VanEck®

September 2022

The Inflation Reduction Act: Accelerating the Energy Transition in the U.S.

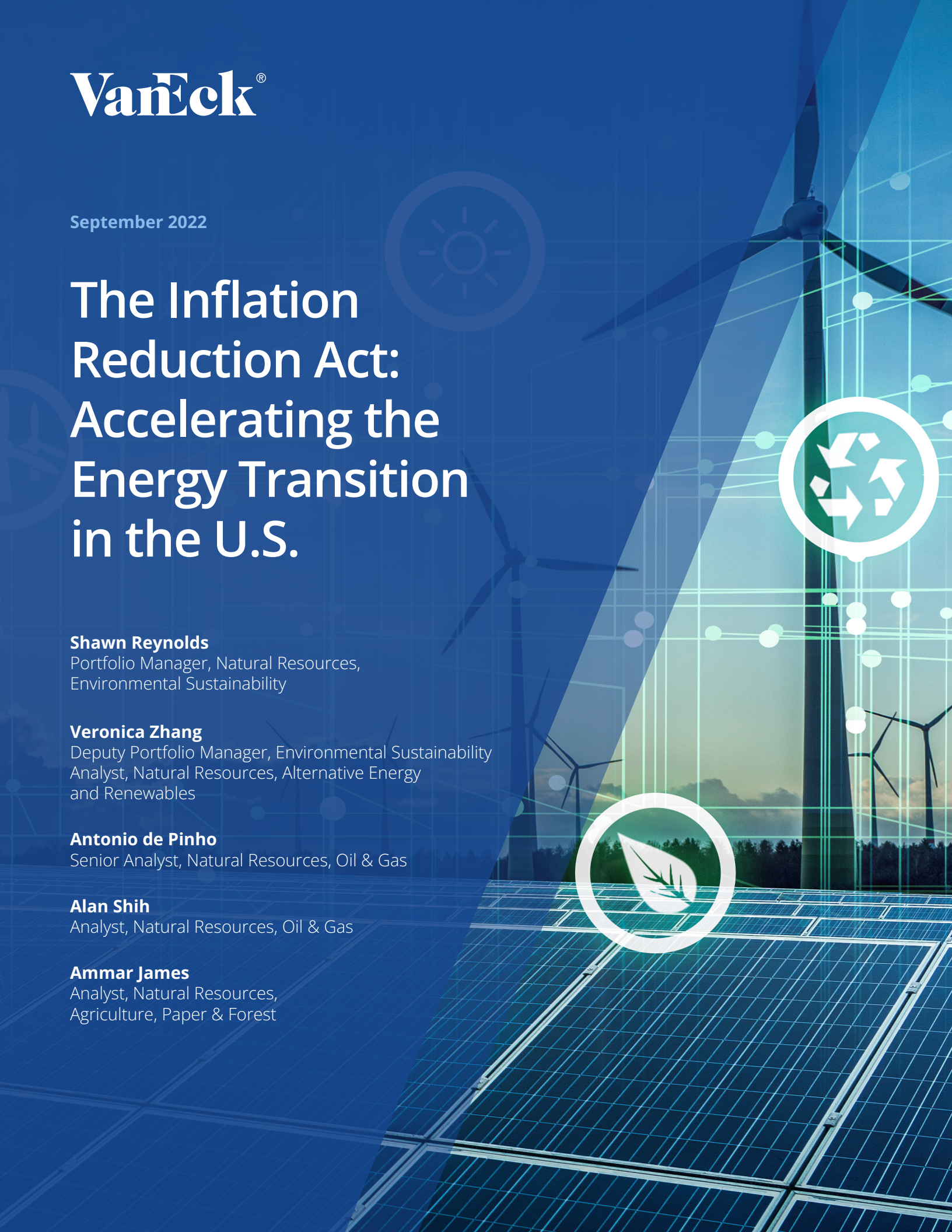
Shawn Reynolds
Portfolio Manager, Natural Resources, Environmental Sustainability

Veronica Zhang
Deputy Portfolio Manager, Environmental Sustainability Analyst, Natural Resources, Alternative Energy and Renewables

Antonio de Pinho
Senior Analyst, Natural Resources, Oil & Gas

Alan Shih
Analyst, Natural Resources, Oil & Gas

Ammar James
Analyst, Natural Resources, Agriculture, Paper & Forest



On August 16, 2022, President Joe Biden signed the Inflation Reduction Act ("the Act") into law. **We believe the Act is a critical catalyst to accelerate the sustainable development of a sustainable green resources sector in the U.S. and should serve to amplify the investment opportunities in this emerging new asset class**. The vast majority of this bill is focused on tax credits and infrastructure funding to address climate and energy security, enhancing the economic viability of the relatively nascent green power, manufacturing, transportation and agricultural industries. With approximately $400 billion earmarked for these initiatives over the next 10 years, the current federal government has clearly indicated its intention to provide meaningful support to a variety of industries with the aim of securing the U.S.'s energy independence and significantly reducing its emissions.

In our view, the most impactful part of the legislation is less so the dollar amount of spend directed toward these tax credits and more the certainty in their duration over the next 10 years through potentially changing and divided governments. The ramifications of the Act's duration are substantive. Roughly half of the legislation is directed toward the extension and expansion of investment tax credits (ITC) and production tax credits (PTC) for the wind, solar and, now, electricity storage (batteries) industries. Typically these tax extensions have been renewed every few years since their inception in 2006. However, the general uncertainty of the continuation of the ITC/PTC programs at prevailing rates resulted in developers' inability to plan longer term around investment and project returns. The Act also provides a level of visibility for other related industries, which we believe will be vital in the long-term viability, profitability and environmental impact of these businesses.

Is This Enough?

The Act also addresses many other verticals of U.S. emissions. It is, however, important to note that the fine print around qualifying for additional tiers of benefits reveals a strong push toward using domestic content, as well as project development incentives in "energy communities," areas in the country that previously had significant employment or shuttered projects in the extraction, processing, or transportation of coal, oil or natural gas. This could result in a solar developer, for example, avoiding 50% taxes on their project if they installed domestically sourced solar panels at a closed coal mine.

However, these "qualifications" also seem to be ahead of their time. The domestic supply chain of raw materials used in solar and electric vehicles (EVs) is grossly underdeveloped in the U.S., and would make it nearly impossible for manufacturers to fully access many of the benefits embedded in the Act. It would take a number of years to establish a supply chain of critical minerals mining and/or processing in North America, as well as polysilicon and solar modules – both are currently dominated by China and Southeast Asia. Addressing the upstream portion of supply chains with direct funding is critical, in our view.

While the Act has been long awaited and is a welcome piece of legislation across energy transition industries, it pays to note that there is still much room to grow if the U.S. wants to decarbonize and spur investments in both renewables buildout as well as new technology development to truly make a dent in the following years. The European Union, since announcing its Green Deal in 2019, has earmarked well over $1 trillion toward energy independence and decarbonization. Other major countries such as China and India, while short of announcing official spending targets, have already spent a decade-plus investing in (China) or are rapidly moving toward (India) decarbonization through widespread national, regional and local initiatives. In our view, the Act is a solid start at the federal level, but much more needs to be done in climate-related actions and investments at all levels of government (critically, including state and local communities) in conjunction with the private sector.

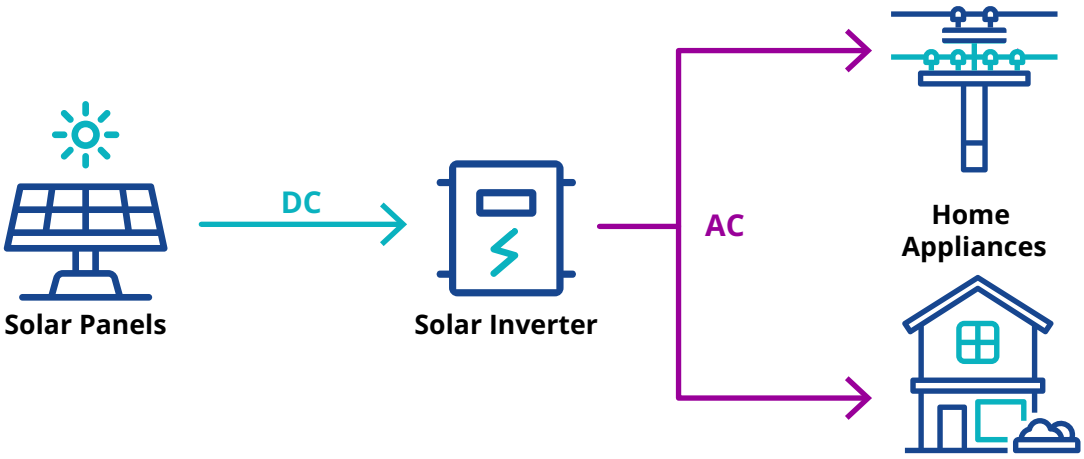
Renewable Energy: (Much) More of the Same

A significant portion of the Act is directed toward tax credits to support the growth of traditional renewable energy (namely wind and solar) as well as battery storage. Currently, the ITC for solar is 26% (stepping down to as little as 10% post-2024), while the PTC, usually utilized in wind projects, expired at the end of last year. Importantly, the Act now paves a pathway to reaching an ITC of 30% and a PTC of 1.5 cents per kilowatt-hour (kWh) produced (assuming certain domestic labor standards are met) lasting at least until 2032.

Other incentives outside of tax credits include an advanced manufacturing production credit, which applies to the build-out of the renewables supply chain. A recent study by the Solar Energy Industries Association suggests that this could spur the growth of domestic capacity to over 50 gigawatts of solar panel manufacturing capacity by the end of this decade, compared to 11 gigawatts today.[1] Currently, the vast majority of the supply chain of modules, wafers, cells, and polysilicon are manufactured by China and Southeast Asia, given competitive economics and already built out capacity. However, as the U.S. looks to accelerate its renewables adoption as well as address security of supply and logistics challenges, the incentive to build out a domestic supply chain is more pressing than ever.

We hold a number of names across our portfolios that benefit from these policies. Companies such as diversified solar inverter manufacturer Enphase (5.63% of the VanEck Environmental Sustainability Fund (ESF) net assets, 2.48% of the VanEck Global Resources Fund (GRF) net assets)[2] should benefit from the necessary and rapid buildout of solar projects into the decade, as well as homeowners' move toward independent energy management.

The company currently holds 35% market share of inverters in the U.S., with a strong bent toward technological innovation, as it rolls out products focused on automation and energy optimization for home applications. We think the solar inverter, considered the "brain" of energy flow from solar panels, grid and appliances, can result in tremendous savings for both utilities and homeowners by reducing power wastage. Enphase is uniquely positioned to benefit from the long arc of adoption through residential, commercial and utility solar, through increased wallet share from end consumers, as it engages more in home energy control.



Source: Clean Energy Reviews

Small but Critical: Energy Storage

The Act includes a new 30% tax credit toward stationary battery storage. This has been anxiously anticipated given recent demand trends and a challenging cost curve for consumers. We view storage as the linchpin to renewables adoption. Current battery input costs render most large-scale storage options uneconomic and result in a lack of true grid balancing when integrating renewables. Battery storage growth has been strong, albeit off a low base, and we expect this growth to multiply over the next several years.

Portfolio Highlights

Other Renewable Energy Beneficiaries:

- Sunnova (1.62% of ESF net assets)
- Solaredge (4.33% of ESF net assets, 4.64% of GRF net assets)
- Stem (2.53% of ESF net assets, 0.83% of GRF net assets)
- Fluence Energy (0.31% of ESF net assets, 0.05% of GRF net assets)
- Hannon Armstrong (2.49% of ESF net assets, 2.09% of GRF net assets)
- NextEra Energy Partners (1.34% of ESF net assets)
- Brookfield Renewable Partners (1.01% of ESF net assets)

Spotlight on the Consumer: Energy Efficiency and EVs

A prominent undertone of the Act is a clear push for residential consumer subsidies, particularly those that serve the middle-class. These subsidies apply to modernizing and electrifying homes, which include upgrading appliances to make them more energy efficient as well as retrofitting the house to support EV charging.

Under the Act, qualified consumers can claim a 30% tax credit up to $1,200 annually toward projects that improve their home's energy efficiency each year for the next 10 years (compared to the current $500 lifetime credit). Additionally, specific items have qualifying thresholds which are even higher and will not count against the annual limit, such as heat pumps (a 30% tax credit up to $2,000).

Another major policy that has received plenty of airtime has been subsidies for EV purchases. The EV market has been focused mostly on high income consumers, evidenced by the price and availability of current models. The Act offers up to a $7,500 income tax credit for new cars and up to $4,000 for used cars. It is available to individuals making less than $150,000 a year, with price caps of $55,000 on sedans and $80,000 on pick-ups or SUVs to spur mass-market adoption. In line with the focus on domestic manufacturing and supply chain security, the subsidy is only available on models with final assembly in North America, with a glide path upward on the percentage of critical minerals and batteries manufactured in North America over time (by 2024, 50% of a qualifying car's battery will have to be sourced from North America, increasing to 80% in 2026). As mentioned previously, the Act does not include meaningful incentives encouraging domestic production of battery materials, and we see meeting these requirements as a serious challenge.

As such, we have witnessed an increasing number of battery manufacturers over the past two years break ground (or intend to break ground) in North America and Europe in order to address supply chain security in an industry in which 70%+ of critical minerals are found and/or are processed in Asia. The Act encourages an ongoing trend and reflects the very strong view that the U.S., a major global player in the traditional automotive market, does not intend to lose its foothold in a multi-trillion-dollar EV market.

Given EV manufacturers' requirement for domestic content as well as the attractive incentives for EV buyers, we believe that Freyr (3.24% of ESF net assets, 0.92% of GRF net assets) is in a unique position to benefit from the inflection of growth we should see in the adoption of mass market EVs. The Norwegian-based battery manufacturing company sources 100% of its electricity through renewable energy, and is estimated to be one of the lowest cost battery manufacturers on a per kilowatt hour (kWh) basis. This is due in part to cheap electricity, but also a novel manufacturing process that shortens the steps needed to produce a battery compared to traditional methodologies.

Freyr has expanded its footprint significantly over the past few years and is currently constructing its "Giga Arctic" Gigafactory in Norway and expanding in the U.S., Finland and Sweden through partnerships. Freyr has been planning its U.S. facility through a joint venture with Koch Strategic Platforms since 2021 and is very close to determining the site location and beginning its customer qualification process. Additionally, Freyr recently stated it is accelerating its development plans for the U.S. project on the back of the incentives associated with the Act. The combination of demand drivers and regulatory support positions Freyr very well for tremendous growth at favorable economics.

Portfolio Highlights

- Piedmont Lithium (1.47% of ESF net assets, 0.73% of GRF net assets)
- Allkem Limited (1.34% of ESF net assets, 0.23% of GRF net assets)
- Talon Metals (0.08% of GRF net assets)
- Tesla (2.38% of ESF net assets)
- EVgo (1.60% of ESF net assets, 0.04% of GRF net assets)
- Ecograf (0.42% of ESF net assets, 0.04% of GRF net assets)
- Euro Manganese (0.50% of ESF net assets, 0.06% of GRF net assets)
- MP Materials (0.90% of ESF net assets, 0.97% of GRF net assets)
- Nouveau Monde (0.10% of GRF net assets)
- Glencore (3.08% of GRF net assets)
- Vale (1.32% of GRF net assets)

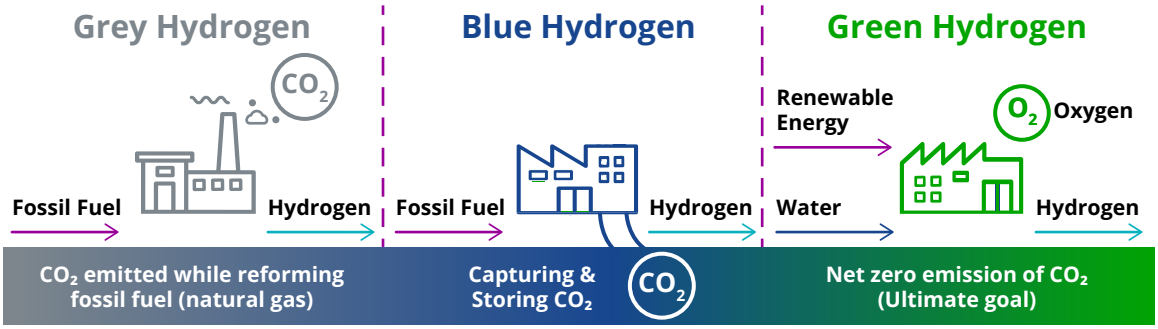
Green Hydrogen: Addressing the Big Emitters

In our view, hydrogen has the potential to become a critical component of the world's future energy system, and the Act provides serious support that improves its economic feasibility. Today, hydrogen is an abundantly produced and utilized industrial gas that is used in many different commercial applications. Almost all produced hydrogen currently is known as grey hydrogen – generated through natural gas reformation – and produces a meaningful amount of emissions. The cost of grey hydrogen is directly correlated to the price of natural gas and, therefore, has seen a dramatic increase recently.

Green hydrogen is produced through the electrolysis of water and uses clean energy sources, such as wind or solar, to power the process. Additionally, green hydrogen production does not generate operations-related emissions. In our view, green hydrogen has overarching benefits toward mitigating hard to decarbonize industries – such as replacing coal in steel production and natural gas in ammonia and fertilizer production.

The cost difference between grey and green hydrogen has historically been quite wide. However, the difference is closing, and in some cases green may appear cheaper than grey, particularly where natural gas prices have been spiking. However, the industrial production of green hydrogen is extremely limited at this time, which limits its practicality. Nevertheless, the benefits from the Act could prove to greatly accelerate commercial scale development.

The Act grants a PTC of up to $3 per kilogram (kg) for a period of 10 years for the production of green hydrogen. The cost of green hydrogen varies greatly but has been purported to be as low as ~$4-6/kg, but more typically in the $10-15/kg range. Grey hydrogen has typically cost in the $1-2/kg range, but this has recently been seen at $5/kg or higher due to the staggering escalation of feedstock prices. The benefit of this Act is that even in a normalized natural gas price environment, green hydrogen is becoming cost competitive.



Source: Posco Newsroom, December 2020

Although the bill addresses green hydrogen, it offers no direct support for the production of green ammonia, which would vastly improve the environmental sustainability of the U.S.'s agriculture sector. Unlike conventional ammonia, which uses natural gas as a chemical feedstock, green ammonia production only requires hydrogen. Farmers can use green ammonia on their fields as an alternative to conventional ammonia. In addition, green ammonia can be liquefied and used as a transport mechanism for green hydrogen.

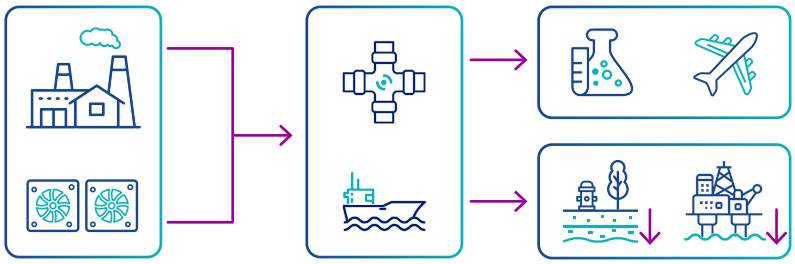
Given the lack of support for the production of green ammonia, the Act lags European initiatives. One such initiative is the Herøya Green Ammonia project in Norway. The project aims to electrify and decarbonize an ammonia plant owned by Yara, which is the world's largest ammonia producer. It is Norway's largest climate initiative, with a goal to reduce CO_2 emissions by 800,000 tons annually, which is the equivalent of 300,000 fossil-fueled cars. The project marks the beginning of a Norwegian value chain for green ammonia and hydrogen.

Portfolio Highlights

- Yara International ASA (0.45% of ESF net assets, 0.47% of GRF net assets)
- Bloom Energy (0.85% of ESF net assets)
- Plug Power (0.62% of ESF net assets)

A Major Lift: Carbon Capture, Utilization and Storage Systems (CCUS)

Carbon capture, utilization and storage (CCUS) is increasingly being viewed as a critical contributor of emissions mitigation. CCUS technologies have an enormous potential to reduce carbon dioxide (CO_2) emissions from a myriad of difficult to decarbonize sources, such as power generation or industrial facilities, or directly from the atmosphere (known as direct air capture – DAC). CCUS technology is used to separate and capture CO_2 from point sources and then transport it through pipeline, ship, rail or truck. The CO_2 can then be utilized in a range of products or services or permanently stored (injected) into deep geological formations (including depleted oil and gas reservoirs or saline formations).



Capture

Capturing CO_2 from fossil or biomass-fuelled power stations, industrial facilities, or directly from the air.

Transport

Moving compressed CO_2 by ship or pipeline from the point of capture to the point of use or storage.

Use

Using captured CO_2 as an input or feedstock to create products or services.

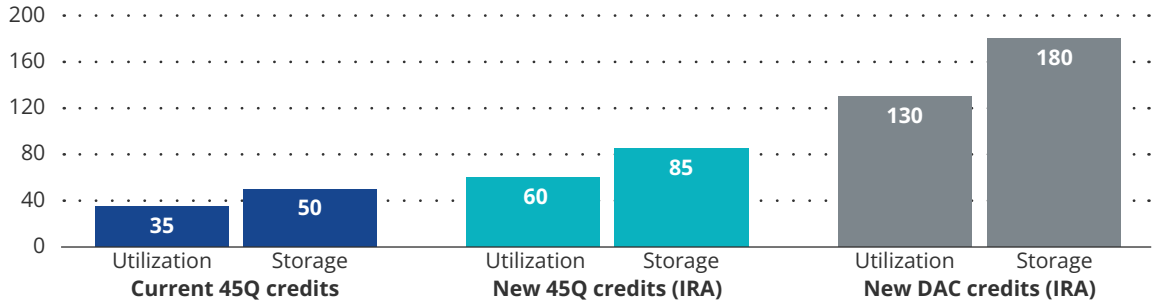
Storage

Permanently storing CO_2 in underground geological formations, onshore or offshore.

Source: IEA, April 2021

Tax credits associated with CCUS, known as 45Q credits, have been in place since 2008. The Act provides a major uplift in federal incentives for CCUS applications and could deliver a 70% increase in the maximum tax credits allowed. DAC has been provided with a sizeable benefit that dramatically improves the capacity for this approach to reach a commercial scale.

Comparison of current and new 45Q credits



Source: BloombergNEF. Data as of August 2022.
Note: Bonus credits require project owners to pay prevailing wages to all workers and to have an apprenticeship scheme.

The new proposed targets are considerable and raises the 45Q credits to $60/ton of CO_2 (from $35/ton) captured from industrialized activities and utilized in certain commercial applications, including food production as well as in Enhanced Oil Recovery (EOR) projects. The credit was increased to $85/ton (from $50/ton) for industrial capture projects that include permanent geological storage.

The Act also creates even more ambitious credits for CO_2 captured by DAC facilities - up to $130/ton for captured CO_2 used in commercial applications, and $180/ton for projects that include geological storage.

Portfolio Highlights

- Valero Energy (3.40% of GRF net assets)
- Chevron Corp (2.95% of GRF net assets)

Addressing Transportation: Biofuels

To incentivize the acceleration of the production of biofuels in the road transportation sector, the Act provides for a further extension of the Blenders Tax Credit (BTC) of $1 per gallon through December 31, 2024. This measure would benefit the current renewable diesel producers but would also allow for a number of new entrants into this business.

The Act also provides for a new fuel tax credit program to support development projects for Sustainable Aviation Fuels (SAF). It provides a blending tax credit of $1.25 per gallon, plus a supplementary credit up to $0.50 per gallon. The credit applies only to the mixture of SAF and kerosene that is produced and transferred to an aircraft's fuel tank in the U.S.

For more on renewable diesel and SAF technologies, read Turning Trash to Treasure: The Revolutionary Power of Renewable Diesel and Fueling a Sustainable Future with Renewable Diesel.

Portfolio Highlights

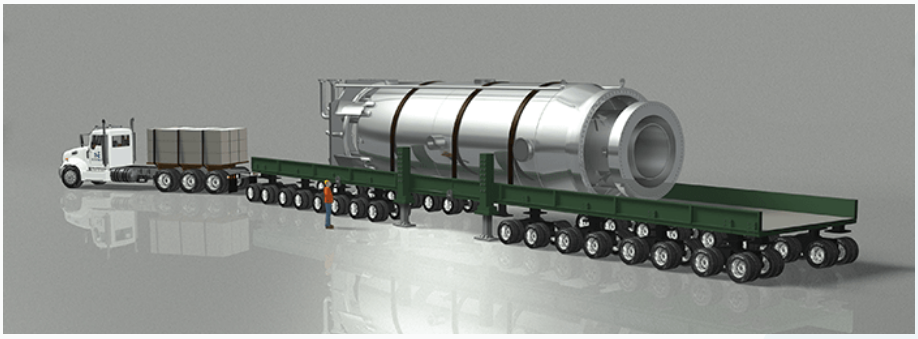
- Neste (3.09% of ESF net assets, 0.67% of GRF net assets)
- Darling Ingredients (2.30% of ESF net assets, 0.92% of GRF net assets)
- Valero Energy (3.40% of GRF net assets)
- Chevron Corp (2.95% of GRF net assets)

Early Stages for Nuclear, but Here to Stay

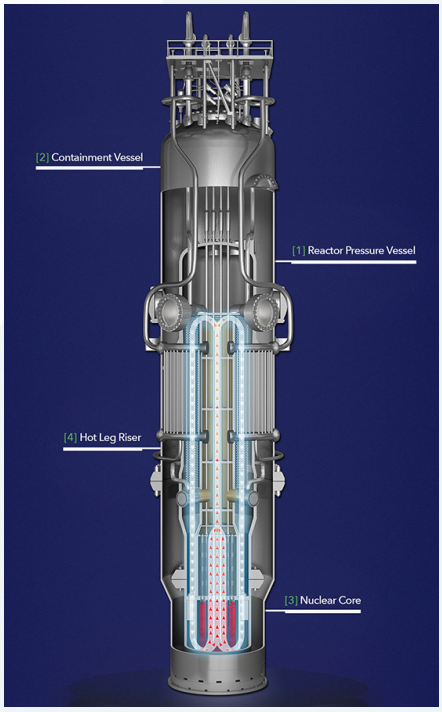
The view on re-stimulating the nuclear industry in the U.S. has been a divided one, largely due to safety concerns and the expansion of zero emission alternative technologies at competitive costs. The Act proposes a PTC up to $15 per megawatt-hour (mWh) for electricity produced by existing nuclear plants through 2032 and goes a long way toward maintaining the commercial viability of the current U.S. fleet.

Technology – Small Modular Reactors (SMRs) are advanced nuclear reactors with an electrical capacity of less than 300 MW per module, which is the equivalent of one-third of the generating capacity of traditional nuclear power reactors. They can be installed as single modules distributed throughout the grid, as dedicated sources of electricity for industrial complexes or in traditional large-scale plants that group together several modules. SMR designs may use any type of fuel and coolant and can be coupled with various power conversion systems (steam or gas turbines). Further, SMRs can be used to produce fresh water, hydrogen and heat (district or industrial).

The micro modular reactor (MMR) is a more recent type of SMR that contains units with a capacity of less than 10 megawatts. The reactor is semiautonomous and easy to transport and is intended to be used in several contexts, including in remote communities, seasonal industrial complexes, mining sites, offshore platforms, military bases or expeditionary forces.



Source: NuScale Power, as of September 2022.
The NuScale Power Module.



Source: NuScale Power, as of September 2022.
The NuScale Power Module.

The Act also allows Small Modular Reactors (SMRs) and other advanced technologies to qualify for the "technology neutral" PTC and ITC for facilities that produce zero greenhouse gas emissions and that are placed into service after December 31, 2024. The PTC provides a $15/mWh subsidy while the ITC offers a 30% credit. Additionally, the Act includes $700 million to support the research, development, demonstration and commercialization of High-Assay Low-Enriched Uranium (HALEU) nuclear fuel, which is required to operate advanced reactors.

In our view, these subsidy levels are low compared to the PTCs and ITCs for solar and wind, given the relative cost of energy of some newer nuclear technologies that still need significant funding to reach commercialization. However, this speaks to the U.S. government's encouragement of the development of these promising technologies.

Portfolio Highlight

- Chevron Corp (2.95% of GRF net assets)

The Ag Piece: Supporting the Farmer, but Not Much More

The Act includes $20 billion for climate mitigation and adaptation in the agricultural sector, which falls short of the support offered to other sectors. Unfortunately, although its specific policies appear to be good, practical initiatives, they will do little to reduce emissions from the agriculture sector, which is one of the most neglected sources of greenhouse gases (GHGs). In our view, there are two key areas where the bill falls short: fertilizer production (noted above) and alternative meat production. The bill omits incentives for U.S. nitrogen fertilizer companies to produce green ammonia, which would avoid the use of natural gas as a feedstock and reduce emissions drastically. The bill also omits incentives for U.S. food manufacturers to produce alternative meat products, which would further cut down on emissions.

Instead, the Act includes funding for several of the U.S. Department of Agriculture's (USDA) voluntary land stewardship programs, which provide financial and technical assistance for farmers and other landowners to implement conservation practices that improve environmental conditions, including improving soil health, maintaining water and air quality and sequestering GHG emissions. These programs seek to improve climate resiliency in the face of droughts, flooding, extreme heat and other extreme climate events.

Portfolio Highlights

- Darling Ingredients (2.30% of ESF net assets, 0.92% of GRF net assets)
- Neste (3.09% of ESF net assets, 0.67% of GRF net assets)
- Valero Energy (3.40% of GRF net assets)

Conclusion

In our view, the investment implications associated with the Act are broad and compelling. New and significantly expanded incentives for numerous different industries and technologies are now in place and should definitively put the U.S. on a course to enable a durable and cost effective energy and resources transition. Testing of the viability and returns profile of the green revolution is certain to be accelerated by this Act and we expect significant winners as well as failed business models. We believe this creates a very attractive environment for active equity investment managers to apply extensive experience, hands on expertise and understanding of both old and new paradigms. VanEck expresses its strengths in these attributes via our Environmental Sustainability Fund and our Global Resources Fund and believe that significant holdings in each fund will be able to capitalize on the green catalysts emanating from the Inflation Reduction Act.

[1] https://iea.blob.core.windows.net/assets/4eedd256-b3db-4bc6-b5aa-2711ddfc1f90/SpecialReportonSolarPVGlobalSupplyChains.pdf

[2] All company, sector, and sub-industry weightings for ESF are as of July 31, 2022 unless otherwise noted.

VanEck®

Van Eck Securities Corporation, Distributor
A wholly-owned subsidiary of Van Eck Associates Corporation

666 Third Avenue | New York, NY 10017
vaneck.com | 800.826.2333