

AcreWise: A Distributed Land Asset Management Platform

The AcreWise Team

<https://acrewise.io>

<https://t.me/acrewise>

Abstract: AcreWise is a blockchain-powered land asset management platform that delivers unprecedented levels of trust, clarity, and accessibility to any and all land-based claims and contracts. The primary objective of AcreWise is to increase revenue opportunities for property owners, investment firms, and financial institutions. AcreWise aims to remove the complexity and mitigate the risks associated with land rights claims and transactions. AcreWise goes beyond just solving the deep-rooted problems associated with land claims and transactions. AcreWise aims to eliminate these problems entirely by opening up a distributed blockchain-based platform to the entire world.

1. Introduction & Terminology

AcreWise will introduce innovative approaches that maximize the value of your land. AcreWise enables individual and institutional investors to buy, sell, store and trade land leasing agreements using a seamless digital interface powered by the blockchain. The AcreWise platform brings trust, efficiency and commerce to property derivative rights, primarily through distributed ledger technology enabled by the blockchain. Once an asset is made available on AcreWise, its derivative rights are instantly monetizable for commodities such as:

- Oil and Gas
- Mining
- Drilling
- Timber
- Farming
- Airspace
- Water extraction

What is 'Land'?

Land is real estate or property, minus buildings and equipment, that is designated by fixed spatial boundaries. Land ownership may offer the title holder the right to natural resources on the land. The traditional school of economics dictates that land is a factor of production, along with capital and labor. The sale of land results in capital gain or loss; under IRS tax laws, land is not a depreciable asset.¹

What is a 'Commodity'?

A commodity is a basic good used in commerce that is interchangeable with other commodities of the same type. Commodities are most often used as inputs in the production of other goods or services. The quality of a given commodity may differ slightly, but it is essentially uniform across producers. When they are traded on an exchange, commodities must also meet specified minimum standards, also known as a basis grade.²

What is a 'Derivative'?

A derivative is a financial security with a value that is reliant upon or derived from an underlying asset or group of assets. The derivative itself is a contract between two or more parties based upon the asset or assets. Its price is determined by fluctuations in the underlying asset. The most common underlying assets include stocks, bonds, commodities, currencies, interest rates and market indexes.³

What is a 'Royalty'?

A royalty is a payment to an owner for the ongoing use of their asset or property, such as patents, copyrighted works, franchises, or natural resources. A royalty payment is made to the legal owner of the property, patent, copyrighted work, or franchise by licensees or franchisees who wish to make use of it for the purposes of generating revenue or other such desirable activities. In most cases, royalties are designed to compensate the owner

1 Staff, Investopedia. "Land." *Investopedia*, Investopedia, 26 Jan. 2018, www.investopedia.com/terms/l/land.asp.

2 Staff, Investopedia. "Commodity." *Investopedia*, Investopedia, 21 Oct. 2018, www.investopedia.com/terms/c/commodity.asp.

3 Staff, Investopedia. "Derivative." *Investopedia*, Investopedia, 3 Aug. 2018, www.investopedia.com/terms/d/derivative.asp.

for the asset's use, and they are legally binding.⁴

What is a 'Smart Contract'?

Smart contracts are self-executing contracts with the terms of the agreement between buyer and seller being directly written into lines of code. The code and the agreements contained therein exist across a distributed, decentralized blockchain network. Smart contracts permit trusted transactions and agreements to be carried out among disparate, anonymous parties without the need for a central authority, legal system, or external enforcement mechanism. They render transactions traceable, transparent, and irreversible.⁵

2. What AcreWise Optimizes

Market Accessibility

Bolster company profitability obtain residual income with a land leasing contract, or secure tracts of land for ecological revitalization: with unfettered access to “the long tail” of an increasingly robust marketplace, AcreWise reinvents the concepts of land use and accessibility, transitioning these markets into the frictionless future.⁶

Dispute Resolution

Drastically reduce dispute resolution time and cost via a digitally auditable distributed ledger that detects and rectifies discrepancies near instantaneously.

Data Security

Secure proprietary data while maximizing transparency, ensuring relevant entities within your industry to have access to real-time data.

Contract Finality

4 Staff, Investopedia. “Royalty.” *Investopedia*, Investopedia, 18 June 2018, www.investopedia.com/terms/r/royalty.asp.

5 Staff, Investopedia. “Smart Contracts.” *Investopedia*, Investopedia, 23 Jan. 2018, www.investopedia.com/terms/s/smart-contracts.asp.

6 Anderson, Chris. “The Long Tail.” *Wired*, Conde Nast, 2 Oct. 2018, www.wired.com/2004/10/tail/.

Real-time digital attestation of data on the AcreWise blockchain demystifies the point of contract finality.

3. The Precarious Present vs. The Frictionless Future

All human action is in some way, shape, or form, predicated on the use of land. Today's land leasing, commodities, and derivatives “marketplaces” are high-friction environments. Institutions spend untold amounts of capital ensuring that sufficient communication with relevant entities is achieved without divulging sensitive information that may negatively impact a company's competitive edge. These tedious processes are at present costly, oftentimes lengthy, and objectively inefficient.

A 2017 litigation analysis by Norton-Rose-Fullbright revealed that while total number of disputes has decreased for survey participants, they nonetheless experienced an increase in spending on disputes relative to revenue. Survey participants on average hired three dispute lawyers and spent \$1.7 million on disputes per \$1 billion in revenue.⁷ Discerning industry-specific litigation expenditures is difficult given the complexity of human economy, however with oil and gas litigation costing the state of Louisiana \$1.1 billion in direct cost (plus and additional \$1.5 billion in output cost), a general precedent can be ascertained.⁸ This is corroborated by the comparatively low but contextually large figure of \$6.8 million in ecological litigation expenditures alone in the US timber industry during the fiscal year 2014.⁹ Taken in conjunction, this information paints a picture of consolidating yet increasingly expensive litigation across major industries. Recent data shows that the US industries of energy, mining, timber, farming infrastructure, urban development and others are spending \$306 billion annually dispute resolution.¹⁰

These additional costs translate to an increased barrier to entry for individual

7 Norton, et al. “2017 Litigation Trends Annual Survey: Perspectives from Corporate Counsel.” [Http://Www.nortonrosefulbright.com](http://www.nortonrosefulbright.com), Norton Rose Fulbright, 2017, www.nortonrosefulbright.com/files/20171025-2017-litigation-trends-annual-survey-pdf-157870.pdf .

8 Bradon, Carrie. “Louisiana Oil and Gas Warns of Excessive Litigation Costs.” *Louisiana Record*, 28 Oct. 2018, louisianarecord.com/stories/511612311-louisiana-oil-and-gas-warns-of-excessive-litigation-costs.

9 Morgan, Todd A, and John Baldrige. “Understanding Costs and Other Impacts of Litigation of Forest Service Projects: A Region One Case Study.” *Bureau of Business and Research University of Montana*, 5 May 2015, www.bber.umt.edu/pubs/forest/BBERLitigationRpt2015.pdf.

10 Buehler, Michael, et al. “It Costs Trillions of Dollars to Settle Commercial Conflicts. It's Time for Alternative Dispute Resolution.” *World Economic Forum*, 20 Dec. 2017, www.weforum.org/agenda/2017/12/commercial-disputes-conflicts-costs-trillions-dollars-alternative-dispute-resolution/.

property owners, further constricting resource availability and increasing the probability of legal discrepancies as industry participants sometimes needlessly overlap. Parcels with monetizable land rights are often excluded from market participation due to the lack of profitable at-scale solutions in modern industry.

Due to the complexity of these existing issues most industry participants maintain a number of complicated, siloed ledgers to track ownership status in order to keep logistics as close to optimal as possible. Today's systems are expensive to maintain, have centralized points of failure, and are often susceptible to corruption or human error. The multi-faceted and high-risk nature of implementing new technologies to improve these systems makes return on investment difficult to calculate. Companies may be wary to be the first in their industry to develop and implement new technologies as to diverge from their current business practices. Additionally, these issues can be remedied by the equilateral adoption of an innovative platform built upon proven technology and digital systems that protect proprietary data while optimizing logistics.

AcreWise delivers a blockchain-powered digital platform that empowers industry participants and individuals alike to monetize land in exciting new ways. AcreWise provides unparalleled market access for the monetization of land and a new avenue for institutional investors to diversify and expand their portfolios.

AcreWise's role based, permissioned architecture allows for unfettered access to market data as well as ironclad protection of sensitive data through cutting edge encryption techniques enabled by the blockchain. This heavily reduces production overlap and streamlines dispute resolution arising from information discrepancies. This will enable a surge of individual and institutional market participation and will remarkably diminish associated costs for managing land rights, commodities, and their derivatives' values.

4. Industries and Markets

Oil and Gas/Crude Oil: Fueling the Future

Oil and gas commodity trading is a highly complex and global business that includes the

vast majority of today's energy sector. The most widespread product of the oil and gas industry, crude oil, is refined into gasoline, petrochemicals, and other petroleum byproducts. At present, crude oil accounts for roughly 39% of global energy consumption.¹¹ Contemporary inefficiencies in the crude oil industry are widespread. Crude oil is a centenarian industry with many established precedents that are becoming increasingly incompatible with modern technology. Inevitably these inefficiencies culminate in a number of issues that negatively impact the bottom line.¹²

The most common measurement of productivity used today in the crude oil industry is known as “wrench time”. This metric measures the proportional amount of time a worker spends on average completing their designated task, excluding obtaining parts, tools, or receiving instruction. The difference in wrench time between the high-end industry average of 35% and best-practice average of 55% results in a 57% improvement in productivity.¹³

Despite this stark increase in productivity, accurately tracking wrench time is difficult and often results in dubious or inaccurate information. Although 75% of optimization efforts target wrench time improvements, industry leaders are increasingly advising against focusing solely on this metric.¹⁴ The slow propagation of knowledge about wrench time and its associated inefficiencies as a metric of production highlights the existing communicative inefficiencies in the crude oil industry and the need for a candid digital solution.

The oil-rich Permian Basin in Texas has experienced a 128% increase in oil production between the years of 2015 and 2018. The logistical challenges faced due to the geographical concentration of this upsurge in production has resulted in intense strain on the local infrastructure. Some industry participants are choosing the comparatively inefficient transportation methods of truck or railcar in the face of overcrowded pipelines. The difference in cost between these methods is astounding, with trucks costing between \$15-\$25 per barrel, rail costing \$8-\$12 per barrel, and pipelines costing less than \$4 per

11 Ritchie, Hannah, and Max Roser. “Fossil Fuels.” *Our World in Data*, 2018, ourworldindata.org/fossil-fuels.

12 Delvin, David, and Hitachi Consulting. “Top 10 Offshore Inefficiencies - OE Digital.” *Home - OE Digital*, 18 Nov. 2015, www.oedigital.com/drilling/item/10872-top-10-offshore-inefficiencies.

13 Palmer, Doc, and Richard Palmer. “Wrench Time Dos and Don'ts.” *Plant Services*, 1 Aug. 2017, www.plantservices.com/articles/2017/palmers-planning-corner-wrench-time/.

14 Hillebrand, Val. “Why You Should NOT Calculate a ROI Based on Wrench Time.” *VIZIYA*, www.viziya.com/resource/dont-calculate-roi-based-wrench-time/.

barrel, resulting in a premium of up to 625%. The streamlined sharing of information between industry leaders about productive capacity will help to decrease the staggeringly high premiums associated with bottlenecks in operation.¹⁵

Perception of the oil and gas industry is both positive and consistent between industry executives and the general public. While 78% of executives agree that oil and gas should remain the primary source of energy until cleaner alternatives become economically viable, 58% of the general public echoes this sentiment. Although these currently positive figures the generational differences in perception of oil and gas are staggering: 38% of baby boomers are likely to say oil and gas are a net *positive* for society whereas 14% of generation Z are likely to say oil and gas are net *negative* for society.¹⁶ ¹⁷ Transparency afforded by sound technological innovation will help to shore up this rapidly depreciating perception of the oil and gas industry between generations.¹⁸

The inevitability of modernization can be overwhelming for individuals and institutions alike. Proven approaches that ensure ROI are subject to diminishing returns as competition saturates the market and once-innovative practices become industry standard. The first industry players that successfully pioneer the implementation of proven new technology into their operations have historically enjoyed an unparalleled period of competitive edge relative to their competition. Simply optimizing existing digital systems in the oil and gas industry presents an unrealized profit margin of roughly \$1 billion annually.¹⁹ Industry leaders largely agree that the “Netflix of Oil and Gas” will soon present remarkable transparency, interconnectedness, and profitability in the sector.²⁰

15 Hampton, Liz, et al. “Too Much Oil? Texas Boom Outpaces Supply, Transport Networks.” *Reuters*, Thomson Reuters, 2 Oct. 2018, www.reuters.com/article/us-usa-oil-record-bottlenecks-analysis/too-much-oil-texas-boom-outpaces-supply-transport-networks-idUSKCN1MC1CE.

16 “US Consumer Perceptions of the Oil and Gas Industry.” *Home*, EY, 2017, www.ey.com/us/en/industries/oil---gas/ey-us-perception-of-the-oil-and-gas-industry-2017.

17 “Trust Challenge Facing the Global Oil & Gas Industry.” *Global Agenda Council on the Future of Oil & Gas*, Apr. 2016, www3.weforum.org/docs/Trust_Challenges_Facing_Global_OilandGas_Industry.pdf.

18 Nakhle, Carole. “Transparency in the Oil and Gas Sector: Much Talk but Limited Action.” *Carnegie Middle East Center*, 16 Dec. 2016, carnegie-mec.org/2016/12/16/transparency-in-oil-and-gas-sector-much-talk-but-limited-action-pub-66495.

19 Ward, Richard. “A Billion-Dollar Digital Opportunity for Oil Companies.” *McKinsey & Company*, Mar. 2016, www.mckinsey.com/industries/oil-and-gas/our-insights/a-billion-dollar-digital-opportunity-for-oil-companies.

20 Meredith, Sam, and Nancy Hungerford. “Continuous Disruption Is ‘New Normal’ for Oil and Gas Industry, Baker Hughes GE CEO Says.” *CNBC*, CNBC, 15 Nov. 2017, www.cnn.com/2017/11/14/continuous-disruption-is-new-normal-for-oil-and-gas-industry-baker-hughes-ceo-lorenzo-simonelli-says.html.

AcreWise enables the equilateral disassembly of the cumbersome data-silos that exist in today's oil and gas industry while preserving the integrity of proprietary data and the competitive edge of individual companies. Our permissioned, regulatory-compliant platform enables the seamless digital tracking of real-world derivative assets within and between industry participants, while streamlining dispute resolution and simultaneously optimizing individual company logistics. AcreWise's permissioned availability of data empowers down-stream industry participants with more flexibility in terms of resource management and capital allocation. An unprecedented level of transparency and digital accessibility engenders far greater degrees of social efficacy for industry participants, bridging the gap between public perception and the industry realities of increasing ecological impact management.

Mining: Digging for Answers

The mining industry is a critical component of the modern global economy. The extraction of minerals from the earth is the first step in the lifecycle of almost every consumer and producer good on the planet. This industry is the life-blood of many communities and nations around the world yet still exhibits glaring inefficiencies despite its crucial role in industrial production.

The stark decline in mining productivity since 2000 is the largest systemic risk faced by the industry today. Periods of elevated mineral and metal prices often facilitate behaviors and practices that decrease overall productivity as companies prioritize production and immediate profitability. These inefficiencies often compound as they are offset by higher market prices with excessive hiring during boom-times leading to imprecise distribution of skills. The result of these practices is an average labor productivity decline of 44% between 2009 and 2012 in the US coal sector.²¹

Mining is an industry of forward-thinkers with exploration for new resources a constant feature of the landscape. Despite this prescient group, a tenfold increase in spending from 2002 to 2012 has resulted in virtually zero increase in total discoveries. Easily accessible surface minerals have already been mined as the demand for deeper

²¹ Mitchell, Paul, and John Steen. "Productivity in Mining: A Case for Broad Transformation." *EY*, EY, 2017, [webforms.ey.com/Publication/vwLUAssets/EY-Productivity-in-mining/\\$FILE/EY-Productivity-in-mining.pdf](http://webforms.ey.com/Publication/vwLUAssets/EY-Productivity-in-mining/$FILE/EY-Productivity-in-mining.pdf).

drilling has resulted in a bottleneck and subsequent price increase for the exploration process. Between 2005 and 2010 the cost to diamond drill a new exploratory mine more than doubled in much of the world.²²

This collection of factors has resulted in a uniquely precarious situation for the mining industry. An unexpected economic downturn may result in a disproportionate negative impact on industry participants as contracting economic conditions further constrains the amount of capital available for new, increasingly expensive exploration. The boom in mineral prices brought on by the increased consumption and market participation of developing nations has largely staved off the deleterious reality faced by today's mining industry. Mining industry leaders are quickly waking up to the critical importance of research and development as they're faced with limited options and tangible preventative forces that make mineral resources proportionally scarce. The last major investment into R&D occurred almost half a century ago in the 1970s and revolutionized the gold extraction process. Since this period of rapid development, the mining sector has spent one-tenth the amount on research and development when compared to its oil industry counterpart.²³

The dire need for research and development investment in the mining industry is abundantly clear and increasingly echoed by industry professionals. Optimizing existing logistics and resource management approaches will give companies financial breathing room to fund long-overdue R&D and equipment optimization efforts. Equipment manufacturers have expressed interest in partnerships focusing on these topics as well as wider industry innovation in an effort to distribute and minimize the impact of immediate cost.²⁴

Technologies with provable historical precedent such as blockchain are already being tested by major industry participants. The transparency afforded by distributed ledger technology enables industry leaders and equipment manufacturers to eliminate

22 Koch, Alexander, et al. "Tackling the Crisis in Mineral Exploration." *BCG*, 30 June 2015, www.bcg.com/en-us/publications/2015/metals-mining-sustainability-tackling-the-crisis-in-mineral-exploration.aspx.

23 Leach, Adam. "Is Increasing Mining R&D the Only Hope for Saving a Stalling Industry?" *Mining Technology*, 25 May 2014, www.mining-technology.com/features/featureis-increasing-mining-rd-the-only-hope-for-saving-a-stalling-industry-4274633/.

24 Lala, Ajay, et al. "Productivity in Mining Operations: Reversing the Downward Trend." *McKinsey & Company*, May 2015, www.mckinsey.com/industries/metals-and-mining/our-insights/productivity-in-mining-operations-reversing-the-downward-trend.

redundancy in research and usher in a new era of technological innovation. As regulatory clarity emerges around these technologies the mining industry is perhaps the best poised to receive the most benefit from its implementation.²⁵

AcreWise presents the mining industry with access to previously unprofitable or inaccessible at-scale land plots, increasing the reachability of marketable surface minerals. Standardized digital correspondence lowers the cost of communication and diminishes redundancies in R&D. Digital mineral rights and land use tracking reduces accounting errors, thereby maximizing industry profitability. AcreWise boosts awareness of environmentally conscious industry standards, putting a new face of social good and accessibility on economically critical industries such as mining.

Timber: Logging the Changes

The logging and timber industries have long been lauded as ecologically detrimental and intrinsically threatening to the environment in spite of their critical importance in the global economy and modern infrastructure. Comprising roughly 1% of global GDP, regulated logging and timber activities maintain a highly effective, increasingly conservationally-minded approach despite the negative stigma surrounding their existence.²⁶ Nonetheless dissuading illegal but highly profitable logging activity in developing economies on a global scale presents unique challenges to an industry battling public perception alongside profitability. Current estimates show that illegal logging accounts for 8-10% of global timber consumption, with 40-50% of logging done in threatened forests undertaken by such culprits.²⁷ It is clear from these high figures that ensured point-of-origin is needed to more effectively combat these illicit activities and subsequently increase recognition of successful conservation initiatives in the industry.

Modern long-term efforts to better isolate the origin of lumber and combat the ecological detriments wrought from illegal harvesting have largely been rendered inert and at times have served as a detriment to transparency. The Forest Stewardship Council

25 Campbell, Rebecca, and Andrzej Omietanski. "Digitalising the Mining & Metals Global Supply Chain: Rise of Blockchain and the Smart Contract." *White & Case*, 20 Sept. 2018, www.whitecase.com/publications/insight/digitalising-mining-metals-global-supply-chain-rise-blockchain-and-smart.

26 "Forest Use & Logging." *Yale School of Forestry and Environmental Study Global Forest Atlas*, globalforestatlas.yale.edu/forest-use-logging.

27 "Timber." *World Wildlife Fund*, World Wildlife Fund, www.worldwildlife.org/industries/timber.

(FSC), a voluntary organization comprised of environmentalists, social activists, and industry leaders, has contributed to the inadvertent rise of “green-washing” as the group's ecological “seal of approval” has itself become a marketable commodity utilized by participants in illegal logging.²⁸ Brazil, a major participant in the international logging and timber industries, has attested to these difficulties surrounding efforts to track the origins of wood.²⁹

While illegal logging activity primarily contributes to negative public perception, inter-governmental regulations and practices pose their own difficulties in terms of profitability and logistics. Two of the largest industry participants, The United States and Canada, maintain a number of discrepancies that have resulted in multiple lawsuits and agreements over the last half century in no small part due to Canada's subsidization of its timber industry. This hands-on regulatory environment is in stark contrast to The United States' relatively free-market approach to logging and timber in which profitability is more varied. This market asymmetry has resulted in historical price spikes and dips as industry participants explore how to best capitalize on fluctuating jurisdictional differences, often leading to redundancies in research and development.³⁰

The implementation of the AcreWise platform introduces a standardized digital process through which point-of-origin can be assured will provide clarity and consistency in otherwise opaque and diverse international markets. Affirmed point-of-origin minimizes the market impact of illegal harvesting on regulated industries by decimating illegal actor's potential for wider market participation. Such limitations will drastically reduce industry-wide competition by up to 8-10% as these actors are relegated to informal markets, thereby increasing the market share of honest industry professionals. Digital point-of-origin confirmation ensures accurate assessment of age, quality, and most importantly: transparently demonstrates both environmental and social impact at every stage of the process. This quality assurance coupled with the expanded accessibility

28 Conniff, Richard. “Greenwashed Timber: How Sustainable Forest Certification Has Failed.” *Yale Environment* 360, Yale School of Forestry & Environmental Studies, 20 Feb. 2018, e360.yale.edu/features/greenwashed-timber-how-sustainable-forest-certification-has-failed.

29 Staff. “Inefficient Amazon Harvesting, Processing Creating Huge Losses in Brazil.” *Stabroek News*, Stabroek News, 21 July 2011, www.stabroeknews.com/2011/business/07/22/inefficient-amazon-harvesting-processing-creating-huge-losses-in-brazil-%E2%80%94-report/.

30 Messner, Matthew. “The Lumber Industry Responds to the Rise of Mass Timber.” *The Architects Newspaper*, 28 Nov. 2017, archpaper.com/2017/11/lumber-industry-future-balancing-construction-conservation/.

engendered by the AcreWise platform drastically elevates the amount of woodland available for commercial use. The multilateral application of proven digital technologies like blockchain will sequester illegitimate industry participants and enable more flexibility in an environment of historically-volatile prices; all while dispelling the misconceptions that surround the ecological consciousness that has become the pervasive standard by legitimate actors in the timber industry.

Airspace: Soaring to New Heights

The current applicability of drones and unmanned aerial vehicles (UAVs) in commercial application is tentative at best in no small part due to the opaqueness and ever-evolving nature of government regulation surrounding the technology. Optimizing logistics using aerial technologies is subject to economies of scale and presently is only theoretically profitable for the industry's largest players. The growing accessibility and affordability of civilian and commercial drones, however, is forcing the hand of regulators as rapid development of the industry is suppressing costs and eliciting reconsiderations surrounding small-scale commercial viability. Enthusiasts, industry leaders, and government bodies such as the FAA are working closely to homogenize and clarify existing regulations without compromising civic safety and legal compliance.³¹

The Federal Aviation Administration Extension, Safety, and Security Act of 2016 (also known as “FAA Reauthorization”) is currently the predominant regulatory framework concerning drones and UAVs in the United States. FAA Reauthorization offers greater regulatory clarity yet places stringent limitations on operators such as the necessity for a constant visual line of sight between the UAV and operator. This terminology relegates the use of GPS navigation by UAVs to the periphery as entities that wish to utilize this approach contend with ambiguous terminology such as the line of sight requirement being “satisfied in other ways”.³²

This lack of clarity offers a mix of pros and cons as regulatory bodies contend with exuberant enthusiasts, inquiring industries, and concerned citizens alike. The

31 Rupprecht, Jonathan. “Ultimate Guide to U.S. Drone Regulations (2018).” *Rupprecht Law P.A.*, 28 Aug. 2018, rupprechtlaw.com/drone-regulations.

32 “Fly Under the Small UAS Rule.” *Federal Aviation Administration*, The United States Department of Transportation, 19 Sept. 2018, www.faa.gov/uas/getting_started/part_107/#or.

regulatory rulemaking process includes a comment period for citizens to voice their potential support or concerns surrounding a proposed rule, thereby helping to enforce a grassroots culture of regulatory development.³³ Bottom-to-top regulation foments a culture of innovative solutions that benefit all parties involved, resulting in robust market applications.

The currently opaque regulatory environment surrounding UAVs implies that the aerospace and drone industries would benefit heavily from the blockchain-powered property leasing management system that is AcreWise. Clearly defined, easily accessible data regarding Class G airspace interactions means industry participants, land owners, citizens, and regulatory bodies are assured their legal land rights are not violated. Simplified intercommunication in real-time means all relevant parties remain aware of one another's presence, legal rights, and subsequent actions, thereby minimizing information disparities, lessening the cost of dispute resolution, and ensuring that the best possible industry standards are consistently maintained. AcreWise fosters a robust ecosystem for aerospace development and presents a new level of land profitability.

Derivatives: Forward Focused Finance

Derivatives are unique and often misunderstood financial instruments that present an immense amount of value to the global economy as tools for capital intermediation in markets. The complexity of derivatives and their associated markets entail information asymmetries between major financial players and the average market participant. This has led to some unfavorable application of these otherwise useful contracts that has sometimes resulted in market turmoil, such as in the 2008 Financial Crisis. Recent studies have concluded: “Enhancing investors' understanding of firms' credit risk exposure could, in the first instance, help alleviate the very real costs this uncertainty poses to both the real and financial economy.”³⁴

This information makes clear that a transparent incentive mechanism is needed to

33 Perkins, Chase, et al. “Navigable Airspace for Drones: Private Property Rights and Regulated Airspace.” *Hacker Noon*, AERO Token, 18 Sept. 2017, hackernoon.com/navigable-airspace-for-drones-private-property-rights-and-regulated-airspace-12d18c34fb1c.

34 Bartlett, Robert P. “Inefficiencies in the Information Thicket: A Case Study of Derivative Disclosures During the Financial Crisis.” *Berkeley Law Scholarship Repository*, Berkeley Law University of California, 1 Jan. 2010, scholarship.law.berkeley.edu/facpubs/854/.

entice investors to better acquaint themselves with derivatives, their various functionalities, and subsequent implications. Derivatives are not new; however, their digitization has embodied them with a new tier of complexity, further complicating education efforts.³⁵ A simplified, easily-accessible, digital platform that includes comprehensive derivative opportunities for the average accredited investor can drastically increase the diffusion of derivatives and their equilateral application as a financial tool. This diffusion will in turn positively reinforce derivative's precision in hedging, portfolio risk balancing, and capital intermediation in global markets.³⁶

Seasoned investors who are familiar with the complicated schematics of derivatives will benefit extravagantly from a streamlined process that incorporates an even greater degree of contractual customization in a regulatory-compliant system. The lucidity permitted by such a system decidedly elevates the capacity for derivatives to serve as risk management devices and capital intermediation flow.³⁷

The transparency, clarity, and ease-of-use afforded by the AcreWise platform accelerates the diffusion of derivatives as a comprehensive and applicable tool for the modern investor. The low cost and high speed of information transmittance on the AcreWise platform results in a low friction, data-driven environment conducive of incentivizing a wider scope of investor involvement with derivatives. AcreWise's smart contract derivative rights modeling delivers seasoned derivative specialists a platform that enables maximum ROI. AcreWise increases proportional value per contract, decreases the high costs and difficulties currently associated with derivatives markets, and increases utilization of derivatives, thereby positively impacting their accuracy as an assessment of value in the global marketplace.

35 Palaniappan, Raja. "A Brief History of Derivatives." *Origin Markets*, 14 Apr. 2017, originmarkets.com/origin-hosts-issuer-roundtable-in-parallel-with-the-25th-annual-euromoney-global-borrowers-conference-3/.

36 Hall, Bronwyn, and Beethika Khan. "Adoption of New Technology." *Econometrics Laboratory University of California, Berkeley*, University of California, Berkeley, Nov. 2002, eml.berkeley.edu/~bhhall/papers/HallKhan03%20diffusion.pdf.

37 Stankovska, Aleksandra. "Global Derivatives Market." *Sciend Economics and Culture*, European University - Republic of Macedonia, 23 Oct. 2018, content.sciendo.com/view/journals/seeur/12/1/article-p81.xml.

5. People and Governments

Individuals: People Propelling Progress

All industries, companies, and organizations are synonymous with the individuals that comprise them. Individual human action propels economic prosperity forward through cooperation, shaping a world of greater resource abundance for all. Central to this abundance is the allocation of existing resources, the vast majority of which are derived from physical land. The United States is unique in the sense that countless individual property owners benefit financially from leasing the rights to the resources that are associated with their property. It is estimated that private royalty owners were paid ~\$22 billion in royalties for their mineral property rights in the year 2012 with oil and natural gas royalties accounting for an additional ~\$17 billion in 2010.³⁸

AcreWise removes the negative sentiments and worries surrounding land leasing agreements of all sizes by presenting a no-nonsense, digital platform with human-readable contracts, reinforcing trust in commerce. This allows property owners with land of any size to flexibly explore monetization options on an open marketplace without the burden of opaque paperwork. Clearly accessible information regarding average royalties for particular contracts, industry standard processes surrounding various land use, and easily-accessible information regarding industry precedents empowers individuals with a level playing field in negotiation. This rounding-out of the previously rigid disparity in knowledge and efficacy between the individual and companies in negotiation optimizes both parties' profitability, satisfaction, and mutual trust. Individuals gain an additional vector of profitability through optional participation in subsequent derivatives contracts that involve the owner's property. Unparalleled access to the financial opportunities presented by land leasing agreements is afforded through AcreWise's revolutionary digital platform.

38 Fitzgerald, Timothy, and Randal R. Rucker. "U.S. Private and Natural Gas Royalties: Estimates and Policy Consideration ." *ScholarWorks*, Montana State University , 12 Mar. 2014, scholarworks.montana.edu/xmlui/bitstream/handle/1/3277/US%20Private%20Natural%20Gas%20Royalties%20etc.pdf.

Public Entities: Growing Governmental Good

The largest beneficiary of an optimized digital marketplace predicated on land use and rights is the sovereign government presiding over the land's legal status yet maximizing actualized revenue from taxation of these resources remains a consistent issue for government entities worldwide. The administrative inefficiencies associated with these difficulties negatively impacts perception of government and therefore governmental efficacy in society. Utilizing a flexible but homogenous digital medium that decreases overall economic friction presents a multiplicity of positive confluences for governing bodies.

Previous sections of this whitepaper make evident the intensely positive economic results that will be achieved through digital optimization of resource management and logistics. The oil and gas industry accounts for \$20 billion in annual United States tax revenue with the Interior Department distributing \$6.23 billion in 2016 from energy revenues alone.^{39 40} Governments can assist with this increase in revenue by fostering a regulatory environment conducive of technical industrial innovation. Historical precedent demonstrates that the use of “regulatory sandboxes” provides the most applicable environment in which various industries test and implement these emerging technologies.⁴¹ Such experimental environments amplify the revenue generated by domestic industry while simultaneously attracting foreign investment and competition in an increasingly globalized economy.

This global economic landscape is rapidly evolving in the face of unprecedented technological innovation, posing unique challenges for governance. What used to be a clearly defined collection of industry leaders is shifting towards a more crowded landscape of “niche specialists” that capitalize on previously unprofitable aspects of economic activity. This phenomenon, known as The Long Tail, presents a situation in which the economic scope of an enterprise is narrowed without negatively impacting the scale of operations. Said another way: a greater amount of people can produce far more

39 Petak, Kevin, et al. “U.S Oil and Gas Infrastructure Investment Through 2035.” *American Petroleum Institute*, ICF, Apr. 2017, www.api.org/~media/Files/Policy/Infrastructure/API-Infrastructure-Study-2017.pdf.

40 “Interior Department Disburses \$6.23 Billion in FY 2016 Energy Revenues Federal Revenues Support State, Tribal, National Needs.” *Office of Natural Resources Revenue*, U.S. Department of the Interior, 25 Nov. 2016, www.onrr.gov/pdfdocs/20161125a.pdf.

41 Henrichs, Jason. “Fintech Needs More Regulatory 'Sandboxes'.” *American Banker*, American Banker, 26 Apr. 2018, www.americanbanker.com/opinion/fintech-needs-more-regulatory-sandboxes.

value for much less input thanks to digital technologies. Despite recent studies demonstrating a proportional increase in employment by large corporations, the number of venture capital investments by companies has increased by 79% since 2011, highlighting the growing focus on the economic flexibility offered by smaller startups.⁴² Small-scale land use by business is highly prevalent in the United States as well, as 90% of companies in the nation employ less than 20 individuals.⁴³ The need for a homogenous digital platform through which small-scale businesses can economically interact in a viable, regulatory-compliant manner is becoming increasingly relevant to government interest.

Increasing actualized tax revenue while fostering wider economic development may appear to be the ideal situation for any governing entity. The true optimal situation for government finance, however, is a sustainably proportional decrease in administrative expenditures relative to a simultaneously increasing amount of tax revenue generated. The positive impact that digitization will have on administrative costs is hard to overstate as the long-term expenditures needed to maintain these digital systems are orders of magnitude less expensive when compared to their traditional counterparts. The taxation component of regulatory compliance has been disproportionately increasing for small and medium businesses in recent years, stifling grassroots innovation in one of the most critical sectors for modern, sustainable economic development.⁴⁴ Government support for a regulatory-compliant, digital alternative will eliminate the costly and often archaic processes that presently burden industry of all sizes.⁴⁵

The customization, transparency, and permissioned framework of the AcreWise marketplace presents to government officials the perfect balance of economic liberty and rational application of governmental authority. AcreWise offers a digital alternative to extant enforcement mechanisms which in turn reduces costs while allowing for greater

42 Smith, Randall. "General Mills and 7-Eleven Join the Venture Capital Crowd." *The New York Times*, The New York Times, 21 Dec. 2017, www.nytimes.com/2016/04/19/business/dealbook/general-mills-and-7-elevenjoin-the-venture-capital-crowd.html.

43 Kiersz, Andy. "The Impact of Small Business on the US Economy in 2 Extreme Charts." *Business Insider*, Business Insider, 16 June 2015, www.businessinsider.com/us-employment-by-firm-size-has-a-fat-tailed-distribution-2015-6.

44 Evans, Christopher. "Taxation Compliance and Administrative Costs: An Overview." *Research Gate*, UNSW Sydney, Jan. 2008, www.researchgate.net/publication/285898750_Taxation_Compliance_and_Administrative_Costs_An_Overview.

45 Herzberg, Joscelyn. "Essentials for Staying Ahead of Regulatory Change." *Wolters Kluwer*, Wolters Kluwer, www.wkelmsolutions.com/blog/joscelyn-herzberg/essentials-staying-ahead-regulatory-change.

innovation through expedited digital regulatory compliance. Empowering regulators with this forward-thinking toolbox will enable them to better manage an increasingly complex, industrial, and demographically robust modern economy.

NGO: Accelerating Altruism

Perhaps the greatest human victory in the last century has been the monumental decrease in individuals living in extreme poverty; the global poverty rate was *halved* between the years 1990 and 2010.⁴⁶ Philanthropic organizations are critical to the continued mission of decreasing global poverty and empowering the world's poor with economic efficacy and participation in the global economy. Non-governmental organizations (NGOs) remain a major force in this process yet are poorly defined and often overlap with Non-Profit Organizations (NPOs) and Intergovernmental Organizations (IGOs) depending on regional definitions. Jurisdictional distinctions potentially impede fundraising and operations for these altruistically focused entities as a more uniform definition of what constitutes a NGO has been the focus of recent scholarly efforts. This exploration for a concrete distinction between these various entities is accompanied by a demand for greater transparency and impact assessment on the part of NGOs worldwide.⁴⁷

Measuring the success of a traditional business is relatively simple when compared to measuring the success of philanthropic endeavors as net profits are easier to track than social impact. Many NGOs are beginning to not only track the financial impact that their actions have on communities in need, but also at what social cost and how alternative approaches may better facilitate their goals. This is in no small part due to the growing focus on the contemporary metrics utilized by NGOs and their inefficiencies by active and prospective benefactors worldwide. Due to the asymmetrical economic development in traditionally targeted regions, the contextualized circumstances of recipients of NGO assistance is becoming increasingly relevant to the financial perpetuity of the entities that facilitate this aid.⁴⁸

46 "Poverty." *The World Bank*, The World Bank, www.worldbank.org/en/topic/poverty/overview.

47 Vakil, Anna. "Confronting the Classification Problem: Toward a Taxonomy of NGOs." *Science Direct*, Academic Press, Dec. 1997, www.sciencedirect.com/science/article/abs/pii/S0305750X97000983.

48 O'Leary, Susan, et al. "Impact Assessment in a Non-Government Organisation." *CIMA Global*, CIMA Global Academic Research Programme, June 2017, www.cimaglobal.com/PageFiles/372632368/Impact%20assessment%20in%20a%20non-government%20organisation.pdf.

Discrepancies between stated impact and actualized economic development have become increasingly acute in recent years due to accelerating global prosperity. This results in a difficult contradiction in which NGO activity with diminishing returns becomes increasingly difficult to identify. A 2014 study demonstrates that individuals in Tanzania that received food subsidy programs spent *less* money on food per month when compared to their peers who did not receive a food subsidy, highlighting the increasing difficulty in discerning actualized impact by NGOs.⁴⁹

NGOs can secure land for operations on the AcreWise platform, subsequently ensuring that their transactions benefit the local community. This remarkable transparency and ease of accessibility disproportionately benefits the at-need community and helps to dislodge the Catch-22 of asymmetrical economic development negatively impacting NGO efficacy. Similar digital programs have already been explored and help to depress costs of operation, increase positive and sustainable social impact in effected locales, and deliver accurate impact assessments to beneficiaries and benefactors alike.⁵⁰ AcreWise supercharges the digitization and transparency of philanthropic activity worldwide which amplifies the positive economic impact that global market development has on underserved communities worldwide.

Environmental Initiatives: Sprouting Sustainability

Global economic inclusion may prove to be the largest driving force behind ecological preservation in the 21st century. Recent studies demonstrate that the vast majority of individuals surveyed hold nuanced and complex opinions regarding environmental issues and how best to address them, highlighting the growing importance of ecological mindfulness in daily life.⁵¹ Opaque impact assessments and unclear metrics regarding the efficacy of various environmental initiatives, however, are in-part responsible for this increasing focus on ecology. Concerted efforts towards positive environmental impact

49 Evans, David, and Bruce Wydick. "Is My NGO Having a Positive Impact?" *The World Bank*, The World Bank, 3 Feb. 2016, blogs.worldbank.org/impacetevaluations/my-ngo-having-positive-impact.

50 Charbonneau, Adèle. "Helping NGOs Improve Impact Assessments?" Edited by Josephine D'Allant, *The Huffington Post*, The Huffington Post, 6 Dec. 2017, www.huffingtonpost.com/josephine-dallant/helping-ngos-improve-impacts_b_9099890.html.

51 "The Yale AP-NORC Environment Poll." *Yale Program on Climate Change Communication*, The AP-NORC Center, 1 Jan. 2014, climatecommunication.yale.edu/about/projects/environment-poll/.

remain hampered without clearly defined parameters for progress.⁵²

Contemporary efforts to clarify the multifaceted impact that ecological initiatives have on their surroundings have been widespread in no small part thanks to calls for empirical evaluation of ecological investment.⁵³ This has resulted in a more nuanced understanding of the various challenges faced by conservation efforts: multiple outcomes and scales, spatial spillovers, and confounding factors have been identified as leading impediments. Geographical complexity, biodiversity, and regulatory discrepancies all contribute in varying ways to the identified points of concern, demonstrating the clear need for non-redundant, expedient communication of geographically broad and in-depth ecological data in real-time.

The largest and perhaps most unexpected partner in conservation is the average American private land owner. Individuals who own more than ten acres of woods or forest account for 95% of all private woods or forest ownership in the United States, on average owning just shy of 100 acres. This indicates massive opportunity for digital, peer-to-peer, mutually beneficial ecological negotiations as only ~33% of woods or forest owners have received forest management advice.⁵⁴ Individual land owners' openness to conservation is difficult to overstate as over 56 million acres of private land and water are voluntarily conserved in the United States by their owners; this is more than all national parks combined.⁵⁵ Internationally there exist initiatives which empower individuals with the ability to purchase conservation land by the acre.⁵⁶ The increase of provable ecological efficacy and profitability is achieved by bridging the gap between environmentalists and private land owners.

AcreWise intensifies the transparency, accessibility, and flexibility in ecological

52 Baylis, Kathy, et al. "Mainstreaming Impact Evaluation in Nature Conservation." Edited by William Sutherland, *Wiley Online Library*, Society of Conservation Biology, 29 Apr. 2015, onlinelibrary.wiley.com/doi/full/10.1111/conl.12180.

53 Ferraro, Paul J, and Subhrendu K Pattanayak. "Money for Nothing? A Call for Empirical Evaluation of Biodiversity Conservation Investments." *PLoS Biology*, Conservation International's Center for Applied Biodiversity Sciences, 11 Apr. 2016, journals.plos.org/plosbiology/article?id=10.1371%2Fjournal.pbio.0040105.

54 "Who Owns America's Trees, Woods, and Forests?" *U.S Forest Service*, Family Forest Research Center, Mar. 2015, www.fs.fed.us/nrs/pubs/inf/nrs_inf_31_15-NWOS-whoowns.pdf.

55 McLendon, Russell. "Americans Are Quietly Preserving 56 Million Acres of Private Land." *MNN - Mother Nature Network*, Mother Nature Network, 20 Dec. 2016, www.mnn.com/earth-matters/wilderness-resources/blogs/land-trust-census-56-million-acres-private-land.

56 "Buy an Acre Protects Threatened Dry Forest in Ecuador." *World Land Trust*, World Land Trust, 15 Nov. 2013, www.worldlandtrust.org/news/2013/11/buy-acre-funding-protects-threatened-dry-forest-ecuador/.

initiatives for private land owners, environmentalists, corporations, and regulatory entities, which allows for more accurate impact assessments and resource allocation. The AcreWise platform enables the uniform assessment of relevant variables which homogenizes the multiple outcomes and scales present in ecological impact assessment. Real-time data accessibility allows philanthropists to track resource allocation alongside financial efficacy and ecologists to better manage conservation processes while considering special spillovers. This massive shift towards transparency and accessibility successfully bridges the aforementioned gap between environmentalists and increasingly ecologically-minded private land owners. Small, privately owned plots are ecologically optimized, data accessibility eliminates resource redundancies and confounding factors, and most importantly: AcreWise equalizes the land leasing agreement marketplace allowing ecological entities to maintain a fair, financial stake in land negotiations.

6. AcreWise: Accelerating the Global Economy

AcreWise solves or in many cases completely removes the barriers traditionally associated with land leasing agreements.

AcreWise offers a real-time market data about available land and resources through a simplified digital interface. Each transaction undertaken is associated with a unique, cryptographically secured user identity, allowing portfolio tracking from anywhere in the. Creating an AcreWise account is as easy as creating an account on other popular digital platforms such as Facebook, Twitter, or Google. Once identity is verified, bidding and listing of land derivatives can begin immediately! It is simple, convenient, and intuitive to select from the vast and ever-growing array of goods listed on the AcreWise marketplace. This level of simplicity and visibility will offer opportunities to diversify the portfolios of individuals and institutional investors. AcreWise provides a real-time comprehensive overview of resource availability, listed property, and a historical log of activity.

When property is listed on the AcreWise platform a unique, non-fungible, digital token is created which is then associated with that specific property. This token can be viewed as a “digital deed” that can be seamlessly exchanged, significantly easing the

burdens associated with property transfer. Additionally, all relevant information about the property (owner, title number, approximate acreage, available resources, etc.) is associated with this unique digital token. The AcreWise system makes cross-referencing characteristics of various properties a painless experience!

Property owners can confidently list their property knowing that their asking price is on par with local rates thanks to AcreWise's real-time data and intuitive interface. Owners will receive alerts regarding expressions of interest about their listed property, saving time and maximizing flexibility in negotiation. The robustness of the AcreWise platform allows owners to accept bids automatically or enter into negotiations with the counterparty, all from the comfort of your current location. The ability to instantly communicate interest simplifies the bidding process without sacrificing transaction security. Real-time, blockchain-attested data illuminates a clear point of transaction finality for all parties involved, allowing bidders to maximize the value of their newly leased asset. AcreWise's blockchain-powered land derivatives marketplace provides authenticated documents, smart contract services, land leasing escrows, process automation, clear transaction finality, and much more, removing the complexity and mitigating the risks associated with property transactions.