenario for suppliers and buyers by improving the management of working capital and increasing liquidity along the supply chain. Most trade today is conducted on an open-account basis, to the benefit of buyers and the detriment of suppliers.[155] In essence, a buyer will receive goods or services and an invoice indicating when payment is due, normally 30 to 90 days after receipt.[156] While creating value for the buyer, the arrangement ties up capital that the supplier could otherwise use to grow its business and shifts to the supplier all the financial risk associated with the transaction.[157] Competition among suppliers, particularly international suppliers, creates pressure for the

151. Natasha Condon, *Incorporating ESG into Supply Chain Finance*, J.P.MORGAN, https://www.jpmorgan.com/insights/payments/trade-and-working-capital/incorporating-esg-into-supply-chain-finance (last visited Nov. 17, 2025).

152. *Id.*

153. *See* Bancilhon et al., *supra* note 16, at 9.

154. David Noah, *Methods of Payment in International Trade: Open Account*, SHIPPING SOLUTIONS (Nov. 10, 2025), https://shippingsolutionssoftware.com/blog/methods-of-payment-in-international-trade-open-account ("For exporters, any sale is a gift until payment is received.").

155. *See id.* at 14.

156. Bancilhon et al., *supra* note 16, at 9; *see id.* at 8 n.6.

157. *Id.* at 8–9; *see* Noah, *supra* note 154. These risks can be multifaceted, including economic and commercial risk but also political and cultural risk in international trade arrangements. *Id.*

suppliers to agree to these buyer-friendly terms.[158]

Given the asymmetric risk exposure of open-account trade, some have described SCF as a "tool for benefiting the small[] supplier."[159] The practice leverages the buyer's high credit rating to induce a financial intermediary to provide more timely payment to the supplier in exchange for an entitlement to the eventual payment from the buyer.[160] In practice, a buyer will coordinate with a financial services provider (FSP) to create a SCF facility that suppliers may utilize when they choose. If the supplier chooses to participate, after delivering the goods or providing the services contracted for with the buyer, the supplier receives payment from the FSP immediately, less a fee; in exchange, the financer receives the right to collect the buyer's payment when it comes due.[161]

Environmentally conscious firms are now using SCF to encourage sustainability from their suppliers too. SSCF operates in the same way traditional SCF arrangements do, but when buyers coordinate with financial intermediaries to initiate the programs,[162] the buyers establish different sustainability metrics that trigger access to the SCF program or to preferential financing terms within the program. For example, as a part of Project Gigaton,[163] Walmart established a SSCF program with the bank HSBC. Under Walmart's SSCF program, suppliers have access to preferential SCF terms if they set science-based emission reductions targets validated by the

158. *See* Noah, *supra* note 154 ("Because of intense competition in export markets, importers often press exporters for open account terms . . . . Therefore, exporters who are reluctant to extend credit may lose sales to their competitors.").

159. Condon, *supra* note 151.

160. A more detailed discussion of SCF's benefits follows in Part II.A.2.

161. Bancilhon et al., *supra* note 16, at 9. In other words, suppliers can sell a portion of their accounts receivable to an FSP for some fraction of the face value of the account to receive immediate payment for sales. *Id.* Other products and arrangements are available for discharging the risk associated with open account trade in addition to SCF, including export working capital financing (which can sometimes be government guaranteed), insurance, standby letters of credit, forward contracts (for trade in different currencies), and factoring. *See* Noah, *supra* note 154. Factoring is very similar to SCF but distinct both in that the buyer is less central to initiating a factoring relationship with an FSP and the relative risk that suppliers can discharge with these arrangements. *See Supply Chain Finance vs. Factoring: What's The Difference?*, LIQUIDITAS (Mar. 24, 2023), https://liquiditas.com/supply-chain-finance-vs-factoring-whats-the-difference/. For a more detailed discussion of the differences between factoring and SCF, see *infra* note 176 and the accompanying text.

162. Here again, the buyer's central role in SCF differentiates risk-hedging techniques available to SMEs since such buyer leverage would not be available in a factoring arrangement, for example, since the buyer plays no coordination role in factoring arrangements. *Supply Chain Finance vs. Factoring: What's The Difference?*, *supra* note 161.

163. *See Walmart Suppliers Lead the Charge, Help Deliver Project Gigaton Goal More Than Six Years Early*, WALMART (Feb. 21, 2024), https://corporate.walmart.com/news/2024/02/21/walmart-suppliers-lead-the-charge-help-deliver-project-gigaton-goal-more-than-six-years-early ("In 2017, Walmart announced a bold ambition to work with our suppliers to reduce, avoid or sequester 1 gigaton—that's 1 billion metric tons—of greenhouse gas emissions in product value chains by 2030. We called it Project Gigaton.").

Science Based Targets Initiative or if the suppliers achieve threshold sustainability scores based on Carbon Disclosure Project (CDP) metrics.[164]

Walmart's program specifically had SMEs in mind, coming in response to an HSBC and Boston Consulting Group study that found "small- and medium-sized businesses don't have the in-house climate expertise" of large firms and also "have limited access to capital to drive and fund climate transformation."[165] The study identifies a "need for a 'leadership crucible,' where large corporates can provide liquidity and share knowledge and resources with smaller businesses," that Walmart designed their SSCF program to help satisfy.[166]

Other firms offer programs like Walmart's, some of which predate Walmart's December 2021 rollout of their SSCF program. In February 2021, for example, Levi Strauss & Co. introduced an analogous program, also in collaboration with HSBC, with preferential financing tied to suppliers' adherence to Levi's Supplier Code of Conduct.[167] Levi's was no stranger to SCF, however, having established a program with the International Finance Corporation (IFC) in 2014.[168] PHV Corp., another textile retailer that owns brands Tommy Hilfiger and Calvin Klein, established a SSCF program with HSBC, DBS (a Singaporean multinational bank), and Standard Charter Bank in June 2022. Improved financing terms under the PHV program are based on improving workplace health, safety conditions, and other labor practices, highlighting SCF's ability to target other social and governance goals.[169] More recently, banks without connections to specific buyers have also announced efforts to establish SSCF programs with a focus on reaching SMEs in developing nations, including Taulia and Citi Bank's respective collaborations with the IFC announced in February 2024 and August 2024.[170]

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164. *Walmart Creates Industry First by Introducing Science-Based Targets for Supply Chain Finance Program*, WALMART: NEWS (Dec. 8, 2021) [hereinafter *Walmart Creates SCF Program*], https://corporate.walmart.com/news/2021/12/08/walmart-creates-industry-first-by-introducing-science-based-targets-for-supply-chain-finance-program.

165. *Id.*

166. *Id.*; *Seven Steps to Tackle a USD50 Trillion Challenge*, HSBC (Oct. 27, 2021), https://web.archive.org/web/20250729135816/https://www.hsbc.com/news-and-views/views/hsbc-views/seven-steps-to-tackle-a-usd50-trillion-challenge.

167. *Financing Supplier Sustainability with HSBC*, LEVI STRAUSS & CO. (Oct. 3, 2022), https://www.levistrauss.com/2022/10/03/financing-supplier-sustainability-with-hsbc/.

168. *Shared Prosperity: IFC and LS&Co. Team Up to Reward Suppliers for Doing the Right Thing*, LEVI STRAUSS & CO. (Nov. 5, 2014), https://www.levistrauss.com/2014/11/05/shared-prosperity-ifc-and-levis-team-up-to-reward-suppliers-for-doing-the-right-thing/.

169. Scot Case, *Retailers Fund the Future with Sustainable Supply Chain Finance Solutions*, NAT'L RETAIL FED. (July 10, 2023), https://nrf.com/blog/retailers-fund-future-sustainable-supply-chain-finance-solutions.

170. *Taulia and IFC Collaborate to Help Build Sustainable Supply Chain Finance Programs*, SAP TAULIA (Feb. 15, 2024), https://taulia.com/company/news/press-releases/taulia-and-ifc-collaborate-to-help-build-sustainable-supply-chain-finance-programs/.

2. Benefits

When businesses employ SCF in the proper setting, it creates a win-win-win scenario for all three entities involved, creating value for suppliers at no cost to buyers.[171] The buyer ensures that its critical suppliers have stability and the cash flow necessary to grow, at no cost to the buyer. The supplier gets increased cash flow, which improves liquidity[172]—a benefit that buyers also reap by maintaining access to open account trade. The FSP, for its part, receives a low-risk vehicle for making productive use of its capital.[173] The buyer typically has a low-risk profile due to its relative financial stability, and the buyer is the ultimate source of risk in SCF because this firm owes eventual payment to the FSP for goods or services the supplier previously provided.[174] As such, the smaller supplier has access to capital at a lower cost than if its own credit rating were implicated, while fully transferring the risk associated with the sale to the FSP.[175] This complete risk shifting primarily differentiates factoring from SCF, which is sometimes called "reverse factoring" because of the buyer's role in securing the financing.[176]

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171. Of course, the "proper setting" is one in which the transaction costs of the SCF program are offset by the benefits described in this Section. Most problematic here, the proper setting is not always inclusive of SMEs, as discussed further in Part II.A.3 below. *See also* Bancilhon et al., *supra* note 16, at 10.

172. A related benefit is that this cheaper capital is also *flexible*. Participation in SCF programs is not mandatory, and even for suppliers that choose to participate occasionally, they need not discount their receivables through SCF all the time—for example, if they have no immediate need for liquidity. Bancilhon et.al., *supra* note 16, at 10.

173. *Id.* at 10, 12 ("We estimate that in time the sustainable supply finance market will reach one third of the market, hence US$660 billion, representing a US$6 billion opportunity in sustainable supply chain revenue for financial service providers.").

174. *Id.* at 10; *Supply Chain Finance vs. Factoring: What's The Difference?*, *supra* note 161.

175. Bancilhon et al., *supra* note 16, at 10, 14 ("Micro, small, and medium-sized enterprises (MSMEs) face more difficulty accessing trade finance than large firms, with banks reporting that 74 percent of rejections [for trade finance transactions] come from MSMEs and mid-cap firms."). Small is used in a relative sense here. Since the buyer firm arranges SCF—in contrast to a factoring arrangement, for example—the suppliers taking advantage of the financing tend to be smaller than the buyers by comparison. *See Supply Chain Finance vs. Factoring: What's the Difference?*, *supra* note 161 ("This method is more cost-effective for the supplier as the lender takes on the risk associated with the larger company instead of the smaller supplier.").

176. *Supply Chain Finance vs. Factoring: What's the Difference?*, *supra* note 161. With factoring, the supplier retains some of the risk associated with nonpayment by the buyer. Factoring arrangements involve a buyer and an FSP (called a "factor"), with the factor immediately providing some fraction of the face value of the account receivable when the seller delivers goods or provides a service in exchange for title to the account receivable for that buyer. If the buyer later satisfies their obligations and pays the factor, the remaining fraction of payment that the factor withheld from the supplier is paid to it, less previously agreed upon fees. SCF differs in that a third party is involved, the buyer, which arranges the financing on behalf of the supplier rather than the supplier seeking financing on their own. Further, instead of providing a fraction of the account receivable upon delivery, the FSP in a SCF arrangement provides the full value of the account receivable—but still less previously agreed upon fees. *Id.* SCF may

SSCF may also produce non-pecuniary benefits for the firms involved. SSCF, and to some extent SCF, strengthens the relationships between suppliers and buyers while also aligning their goals.[177] As a buyer begins considering the creation of a SSCF program, the buyer invests significant resources connecting with suppliers. This ensures that suppliers are open to utilizing the program and helps the buyer understand how to structure the program to serve the suppliers' needs.[178] As a result, buyers that coordinate SSCF programs often cite these improved connections with their suppliers as a—if not the—primary benefit of initiating the programs.[179] Improved buyer-supplier relationships alongside the financial incentives at the center of SCF also help increase compliance with the buyers' supplier codes of conduct, especially when that compliance metric is tied to the financing terms.[180]

Perhaps most importantly, SSCF offers buyers a means of bringing their suppliers into their broader decarbonization and sustainability initiatives. By improving cash flow and liquidity for suppliers, SCF has the co-benefit of enabling suppliers to use that capital for sustainability investments. Similarly, by tying financing access or terms to sustainability metrics or other ESG goals of the buyer firms, SSCF incentivizes suppliers to act in accordance with those goals and reduce the environmental impact of their activities.[181] Consequently, SSCF has the potential to decrease suppliers' Scope 1 and 2 emissions, but as partners in the buyers' value chains, these reductions also reduce the buyers' Scope 3 emissions.[182] Endeavoring to decarbonize in this way provides positive press for suppliers and buyers as well as the financial intermediaries coordinating the programs,[183] strengthening these firms' social licenses to operate.[184] Collectively, SSCF appears to present a win-win-win-win scenario where suppliers, buyers, FSPs, and the planet all stand to benefit.[185]

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prove more advantageous than factoring where suppliers lack expertise acquiring their own financing or the supplier desires a risk-free means of increasing liquidity.

177. SUSTAINABLE SUPPLY CHAIN FINANCE, *supra* note 17, at 11.

178. *Id.*

179. *Id.* at 7, 8, 11 ("Buyers who participated in the [SSCF] survey cited stronger relationships with suppliers as the primary benefit.").

180. *See id.* at 11; *Financing Supplier Sustainability with HSBC*, *supra* note 167.

181. Bancilhon et. al., *supra* note 16, at 19 (describing how the financial incentives of SSCF programs help induce sustainability investments in SMEs who might have difficulty quantifying other benefits of sustainability improvements); *see also Financing Supplier Sustainability with HSBC*, supra note 167 (discussing Levi's SCF program as a way of supporting suppliers' adherence to its supplier code of conduct).

182. *See What Are Scope 3 Emissions (And Why Should I Care?)*, *supra* note 167.

183. *See, e.g.*, *Financing Supplier Sustainability with HSBC*, *supra* note 167; *Walmart Creates SCF Program*, *supra* note 164.

184. *See supra* note 72 and accompanying text.

185. SUSTAINABLE SUPPLY CHAIN FINANCE, *supra* note 17, at 7.

3. Limitations

Notwithstanding the many benefits of SSCF, the practice is not a panacea; however, reflecting on these limitations also opens new perspectives on reforms, which may increase SSCF's efficacy. SSCF, like other public-facing sustainability measures, is susceptible to greenwashing—a practice where firms make environmental commitments despite little ability to publicly assess whether the firms follow through on their promises.[186] Firms may rely on the positive press associated with initiating an SSCF program to temporarily boost the firms' reputations with minimal consequences if the SSCF fails to deliver any environmental benefits in the future.[187]

Although greenwashing can take place with malicious intent (i.e., the firm has no intention of fulfilling its sustainability promises), SSCF also suffers from systemic deficiencies that might precipitate inadvertent greenwashing. While capital-freeing SSCF theoretically enables suppliers to invest in further sustainability measures, with potential to receive still more preferential financing terms, SSCF programs rarely have formal restrictions on the use of the capital provided.[188] Just because someone received SSCF does not mean the financing will be used for sustainability investments in the same way other green financing would need to be.[189] One consequence of this unrestricted use of capital is the difficulty with which buyers measure and report the tangible sustainability impacts of their programs. Frequently, SSCF programs publish metrics related to capital payouts or reductions in

186. Perez & Vandenbergh, *supra* note 4, at 685; *see* Amanda Shanor & Sarah A. Light, *Greenwashing and the First Amendment*, 122 COLUM. L. REV. 2033, 2043–45 (2022) (defining different types of greenwashing). *But cf.* Quinn Curtis et. al., *Do ESG Funds Deliver on Their Promises?*, 120 MICH. L. REV. 393 (2021) (using empirical methods to conclude that ESG funds fulfill the green promises of their environmental labeling and should not be singled out for special regulatory scrutiny).

187. Firms are not totally free from scrutiny, however, as limited government oversight of climate pledges through disclosure, private environmental governance initiatives, consumer protection laws, and tort law provide some downside risk to greenwashing. *See* Perez & Vandenbergh, *supra* note 4, at 692–704 (describing governance of corporate climate commitments).

188. SUSTAINABLE SUPPLY CHAIN FINANCE, *supra* note 17, at 6 ("The sustainability incentive is at the front end, where suppliers must illustrate sustainability achievements to qualify for funding. Once the supplier obtains the financing, they have discretion on how it may be used, whether that be towards sustainability improvements to qualify for higher pricing tiers or towards non-sustainability related needs.").

189. *Id.* ("Green loans and bonds and sustainability capital funds may provide examples of other sustainable financing mechanisms that do implement requirements on use of capital."); *see, e.g.*, *What You Need to Know About Green Loans*, WORLD BANK GRP. (Oct. 4, 2021), https://www.worldbank.org/en/news/feature/2021/10/04/what-you-need-to-know-about-green-loans ("A green loan is a form of financing that enables borrowers to use the proceeds to exclusively fund projects that make a substantial contribution to an environmental objective.").

payment times but not emissions reductions.[190]

Low participation rates exacerbate SSCF program's uncertain impacts. Although most buyers describe their SSCF experiences positively and voice their intention to continue their programs, uptake among suppliers tends to be low. In one survey, buyers indicated that only around 20% of the suppliers they approached ultimately participated in their SSCF programs.[191] Frequently, buyers must grapple with the uncertain effects of weakening eligibility criteria to increase uptake, which may reduce participant-level sustainability gains.[192] But uptake among buyers has been limited as well, likely due to a lack of awareness of SSCF opportunities and diverse stakeholders' misaligned priorities within large companies.[193]

The transactions costs associated with SSCF also act as a barrier to widespread adoption of SSCF. Many FSPs supporting SCF programs, for example, are hesitant to engage with firms that are too small—the firms already facing the highest barriers to access traditional financing.[194] As one bank shared, "[T]he general rule of thumb is that costs outweigh benefits for suppliers that have less than US$350,000 in receivables, depending [on] the duration and the composition of the account receivable."[195] SMEs may similarly avoid SSCF programs if they perceive the associated costs to be too high, especially perceived risk from being locked into a relationship with a buyer if a significant portion of their financing comes through the buyer's FSP.[196]

SSCF's most significant limitation comes from its short duration. Because SSCF is a short-term credit source, it does not provide the long-term capital necessary to catalyze more costly and impactful means to decarbonize.[197] Relatedly, although SSCF can theoretically enable suppliers to further their decarbonization efforts—notwithstanding the lack of conditions on the funding once its received—it seems to put the cart before

190. SUSTAINABLE SUPPLY CHAIN FINANCE, *supra* note 17, at 6, 8 ("[T]he most common impact metrics focus on total dollar amount received by suppliers, total dollar amount of early payments made, number of days from order of payment relative to typical payment timeframes, and total number of suppliers participating.").

191. SUSTAINABLE SUPPLY CHAIN FINANCE, *supra* note 17, at 8.

192. *Id.* ("For example, increasing standards for participation over time could eliminate suppliers from qualifying. At the same time, maintaining the same standards hinders ambition.").

193. Bancilhon et al., *supra* note 16, at 21; SUSTAINABLE SUPPLY CHAIN FINANCE, *supra* note 17, at 8.

194. *See, e.g.*, Leora Klapper & Natascha Beinker, *Smaller Businesses Lack the Financing to Be Sustainable. Here's How We Can Help*, WORLD ECON. FORUM (Nov. 8, 2017), https://www.weforum.org/stories/2017/11/smes-need-financing-to-improve-their-sustainability-practices-here-s-how-we-can-help/ (describing SMEs' significant difficulty accessing financing from the large corporations they supply or financial institutions, leading to trillion-dollar financing shortfalls).

195. Bancilhon et. al., *supra* note 16, at 21.

196. *Id*.

197. SUSTAINABLE SUPPLY CHAIN FINANCE, *supra* note 17, at 8.

the horse. If suppliers lack the access to capital necessary to decarbonize,[198] how can SMEs successfully invest in sustainability to satisfy the eligibility requirements of their buyers' SSCF programs? And even with unrestricted access to capital, SMEs' lack of knowledge about how to effectively and efficiently decarbonize will remain a significant barrier to their sustainability efforts.[199] Some firms with existing access to capital and sustainability knowledge about how to invest that capital may be incentivized by SSCF programs to choose the investment with the largest sustainability returns at the margin, but many SMEs who lack these resources will be left behind by existing SSCF programs.

4. Opportunities

SSCF's limitations are not indictments of the programs but are instead opportunities for implementing reforms to new and existing programs. These limitations principally fall into two categories around which adjustments to future SSCF programs should be based: low uptake and low impact. Reforms to address low uptake could easily center on improved communications by NGOs and FSPs with SMEs and large buyers, respectively. Efforts like the SME Climate Hub[200] are doing just that, providing resources to SMEs so they can understand the ways decarbonization can work for them. The SME Climate Hub also goes further, communicating how SMEs can finance climate action.[201] These efforts should be celebrated, amplified, and replicated but also expanded to reach buyers as well. FSPs should similarly continue engaging with buyers about the sustainability and economic case for initiating a SSCF program.[202] Specifically, FSPs should focus their efforts

198. *See* PEDRO ANAYA ET AL., HSBC, BOSTON CONSULTING GRP., DELIVERING NET ZERO SUPPLY CHAINS: THE MULTI-TRILLION DOLLAR KEY TO BEAT CLIMATE CHANGE 10 (2021) ("Most small businesses don't have the capacity or money to focus on a net zero strategy. Of the SMEs in our survey that have not launched initiatives to reduce emissions, about half report the lack of access to finance as a key preventing factor.").

199. *Id.* at 8 ("More than half of the SMEs in the survey mentioned the lack of know-how as one of the top 2 reasons for not having net zero transition plans. The number for large corporates was only half that. As a result, SMEs simply do not feel ready for the transition.").

200. SME Climate Hub was founded by the UN Climate Change High Level Champion's Race to Zero campaign, the We Mean Business Coalition, and the Exponential Roadmap Initiative in collaboration with Oxford University and Normative. The organization's goal is "to mainstream climate action in the small and medium-sized enterprises (SMEs)" community and enable SMEs to build resilient businesses for the future. *About Us*, SME CLIMATE HUB, https://smeclimatehub.org/about-us/ (last visited Nov. 19, 2025).

201. *See Customers (Buyers)*, SME CLIMATE HUB, https://smeclimatehub.org/customers-buyers/ (last visited Nov. 19, 2025) (discussing financing options for SMEs and how SMEs gain access to these resources, including supply chain financing).

202. *See, e.g.*, Condon, *supra* note 151; SUSTAINABLE SUPPLY CHAIN FINANCE, *supra* note 17; *Your ESG Vision, In Action*, SAP TAULIA, https://taulia.com/platform/enterprises/sustainable-supplier-

on building coalitions within large corporations to support an SSCF program rather than focusing on a firm's sustainability or supply chain departments in isolation.[203]

Improving firms' understanding of SSCF will also enable better communication between buyers and suppliers, which should improve the programs' design and maximize enrollment incentives for SMEs.[204] Further improving the relational aspect of SSCF may also reduce the salience of the risk associated with securing significant financing from one buyer's affiliated FSP because a long-term relationship with a trusted buyer is desirable.[205] Extending the span of these relationships reduces transactions costs by decreasing aggregated fixed costs from SME enrollment (because there are fewer firms leaving the program once enrolled)[206] and may help overcome the temporal limitations inherent in SCF.

Reforms to address the low impact of existing SSCF programs should focus on effectively measuring environmental benefits. Given the diversity of sustainability audits and assessment schemes available to firms across industries, scaling an SSCF program around one of them can be difficult. For example, the apparel industry alone utilizes myriad sustainability-assessment measures, many of which differ from other industries.[207] Whereas collective standards for SSCF assessment would mitigate this concern, the system's seemingly unilateral standards inhibit SSCF uptake, as well as effective

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finance/ (last visited Nov. 19, 2025); *Sustainable Supply Chain Financing*, ING, https://www.ingwb.com/en/sustainable-finance/sustainable-supply-chain-finance, (last visited Nov. 19, 2025); *Creating a Path for Sustainable Supply Chains,* FLOW (May 19, 2022), https://flow.db.com/trade-finance/creating-a-path-for-sustainable-supply-chains ("Deutsche Bank's Anil Walia explores the various motivations driving a path towards a sustainable future and how banks are helping through innovative products in the supply chain finance space."); GEOFFRY BRADY & CONNOR MILLER, BANK OF AM., SUSTAINABILITY ACROSS THE SUPPLY CHAIN 2 (2022); MIZUHO BANK, MIZUHO BANK LAUNCHED JAPAN'S FIRST SUSTAINABLE SUPPLY CHAIN FINANCE (SSCF) (2022); *Citi Launches Sustainability-linked Supply Chain Financing in Asia Pacific*, CITI (Nov. 1, 2021), https://www.citigroup.com/global/news/press-release/2021/citi-launches-sustainability-linked-supply-chain-financing-in-asia-pacific.

203. *See* Bancilhon et. al., *supra* note 16, at 21–22 (describing issues aligning sustainability priorities in large, multinational firms).

204. *See* SUSTAINABLE SUPPLY CHAIN FINANCE, *supra* note 17, at 11. Increased interest rates may also increase the desirability of SCF even without changes to existing SCF programs. *See The Impact of Higher Rates on Small Businesses*, GOLDMAN SACHS (Oct. 15, 2023), https://www.gspublishing.com/content/research/en/reports/2023/10/16/86420194-1c0b-4c3c-ba94-eb127f9acae1.html (discussing the consequences of increased financing costs on small businesses).

205. Buyers can also increase the sense of mutual good faith in their SSCF programs by avoiding temptations to "sweeten the pill"—changing financing terms after starting an SSCF program to increase repayment periods to the suppliers' detriment. Bancilhon et. al., *supra* note 16, at 20–21.

206. The digitization of trade financing is also expected to reduce these transaction costs, which would further increase SMEs' access to SSCF. *Id.* at 14 ("The elimination of paper from trade finance is thought to have significant cost-reduction opportunities, for example by reducing compliance costs by 30 percent and increasing the ability to serve SMEs.").

207. *Id.* at 21.

environmental impact measurements across and within programs.[208] To combat this, NGOs should work in partnership with suppliers and buyers to support specific assessment standards for SSCF programs and participants. These metrics need not be new; they could center on adoption of and progress toward reaching a science-based target, as Walmart's SSCF program does.[209] Or, they could focus on something as simple as tracking emissions through the SME Climate Hub's emissions calculator.[210] This effort should be undertaken with a sensitivity to the benefits that flexible metrics provide buyers for reaching diverse ESG goals through SSCF programs. With more concrete, comparable assessments in place, buyers will be positioned to introduce capital-use restrictions to their SSCF programs and reduce potential greenwashing.[211] Coupling this reform with others may increase both the utilization and impact of SSCF to support decarbonization in SMEs.

B. Energy Savings Performance Contracts

Focused on capturing the savings from energy efficiency upgrades to allow them to pay for themselves, energy savings performance contracts (ESPCs) offer capital-constrained organizations a cost-free opportunity to become more efficient and sustainable. Projects where such investments have been historically economical are concentrated in large, government-owned facilities, but efforts are underway to expand this financing mechanism to private firms, including SMEs. This Section begins with a discussion of how ESPCs function followed by a recounting of the tool's benefits and limitations and suggestions for how to expand ESPCs' reach.

1. Mechanics

An ESPC is a budget neutral contracting mechanism for making sustainability upgrades to publicly and privately owned facilities.[212] ESPCs first appeared in the late 1980s as utility companies faced increasing costs for

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208. *See* Michael P. Vandenbergh, *The New Wal-Mart Effect: The Role of Private Contracting in Global Governance*, 54 UCLA L. REV. 913, 922–24 (2007) (discussing private collective standards and private unilateral standards).

209. *Walmart Creates SCF Program*, *supra* note 164.

210. SUSTAINABLE SUPPLY CHAIN FINANCE, *supra* note 17, at 11; *Calculate Your Business Emissions*, SME CLIMATE HUB, https://businessclimatehub.org/start-measuring/ (last visited Nov. 20, 2025).

211. To further combat greenwashing concerns, firms may consider novel financial commitment devices to create downside economic consequences if their SSCF programs fail to reach promised sustainability goals. *See* Perez & Vandenbergh, *supra* note 4.

212. *Energy Savings Performance Contracting,* U.S. DEP'T OF ENERGY, https://www.energy.gov/eere/buildings/energy-savings-performance-contracts (last visited Nov. 20, 2025).

fuel and construction of new electricity generation resources.[213] As part of a broader reconceptualization of domestic energy regulation, states embraced energy efficiency as a tool for combating the ongoing energy crisis.[214] State-regulated utilities were ordered to develop integrated resource plans,[215] which included requirements for acquiring energy efficiency resources.[216] This investment helped develop a new subindustry of ESCOs that would develop turnkey energy efficiency projects for large industrial and institutional clientele.[217] After the industry adopted a standardized measurement and verification (M&V) procedure that ensured projects delivered meaningful energy savings and ESCOs produced a record of project savings, energy performance contracting experienced rapid growth around the turn of the century.[218] Once the industry demonstrated that financing performance contracts were a profitable and low-cost investment—thanks to mature energy efficiency technology and lower-cost M&V procedures—new FSPs entered the market, driving down financing costs that had previously handicapped the industry.[219] The Enron implosion and corresponding energy crisis in California during the early 2000s briefly dampened growth before the industry rebounded with 22% annual growth through the end of the 2000s.[220] A study from the Lawrence Berkeley National Laboratory estimates ESCOs invest around $7 billion annually in energy efficiency retrofits,[221] even as year-over-year growth has slowed.[222]

Many of the factors that have historically driven interest in performance contracting persist today, suggesting continued vibrancy of the energy performance contracting market. Geopolitical conflict in Eastern Europe and

213. ICF INT'L, NAT'L ASS'N OF ENERGY SERV. COS., INTRODUCTION TO ENERGY PERFORMANCE CONTRACTING 8 (2007); TUTTLE ET AL., U. TEX. ENERGY INST., THE HISTORY AND EVOLUTION OF THE U.S. ELECTRIC INDUSTRY 6–7 (2016).

214. INTRODUCTION TO ENERGY PERFORMANCE CONTRACTING, *supra* note 213, at 8; TUTTLE ET AL., *supra* note 213, at 6–7.

215. *See* Coley Girouard, *Understanding IRPs: How Utilities Plan for the Future*, ADVANCED ENERGY PERSPS. (Aug. 11, 2015), https://blog.advancedenergyunited.org/understanding-irps-how-utilities-plan-for-the-future ("An IRP is a roadmap to meet forecasted energy demand using both supply and demand side resources to ensure reliable service to customers in the most cost-effective way.").

216. INTRODUCTION TO ENERGY PERFORMANCE CONTRACTING, *supra* note 213, at 8.

217. *Id.*; *see The ESCO Story*, NAESCO, https://www.naesco.org/esco/ (last visited Nov. 20, 2025) ("ESCOs[] [c]ontract with institutional energy users in the public and private sectors to provide cost-effective energy efficiency retrofits across a wide spectrum of client facilities, from college campuses to water treatment plants. Effectively utilizing a performance-based contract business model, ESCO's have implemented significant comprehensive energy efficiency retrofit projects over the last three decades.").

218. INTRODUCTION TO ENERGY PERFORMANCE CONTRACTING, *supra* note 213, at 8, 31.

219. *Id.* at 8, 29–30.

220. *Id.* at 12.

221. ELIZABETH STUART ET AL., LAWRENCE BERKELEY NAT'L LAB'Y, U.S. ESCO INDUSTRY: INDUSTRY SIZE AND RECENT MARKET TRENDS 25 (2021); *see The ESCO Story*, *supra* note 217.

222. STUART ET AL., *supra* note 221, at 25.

the Middle East has introduced new volatility into energy markets.[223] Electricity prices are increasing rapidly in some parts of the country.[224] Governments are still very interested in developing energy efficiency resources as part of integrated resource plans.[225] The interest in reducing greenhouse gas emissions has never been so widespread.[226] Perhaps most importantly here, many governments and businesses—particularly SMEs—lack the capital and maintenance funding to keep up with maintaining their facilities or upgrading them to capture the gains from efficiency due to technological advances.[227]

ESPCs speak to these interests and serve these goals by facilitating the identification and installation of energy efficiency upgrades that functionally pay for themselves. In essence, a customer partners with an ESCO, who serves as a general contractor. In that capacity, the ESCO scopes, develops, and implements energy efficiency improvements across one or more of the customer's facilities.[228] Once a customer decides on an ESPC to implement energy efficiency improvements and selects an ESCO partner, the ESCO will conduct a comprehensive energy audit of the customer's facilities to identify what upgrades are available and cost-effective in that specific setting.[229] The

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223. Adrian-Gabriel Enescu & Monica Răileanu Szeles, *Discussing Energy Volatility and Policy in the Aftermath of the Russia–Ukraine Conflict*, 11 FRONTIERS ENV'T SCI. 1 (2023) (Russia–Ukraine); Qi Zhang et al., *Assessing the Extent and Persistence of Major Crisis Events in the Crude Oil Market and Economy: Evidence from the Past 30 Years*, 11 HUMANITIES & SOC. SCIS. COMMC'NS 1 (2024) (global conflicts); Adi Imsirovic, *Experts React: Energy Implications of Escalating Middle East Conflict*, *Market Undercurrents Steering Oil Prices Amid Middle East Conflict*, CTR. FOR STRATEGIC & INT'L STUD. (Oct. 8, 2024), https://www.csis.org/analysis/experts-react-energy-implications-escalating-middle-east-conflict. Recall that the 1973 Arab Oil Embargo helped birth the performance-contracting industry decades ago. *See* TUTTLE ET AL., *supra* note 213, at 6–7.

224. Brad Plumer et al., *Why the Price of Electricity Is Spiking Around the Country*, N.Y. TIMES: CLIMATE (Oct. 30, 2025), https://www.nytimes.com/2025/10/30/climate/electricity-prices.html.

225. *Energy Efficiency as a Resource*, AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., https://database.aceee.org/state/energy-efficiency-resource (last visited Nov. 20, 2025).

226. *See, e.g.*, Alec Tyson et al., *Americans Largely Favor U.S. Taking Steps to Become Carbon Neutral by 2050*, PEW RSCH. CTR. (Mar. 1, 2022), https://www.pewresearch.org/science/2022/03/01/americans-largely-favor-u-s-taking-steps-to-become-carbon-neutral-by-2050/.

227. LAND-OF-SKY REG'L COUNCIL, A DECISION-MAKERS GUIDE TO ENERGY SAVING PERFORMANCE CONTRACTING: LOCAL GOVERNMENTS IN NORTH CAROLINA 1 ("Many local governments have identified deferred maintenance items and needed energy efficiency upgrades, but lack the funds to make improvements. Smaller counties and municipalities may lack the technical staffing to effectively accomplish these upgrades on their own."); CORRIE E. CLARK, CONG. RSCH. SERV., R45411, ENERGY SAVINGS PERFORMANCE CONTRACTS (ESPCS) AND UTILITY ENERGY SERVICE CONTRACTS (UESCS) 1 (Dec. 17, 2018) ("Many Members of Congress have expressed a continuing interest in improving energy efficiency and increasing the use of renewable energy. One barrier to federal agencies making such investments relates to the availability of capital given the constrained fiscal environment."); *see, e.g.*, Klapper & Beinker, *supra* note 194.

228. *Energy Savings Performance Contract*, *supra* note 18.

229. *Id.*

investments are selected to ensure the energy savings they generate are sufficient to cover the costs associated with implementing the project; as such, ESPCs allow customers to use tomorrow's energy savings to fund today's facility upgrades.[230] Potential projects are tailored to the facility but may include energy efficiency upgrades (e.g., lighting, HVAC, energy management and control, envelope insulation), renewable energy investments, and water conservation and sustainable material and operations measures.[231] Once projects are identified, the ESCO and customer enter into a formal ESPC with the following terms:

> [L]egal requirements, energy savings analysis, projected annual cash flows, Measurement & Verification (M&V), technical audit report, project costs breakdown, and all construction process provisions and a number of attachment "schedules" that define various project information, guarantee, responsibilities, insurance, warranties, M&V, commissioning, training, project costs and more.[232]

The customer and ESCO, however, must first agree on how to finance the projects.[233] The first question a customer faces is whether to self-finance the project or utilize third-party financing.[234] Given their capital constraints, SMEs typically prefer to use the latter option. In this case, the ESCO will often arrange financing on behalf of the customer.[235] The loans are issued to the customer, but the financing contracts may be structured as operating leases to avoid adding new debt to customers' balance sheets.[236] Third-party

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230. WHAT IS ESPC?, *supra* note 19, at 1 ("ESPC is a financial mechanism used to pay for today's facility upgrades with tomorrow's energy savings—without tapping your organization's capital budget."); *Energy Savings Performance Contract*, *supra* note 18.

231. Peter K. Floyd, *Funding Options for Energy Saving and Other Operational Cost Saving Transactions*, Alston & Bird, LLP, at 13 (2013); LAFFONT-ELOIRE, *supra* note 21.

232. LAND-OF-SKY REG'L COUNCIL, *supra* note 227, at 3.

233. U.S. DEP'T OF ENERGY: OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, ENERGY SAVINGS PERFORMANCE CONTRACTING (ESPC): THE ESPC PROCESS 1 (2014).

234. *Energy Savings Performance Contract*, *supra* note 18 ("The customer may pay for the installation out of pocket if it has enough cash on hand, or it may seek financing from a third-party lender to cover some or all of the upfront cost.").

235. Floyd, *supra* note 231, at 13. *But see Energy Savings Performance Contract*, *supra* note 18 ("Historically, ESCOs have often helped their customers arrange financing for ESPCs. However, due to passage of the Dodd-Frank Act in 2010, ESCOs are sometimes prohibited from arranging financing as part of their service package without appropriate registration. In some cases, this means customers must now independently arrange financing with a third party.").

236. *ESCO Contracts*, *supra* note 20 ("[T]his is not the case in the United States, where under the Generally Accepted Accounting Principles, EPCs are often structured as operating leases, which are also not accounted for on a company's balance sheet. Reporting an EPC on balance sheet [sic] indicates an increase in debt or liabilities held by that company, and is therefore an unattractive prospect for an

financiers in the ESPC market include both specialized ESPC project finance brokers and major financial institutions, like Bank of America and Citibank.[237] Technical performance risk can be shared by the customer and ESCO—as in a shared savings contract—or shouldered exclusively by the ESCO—as in a guaranteed savings contract.[238] The latter method is more prominent in the United States,[239] but the former may be more advantageous in the developing world where customers prefer less investment risk.[240] Under the guaranteed savings contract, the customer uses the savings from the project to repay any financing facilitating the investment. If the realized savings are insufficient to service the debt, the ESCO satisfies the difference.[241] By contrast, if the realized savings exceed the amount necessary to service the debt, the customer may retain the surplus or share it with the ESCO, depending on the specific terms of the ESPC.[242] This arrangement makes the ESPC more attractive to customers by shifting technical performance risks to another party, while reducing financing costs. This is because a second party (the ESCO) is ensuring repayment of the debt

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organization considering investment in energy efficiency improvements."); *Energy Savings Performance Contract*, *supra* note 18 ("In some cases, ESPCs may be backed by an off-balance sheet financing mechanism in which the third-party financier owns the equipment during the term, such as an ESA or operating lease, or by a tax-exempt lease purchase agreements [sic] for public organizations.").

237. INTRODUCTION TO ENERGY PERFORMANCE CONTRACTING, *supra* note 213, at 24.

238. SERGI MOLES-GRUESO ET AL., JOINT RSCH. CTR.: EUROPEAN ENERGY EFFICIENCY PLATFORM, ENERGY PERFORMANCE CONTRACTING 4 (2023) (comparing the two types of performance contracting).

239. *Energy Savings Performance Contract*, *supra* note 18 ("The ESCO typically provides a savings guarantee."); SERGI MOLES-GRUESO ET AL., *supra* note 238 ("In the US the guaranteed savings model evolved from the shared savings model in response to drop [sic] in interest in fuel savings and attempt [sic] of ESCOs to make value-based offerings for cost – rather than energy – savings."); INTRODUCTION TO ENERGY PERFORMANCE CONTRACTING, *supra* note 213, at 29 ("[T]he ESCO is guaranteeing the level of energy savings."); Floyd, *supra* note 231, at 13 ("The ESCO provides a guarantee that the savings produced by the project will be sufficient to cover the cost of project financing for the life of the project."); LAND-OF-SKY REG'L COUNCIL, *supra* note 227, at 1 ("About 95 percent of performance contracts are structured for guaranteed energy saving with the local government (i.e., owner) accepting the debt through third party financing.").

240. This is because ESCOs typically shoulder the financing burden in shared savings contracts. In these arrangements, the ESCOs discharge some technical risk by sharing potential savings (or losses) from the efficiency upgrades but take on risk of the customer defaulting because the ESCO finances the project (either directly or with third-party financing). In developing markets, customers have less desire to accept financing risk, so they prefer the shared savings model. *See Energy Performance Contracting*, *supra* note 225 ("The guaranteed savings concept is difficult to use [to introduce] the ESCO concept in developing markets because it requires customers to assume investment repayment risk.").

241. SERGI MOLES-GRUESO ET AL, *supra* note 238 ("If the savings are not enough to cover debt service, then the ESCO has to cover the difference.").

242. *Id.* ("If savings exceed the guaranteed level, then the customer pays an agreed upon percentage of the savings to the ESCO."); *ESCO Contracts*, *supra* note 20 ("[T]he ESCO guarantees a certain savings on the client's energy bill. The ESCO takes on the technical risk. The client obtains a bank loan, or uses their own equity, to pay contractually determined fees to the ESCO and the bank, and keeps the difference.").

underlying the project through the energy savings guarantee.[243]

Once the ESPC is finalized and financing is secured, the ESCO oversees execution of the project according to the ESPC and monitors the subsequent savings using pre-established M&V procedures.[244] The ESCO may also undertake operations and maintenance responsibilities, conduct repairs, and provide service upgrades during the life of the ESPC.[245] In return, the customer will continue making payments on any debt associated with the project and issue service payments to the ESCO as agreed upon.[246] Once the ESPC expires, the ESCO moves on to other projects and the customer retains remaining energy savings in perpetuity.[247]

Governments and schools have historically been common customers in ESPC arrangements with ESCOs. In 1999, President Clinton signed Executive Order 13,123—which required federal agencies to reduce their energy use per square foot by 35% from 1985 levels by 2010.[248] Congress's reluctance to appropriate funds to support this goal, which was estimated to cost $6–7 billion to reach, left federal agencies with few options for fulfilling their requirements under the Order.[249] Lacking public funding, the Department of Energy's Federal Energy Management Program (FEMP) sought to unleash the power of private capital to support energy efficiency investments. To do so, the FEMP coordinated ESPCs on behalf of other federal agencies.[250]

In less than three years, 26 projects totaling $65 million in investments were carried out under the program.[251] Investments include a $170,000 project updating lighting for the Department of Labor; a nearly $600,000 project improving boiler efficiency, building automation systems, energy management control systems, HVAC, lighting, and other equipment for the Department of the Interior; and a roughly $1 million project upgrading lighting, HVAC, energy management control systems, and boilers for the Coast Guard.[252] Annual savings amounted to roughly $30,000; $80,000; and

243. *Energy Savings Performance Contract*, *supra* note 18.

244. *Id.*; ENERGY SAVINGS PERFORMANCE CONTRACTING (ESPC): THE ESPC PROCESS, *supra* note 233.

245. *Energy Savings Performance Contract*, *supra* note 18.

246. *Id.*

247. *Id.*

248. Exec. Order No. 13,123, 3 C.F.R. 180 (1999); Patrick J. Hughes & Tatiana Strajnic Muessel, *Energy Savings Performance Contracting: Experience of the U.S. Department of Energy Federal Energy Management Program*, *in* ACEEE SUMMER STUDY ON ENERGY EFFICIENCY IN BUILDINGS 175, 175 (2000).

249. Hughes & Muessel, *supra* note 248, at 175.

250. *Id.* at 176.

251. *Id.* at 176–77.

252. *Id.* at 179.

$230,000 for each project, respectively.[253] The FEMP results demonstrate the impact of performance contracting in this setting. Between 2005 and 2017, the federal government invested $21.7 billion in facility energy efficiency improvements, $5.7 billion of which was funded through ESPCs.[254]

With this record of success,[255] interest in using ESPCs in the federal government remains high,[256] especially in defense facilities.[257] State governments utilize ESPCs too. For example, nearly a dozen local and county governments in North Carolina invested in energy efficiency improvements with ESPCs in a several-year timespan.[258] Investments across the ten customers totaled over $13 million; individual project costs ranged from below $500,000 to over $4.5 million and led to 20% average reductions in utility bills.[259] Similarly, the Rockford Housing Authority in Illinois entered into a $7.5 million ESPC to facilitate energy efficiency improvements across eight of its multi-family housing projects; the projects produced six-figure energy savings annually.[260] Also in Illinois, Lewis and Clark Community College partnered with an ESCO to secure $185,000 in funding for fluorescent to LED lighting conversions, building envelope improvements, pipe insulation, and HVAC management systems—an investment producing over $17,000 in annual energy savings.[261]

Private entities utilize ESPCs to accelerate decarbonization efforts. Concerned it would not be able to achieve its energy reduction goals without additional capital investments, General Motors turned to performance contracting as a solution. Since 2012, the company has used shared-savings ESPCs to fund an additional $40 million in energy conservation projects, doubling its initial investment in such projects.[262] General Motors' lighting

253. *Id.*

254. CLARK, *supra* note 227, at 1.

255. *See generally* ROCKY MOUNTAIN INST., GSA, DEEP ENERGY RETROFITS USING ENERGY SAVINGS PERFORMANCE CONTRACTS: SUCCESS STORIES (2015).

256. CLARK, *supra* note 227, at 1 (discussing congressional interest in improving energy efficiency and the ways ESPC may be used to finance these investments).

257. *See* Sarah E. Light, *The Military-Environmental Complex*, 45 ENV'T L. REP. 10763, 10767–68 (2015).

258. LAND-OF-SKY REG'L COUNCIL, *supra* note 227, at 1.

259. *Id.*

260. *Energy Savings Performance Contract*, *supra* note 18 ("The Rockford Housing Authority engaged in a $7.5 million Energy Performance Contract to evaluate the conduct [sic] a comprehensive energy audit and implement energy efficiency measures at eight of its multifamily properties, reducing energy costs by over $100,000 a year while improving the quality of housing for low-income housing tenants.").

261. *Lewis and Clark Community College Infuses Education and Sustainability*, CENTRICA, https://www.centricabusinesssolutions.com/us/case-study/lewis-and-clark-community-college-infuses-education-and-sustainability (last visited Nov. 20, 2025).

262. *General Motors Funds Energy Conservation Projects Through an Energy Performance Contracting Model*, U.S. DEP'T OF ENERGY: BETTER BUILDINGS,

and steam elimination projects funded through their ESPCs have resulted in an additional 120,000 megawatt-hour reduction in energy consumption annually[263]—the equivalent of more than 11,000 homes' annual consumption.[264]

2. Benefits

Under the proper conditions, ESPCs provide tangible sustainability and economic benefits to the firms that sign onto them. The benefits from ESPCs, however, tend to be more principally pecuniary than with SSCF. These pecuniary benefits center on the contracting mechanism's ability to enable investments in sustainability upgrades at no cost to the customer, preserving capital budget dollars for other necessary services[265] and stretching existing sustainability investments.[266] Since ESCOs work with customers to select projects with high energy-savings potential, investments undertaken today are effectively paid for with tomorrow's energy savings.[267] Although customers often secure financing for the projects they undertake, ESCOs' energy savings guarantees should reduce the cost of this financing by reducing risk associated with the projects, just as the focus on installing reliable energy efficiency technologies has.[268] When public entities participate, even greater financing benefits may be available under applicable state law.[269]

The efficiency investments that ESPCs facilitate create substantial forward-looking value for customers once projects are completed. ESPCs

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https://betterbuildingssolutioncenter.energy.gov/implementation-models/general-motors-funds-energy-conservation-projects-through-energy-performance (last visited Nov. 20, 2025) [hereinafter *General Motors Funds Energy Conservation*].

263. *Id.*

264. The average household uses around 10,500 kilowatt-hours of electricity annually, which is equal to 10.5 megawatt-hours, so the exact math is as follows: 120,000/10.5=11,428.6. *See Use of Energy Explained: Energy Use in Homes*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/use-of-energy/electricity-use-in-homes.php (last updated Dec. 18, 2023).

265. LAND-OF-SKY REG'L COUNCIL, *supra* note 227, at 4 (noting how ESPCs "[preserve] limited budget dollars for other needed services and activities").

266. *General Motors Funds Energy Conservation*, *supra* note 249 (describing how GM doubled sustainability investments from $40 million to $80 million).

267. WHAT IS ESPC?, *supra* note 19, at 1; *Energy Savings Performance Contract*, *supra* note 18.

268. INTRODUCTION TO ENERGY PERFORMANCE CONTRACTING, *supra* note 213, at 30 ("The technologies employed in most performance contract projects were not very risky, because the technologies had matured and most customers shied away from cutting-edge technologies. The financing of performance contracts was profitable and not very risky.").

269. WHAT IS ESPC?, *supra* note 19, at 1; U.S. DEP'T OF ENERGY: OFF. OF EFFICIENCY & RENEWABLE ENERGY, ENERGY SAVINGS PERFORMANCE CONTRACTING (ESPC): HOW TO FINANCE AN ESPC (2014) [hereinafter HOW TO FINANCE AN ESPC] (describing ESPC-funding opportunities under state treasurer–established "umbrella contracts").

have helped customers realize significant energy savings that they retain in full at the end of the ESPC's term.[270] While the term may be long, ESPCs' lengthy time horizon enables bigger investments with larger potential savings and environmental impact.[271] Aside from direct savings, reduced energy consumption also insulates customers from volatility in energy markets.[272] Energy savings and reduced energy-market risk exposure are important forward-looking benefits, but ESPCs also help address deferred maintenance issues a firm might be facing from a prior lack of maintenance investment.[273]

Partnering with ESCOs also creates several benefits for customers given the firms' technical expertise. ESCOs' central role in executing ESPCs from the initial energy audits to final delivery to periodic maintenance and M&V during the life of the contract represents a centralized process for executing what can be technically complex facility upgrades.[274] Rather than diverting significant resources to overseeing sustainability projects or coordinating with several contractors to do so, the customer outsources project management to the ESCO—a single point of contact and accountability for the projects undertaken.[275] In many cases, the ESCO even goes beyond the technical support described and assists the customer in securing the financing for the project.[276] By offering centralized technical support and improving access to financing through coordination and savings guarantees, ESPCs and the ESCOs that execute them provide customers with low-risk opportunities for achieving their sustainability goals and realizing cost savings through

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270. *See supra* notes 252–262 and accompanying text.

271. SME COMPETITIVENESS OUTLOOK: EMPOWERING THE GREEN RECOVERY, *supra* note 43, at 40 ("[B]igger investments in resource efficiency measures deliver much more significant benefits to both the bottom line and the planet. The more a company is able to invest, the more benefits it receives in the long term. Moreover, measures that are most costly to start are more effective in reducing greenhouse gas emissions.").

272. *See* LAND-OF-SKY REG'L COUNCIL, *supra* note 227, at 4 (listing "[r]educed cost of escalating utilities at contract completion" in addition to energy cost reductions as benefits of ESPCs); *cf.* Catherine Clifford, *How Higher and More Volatile Energy Prices Will Affect the Move to Clean Energy*, CNBC (Mar. 17, 2022), https://www.cnbc.com/2022/03/17/what-higher-volatile-energy-prices-mean-for-clean-energy-transition.html (noting customers' tendency to "look for more efficiency" in their modes of transportation when gas prices rise because of their exposure to "higher price volatility").

273. LAND-OF-SKY REG'L COUNCIL, *supra* note 227, at 1 ("Many local governments have identified deferred maintenance items and needed energy efficiency upgrades, but lack the funds to make improvements."); *Guaranteed Energy Performance Contract Saves County over $27,000 Annually*, CENTRICA, https://www.centricabusinesssolutions.com/us/case-study/guaranteed-energy-performance-contract-saves-county-over-27000-annually (last visited Nov. 20, 2025) (describing a successful ESPC to address a "cooling system . . . utilizing R22 refrigerant which, because of its negative effects on the ozone layer, became illegal in the U.S. in 2020" and "ongoing plumbing maintenance issues in inmate living quarters").

274. *Energy Savings Performance Contract*, *supra* note 18.

275. *Id.*; WHAT IS ESPC?, *supra* note 19, at 1; LAND-OF-SKY REG'L COUNCIL, *supra* note 227, at 4.

276. Floyd, *supra* note 231, at 13.

reliable energy efficiency investments.

3. Limitations

Despite their many benefits, ESPCs will not always be a viable tool for facilitating the cost-saving energy efficiency upgrades needed to reach decarbonization goals. Addressing these limitations, however, is not an indictment of the tool but instead highlights areas ripe for experimentation and exploration by firms, non-governmental organizations (NGOs), and governments seeking to expand decarbonization efforts through nontraditional financing. ESPCs' most significant shortcoming concerning the private SMEs at the center of this Article is performance contracting's historical focus on large, public entities. According to the most recent estimates from the Lawrence Berkeley National Lab,[277] by revenue, large public entities—customers in the "MUSH market," which includes municipalities, universities, schools, and hospitals—comprise roughly 72% of the ESPC market.[278] Federal projects, like the Department of Labor, Department of the Interior, and Department of Defense projects described above,[279] make up 16% of the market.[280] Another 5% center on residential and public housing projects,[281] like the Rockford Housing Authority project described above.[282] Ultimately, only 7% of the market consists of commercial and industrial sector projects, a retreat from these industries' 15% market share in 2006.[283]

The focus on MUSH customers is motivated by two factors. First, ESPCs are best suited for executing large projects with energy-intensive clients. While ESCOs vary in what size projects they will agree to undertake and small ESCOs willing to take on smaller projects appear to be gaining market share,[284] the Department of Energy notes that ESPCs are best suited for million-dollar projects, while some ESCOs prefer projects over $5 million.[285] Similarly, one firm abroad only recommends taking on projects where annual energy expenditures exceed €200,000—around $210,000.[286] While

277. Although published in 2021, the estimates describe the ESCO market as of 2018. STUART ET AL., *supra* note 221, at 25.

278. *Id.* at 26. This appears to be larger than estimates of MUSH's market share in the mid-2000s. *See* INTRODUCTION TO ENERGY PERFORMANCE CONTRACTING, *supra* note 213, at 17.

279. *See supra* notes 252–255 and accompanying text.

280. STUART ET AL., *supra* note 221, at 26.

281. *Id.*; INTRODUCTION TO ENERGY PERFORMANCE CONTRACTING, *supra* note 213, at 17.

282. *See supra* note 261 and accompanying text.

283. STUART ET AL., *supra* note 221, at 25.

284. *Id.* at 27 (noting an increase in market share for ESCOs with revenue below $100 million annually from 16% in 2014 to 22% in 2018).

285. *Energy Savings Performance Contract*, *supra* note 18.

286. *See* LAFFONT-ELOIRE ET AL., *supra* note 21.

constraining, the size thresholds are necessary to ensure the returns from the project are fairly predictable and sufficient to justify the significant transaction costs associated with designing, implementing, and monitoring an energy efficiency project.[287]

MUSH customers are also attractive candidates for ESPCs because these entities typically own the facilities they occupy and plan on remaining in them for decades.[288] Industrial and commercial enterprises, especially the latter, are far more likely to lease the spaces where they operate.[289] Owning a space is not a prerequisite to a successful ESPC, but issues arise when the term of the relevant lease is shorter than the term of the ESPC since this introduces more risk into the transaction.[290] The difficulties of executing an ESPC in a rented property are exacerbated by the long lead times for many projects, both in terms of negotiation and eventual execution.[291] After all, energy savings—the ultimate vehicle for repayment under an ESPC—cannot accrue until the energy efficiency measures are implemented and associated equipment is brought online.

SMEs outside the MUSH market are not entirely cut off from performance contracting, but even when they have access to ESPCs, they may not retain all the benefits that, for example, a large municipal client might enjoy. Public entities have broader sources of funding than many private entities, including bonds, tax-exempt lease purchase agreements, or state-level financing contracts.[292] Similarly, SMEs might not be able to leverage the high credit rating of their ESCOs in the same way larger firms

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287. *Energy Savings Performance Contract*, *supra* note 18.

288. *Id.*

289. *Id.* Alternatively, performance contracts could be presented to the owners of commercial real estate, but this sector has historically been reluctant to take on long-term debt that may inhibit their ability to flip a property quickly. INTRODUCTION TO ENERGY PERFORMANCE CONTRACTING, *supra* note 213, at 33. Although there is some evidence this trend is changing, empirical research suggests landlords are less willing to invest in energy efficiency upgrades since the landlords themselves do not bear the costs of existing energy inefficiencies and they have trouble highlighting efficiency amenities as a means of making their properties more attractive to renters. *Id.*; *see, e.g.*, Ivan Petrov & Lisa Ryan, *The Landlord-Tenant Problem and Energy Efficiency in the Residential Rental Market*, ENERGY POL'Y, 2021, at 1, 2. Increased vacancies in commercial properties since the COVID-19 pandemic, however, might induce commercial landlords to alter this practice and invest in energy efficiency to attempt to distinguish their properties from competitors as they compete for relatively scarce tenants. *See* Jim Tyson, *Commercial Property Vacancy Rate to Peak in 2026 at 24%: Moody's*, CFO DIVE (June 28, 2024), https://www.cfodive.com/news/commercial-property-vacancy-rate-peak-2026-moodys-CRE-delinquency-real-estate/720234/.

290. *Energy Savings Performance Contract*, *supra* note 18.

291. *Id.*

292. HOW TO FINANCE AN ESPC, *supra* note 269; *see* David Roeder, Ecofin Advisors: Director of Sustainable Lending, The Basics of Municipal Leasing, Presentation at the 43rd Annual AGLF Conference (May 10, 2023); *Energy Savings Performance Contracting*, AM. COUNCIL ENERGY-EFFICIENT ECON., https://database.aceee.org/state/energy-savings-performance (last visited Nov. 20, 2025) (summarizing the different ways states' incentives support ESPC use by governments).

might be able to. Many of the ESCOs that engage with SMEs and take on smaller projects are themselves small enterprises that lack the strong credit history prerequisite for supporting the low-cost third-party financing that enables ESPC investments.[293]

4. Opportunities

Reflecting on the limitations of ESPC to date highlights two aspects of the tool where reforms should produce the largest impact: transaction costs and project financing. Directing efforts toward decreasing ESPCs' transaction costs and increasing low-cost financing opportunities will increase accessibility of this tool among firms of all sizes. Since the early days of performance contracting, market participants have been acutely aware of the limits that high transaction costs put on the industry. This was most prominently felt when firms negotiated M&V terms and subsequently fulfilled those monitoring obligations. In the early 1990s, M&V was overly complex and costly. At the time, state-of-the-art M&V procedures included "real-time monitoring of essentially every circuit in every customer facility in the program for the life of the project, with the data telemetered to ESCO offices and consolidated into monthly reports and invoices."[294] M&V in this era typically comprised around 15% of total project costs.[295] Recognizing that the protocols "were overkill" that "were expensive to implement over measured technologies with fairly well understood consumption patterns," the Department of Energy, National Association of Energy Service Companies (NAESCO), and ASHRAE (formerly the "American Society of Heating, Refrigerating and Air-Conditioning Engineers") partnered to develop the International Performance Monitoring and Verification Protocol (IPMVP).[296] The IPMVP's principle innovation was its assignment of M&V protocols based on the riskiness of the specific energy efficiency technology employed, taking care to ensure the cost and rigor of M&V procedures aligned with the risk that the technology would fail to deliver anticipated savings.[297]

Firms utilizing the IPMVP have leveraged its "stipulated savings" terms to reduce M&V costs even further,[298] but a renewed effort by the Department of Energy, NAESCO, ASHRAE, or some other NGO or government actor to incorporate new technology into the IPMVP could further reduce M&V

293. LAFFONT-ELOIRE ET AL., *supra* note 21.
294. INTRODUCTION TO ENERGY PERFORMANCE CONTRACTING, *supra* note 213, at 30.
295. *Id.*
296. *Id.* at 30–31.
297. *Id.* at 31.
298. *Id.* at 31–32.

costs. Increasing digitalization of the energy sector with digital building controls, automation, and consumption analytics will likely improve estimates of potential energy savings for proposed projects, in addition to streamlining M&V after a project is completed.[299] Utilities' rollout of smart metering technology nationwide, which enables real-time consumption monitoring at the facility level, and the increasing prevalence of active energy-management systems are two additional examples of technologies that have the potential to reduce M&V costs if leveraged.[300] To realize these benefits, however, ESCOs and the clients they serve must be confident in the procedures that incorporate these technologies into the M&V terms of their ESPCs. Standardizing M&V protocols with these new technologies in mind by updating the IPMVP could breed such confidence.

Transactions costs can also arise from the complexity of the ESPC as a contractual document and the process of formulating such a contract. Here too, NGOs have demonstrated the value of standardization. The Building Owners and Managers Association, Clinton Climate Initiative, real estate companies, and ESCOs partnered to create a toolkit for performance contracting to streamline the process for forming and executing an ESPC.[301] The toolkit includes "standard documents and contract language vetted by top energy service and real estate companies that are intended to streamline the project development process."[302] The Department of Energy similarly led a public-private partnership for developing model ESPC documents, collaborating with representatives from state and local governments, NGOs, ESCOs, banks, and other organizations.[303] With these resources available, governments, ESCOs, NGOs, and firms should tap into their networks to ensure that the non-MUSH firms most likely to utilize these resources know

299. *ESCO Contracts*, *supra* note 20.

300. *Id.* In fact, smart meters are increasingly being utilized across the globe. Adarsh Krishnan, *Smart Electricity Meter Market 2024: Global Adoption Landscape*, IOT ANALYTICS (Feb. 21, 2024), https://iot-analytics.com/smart-meter-adoption/.

301. BLDG. OWNERS & MANAGERS ASS'N INT'L, BOMA ENERGY PERFORMANCE CONTRACTING MODEL [BEPC] (2015); *see Energy Savings Performance Contract*, *supra* note 18 ("Efforts are currently underway to further standardized the contracting process for ESPCs and expand their appeal beyond the MUSH and government sectors. For example, the BOMA Energy Performance Contract model aims to address the limits of the traditional approach by providing standardized documentation and processes.").

302. BLDG. OWNERS & MANAGERS ASS'N INT'L, *supra* note 301, at 4.

303. *See Model Documents for an Energy Savings Performance Contract Project*, U.S. DEP'T OF ENERGY, http://web.archive.org/web/20241101120019/https://www.energy.gov/scep/slsc/model-documents-energy-savings-performance-contract-project (last visited Nov. 20, 2025) (compiling model ESPC documents, covering everything from an initial solicitation to a final ESPC); *About Energy Savings Performance Contracting Model Documents*, U.S. DEP'T OF ENERGY, https://web.archive.org/web/20241003200322/https://www.energy.gov/scep/slsc/about-energy-savings-performance-contracting-model-documents (last visited Nov. 20, 2025) (thanking partners who contributed to the project).

they are available.[304]

Financing is an important part of even simplified ESPCs whose limited access has stunted growth of the ESPC market; increasing access to low-cost financing for ESPCs would expand the reach of this tool to new businesses, ideally SMEs. One benefit of the savings guarantee in many ESPCs is its ability to reduce financial risk of the ESPC by shifting technical performance risks away from the borrower, which drives down financing costs. If both the ESCO and the borrower have relatively poor credit, as is the case for many SMEs and the small ESCOs most likely to serve them, then financing costs may still be too high to justify an ESPC.[305] Expansion of the burgeoning energy savings insurance market would alleviate this problem by reducing the risk associated with an energy efficiency project beyond what is possible with the ESCO-backed savings guarantee.[306] Associated insurance costs, however, would need to be smaller than the financing savings the insurance is supposed to generate, which may not be the case today given the limited number of financial institutions offering this insurance product.[307]

III. CATALYZING DEEP DECARBONIZATION IN SMALL- AND MEDIUM-SIZED ENTERPRISES

Ambitious climate goals require immediate and substantial investments in decarbonization, but these goals will remain beyond reach if decarbonization efforts are limited to the large firms. Small- and medium-sized enterprises (SMEs) must be a part of the effort. The financial, reputational, and relational benefits of sustainable supply chain financing (SSCF) and energy saving performance contracts (ESPCs) demonstrate the value these tools create for large and small firms alike, creating a strong economic case for more widely employing SSCF and ESPCs to finance decarbonization efforts. Notwithstanding their many benefits and the opportunities and efforts that are underway to increase their utility and availability, stakeholders should think beyond SSCF and ESPCs traditional

304. *See Energy Savings Performance Contract*, *supra* note 18 (describing standardization efforts aimed at expanding ESPCs' reach beyond MUSH and government clients).

305. LAFFONT-ELOIRE ET AL., *supra* note 21 ("Small ESCOs . . . could open the EPC offer to single houses and small condominiums. However, borrowing for ESCOs requires a credit history, which hinders the access of SMEs and small structures to finance. Facilitating the access of small ESCOs to TPF would alleviate this barrier."); *see ESCO Contracts*, *supra* note 20 ("[Energy savings insurance] is particularly useful for ESCOs or smaller enterprises with poor credit or who lack the means to secure third party financing.").

306. *ESCO Contracts*, *supra* note 20 ("Uncertainty associated with the performance of efficiency measures inhibits third-party energy efficiency financing globally. In response, energy savings insurance (ESI) has emerged as a solution offered by a small number of financial institutions, private companies and insurance companies, as a way to reduce the risk of an energy efficiency project.").

307. *Id.*

boundaries and applications to expand their utilization by the SMEs—firms' whose sustainability efforts will be crucial to mitigating the worst effects of global climate change. This Part seeks to fill remaining voids left by SSCF and ESPC by proposing a novel way of combining aspects of the two tools to facilitate their combined use in new and important ways, primarily to facilitate long-term sustainability investments by SMEs.

A. Lessons from Existing Tools

Reflecting on the benefits and limitations of SSCF and ESPCs in their current forms, particularly as they relate to SMEs, several systematic barriers and themes become apparent that should inform modifications and extensions of the tools' use: financing costs, transaction costs, information sharing, interfirm relationships, and time horizons.

As to the first barrier, sustainability investments require capital for firms to execute, and SMEs consistently identify a lack of capital as an inhibitor of their decarbonization efforts.[308] It is less that financing is not conceivably available but that the high cost of financing eats away at the margins that make sustainability investments economical. Borrowers are more likely to access financing and access it at lower cost, however, when they reduce the risk associated with their loans. SSCF and ESPCs are most accessible to firms with inadequate credit on their own when other higher-credit firms play a role in the transaction and assume some of the risk of the financed project. With SSCF, financing risks are reduced because the larger buyer satisfies the account receivable; the large buyer is the debtor. With ESPCs, the energy service companies' (ESCOs') savings guarantees, or analogous energy savings insurance, reduce technical performance risks associated with the financed projects and ensure that realized savings from the investments are sufficient to satisfy loan payments.

Aside from financing costs, transactions costs are another thematic obstacle thwarting more widespread use of SSCF and ESPCs. Both SSCF and ESPCs utilize technological advances to reduce costs. SSCF uses digital platforms to connect FSPs and suppliers seeking trade financing, and ESPCs will likely leverage advances in measurement and management technologies with increasing frequency to reduce transaction costs. Similarly, standardized measurement and verification (M&V) processes historically and the increasing availability of model ESPCs today seek to reduce the transactions costs of this financing tool.

Looking beyond pecuniary themes, the relational aspects of SSCF and ESPCs are central to their success. Using the broader relationships forged by

308. *See Small Businesses Concerned over Navigating Climate Actions*, *supra* note 15.

SSCF and ESPCs to share technical expertise enables SMEs, and other firms lacking sustainability departments and knowledge, to consider how decarbonization efforts fit into their operations. Alongside financing, SMEs cite a lack of expertise as a significant barrier to their engagement in sustainability efforts. To combat this, large firms often utilize trainings, sustainability-resource sharing, and nonfinancial recognition to support decarbonization along their supply chains before initiating SSCF programs to accelerate and financially support sustainability efforts.[309] The value of centralized, technical expertise is even more apparent in the context of performance contracting, where the ESCO acts as a central point of contact for the project—from the initial energy audit through M&V after a project is delivered.

These tools demonstrate the tangible value of relationships beyond resource pooling too. The significant interfirm planning that precedes SSCF programs' rollouts strengthens relationships between buyers and suppliers up and down the value chain—a benefit large buyers are quick to highlight[310]—even though the terms of financing are fairly short when considered in isolation. The financial stability SSCF affords small suppliers by smoothing cashflow also provides large buyers reassurance of the economic health of their supply chains, a concern the 2008 financial crisis originally brought to light. It is true that ESCOs and their customers lack any relationship beyond their contractual ties, allowing them to part ways at the end of the contract term. However, the lengthy terms of some ESPCs demonstrate the central importance of partnering with firms that one can confidently assume will live up to their contractual obligations. ESPCs' ability to provide project support over a lengthy period also has the benefit of enabling long-term decarbonization projects that produce deeper decarbonization benefits—which SSCF has heretofore been unable to deliver, notwithstanding the superior quality long-term trade relationships that SSCF supports.

B. Supply Chain Energy Savings Guarantees

These themes inform ways in which SSCF can be combined with ESPCs to maximize financial returns and emissions reductions from sustainability investments for SMEs, their buyers, and the financial institutions underwriting the investments. This Article proposes a form of ESPC that can be offered to SMEs that supply larger buyers. Smaller ESCOs seem poised to serve this community of SMEs, but small ESCOs' and SMEs' shared credit

309. SUSTAINABLE SUPPLY CHAIN FINANCE, *supra* note 17, at 3 ("Buyers adopt a common set of approaches to engage suppliers on emissions reductions, including trainings, resources, and non-financial recognition. While helpful, these offerings limit the impact that any one buyer can have on a supplier.").

310. *See* SUSTAINABLE SUPPLY CHAIN FINANCE, *supra* note 17, at 7–8, 11.

deficiencies make these arrangements difficult because of financing limitations. Rather than solely relying on larger ESCOs who are hesitant to execute smaller projects or waiting for energy savings insurance markets to mature and become widespread, the credit of the buyer firm should be used to guarantee the energy savings the ESCO anticipates will materialize from successful execution of the ESPC. Leveraging the credit of the buyer firm to reduce technical performance risks should enable smaller ESCOs and SMEs to access the capital necessary for executing ESPCs, which will provide SMEs with new access to a valuable tool for facilitating energy efficiency upgrades and reducing carbon emissions.

Bringing these "supply chain energy savings guarantees" to ESPC markets will undoubtedly require the acquiescence of buyer firms, but buyers' significant interest in developing strong relationships with their suppliers, as evidenced by SSCF programs, suggests such a tool may be feasibly implemented. Whereas ESPCs frequently split upside performance risk between the ESCO and the customer and leave downside risk solely with the ESCO on account of the energy savings guarantee, the novel ESPC component proposed here would use the price in a supplier's supply chain contract with a larger buyer to distribute risk in a similar manner between the supplier (i.e., the ESPC customer), the ESCO, and the buyer.

One way to allocate technical performance risk allocation is to develop a supply chain contract in which the price per unit is bifurcated into energy and non-energy related terms, allowing for a variable energy cost. In practice, the supply chain contract between the supplier and buyer would include an initial energy cost per unit charged to the buyer (based on pre-ESPC energy costs) that falls in proportion to the consumption savings realized from the energy efficiency upgrades after project delivery.[311]

For concreteness, consider a scenario where an ESCO and small supplier sign an ESPC with a supply chain energy savings guarantee from the supplier's larger buyer that helped the supplier access funding for the project. Assume the financing costs are $1 per unit delivered to the buyer and electricity costs $0.25 per kilowatt-hour (kWh). If pre-ESPC energy consumption per unit is 10 kWh and falls to 5 kWh once the efficiency measures are implemented, energy savings amount to $1.25 per unit.[312] The

311. To avoid introducing complexity and risk from fluctuations in energy markets, realized consumption savings may be assessed based on realized reductions in energy consumption, not necessarily the direct cost savings from that reduced consumption. That is, if the product originally required 100 kilowatt-hours (kWh) to produce but falls to 50 kWh, then holding the prevailing price of energy fixed, savings would be assessed as the difference between the total energy costs that would have prevailed with the counterfactual 100-kWh product as compared to the realized 50-kWh product after the efficiency investments are implemented.

312. Mathematically, this looks like the following: (10kWh*$0.25/kWh)-(5kWh*$0.25/kWh)=$1.25.

first dollar in savings will be used to service the loan[313] and the remaining $0.25 per unit may be divided between the supplier-customer, the ESCO, and the larger buyer as the circumstances warrant. Among these three contracting parties, the bulk of the upside risk will likely lay with the buyer because it facilitates access to affordable financing by guaranteeing the energy savings and assuming the associated downside technical performance risks. That is, if energy consumption per unit only falls from 10 kWh to 7 kWh, then the $0.75 in per unit savings would be insufficient to satisfy the loan and the buyer would pay a higher per unit energy cost,[314] increasing the unit price by $0.25 to cover the difference necessary to service the loan.

In this situation, the supplier would still be induced to participate because it bears no downside performance risk while acquiring potential upside risk if cost savings outlast the life of the loan (in which case the $1.25 in savings can be distributed among the supplier and buyer after the loan term concludes through any ongoing supply chain relationship that persists between them) or exceed the amount necessary to service the loan. Participation in such a program may also satisfy sustainability metrics tied to the buyer firm's SSCF program (if it has one), enabling access to additional low-cost capital for new sustainability projects or other investments.[315] Finally, leveraging the existing ESPC model grants smaller suppliers access to much needed sustainability expertise, which has handicapped their decarbonization efforts historically, in a much more tangible way than trainings or sustainability-resource sharing.

The ESCO, for its part, is induced to participate because it gains access to new business that may not otherwise be available without the low-cost financing acquired through the large buyer's savings guarantee, with minimal downside risks since the ESCO no longer needs to assume all the performance risk of the efficiency projects (as it usually would under a traditional ESPC framework).[316] The potential for low-risk, repeat business

313. Here, it is assumed that the loan is used to fund the efficiency projects associated with the ESPC, which includes necessary fees paid to the ESCO under the contract.

314. This result is derived as follows: (10kWh*$0.25/kWh)-(7kWh*$0.25/kWh)=$0.75.

315. It would not be surprising for a buyer to provide supply chain savings guarantees *and* have a SSCF program because the latter can exist at no cost to the buyer firm. When these programs coexist, there is a natural synergy between them because (1) the initial energy audit for the ESPC might identify numerous sustainability measures that are ripe for implementation, even if they cannot be incorporated into the final ESPC, and (2) the improved sustainability of the supplier firm from the ESPC's execution would enable access to additional low-cost capital through the SSCF program that the supplier may use to fund remaining efficiency projects identified during the energy audit.

316. This assumes the administrative costs associated with implementing the program are initially paid for through the loan. Alternatively, to save on financing costs, rather than collecting payment directly from the *loan*, when projected energy savings are sufficiently large ESCOs may choose to be paid directly from the *savings* with increased downside risk if the savings accrued are only sufficient to service the loan, as with shared savings models. *See, e.g.*, *ESCO Contracts*, *supra* note 20 (describing shared savings

grounded in strong ESCO-buyer relationships would likely increase competition among ESCOs by incentivizing existing ESCOs to serve smaller industrial and commercial clients and inviting new ESCOs to enter the market to satisfy the new demand for small-scale ESPCs. ESCOs or sustainability consultants that already have a relationship with the larger buyer firms may also step in to serve this new class of ESPC customers—which would further reduce transaction costs associated with energy audits by leveraging another existing relationship along the supply chain, the relationship between the supplier and the buyer's agents already providing SMEs with sustainability training or other resources.[317]

Finally, the buyer is incentivized to participate because the projects that the ESPC facilitates should generate reductions in the buyer's Scope 3 emissions through low-risk energy efficiency investments, strengthen relationships with its suppliers,[318] and create potential upside risk if energy savings are larger than anticipated or persist beyond the life of the loans. To make supply chain energy savings guarantees viable and ensure deep decarbonization is achievable, however, the length of the buyer-supplier contract terms may need to be extended. This feature may be desirable from the buyer's perspective because such an arrangement serves to secure the buyer's investment in the buyer-supplier relationship, creating long-term economic stability for the supplier and long-term Scope 3 emissions stability for the buyer.[319]

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and guaranteed savings approaches to ESPCs). This has the added upside, however, of preventing perverse incentives on the part of the ESCO, which might be induced to overpromise results if it knows the loan covers its costs and the buyer firm is liable for the cost of the loan independent of the ultimate returns from the energy efficiency investments. The ESCO would face other incentives to remain truthful about projected savings, however, since the buyer firm would be the ESCO's source of future contracts (on account of the buyer's many suppliers), suggesting that cheating these repeat players would not be in the ESCO's long-term best interest.

317. This seems like a natural progression if a large firm works to reduce their own Scope 1 and 2 emissions before leveraging their capital and credit to reduce Scope 3 emissions. Insofar as this assumption holds, it may be the case that the sustainability consultants that the buyer holds out as the supplier's potential ESCO already have strong working relationships with the suppliers. This again highlights the parallel between the supply chain energy savings guarantees proposed here and large firms' ongoing efforts to share their sustainability expertise with SMEs.

318. These relationships are strengthened because the buyer is committing to the suppliers by supporting their long-term sustainability investments but also because the ESCO is likely to be closely related to the buyer because of their repeat interactions through the supply chain–initiated ESPCs that would become more common if the supply chain energy savings guarantee is adopted. This allows the buyer-affiliated ESCO to act as the central conduit for providing sustainability information to the SMEs that need it.

319. That is, if the buyer is taking on risk in part because of potential financial upside risks but also in part because of the reduction in Scope 3 emissions associated with the ESPC's energy efficiency investments, increasing the length of the supply chain relationship solidifies the returns to the buyer from Scope 3 emissions reductions, which continually accrue over the life of the relationship. As noted in the SSCF context, however, some SMEs are hesitant about becoming too reliant on financing from one large

CONCLUSION

There remains much work to be done if aspirational decarbonization goals are going to be achieved. The cumulative impacts of small- and medium-sized enterprises (SMEs) cannot be ignored in this effort. If there is any chance of achieving decarbonization goals, SMEs must be brought into the policy and governance debates surrounding decarbonization.[320] Private environmental governance pressures have already brought SMEs into this dialogue to some extent. Business-to-business pressures levied through the supply chain have also long motivated sustainability in SMEs.[321] But persistent financial and technical barriers still prevent SMEs from fully realizing the economic and environmental benefits of sustainability investments.[322]

Banks, companies, and financial institutions have developed several alternative financing tools with the hope of overcoming some of these limitations. Sustainable supply chain financing (SSCF) offers financial incentives for reaching sustainability goals, helping provide SMEs up the supply chain with access to much needed capital and aiding cash-flow management.[323] Similarly, energy saving performance contracts (ESPCs) leverage energy service companies' (ESCOs') technical expertise and savings guarantees to identify cost-effective energy efficiency investments that functionally pay for themselves, providing a means for cash-strapped organizations to invest in economical and environmentally beneficial energy efficiency upgrades.[324] Of course, in practice these tools have certain flaws that limit their reach and impact. SSCF is only a short-term credit option that offers financing to firms that already have the financial means to invest in sustainability, which only then triggers access to additional, low-cost financing.[325] ESPCs require high-dollar projects to attract one of the large ESCOs that dominate the market and carry out the underlying efficiency projects associated with the contracts. Smaller ESCOs who are more willing

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buyer because it is perceived as limiting the SMEs' ability to expand to serve other buyers. *See* Bancilhon et al., *supra* note 16, at 21. To the extent buyers are able to build rapport with their suppliers and clearly communicate the mutual benefits of ESPCs with supply chain energy savings guarantees and long-term supply chain relationships more broadly, these concerns will be ameliorated. *See id.* at 22. Further, the limited use of the supply chain energy savings guarantee would prevent SMEs from encountering this situation since financing for non-sustainability purposes would need to originate elsewhere. SSCF was concerning to SMEs because the *use* of the financing was unrestricted and made it a potential source of all future financing.

320. *See supra* Part I.A.
321. *See supra* Part I.B.
322. *See supra* Part I.C.
323. *See supra* Part II.A.1.
324. *See supra* Part II.B.1.
325. *See supra* Part II.A.3.

to undertake smaller projects lack the credit to provide energy savings guarantees, or at least guarantees credible enough to have an appreciable impact on financing costs.[326]

Combining aspects of SSCF programs and ESPCs may overcome the tools' individual limitations and assist SMEs in surpassing persistent technical and financial barriers to their decarbonization efforts.[327] By leveraging the relationships that suppliers and buyers forge through the supply chain, large, financially stable buyers are equipped to take over the guarantor role traditionally performed by the ESCO in an ESPC. If a small supplier seeks an ESPC, the larger buyer can step in to offer to add a supply chain energy savings guarantee into an existing supply chain contract, which reduces the financing costs of the ESPC by reducing associated risk and makes performance contracting accessible to the smaller ESCOs who are prepared to take on small-dollar projects.[328] Such a tool reinterprets the structure of a traditional ESPC with SMEs at its center and strong supply chain relationships as a vital enabling characteristic. Although supply chain energy savings guarantees may not be appropriate for every supply chain or every SME, adding this tool to the PEG arsenal supporting decarbonization, alongside SSCF and traditional ESPCs, is an important step toward realizing deep decarbonization in SMEs.

326. *See supra* Part II.B.3.
327. *See supra* Part III.A.
328. *See supra* Part III.B.