



# REVIEWING THE SUSTAINABLE FINANCE LANDSCAPE

INSIGHT BRIEF

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## HIGHLIGHTS

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### FIVE ELEMENTS OF FINANCIAL TRANSACTIONS

Finance concerns the flow of capital. It consists of transactions by **principals** to obtain capital from **financiers** and to make **expenditures** that further their goals. Principals enter into **agreements to obtain capital** and **agreements to make expenditures**. These five transaction elements are common to most finance transactions, including those involving sustainable finance.

### THREE TYPES OF BARRIERS

Barriers to sustainable finance can be categorized as risk/return, information, and scale. These barriers may impact any of the five transaction elements. There are various ways to address these barriers, and these involve both policy and non-policy approaches.

### IDENTIFICATION OF STRATEGY

By examining the five transaction elements, the barriers that impact each, and both policy and non-policy approaches to addressing these barriers in the context of sustainability, we can identify 26 broad sustainable finance strategies.

### IMPLICATIONS FOR SUSTAINABLE FINANCE

- **Diversity of Strategies:** There are many tools in the sustainable finance toolkit. Actors should select strategies appropriate to the aspect of the energy system they wish to transform and to their resource constraints.
- **Interrelationship of Elements:** Sustainable finance transactions generally involve all five elements, so it is necessary to focus on the elements where the greatest barriers exist.
- **Policy and Non-Policy Approaches:** While these approaches may differ in many respects, both should be considered as a means of addressing barriers to financing transactions.



## INTRODUCTION

**Context:** Describing “sustainable finance” reminds us of the parable about blind men with an elephant: each man touches a different part of the elephant and describes something entirely different. Similarly, to understand sustainable finance it is necessary to examine all the parts and understand how they relate to one another. Through this understanding, actors in the sustainability realm can address the high cost or low availability of capital into specific sustainability initiatives.

**Objective:** This insight brief describes sustainable finance by organizing the various elements of financial transactions, identifying key transaction barriers, and applying these concepts to sustainability. For this discussion, sustainability focuses primarily on global energy transformation to a clean, prosperous, and secure low-carbon future.

**Tools:** The framework described in this discussion takes a whole-systems approach to outlining financial transactions. In so doing, it seeks to identify a breadth of strategies for improving the flow of capital into sustainability-related investments. Organizing the landscape of sustainable finance in this way enables actors to more easily identify and leverage the appropriate strategies for their goals.

## ||||||| ELEMENTS OF SUSTAINABLE FINANCE TRANSACTIONS

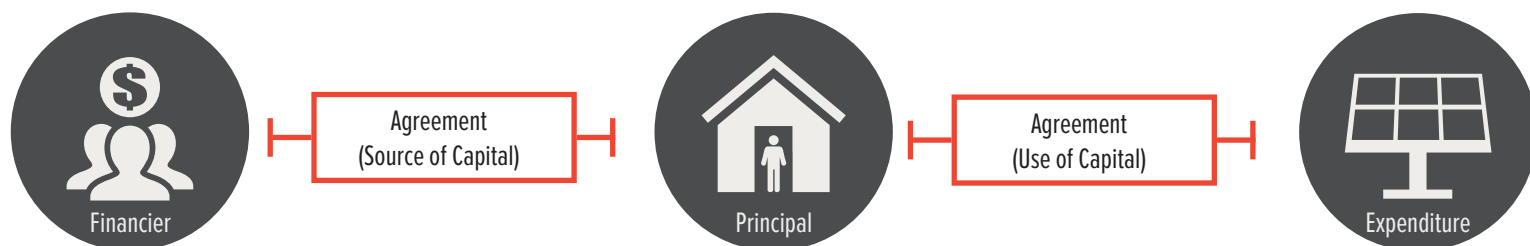
Sustainable finance is a subset of traditional finance. All finance transactions begin with a **principal** that decides to finance an investment. A transaction involves not only a principal, but also a **financier** (source of capital) and an **expenditure** (use of capital).

- A **principal** can be an organization or an individual that decides to finance an investment.
- A **financier** can be a bank, government agency, or other capital provider. Financiers themselves generally obtain capital from other financiers.
- An **expenditure** can be an electric vehicle, a building retrofit, a distributed energy resource, battery manufacturing equipment, or other type of investment that is designed to promote sustainability.

There are also various types of agreements governing both the source of capital for the principal, and the use of capital by a principal.

- An **agreement governing the source of capital** can be a loan document, common stock, or other kind of financial instrument.
- An **agreement governing the use of capital** can be an asset purchase agreement, construction agreement, sales contract, or other document.

**Figure 1: The five elements of a finance transaction.**



## ||||||| BARRIERS TO SUSTAINABLE FINANCE TRANSACTIONS

To improve the flow of capital, it is necessary to reduce the barriers, if any, that exist at each of the five elements for any given aspect of a market transformation (e.g., residential building energy efficiency in the U.S., solar panel manufacturing in China). The three main barriers to financing sustainability-related investments are:<sup>1</sup>

**RISK/RETURN:** One barrier is when there is insufficient return for the actual or perceived risk. Risk and return are inherent in an expenditure, and both principals and financiers have risk/return requirements. Actions that will improve returns relative to risk include:

- Reducing upfront transaction costs
- Increasing or accelerating net cash inflows
- Reducing the uncertainty of cash flows

**INFORMATION:** Another barrier is when market participants are not aware of a potential transaction or do not understand its economic value. Actions to increase available information include:

- Educating market participants
- Developing means to simplify the analysis of a potential transaction
- Decreasing the time required to disseminate information

**SCALE:** A barrier also exists when an opportunity is too small to generate the necessary focus to produce a transaction. Actions that can enlarge the scale of an opportunity include:

- Assembling platforms where information, opportunities, or market participants can be aggregated
- Generating greater interaction between market participants
- Establishing mandates or guidelines to increase transaction volume

This categorization of barriers is imperfect; some strategies will address multiple barriers. Additionally, for many agreements, providing information and driving scale are often indistinguishable, as these are simply understandings between different market participants. Nevertheless, this categorization can assist in evaluating the challenges faced in any given type of financial transaction.

## ||||||| STRATEGY CHOICES: POLICY OR NON-POLICY APPROACHES

Barriers to sustainable finance transactions can be addressed using policy approaches—anything that requires government action (e.g., law, regulation, mandate)—or non-policy approaches. Policy approaches can be used to address market failures and/or stimulate an uptake rate that is too slow to meet the urgency of a sustainability issue. Market-based non-

<sup>1</sup>Market conditions can also serve as a barrier, although this is not discussed here. This barrier is difficult to address by any individual stakeholder and is often relatively short-term in nature (e.g., the 2008 financial crisis), and as such, may represent only a temporary barrier.

policy approaches can supplement policy approaches or drive opportunities where policy forcing mechanisms are unavailable or inadequate.

In this overview, we make no attempt to compare the efficacy of the two approaches, either in general or with respect to specific situations. Rather, we acknowledge that both should be considered.

## ■■■■■■■■ COMBINING SUSTAINABLE FINANCE TRANSACTION ELEMENTS, BARRIERS, AND APPROACHES

By combining the transaction elements, barriers, and approaches (policy and non-policy), it is possible to describe many types of strategies around sustainable finance, illustrated as a matrix in Table 1. The purpose of this matrix is not to suggest which strategy is better or to enumerate all the examples for each strategy. Rather, the matrix offers a framework with which to explore a broad range of strategies. Additional caveats include:

- Not every sustainability initiative requires capital (e.g., choosing to use less energy with existing capital assets). Thus, there are many ways to promote sustainability that do not involve sustainable finance and are not discussed here.
- This categorization makes no attempt to capture all the different business models that may be used by market participants.
- The terms under which capital may be obtained or deployed can vary significantly with respect to timing, costs and benefits, or otherwise.
- The potential scale of each strategy may differ, and significant variations may exist geographically.

Table 1: Matrix of sustainable finance strategies with examples

ELEMENT	BARRIER	POLICY	NON-POLICY
Financier	Risk/return	Public/private financing vehicles such as green banks	Program-related investing by foundations or other impact investors
	Information	Evaluating or regulating climate risk of financial institution portfolios	Voluntary guidelines for responsible lending/investing
	Scale	Regulations requiring minimum investments in a market segment	Attracting new sources of capital through investor education
Agreement (Source of Capital)	Risk/return	Government-enabled financing mechanisms such as property assessed clean energy (PACE) and on-bill financing	Private market financing mechanisms such as cat bonds, solar securitizations, green REITs, and yieldcos
	Information and scale	Establishing assignability of statutory rights such as tax credits	Labeling investments such as green bonds or clean indices, improving document standardization
Principal	Risk/return	Cap-and-trade regulations, third-party access to wholesale markets	Investment and divestment guidelines, shareholder activism, business liability insurance
	Information	Mandatory climate risk reporting guidelines	Voluntary sustainability metrics disclosure
	Scale	Renewable portfolio standards, community solar, climate action plans	Advisors or platforms to assist with renewable procurement
Agreement (Use of Capital)	Risk/return	Feed-in tariffs, value-of-solar tariffs, net energy metering	Green leases to align incentives of lessors and lessees
	Information and scale	Government-established protocols and enabled contracts	Investor information tools such as credit scoring or evaluation methodologies
Expenditure	Risk/return	Government incentives	Insurance policies and performance guarantees for certain asset types
	Information	Mandated reporting of asset economics such as mileage or energy use labels	Voluntary reporting of asset economics
	Scale	Fungible resource rights	Markets for ecosystem services such as carbon sequestration

## ■■■■■ APPLYING THE FRAMEWORK: SELECTED CASE STUDIES

The case studies that follow illustrate how the sustainable finance framework might be applied to evaluate different methods of achieving greater uptake of clean technologies. There are several components to each case study. First, we identify examples for each of the five transaction elements. We then identify and assess the barriers for the five elements and the associated implications to addressing those barriers.

Tables 2 and 3 evaluate the flow of capital in the U.S. residential solar and electric vehicles (EV) markets.











### KEY FINDINGS:

- The main constrictions for residential solar exist closer to the actual expenditure end of the spectrum than the financier side (i.e., the constraint is not access to capital, but is making solar an easier investment choice). The primary opportunity lies in continuing to improve standardization of agreements to deploy solar and increasing convenience and consumer awareness of solar.
- For EVs the opposite is true. Limited financier demand for financial instruments appropriate for electric vehicle supply equipment has stymied massive scale charging infrastructure development and compounded customer range anxiety.

While the assessments of barriers contained in these case studies necessarily involve subjective judgment, they are illustrative of the type of evaluation that should be undertaken when analyzing financing transactions in any area of sustainability.











**Table 2: Applying the Framework—U.S. Residential Solar**

Sustainable finance gap analysis for residential solar using the elements of a financial transaction framework

	 FINANCIER	 PRINCIPAL	 EXPENDITURE		
					
EXAMPLES	Traditional institutional debt and equity investors, tax-oriented investors, structured product investors, green banks	Owner-occupants of residential properties, investors in residential properties	Leases, power purchase agreements, sales contracts, other agreements (e.g., permits, utility interconnection)	Investment tax credit, other incentives, community solar arrangements	
PRIMARY BARRIER(S)	INFO.: There is interest among numerous types of financiers, although some investor groups have been underrepresented in the asset class.	RISK/RETURN: Many potential principals are not yet convinced of the value proposition of solar or the ease of implementation.	INFO./SCALE: Some agreements (e.g., permits) are complex and not standardized, while others are standardized but are not familiar to consumers.	INFO.: While the economics of solar have improved, the asset is still not mainstream for most consumers.	
ASSESSMENT*					
IMPLICATIONS	MEDIUM OPPORTUNITY: Focus on education of investor classes with low participation in the asset class.	HIGH OPPORTUNITY: Give consumers more reasons to say “yes” to solar through expanded education and marketing.	VERY HIGH OPPORTUNITY: Make solar procurement as easy as getting a smart phone: simplify every stage of the acquisition and ownership process.	HIGH OPPORTUNITY: Make the asset easier to understand and more fun to acquire.	

\* The lower the opportunity, the greater the degree to which capital flows are impeded by that transaction element.

**Table 3: Applying the Framework—Electric Vehicles (EVs) and Electric Vehicle Supply Equipment (EVSE)**  
Sustainable finance gap analysis for electric vehicles using the elements of a financial transaction framework

	 FINANCIER	 PRINCIPAL	 ASSET		
					
EXAMPLES	Traditional institutional debt and equity investors, tax-oriented investors, structured product investors, credit unions	Asset backed securitization, traditional debt, green bonds, high yield debt	Retail consumers, commercial and industrial fleets, government fleets, rental/service fleets	Fleet PPA/EPC, lease, dealer financing, cash purchase, bank financing	Federal tax incentives, zero-emission-vehicle state incentives (OR, CA, NY, ME, VT, MA, CT, MD), promotional vendor financing
PRIMARY BARRIER(S)	RISK/RETURN, SCALE: Issues center around infrastructure deployment and financing non-traditional fleet business models which have little credit precedence.	SCALE: Traditional financing instruments exist for vehicles but fail to capture any incremental value of EVs, while limited instruments exist for infrastructure given small scale of investment.	INFO., RISK/RETURN: There is ignorance of full cost of ownership, range anxiety, and social norms. Several states' procurement laws prevent states from entering into PPA-like contracts with fleet operators.	RISK/RETURN, SCALE: Agreements governing EV purchases are in their nascent stage of innovation and are dominated by traditional financing arrangements.	RISK/RETURN: Many consumers are unable to capture tax incentives. Some states levy road fees on EVs to recover lost gas taxes.
ASSESSMENT*					
IMPLICATIONS	MEDIUM OPPORTUNITY: Low EVSE financing and therefore infrastructure, reinforce customer range anxiety barriers.	MEDIUM OPPORTUNITY: Promote innovation in financial instruments to better capture characteristics of EVs and EVSE.	VERY HIGH OPPORTUNITY: Give consumers more reasons to say "yes" to EVs through expanded education and marketing. Enable new fleet business models.	MEDIUM OPPORTUNITY: Incorporate principles from agreement structures for other renewable assets into agreements for EVs.	MEDIUM OPPORTUNITY: Support new business models as well as assignability of state incentives.

\* The lower the opportunity, the greater the degree to which capital flows are impeded by that transaction element.





## IMPLICATIONS

By organizing the sustainable finance landscape into this framework, three key implications are clear:

- **Diversity of Strategies:** There are many strategies, and actors should select strategies appropriate to the area they wish to transform and to their resource constraints.
- **Interrelationship of Elements:** Sustainable finance transactions generally involve five elements. Focusing on the correct elements (i.e., those that pose the greatest barriers to capital flow) may unlock growth across the entire financial transaction value chain.
- **Policy and Non-Policy Approaches:** While certain stakeholders focus on one approach or the other, we recognize that both can address the key barriers to sustainable finance. The suitability of one approach versus the other will depend on the situation.

At the outset of this report, we mentioned the parable of the blind men who each touch a different part of an elephant and, when asked to describe an elephant, each describe something completely different. The intention of this report is to describe the whole sustainable finance system, and connect its various parts, creating a portfolio of strategies.

With an understanding of the broad landscape, we hope that stakeholders can uncover new strategies and recognize the relationship between them. Our hope is that this approach produces greater outcomes than would otherwise be possible. The strategies that will have the greatest impact are those which correctly identify and successfully overcome the barriers that inhibit the financing of sustainable initiatives.

### ABOUT ROCKY MOUNTAIN INSTITUTE

Rocky Mountain Institute (RMI)—an independent nonprofit founded in 1982—transforms global energy use to create a clean, prosperous, and secure low-carbon future. It engages businesses, communities, institutions, and entrepreneurs to accelerate the adoption of market-based solutions that cost-effectively shift from fossil fuels to efficiency and renewables. In 2014, RMI merged with Carbon War Room (CWR), whose business-led market interventions advance a low-carbon economy. The combined organization has offices in Snowmass and Boulder, Colorado; New York City; Washington, D.C.; and Beijing.