

# Alternative Energy Market Update – Q2'22

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*Spring 2022*



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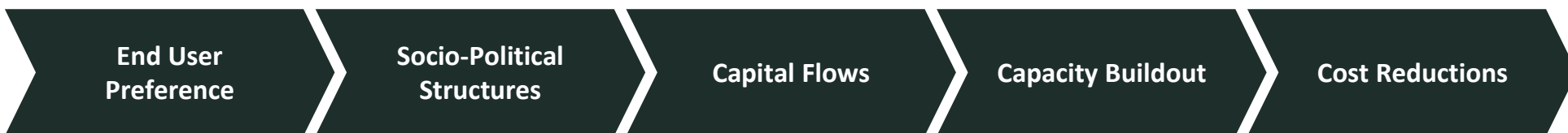
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# Alternative Energy | Long-Term Conceptual Framework

*The dynamic growth in Alternative Energy and Cleantech is underpinned by a generational trend of individuals' increasing preference for cleaner energy*









<p><i>Public support for cleaner energy and fighting climate change is at an all time high</i></p>	<p><i>As demand preferences change, socio-political structures adapt</i></p>	<p><i>As socio-political structures change, the money starts to flow in that direction</i></p>	<p><i>As capital flows increase and chase opportunities, capacity build-out ramps and supply chains scale</i></p>	<p><i>As supply chains scale, costs ratchet down, and once-emerging technologies displace traditional forms of energy</i></p>
<ul style="list-style-type: none"> <li>60% of Americans are worried climate change will negatively impact them in their lifetimes<sup>1</sup></li> <li>More than 75% of Americans say they are willing to make changes to reduce the effects of climate change<sup>1</sup></li> <li>The UNDP's Peoples' Climate Vote revealed that of the U.S. population that believes climate change is a threat, 65% of Americans support clean energy as the best solution<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>ESG trends</li> <li>Emerging markets for Environmental Attributes (e.g. RECs, LCFS, and Carbon Credits)</li> <li>Federal Tax incentives (e.g. ITC/PTC, 45Q)</li> <li>SEC considering standardization of climate-related disclosures for investors</li> <li>Federal government has valued the social cost of carbon at \$51 per ton<sup>3</sup></li> </ul>	<ul style="list-style-type: none"> <li>Investors continue to deploy capital into companies with a strong focus on ESG and related policies</li> <li>Q1'22 net sustainable fund inflows globally totaled ~\$97bn, representing a 36% decrease relative to Q4'21</li> <li>This short-term trend is not limited to sustainable funds, however, as overall global fund flows fell by 73% over the same period</li> </ul>	<ul style="list-style-type: none"> <li>S&amp;P Capital IQ reports that the U.S. added 28 GW of new generating capacity to the grid in 2021. Wind accounted for 41% of new capacity while solar accounted for 31%<sup>5</sup></li> <li>The American Gas Foundation predicts that RNG from LFG production could increase over 200% by 2040<sup>6</sup></li> <li>Globally, green H<sub>2</sub> capacity has grown to 385 MW, with projections of over 151 GW by 2030<sup>7</sup></li> </ul>	<ul style="list-style-type: none"> <li>Being the low-cost producer is the name of the game in Energy</li> <li>Wind and solar costs now outcompete traditional thermal power generation on cost, even on an unsubsidized basis<sup>8</sup></li> <li>Renewable energy capacity additions expected to dwarf traditional sources in 2022, accounting for 90% of new power capacity globally<sup>9</sup></li> </ul>

<sup>1</sup> Pew Research Center; <sup>2</sup> United Nations Development Programme; <sup>3</sup> Whitehouse; <sup>4</sup> Morningstar; <sup>5</sup> IEEFA; <sup>6</sup> American Gas Foundation; <sup>7</sup> IEA Hydrogen Projects Database; <sup>8</sup> Lazard; <sup>9</sup> IEA Renewable Energy Market Update 2021

## Alternative Energy | Short-Term Developments

*While the long-term fundamental backdrop remains very constructive for Alternative Energy and Cleantech, recent headwinds have caused volatility*

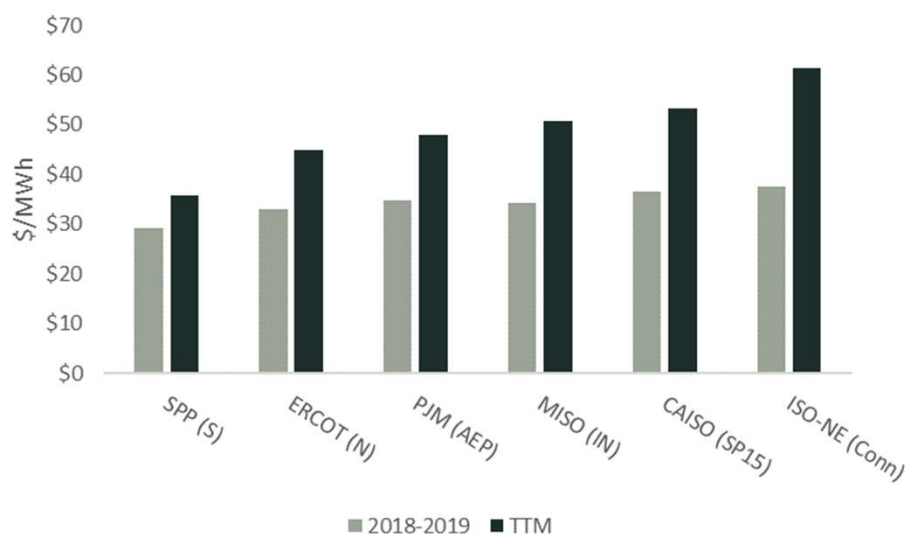
Activity	Market Impact	Commentary
<b>Auxin Solar Tariff Petition</b>		<ul style="list-style-type: none"> <li>▪ Looming fear of retroactively applied tariffs on PV cell imports from Cambodia, Malaysia, Thailand and Vietnam has triggered major supply chain disruption on top of existing issues</li> </ul>
<b>Macroeconomic Headwinds</b>		<ul style="list-style-type: none"> <li>▪ Though not limited to Alternative Energy, inflationary pressures, rising interest rates, and persistent supply chain issues create a challenging landscape</li> </ul>
<b>SEC Disclosure Requirements</b>		<ul style="list-style-type: none"> <li>▪ A new SEC-proposed rule would require public companies to disclose standardized climate-related information for existing and prospective investors, which will boost corporate interests in ESG transactions</li> </ul>
<b>Budget Reconciliation</b>		<ul style="list-style-type: none"> <li>▪ A \$325 billion clean energy tax package is on the table via potential budget reconciliation</li> <li>▪ The package would include solar and wind tax credit extensions and support for energy storage, transmission, nuclear, and other initiatives</li> </ul>
<b>Fund Flows</b>		<ul style="list-style-type: none"> <li>▪ Q1'22 net sustainable fund inflows decreased by ~36% relative to Q4'21, the sharpest quarterly decline in over three years. Comparatively, overall fund inflows decreased by 73% over the same period<sup>1</sup></li> <li>▪ Proliferation of dedicated clean energy funds has assuaged any concerns about capital scarcity</li> </ul>
<b>Capital Markets</b>		<ul style="list-style-type: none"> <li>▪ Monetary tightening, Russia's invasion of Ukraine, persistent Covid lockdowns in China, among other factors, are driving global market volatility</li> <li>▪ Public Cleantech companies have lost ~30% of their value since the beginning of the year, compared with 24% for the broader market<sup>2</sup></li> </ul>

Source: <sup>1</sup> Morningstar, <sup>2</sup> EIP Climate Tech Index

## Alternative Energy | Energy Market Volatility

*Electricity markets are not spared from inflationary pressure, thus providing further catalyst for renewable energy adoption*

### Median Real-Time On-Peak Electricity Prices by Hub



- Electricity prices have risen sharply in every major region of the U.S.
- Compared to 2018-2019, New England TTM ISO prices have risen most significantly relative to other regions
- Even hubs with massive penetrations of zero marginal cost wind and solar production are seeing prices hit multi-year highs, with on-peak SPP-South prices of more than \$35/MWh and Southern CAISO prices over \$50/MWh
- Prices in ERCOT, the most active renewable energy development market, rose more than 30% from 2018 and 2019 levels and recently tested the systemwide price cap during a May 2022 heatwave that coincided with traditional generation planned maintenance outages

### Structural Reset of Thermal Generation Input Fuel Prices

- Higher electricity prices across the country are a reflection of higher natural gas and thermal coal prices, which have seen 140% and 110% increases over the past year, respectively
  - Tight supplies, exacerbated by a growing LNG export market has power generators paying more than \$7.25/MMBtu as of May 2022 for spot natural gas
  - To help Europe reduce its dependence on Russian gas, the U.S. has pledged to export an additional 525 BCF this year, leading the EIA to project a continued rise in domestic natural gas prices
- While commodity prices can whipsaw quickly, we view the trend of higher fuel input prices as secular, driven by a lack of new pipeline build-out to get gas to market and a dearth of capital willing to invest in U.S. coal production
- The silver lining here is that, despite challenges within the renewable energy development industry, expensive fuel inputs make wind, solar, and storage more competitive and serve to accelerate adoption, both among utilities and corporates

Source: S&P CapiQ Pro

# Alternative Energy | Public Market Overview

Ticker	Price 5/23/2022	Market Cap (\$mm)	Enterprise Value (\$mm)	YTD Total Returns (%)	Valuation		Debt / Total Cap (%)	Credit		
					2022E EV / EBITDA (x)	2023E EV / EBITDA (x)		2022E Net Debt / EBITDA (x)	S&P Credit Rating	
<b>Alternative Energy</b>										
Array Technologies	ARRY	\$9.41	\$1,413	\$2,490	(40.0%)	19.7x	10.0x	68.4%	5.4x	B
Brookfield Renewable Corporation	BEPC	36.56	13,229	37,307	1.7%	17.7x	16.2x	49.8%	9.8x	A-
First Solar	FSLR	66.06	7,041	5,893	(24.2%)	41.4x	10.5x	6.4%	0.0x	NA
Hannon Armstrong	HASI	37.55	3,257	5,648	(28.8%)	40.4x	31.3x	37.5%	4.3x	BB+
Ormat Technologies	ORA	78.14	4,381	6,251	(1.2%)	14.1x	11.8x	48.3%	4.3x	NA
Sunnova Energy International	NOVA	17.64	2,022	5,863	(36.8%)	47.4x	28.9x	68.8%	36.9x	B-
SunPower Corporation	SPWR	16.58	2,882	3,002	(20.6%)	31.1x	17.9x	61.3%	0.0x	NA
Sunrun	RUN	23.31	4,898	13,222	(32.0%)	NA	NA	49.5%	0.0x	NA
<b>Cleantech</b>										
Bloom Energy Corporation	BE	\$16.07	\$2,864	\$3,933	(26.7%)	85.9x	24.5x	87.8%	5.1x	NA
Enphase Energy	ENPH	169.55	22,894	23,136	(7.3%)	39.7x	30.4x	79.8%	0.0x	NA
FuelCell Energy	FCEL	3.73	1,368	1,160	(28.3%)	NA	NA	12.9%	0.0x	NA
Plug Power	PLUG	16.64	9,620	6,995	(41.1%)	NA	224.0x	15.5%	0.0x	NA
SolarEdge Technologies	SEDG	255.63	14,159	13,286	(8.9%)	27.0x	18.3x	26.9%	0.0x	NA
Tesla	TSLA	674.90	699,203	689,536	(36.1%)	32.1x	23.0x	16.6%	0.0x	BB+
<b>Solar / Wind IPP</b>										
EDF	EDF	\$9.05	\$33,805	\$74,191	(11.4%)	12.7x	3.5x	52.8%	11.5x	BBB
EDP Renováveis	EDPR	23.84	22,900	29,944	2.3%	15.3x	14.0x	37.9%	2.5x	BBB
NextEra Energy Partners	NEP	66.64	5,591	19,524	(19.4%)	11.1x	10.3x	33.7%	3.0x	BB
Ørsted	ORSTED	111.08	46,671	51,778	(5.9%)	12.6x	14.4x	43.0%	0.9x	BBB+
<b>Alternative Fuels / RNG</b>										
Ameresco	AMRC	\$56.11	\$2,907	\$4,280	(31.1%)	20.5x	18.6x	63.9%	NA	NA
Archaea	LFG	18.13	1,458	2,633	(0.8%)	18.4x	10.7x	30.1%	2.2x	NA
Clean Energy Fuels Corp.	CLNE	4.87	1,085	946	(20.6%)	18.8x	9.7x	10.0%	1.2x	NA
Darling Ingredients	DAR	79.26	12,802	14,653	14.4%	9.2x	7.6x	35.0%	1.5x	BB+
Montauk Renewables	MNTK	12.27	1,731	1,749	19.7%	18.1x	14.9x	29.8%	0.0x	NA
Neste	NESTE	44.26	33,997	35,019	(3.5%)	13.8x	11.5x	21.4%	0.3x	NA
ArcLight Clean Transition Corp. II	ACTD	9.88	1,957	1,471	(1.0%)	20.2x	6.2x	5.7%	0.0x	NA
<b>Electric Vehicle Infrastructure</b>										
ChargePoint Holdings	CHPT	\$11.30	\$3,796	\$3,510	(40.7%)	NA	NA	5.1%	0.0x	NA
Evgo, Inc	EVGO	9.05	624	2,724	(9.0%)	NA	NA	4.0%	0.0x	NA
TPG Pace Beneficial Finance (EVBox)	TPGY	9.88	432	426	0.7%	NA	NA	NA	0.0x	NA
Volta	VLTA	2.24	376	293	(69.5%)	NA	NA	32.9%	0.0x	NA
<b>Battery Storage</b>										
Enovix Corporation	ENVX	\$9.23	\$1,447	\$1,048	(66.2%)	NA	NA	2.2%	0.0x	NA
Eos Energy Enterprises	EOSE	1.16	63	116	(84.6%)	NA	NA	110.5%	0.0x	NA
Fluence	FLNC	8.95	494	326	(74.8%)	NA	NA	NA	2.9x	NA
Li-Cycle	LICY	7.99	1,393	961	(19.8%)	NA	45.3x	19.0%	0.0x	NA
QuantumScape Corporation	QS	11.80	5,079	3,833	(46.8%)	NA	NA	6.1%	0.0x	NA
Stem Inc.	STEM	7.78	1,199	1,392	(59.0%)	NA	68.1x	46.4%	0.0x	NA

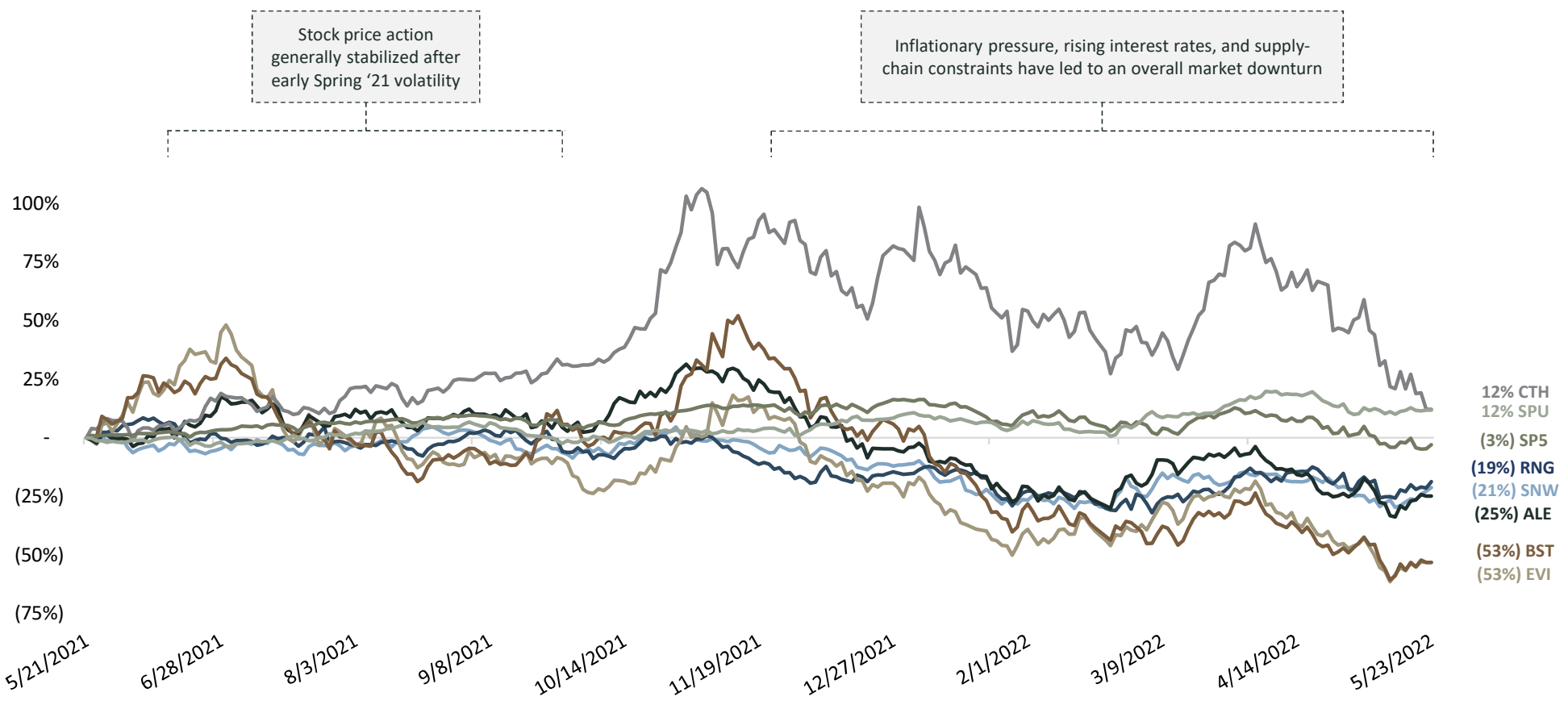
*Note: Prices as of 5/23/2022, 5/20/2022 for companies listed on TSX; OPAL Fuels will merge with ArcLight Clean Transition Corp. II in Q2'22 and will trade under the ticker "OPL" (Market Capitalization and Enterprise Value are representative of SPAC transaction sources and uses and have been updated based on current share price)*

Source: S&P CapiQ Pro

# Alternative Energy | Stock Market Performance

Alternative Energy (ALE)		Cleantech (CTH)		Solar/Wind (SNW)		Renewable Fuels/RNG (RNG)		EV Infrastructure (EVI)		Battery Storage (BST)		S&P Utilities Index (SPU)	S&P 500 (SP5)
ARRY	ORA	BE	PLUG	EDF	NEP	AMRC	MNTK	CHPT	TPGY	ENVX	LICY		
BEPC	NOVA	ENPH	SEDG	EDPR	ORSTED	LFG	NESTE	EVGO	VLTA	EOSE	QS		
FSLR	SPWR	FCEL	TSLA			CLNE	ACTD			FLNC	STEM		
HASI	RUN					DAR							

## Indices Total Return (LTM)



Note: Prices as of 5/23/2022

Source: S&P CapiQ Pro



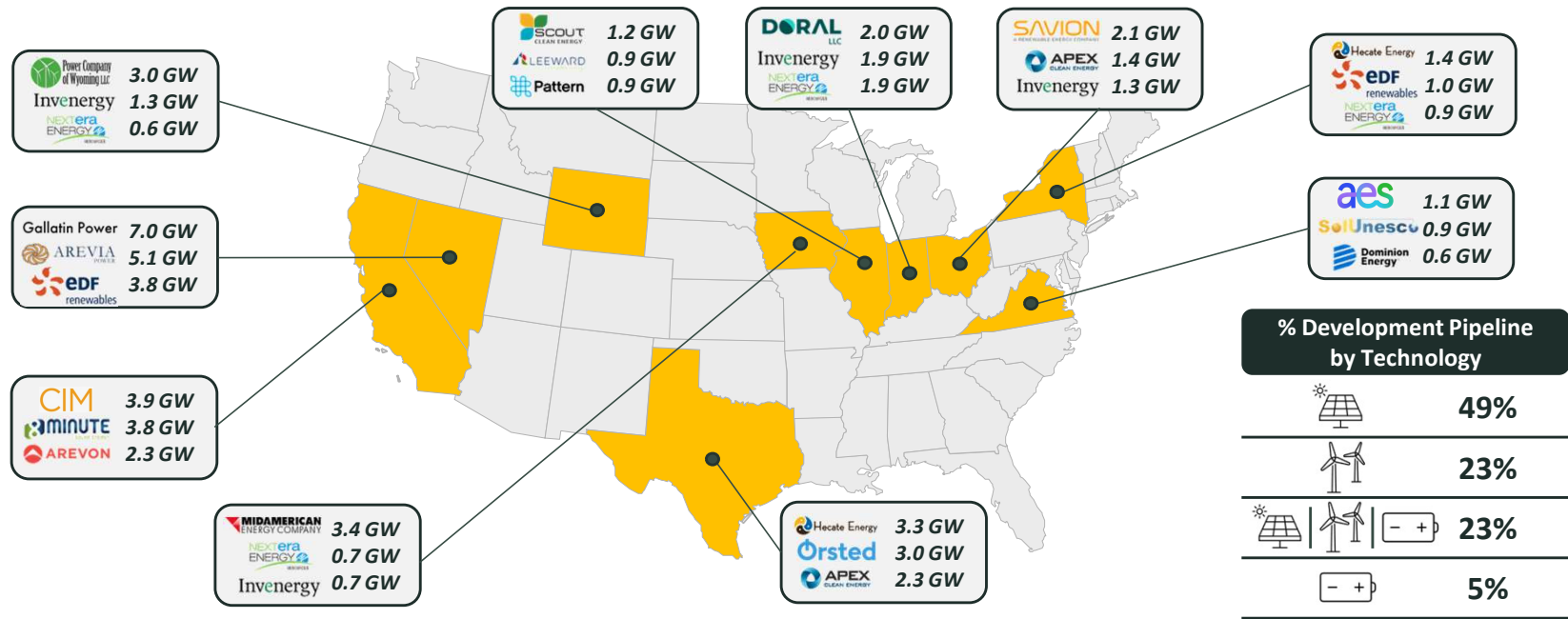
# Alternative Energy | U.S. Solar, Wind, & Storage Landscape

Supply chain and tariff disruptions have entire U.S. utility-scale solar industry at a stand-still

Solar	Wind	Battery Storage
<ul style="list-style-type: none"> <li>Panel supply issues have greatest impact on utility-scale, leading to more late-stage M&amp;A</li> <li>PPA renegotiations working through the system, projects re-marketed without offtake</li> <li>Inflationary pressure on PPAs partially offset by rising retail electricity rates</li> <li>Capital flowing to developers with scale, interconnection, and geographic diversity</li> </ul>	<ul style="list-style-type: none"> <li>Recent progress made on new transmission connecting onshore wind to western markets</li> <li>Offshore wind activity currently concentrated on the east coast with European developers dominating recent auctions</li> <li>Huge investments being made to build supply chain networks, solutions for shipping and labor remain major uncertainties</li> </ul>	<ul style="list-style-type: none"> <li>Developers incorporating indexing mechanisms to insulate project economics from sky rocketing lithium-ion material prices</li> <li>Current cost of storage too high for most hybrid projects, stand-alone benefiting from expanded use cases across markets</li> <li>Most investment flowing into domestic battery manufacturing and service providers</li> </ul>

## Largest U.S. Development Pipeline Market<sup>1</sup>

Top 3 pipelines in each of the top 10 markets, ranked by pre-operational generating capacity<sup>2</sup>





Source: <sup>1</sup> Project pipeline data sourced from NPM Market Data, excludes Offshore Wind. <sup>2</sup> Pipeline capacity data sourced from NPM curated intelligence and publicly available sources



## Alternative Energy | Utility-Scale Solar Transactions









*Companies are recapitalizing to secure development funding over extended timelines, lock in supply of panels and key equipment, and to capitalize on opportunistic M&A*

Date	Investor	Target	Commentary
May '22	 GENERATE	 PINEGATE RENEWABLES	Generate Capital has acquired a 12.5% preferred equity position in Pine Gate Renewables; Pine Gate's founder-owners will continue to run the business
Apr '22	 TotalEnergies	 CORE SOLAR	TotalEnergies acquired Austin-based Core Solar, whose portfolio includes more than 4 GW of utility-scale solar and energy storage projects at various stages of development in the U.S.
Jan '22	 Brookfield Renewable	 URBAN GRID	Brookfield Renewable acquired Virginia-based solar developer, Urban Grid, for \$650mm. The deal is expected to nearly triple Brookfield's capacity in the U.S. to around 31 GW
Jan '22	 EIG	 8MINUTE SOLAR ENERGY	EIG made a \$400mm investment in 8minute Solar Energy in the form of growth equity and a letter of credit to support interconnection deposits
Jan '22	 Fundamental RENEWABLES	 PINEGATE RENEWABLES	Pine Gate Renewables secured a \$500mm credit facility from Fundamental Renewables to fund development, construction, and, in some cases, acquisition of its utility-scale project pipeline
Jan '22	 GLOBAL INFRASTRUCTURE PARTNERS	 BRIGHTNIGHT Power when you need it	Global Infrastructure Partners announced that it has closed on a \$500mm preferred equity investment in independent power producer BrightNight, including a letter of credit facility
Dec '21	 aes	 COMMUNITY ENERGY®	AES acquired Pennsylvania-based solar developer, Community Energy, for \$247mm; deal adds nearly 10 GW of early-to late-stage development assets to AES' project pipeline
Dec '21	 Shell	 SAVION A RENEWABLE ENERGY COMPANY	Shell New Energies is purchasing a 100% equity interest in Savion, complementing its interest in Silicon Ranch, with 18 GW of additional solar + storage project pipeline across 26 states
Oct '21	 ANTIN INFRASTRUCTURE PARTNERS	 Origis Energy POWERING THE SOLAR REVOLUTION	Antin Infrastructure Partners agreed to acquire majority stake in Origis Energy. At the time of the acquisition, Origis had 105 employees and a 20 GW pipeline
Sept '21	 ARES	 APEX CLEAN ENERGY	Ares Management to acquire a majority stake in Apex. Transaction will provide Apex with additional equity growth capital to transition to pure-play IPP
Jul '21	 enlight	 Clēnera	Enlight announced a definitive agreement to acquire U.S. solar and storage developer Clenera at an enterprise value of up to \$433mm. Clenera has a development portfolio of 12 GW of solar and 5.5 GWh of energy storage in 20 states

Sources: Company Press Releases, New Project Media

## Alternative Energy | Distributed Generation Solar Transactions






















*More and more DG solar developers are opting to pursue integrated IPP model to capitalize on institutional demand for long-term yielding assets*

Date	Investor	Target	Commentary
May '22			Axiom Infrastructure acquired BlueWave, a Boston-based community solar developer, to support pipeline execution and transition towards a long-term asset ownership model
May '22			CarVal Investors acquired a minority stake in Verogy, a vertically integrated solar developer specialized in serving the commercial, industrial, and small utility-scale segments for the Connecticut market and throughout New England
Apr '22			Coast Energy announced a substantial growth investment from Houston-based Crosstimbers Capital Group to accelerate its commercial solar development and PPA financing platform across multiple states in the Northeast, Midwest, and West Coast
Apr '22		<b>42 Renewables</b>	Fengate Asset Management formed a partnership with 42 Renewables to launch Fengate Distributed Generation Partners, a solar and storage distributed generation development business targeting community solar, MUSH, C&I, and small utility-scale markets
Mar '22			Allete announced a definitive agreement to acquire New Energy Equity (NEE) for \$166mm on a cash free/debt free basis. NEE has a development portfolio of 2+ GW across 26 states and has completed 250 distributed solar projects totaling 310+ MW
Mar '22			DSD Renewables announced it has secured a \$200mm preferred equity investment from Ares to support its expanding project pipeline, grow its developer network, acquire assets, etc.
Mar '22			Pacolet Milliken, a sustainability-focused investment firm, has made a capital investment in New York-based solar & storage developer Syncarpha Capital to accelerate the company's solar and storage platform that currently has 30 MW of projects under construction
Mar '22			Carlyle has made a strategic growth investment in Complete Solar, a technology-enabled distributed energy platform that offers solar systems and clean energy products
Feb '22			TotalEnergies announced a definitive agreement with SunPower to purchase its C&I solutions business for \$250mm, including \$60mm of earnout subject to regulatory evolution
Dec '21			Brookfield Renewable-backed Luminace signed an agreement with Solops to co-develop up to 300 MW of DG projects over the next 3 years
Nov '21			OMERS Infrastructure announced it has signed an agreement with a fund managed by Ares to acquire 100% of Navisun, an independent distributed generation solar producer

Sources: Company Press Releases, New Project Media

## Alternative Energy | Battery Storage Transactions

*Battery storage market remains fragmented with new technologies and applications vying for relevance in the electrification of the U.S. economy*

Date	Investor	Target	Commentary
May '22	 CHARDAN NEXTECH ACQ 2	 dragonfly	Dragonfly Energy, a deep cycle lithium-ion battery maker, announced it would go public via a merger with SPAC, Chardan NexTech Acquisition 2 Corp, valuing Dragonfly at \$500mm
May '22	 North Sky CAPITAL	 ORENDA	North Sky Capital has invested in Project Vader, a partnership with energy storage developer Orenda that aims to develop 50 MW / 200 MWh of battery storage capacity across 10 sites in New York City and Westchester county
Apr '22	 YA Yorkville Advisors	 eos	Eos Energy, a provider of zinc-based energy storage systems, announced a \$200mm common stock standby equity purchase agreement with an affiliate of Yorkville Advisors
Mar '22	 KORE POWER	 Northern Reliability	Battery maker KORE Power has acquired energy storage system installer Northern Reliability Inc. and has launched KORE Solutions, a full-service storage integrator
Jan '22	 HULL STREET ENERGY	 SunGrid Better energy for tomorrow	Hull Street Energy has made a substantial capital commitment to SunGrid Solutions, a leading Battery Energy Storage Solutions (BESS) services company
Jan '22	 Greenbacker CAPITAL	 DELOREAN POWER	Delorean Power, a developer and owner-operator of standalone battery energy storage projects secured a \$20mm investment from Greenbacker Capital Management
Dec '21	 GLOBAL INFRASTRUCTURE PARTNERS	 ABLE GRID	Global Infrastructure Partners portfolio company Eolian has bought out joint venture partner Able Grid Energy Solutions' interest in storage project portfolio exceeding 10 GW
Nov '21	 quinbrook infrastructure PARTNERS	 HABITAT ENERGY	Quinbrook Infrastructure Partners acquired UK-based battery storage and optimization and trading platform Habitat Energy Limited that will focus on the ERCOT market
Nov '21	n/a	 FLUENCE A Siemens and AES Company	Fluence, a global provider of energy storage products and services and digital applications for renewables and storage raised total proceeds of \$998m from its IPO
Nov '21	 APOLLO	 BROAD REACH POWER	Apollo agreed to acquire a 50% stake in Houston-based Broad Reach Power from Encap. EnCap and its co-investment partners will retain a 50% interest
Sept '21	 Novus Capital	 ENERGY VAULT Enabling a Renewable World	Gravity-based storage firm Energy Vault announced that it will go public through a merger with SPAC, Novus Capital Corporation II, which values Energy Vault at \$1.6bn

Sources: Company Press Releases, New Project Media

# Alternative Energy | Cleantech Market Overview

Heavy competition for conventional renewable investment opportunities is driving investors further into Cleantech applications beyond solar, wind, and battery storage

## Market Overview

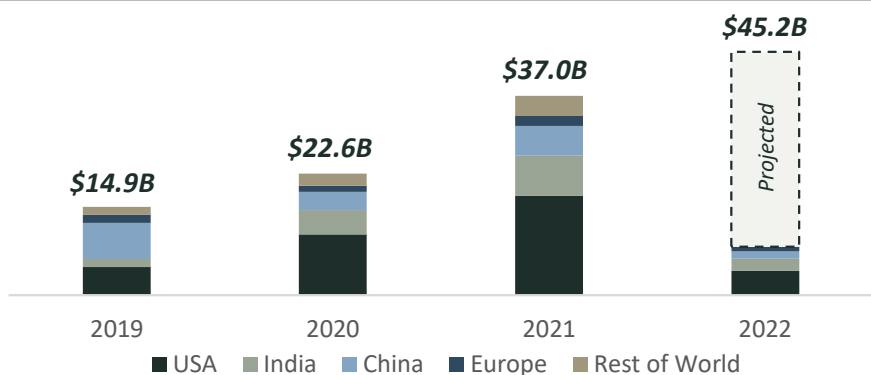
- Public Cleantech companies have lost ~30% of their value since the beginning of the year, compared with 24% for the broader market<sup>1</sup>
- Despite public equity market conditions, largely driven by 2021 SPAC underperformance, private capital continues to flow into the sector
- \$11bn of global VC funding was deployed in Q1'22, and with more than 50 new climate funds launched in 2021, there's plenty of dry powder to go around<sup>2</sup>
- Top segments for investment include solar, EVs, microgrid, mobility, and battery technologies

*"We are in an interesting time where the undeniable macro tailwinds behind the need for climate tech solutions are competing with the undeniable macro headwinds of the current state of the economy. While we expect to continue to see valuations retreat from their 2021 highs, we also believe considerable capital will continue to flow into the space."*



- Cassie Bowe, Partner at Energy Impact Partners

## Climate Tech Venture Capital Funding (FY'19 – Q1 '22)<sup>3</sup>



Source: <sup>1</sup> EIP Climate Tech Index. <sup>2,3</sup> HolonIQ: Global Climate Tech VC Funding

## Selected Transactions

Date	Investor	Target	Commentary
May '22	MACQUARIE ferrovial	Inspiration	Inspiration Mobility received \$215mm of new capital to accelerate its work electrifying commercial vehicle fleets
May '22	ALLIANCE RESOURCE PARTNERS, L.P.	FRANCIS ENERGY	Alliance Resource Partners made an investment in Francis Energy to expand its fast-charging network into 35 states
May '22	Ridgewood Infrastructure	ECOSAVE	Ridgewood invested a controlling stake in Ecosave, an energy efficiency infrastructure business
May '22	s2gVentures	Common Energy	S2G Ventures invested \$17mm in Common Energy, a SAAS platform provider for community solar project owners
May '22	J.P.Morgan Asset Management	Arcadia	JPM led a \$200mm Series E Funding round to expand coverage of Arcadia's API platform to monitor, report, and act on their carbon impact
Apr '22	FLUENCE A Siemens and AES Company	Nispera	Fluence paid \$30mm to acquire Nispera, a performance optimization company for renewable energy assets
Apr '22	Sensata Technologies	DYNAPOWER POWERING A CLEANER PLANET	Sensata paid \$580mm to acquire Dynapower, a provider of power conversion equipment for H <sub>2</sub> and e-mobility systems

# Alternative Energy | Corporate PPA Market Overview

*Corporate PPA demand continues to rise and developers' ability to provide contract-ready projects remains impaired by market and regulatory forces*

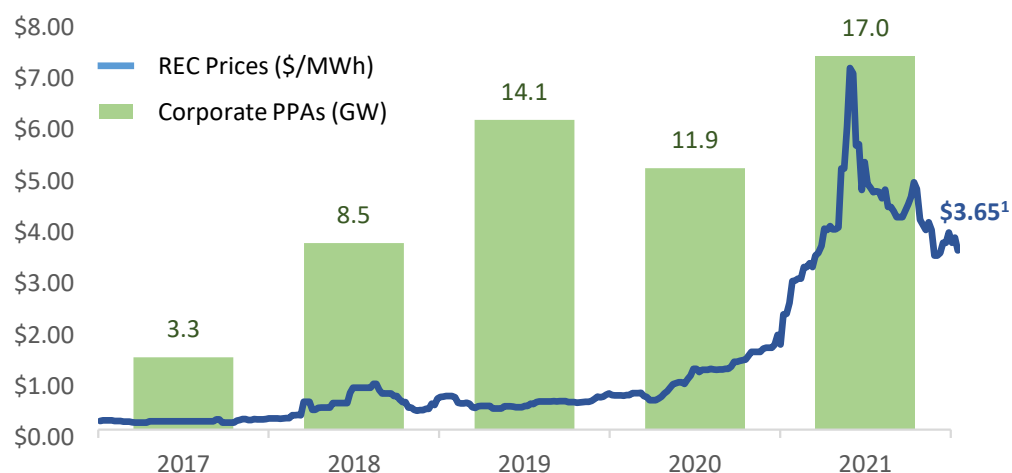
## Renewable Energy Development Hurdles Get Higher

- An investigation into solar module anti-dumping circumvention by the Department of Commerce was launched in late March 2022 against four Southeast Asian countries that account for 65-80% of U.S. solar panel supply. With the threat of up to 240% retroactive tariffs, those countries have stopped U.S. shipments. More than half of 2022 and 2023 utility scale projects are experiencing delays
  - Nearly the entire industry, including members of the Biden administration, are pushing to accelerate what could be a year-long investigation
- Major interconnection reform is underway in PJM and MISO, pushing back delivery of early/mid-stage projects. The logjam of renewable energy projects in the queue is resulting in expensive and protracted development cycles in most areas of the country







## Corporate Demand Gets a Regulatory Boost

- On March 21, 2022, the SEC proposed new rules for climate change disclosure. The rules would be largely based on Taskforce on Climate-related Financial Disclosures (TCFD) and Greenhouse Gas Protocol standards
  - Large accelerated filers would be required to report independently attested Scope 1 and 2 GHG emissions, starting for FY 2023, with accelerated filers starting in FY 2024
  - Scope 3 emissions reporting required if material, or if company has set GHG reduction targets that include Scope 3
  - Additional qualitative and quantitative climate-related event risks and transition activities to be disclosed
  - If a company has advertised environmental claims, it must show plans to comply with such claims

## Annual Corporate PPAs (GW)



## 2022 YTD Noteworthy Corporate PPA Deals

	Seller	Size	Fuel Source	Location
	Apex	225 MW	Wind	SPP
	AES	450 MW	Solar	CAISO
	AES	110 MW	Solar	CAISO
	Enel	47 MW	Wind	SPP
	Vitol	155 MW	Solar	PJM
	Constellation	250 MW	Solar	PJM

Source: <sup>1</sup>S&P Platts, BloombergNEF, S&P Market Intelligence, REBA, PFR, GreenBiz, Gibson Dunn

## Alternative Energy | Carbon Capture Sequestration (CCS)

CCS is an essential part of the all-of-the-above solution for reaching mid-century decarbonization goals, yet its value chain requires a delicate balancing act among multiple stakeholders

### Regulatory



- Failure of Build Back Better
- Tax code uncertainty
- LCFS pricing softness (see next page)

### Emitters



- Overcoming reluctance from emitters to sign long-term take-or-pay contracts required for project finance

### Midstream



- Significant CapEx for distances between point source emissions & sequestration sites
- Landowner and NIMBY hurdles

### Injection



- Subsurface expertise required
- Expensive stratigraphic tests required for Class VI well permits, with a binary risk profile
- Leakage concern and insurance expense

### Financing



- Only one 45Q tax equity capital markets deal that GreenFront is aware of to-date

**Given the above challenges, which must all be fully resolved and aligned, CCS has quickly become a “big kids only” space to play in**

### Noteworthy Activity



- **May 11, 2022:** Summit Carbon Solutions, developer of the world’s largest CCS project, announced that it has raised over \$1bn in equity commitments from investors including Tiger Infrastructure Partners, Continental Resources, Inc., TPG Rise Climate, SK E&S, and others
- **May 3, 2022:** Talos Energy, through its Carbonvert division, and Chevron New Energies announced a MOU to jointly develop the Bayou Bend CCS offshore CCS hub
- **April 19, 2022:** Exxon Mobil Corp estimates a \$4 trillion market opportunity for carbon capture by 2050

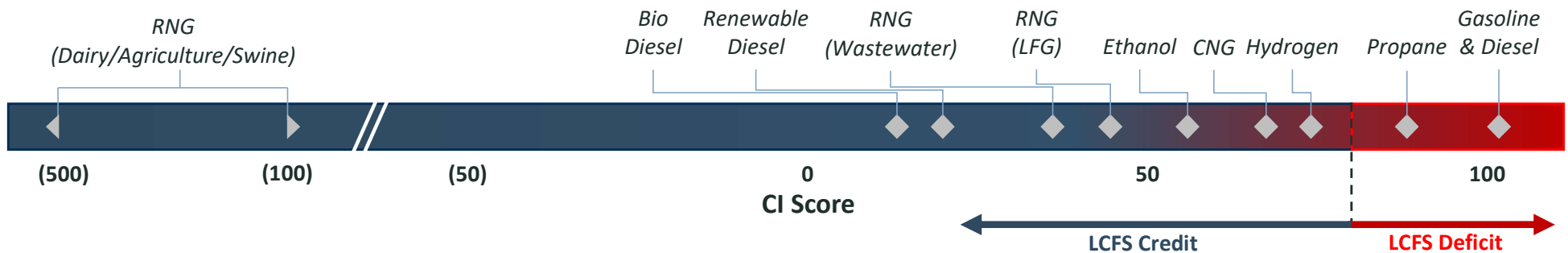
Source: Company data, Global CCS Institute, New Project Media

# Alternative Energy | LCFS Pricing

Low Carbon Fuel Standards (LCFS) pricing weakness has prompted CARB to consider further pricing support, with Renewable Fuel producers poised to benefit

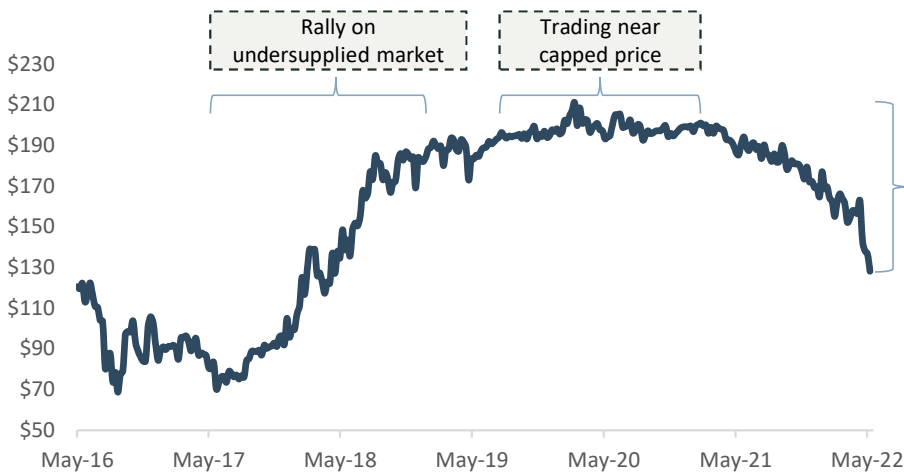
## Carbon Intensity Scoring

Fuel sources with a CI score below the par threshold generate LCFS credits. RNG projects with the least carbon-intensive feedstock and production processes generate the most valuable LCFS credit. RNG not only creates a usable biofuel alternative, but also eliminates GHG emissions created by degrading waste released into the open atmosphere if left uncaptured



## LCFS Credit Weekly Average Price (\$/ton)

The average of LCFS transfers has traded near its maximum for years, but recent supply additions has caused prices to drop down as low as \$105



### Price Weakness Caused by Credit Supply Additions

- New Renewable Diesel (RD) volumes:**
  - 807 mmgy brought online in 2021
  - 590 mmgy occurring in 1H'22
  - 2,350 mmgy announced from 2H'22 through YE'24

RD economics suffer at sub-\$150 LCFS, which means some projects will operate at reduced capacity or be idled
- RNG** – dairy and landfill volumes have projections suggesting ~4-5MMT of credits annually by 2030 (California only)
- Electricity** – 50% EV penetration in California would likely produce ~140MMT of cumulative credits by 2030

Given the above supply imbalance implications, the market expects that CARB will move to increase its GHG reduction targets and support LCFS in the next 2-year cycle

Source: California Air Resources Board, SREC Trade Clean Fuels Market Update, Equity Research, Strata, Argus, Stillwater, EcoEngineers, BNEF

## Alternative Energy | RNG – Recent North American Announcements & Transactions

*Increasing focus on methane has spurred significant strategic activity in the Renewable Natural Gas space*



















Date	Category	Involved Parties	Commentary
May '22	Strategic Agreement		SJI's Renewable Energy Venture unit and REV LNG have partnered with Denmark-based HoST group to develop three new biogas renewable natural gas projects at dairy farms in upstate New York and Ohio
May '22	Platform Investment		Generate Capital launched Generate Upcycle, which will merge its existing portfolio of anaerobic digesters and composting infrastructure with its recent acquisition of Canada's StormFisher Environmental Services
May '22	Platform Investment		Archaea Energy and Republic Services announced an approximate \$1.1bn joint venture to develop 39 renewable natural gas projects at Republic landfills across the U.S. over the course of five years
May '22	Noteworthy Announcement		Waste Management plans to invest \$825mm by 2025 to expand its renewable natural gas and landfill gas-to-electricity production and anticipates adding 17 new RNG facilities in North America by 2026
May '22	Project Investment		UGI announced that its JV with Sevana Bioenergy, MBL Bioenergy, will invest over \$70mm to develop dairy RNG projects in South Dakota that will generate 300 million cubic feet of RNG annually once completed in 2024
May '22	Strategic Agreement		Aemetis, a renewable fuels company, announced that it has signed a 6-year supply agreement with Trillium to provide 600,000mmbtu of dairy RNG to be used as transportation fuel in California
Apr '22	Platform Investment		True North Renewable Energy announced a partnership with The Weitz Company and DRANCO as the EPC technology supplier for their organic waste-to-renewable gas projects in the western U.S.
Apr '22	Noteworthy Announcement		Synthica Energy has entered the permitting phase of development for a new anaerobic digestion facility to convert approximately 200,000 tons of bourbon stillage and food waste from Kentucky's bourbon industry into renewable natural gas
Apr '22	Platform Investment		Clean Energy Fuels has partnered with TotalEnergies and BP to develop dairy waste-to-renewable natural gas facilities in multiple U.S. states and has obtained several new or renewed RNG fueling supply contracts
Apr '22	Strategic Agreement		Mas Energy RNG, subsidiary of MAS CanAm, has obtained a \$206mm debt facility from lenders Pacific life, Nuveen, and IFM Investors to fund the construction of five biomethane-to-RNG plants
Mar '22	Strategic Agreement		TPG Rise Climate announced an equal partnership in Monarch Bioenergy, a joint venture between Roeslein Alternative Energy and Smithfield Foods, to further develop, implement, and expand next generation RNG technologies

Sources: Company Press Releases, New Project Media



## Alternative Energy | Hydrogen – Recent North American Announcements & Transactions

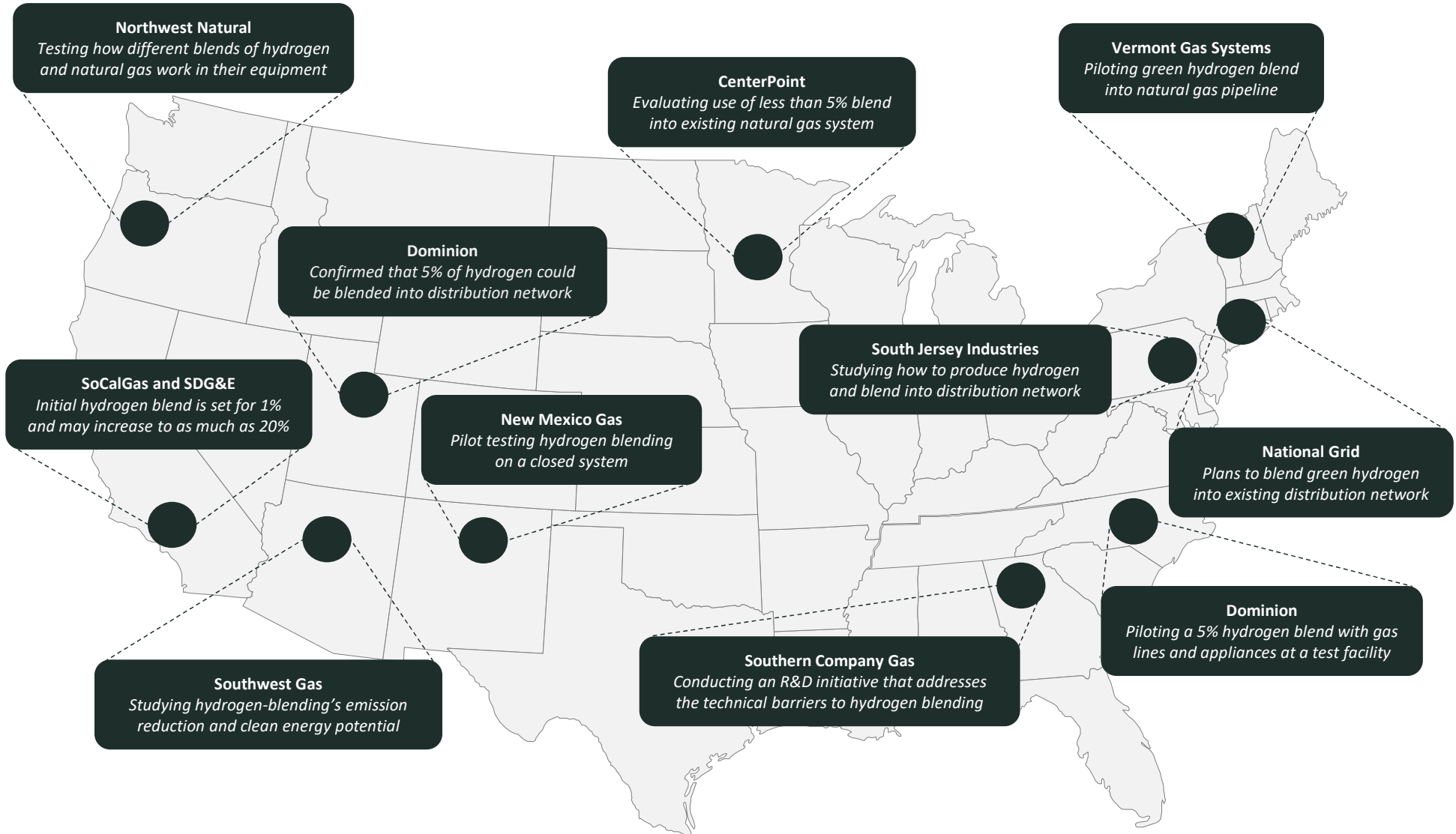
*Corporate collaborations and joint development announcements have fueled a rising clean hydrogen economy*

Date	Category	Involved Parties	Commentary
May '22	Corporate Collaboration	 	Australia-based Fortescue Future Industries is collaborating with Puget Sound Energy on plans to bid in a U.S. Department of Energy process offering \$8bn to fund U.S. regional green hydrogen hubs
Apr '22	Corporate Collaboration	 	GHI and Hydrogen Optimized have signed a memorandum of understanding to develop an electrolyzer manufacturing facility in Texas to supply GHI's 60 GW green hydrogen production and salt cavern storage hub to be built in South Texas
Apr '22	Corporate Collaboration	 	Plug Power and Olin Corporation announced the signing of a memorandum of understanding with the intention to create a joint venture to produce and market green hydrogen. The first production plant is expected to produce 15 tons per day of green hydrogen
Apr '22	Noteworthy Project	 	TC Energy and Nikola are assessing the potential development of a natural gas-derived hydrogen production and distribution hub that would produce an estimated 60 tonnes of hydrogen per day, with the capacity to increase to 150 tonnes per day in the future
Apr '22	Corporate Collaboration	 	Plug Power has obtained an agreement with Walmart for an option to deliver up to 20 tons per day of liquid green hydrogen to power material handling lift trucks across Walmart distribution and fulfillment centers in the U.S.
Apr '22	Noteworthy Project	 	Hydrogen fueling provider ZEV Station and hydrogen-electric aviation company ZeroAvia have agreed to jointly develop green hydrogen refueling infrastructure for airports in California
Apr '22	Corporate Collaboration	 	Electrolyzer manufacturer Next Hydrogen Solutions and EPC firm Black & Veatch have entered a memorandum of understanding to develop a large-scale, multi-megawatt green hydrogen solution for industrial hydrogen customers and identify additional areas of deeper collaboration and specific opportunities worldwide
Apr '22	Noteworthy Project		Atura Power, a subsidiary of Ontario Power Generation, plans to develop a 20MW electrolyzer facility to produce green hydrogen in Ontario, Canada
Apr '22	Noteworthy Project		The Gas Technology Institute is pursuing the development of a pilot project that would generate up to 54MWh of hydrogen on-site at a Southern Company natural gas plant in Alabama via a sorbent enhanced steam reforming process that converts natural gas to hydrogen and reduces carbon emissions by 98%
Mar '22	Noteworthy Project	 	Green hydrogen developer Monarch Energy has obtained an investment from energy technology and infrastructure company Lancium that will enable Monarch to pursue new hydrogen initiatives

Sources: Company Press Releases, New Project Media

# Alternative Energy | Hydrogen – Gas Utility Interest Ramping in the U.S.

Utilities are increasingly participating in strategic hydrogen-related projects

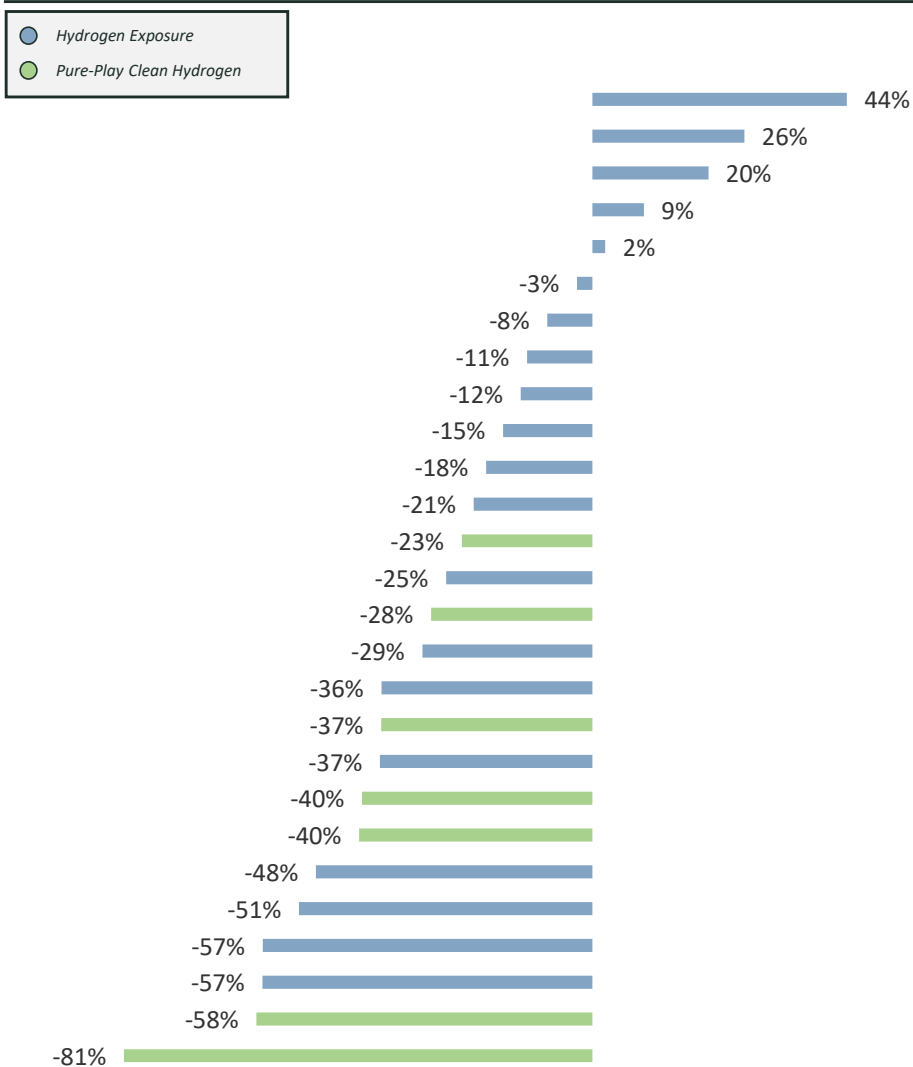


Sources: Green Hydrogen Coalition, Company Data

## Alternative Energy | Hydrogen – Related Stock Basket

The table below includes pure-play hydrogen companies and companies that have exposure to hydrogen through offerings of equipment, products, and services

### LTM Total Return %



### LTM Trading Table

Ticker	Listing	Company	Market Cap (\$M)
BKR (NASDAQ)	U.S.	Baker Hughes Company	35,159
ACC (OB)	Norway	Aker Carbon Capture ASA	1,228
GTLS (NYSE)	U.S.	Chart Industries, Inc.	6,363
LIN (NYSE)	U.S.	Linde plc	160,644
NFE (NASDAQ)	U.S.	New Fortress Energy Inc.	9,099
FTI (NYSE)	U.S.	TechnipFMC plc	3,645
A336260 (KOSE)	Korea	Doosan Fuel Cell Co., Ltd.	1,960
3407 (TSE)	Japan	Asahi Kasei Corporation	11,408
8088 (TSE)	Japan	Iwatani Corporation	2,449
ITM (AIM)	United Kingdom	ITM Power Plc	2,455
APD (NYSE)	U.S.	Air Products and Chemicals, Inc.	52,771
CMI (NYSE)	U.S.	Cummins Inc.	28,042
NEL (OB)	Norway	Nel ASA	2,275
JMAT (LSE)	United Kingdom	Johnson Matthey Plc	5,294
BE (NYSE)	U.S.	Bloom Energy Corporation	2,864
PCELL (OM)	Sweden	PowerCell Sweden AB (publ)	762
CWR (AIM)	United Kingdom	Ceres Power Holdings plc	1,646
ACH (OB)	Norway	Aker Clean Hydrogen AS	354
MCPHY (ENXTPA)	France	McPhy Energy S.A.	494
HTOO (NASDAQ)	U.S.	Fusion Fuel Green PLC	109
PLUG (NASDAQ)	U.S.	Plug Power Inc.	9,620
NKLA (NASDAQ)	U.S.	Nikola Corporation	2,632
BLDP (TSX)	Canada	Ballard Power Systems Inc.	2,160
HYSR (OTCPK)	U.S.	SunHydrogen, Inc.	136
HYZN (NASDAQ)	U.S.	Hyzon Motors Inc.	1,063
FCEL (NASDAQ)	U.S.	FuelCell Energy, Inc.	1,368
NXH (TSX)	Canada	Next Hydrogen Solutions Inc.	30

Sources: S&P Market Intelligence. Market Cap and LTM Total Return % as of 5/23/2022, 5/20/23 for companies listed on TSX

# GreenFront Energy Partners - Overview

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# GreenFront Energy Partners | Founding Partners and Service Offering

*Track record of execution for developers, investors, and corporate clients*

## GreenFront Founding Partners



**Robert Birdsey** – Managing Director

- Head of BB&T Energy Investment Banking 2013-2020
- VP in J.P. Morgan’s Energy Investment Banking group prior to joining BB&T
- MBA, University of Virginia; BA, Sewanee



**Adam Hahn** – Managing Director

- Led BB&T’s Utility Investment Banking coverage 2015-2020
- Prior to BB&T, worked in the CFO’s group at Dominion Energy
- MBA, University of Richmond; BBA, James Madison University



**Whit Wall** – Managing Director

- Led BB&T’s Infrastructure Investment Banking coverage 2015-2020
- Environmental consultant for JJ Blake & Associates prior to BB&T
- MBA, University of Virginia; BS, James Madison University

## Service Offering – Exclusively Focused on Alternative Energy



### Capital Formation

Raising capital for projects and platform growth initiatives



### M&A Advisory

Advising on purchase/sale of alternative energy assets + equity



### ESG / PPA Advisory

Representing corporates in renewable energy procurement efforts

# GreenFront Energy Partners | Coverage Universe

*GreenFront's go-to market strategy enables significant synergies*

## Closely-Linked Coverage Universe



### Renewable Power

Solar, Wind, Storage



### Alternative Energy

Renewable Fuels, Carbon Capture,  
Hydrogen



### ESG Advisory

Corporate procurement of renewable  
energy & carbon credits

### GreenFront Differentiation

- **Regional Market Intelligence:** Our experience negotiating PPAs gives us on-the-ground information specific to different RTO/ISOs across the country
- **Corporate Finance:** As solar/wind/storage move from alternatives to incumbent resources, financing structures are evolving. GreenFront's deep experience in traditional corporate finance helps our clients evolve beyond project financing strategies

### GreenFront Differentiation

- **Experience:** Prior O&G background has enabled GreenFront to already transact in very early-stage markets (RNG, CCUS, H<sub>2</sub>, LFG, GTL)
- **Environmental Attributes:** Deep knowledge around revenue pathways for LCFS, 45Q, voluntary CO<sub>2</sub> credits
- **Corporate Network:** PPA advisory assignments keep us in regular dialogue with corporate sustainability decision-makers

### GreenFront Differentiation

- **Risk Management:** GreenFront has an exclusive partnership with SunAirio®, enabling us to provide clients with proprietary analytics around correlation/covariance between weather, resource production, and market pricing
- **Negotiating Edge:** GreenFront builds project models to understand seller economics, identifying leverage points that benefit our corporate clients. We know where developers can bend on certain terms and where they can't

# GreenFront Energy Partners | Credentials



ENERGY ASSURANCE

Has been acquired by



Sell-side M&A Advisor

**2022**



CEPSOLAR  
COMMONWEALTH ENERGY PARTNERS

Has secured a structured equity private placement from



Greenbacker  
CAPITAL

Placement Agent

**2021**



SECURE  
FUTURES  
Resilient Solar Solutions

Has secured a \$25 million equity commitment from

**Hartz Capital**

Placement Agent

**2021**



NUCOR

Has signed a wind PPA totaling 100 MW of procurement with



Orsted

PPA Advisor

**2021**



CAPROCK  
RENEWABLES

Has secured a private placement for development capital with



LACUNA  
SUSTAINABLE  
INVESTMENTS

Placement Agent

**2021**

**Fortune 500 Corporate**

Has signed an exclusive solar PPA totaling 250 MW of procurement with



NEXTera  
ENERGY

PPA Advisor

**2021**



NUCOR

Has signed an exclusive solar PPA totaling 250 MW of procurement with



edf  
renewables

PPA Advisor

**2020**



RTS  
labs

Was advised on the market entry of SaaS Application into the utility end market

Strategic Advisor

**2020**

Financial advisor to RNG developer in a private placement transaction



Private Placement  
**Pending**

Financial advisor to hydrogen technology company in a private placement transaction



Private Placement  
**Pending**

Sell-side advisor for 80 MW utility-scale solar development asset



Project Sale  
**Pending**

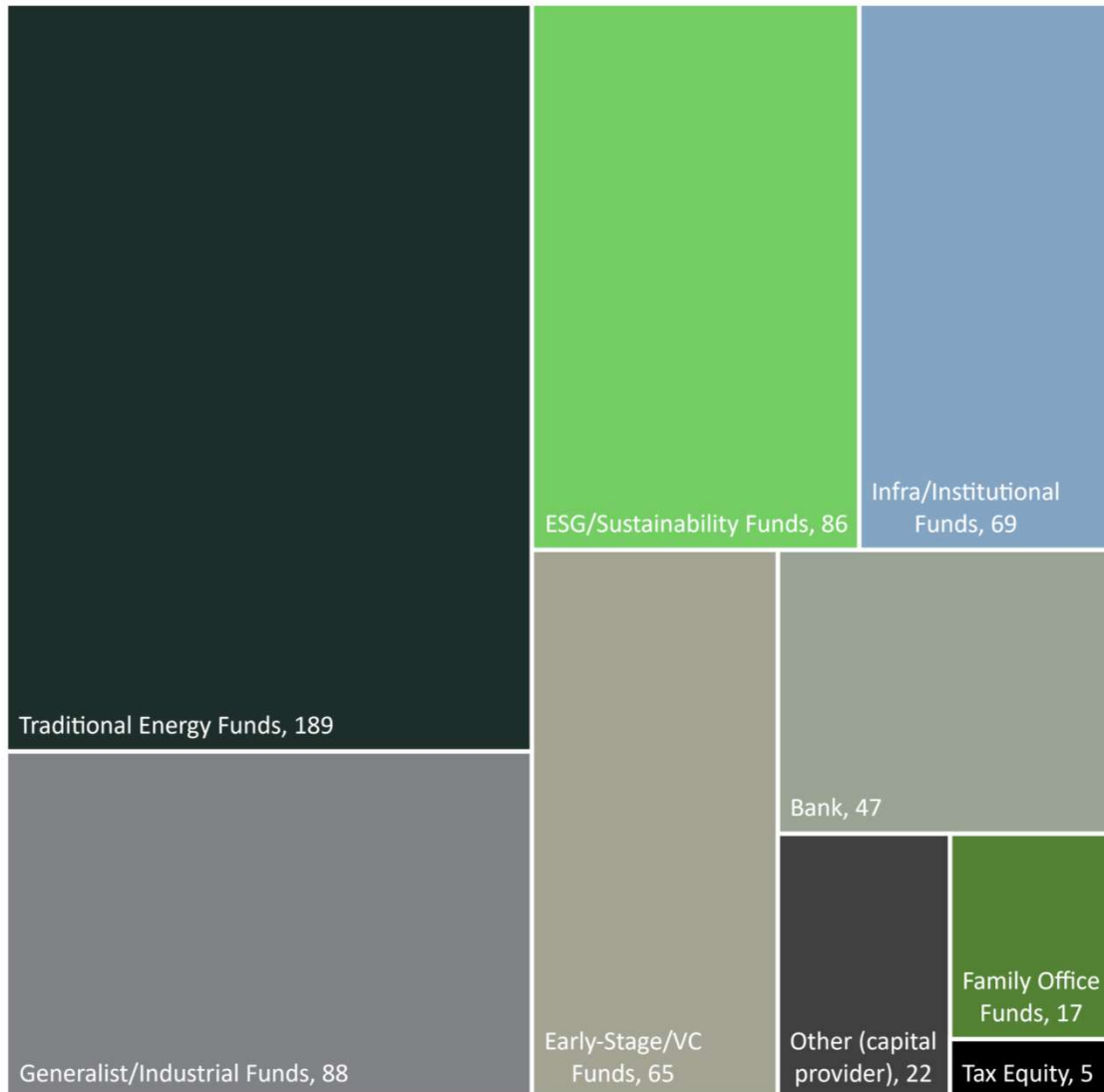
Advisor to large Corporate to offset 100% of North American Consumption



PPA Advisory  
**Pending**

## GreenFront Energy Partners | Investor Network

*GreenFront covers a broad network of contacts with unmatched efficiency, while also having the requisite market knowledge to narrow down the list in a solicitation and quickly identify the most highly motivated parties*



GreenFront tracks over **2,000** corporate relationships through its Salesforce CRM software, including...

**588 Capital Providers**, segmented by capital type & strategy (see left), and appetite within the Alternative Energy Universe

**344 Developers**, segmented by focus area (i.e. Solar/Wind, Storage, RNG, Carbon Capture, Hydrogen, etc.)

**563 Corporates** pursuing different ESG strategies

**135 Traditional Energy Firms** from the Oil & Gas, Power/Utility, and LDC space