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The Long Game:
A Technical Tax Change to Boost American Energy Production

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Introduction

Since its inception in 1916, the Intangible Drilling Cost (IDC) tax deduction has been an important policy tool for fostering drilling innovation and productivity. Historically associated with oil and gas production, the IDC deduction allows producers to expense a broad range of drilling and development costs in the year they are incurred, rather than capitalizing them over the asset's life. Over the past century, this mechanism encouraged risk-taking and technological advancements, catalyzing major leaps in domestic energy production. **However, the deduction is less well-suited for long-cycle energy production from drilling, such as next-generation geothermal.**

One of the most notable success stories emerging from the IDC's design is the shale revolution. By lowering taxable income, the IDC freed up capital to explore and drill new wells, enabling independent producers to embrace experimental techniques such as horizontal drilling and hydraulic fracturing. As the technology improved, the production cycle for shale decreased (wells can now produce just nine months after investment). Accordingly, the IDC is particularly useful for the shale patch because the savings can quickly be turned around to new investment, which further cements feedback loops and technological acceleration. The shale revolution ultimately reshaped the United States' energy landscape, positioning it as the world's leading producer of oil and natural gas.

The IDC is designed to help firms recover costs in the year that the drilling costs occur, so for oil and gas companies that can start production quickly, the deduction immediately offsets their taxable income and can open up capital for more investment. While longer-cycle energy producers such as offshore drillers still utilize the IDC, it is essentially unusable for next-generation geothermal, even though it was extended to geothermal energy in 1978. These projects require large upfront capital expenditures, span multiple tax years before revenue is generated, and involve complex project finance structures that limit the

practical utilization of IDC deductions.

As a result of these longer payback periods and production timelines, many EGS and AGS developers are unable to benefit from the IDC in its current form. Making the IDC work for long-cycle energy production would benefit a firm energy source that the US could export abroad, and also change the economics for longer-cycle oil and gas production in areas like the Gulf Coast or Alaska.

This report argues for Congress to establish a technology-neutral transferable or refundable IDC tax credit, aligning the original deduction's intent with the needs of longer-cycle energy production. By examining the historical success of the IDC in fostering oil and gas innovation and analyzing its current limitations for long-cycle energy production such as geothermal or offshore oil, we demonstrate how a tax credit with transferability or refundability would better serve Congress's original ambition to spur diverse domestic energy resources. We also consider how a tax credit aligns with evolving project financing structures, technology development cycles, and corporate strategies in the geothermal sector.

Understanding the Intangible Drilling Cost Deduction

The Intangible Drilling Cost deduction stands as one of America's oldest and most significant energy tax incentives. Its original purpose was to encourage risky oil and gas exploration at a time when the United States aimed to establish greater energy independence and develop its fledgling petroleum industry. Over the ensuing decades, Congress refined the IDC deduction multiple times and its interaction with other tax provisions to accommodate emerging technologies and changing economic conditions.

In 1978, through the Energy Tax Act, Congress made a pivotal decision to expand the IDC deduction to include geothermal resources. This was a direct response to the energy crisis of the 1970s, during which lawmakers recognized the need to diversify domestic energy sources. By incorporating geothermal under the same tax treatment as oil and gas, Congress signaled that new drilling-intensive energy sources were worthy of similar financial incentives.

Today, the statutory authority for IDCs resides in 26 U.S.C. § 263(c), which grants producers the option to deduct intangible drilling and development costs. These costs include wages, fuel, repairs, hauling, and supplies directly related to drilling wells; site preparation activities; survey work; ground-clearing operations; the installation of derricks and pipelines; and other expenses necessary to prepare wells for production. Treasury Regulation 26 C.F.R. § 1.612-4 provides further guidance, specifying what constitutes a qualifying intangible cost. Because such costs can typically represent 60–90% of total drilling expenditures, the IDC deduction has a profound impact on a producer's working capital and tax liability.

The 1978 Senate Report offers insight into Congress's rationale for extending IDCs to geothermal resources. Legislators recognized that while conservation and conventional oil and gas would remain important, alternative energy sources like geothermal were essential for long-term energy security:

> *"The Senate report emphasized providing "uniform tax treatment" for geothermal wells, mirroring oil and gas. Senator Abraham Ribicoff echoed this objective on the Senate floor, stressing that the "development of alternative sources of energy is a vast undertaking" and that "serious long-term work on alternative energy sources demands greater governmental encouragement."*

Differences in treatment for different types of companies also reflect an emphasis on supporting the independent producers who are typically responsible for marginal production but also have less working capital to deploy. The IDC rules differ for integrated oil companies and independent producers. Under 26 U.S.C. § 291 integrated oil companies, who participate in retail and refining activities, must capitalize 30% of their IDCs and amortize them over five years, whereas independent producers, who focus on upstream exploration and production, can deduct 100% of IDCs immediately. This differentiation has historically allowed independent producers, who typically have less capital available for investment, to reinvest quickly in exploratory drilling and new technological advancements — dynamics that proved critical during the early phases of the shale revolution.

Over time, the IDC deduction has evolved through legislative modifications and judicial interpretations but currently there's a broad view of what qualifies as an intangible drilling cost, recognizing that the provision's overarching purpose is to encourage domestic energy development. As new technologies emerged — from deeper offshore drilling methods to unconventional tight oil extraction— operators successfully applied IDC deductions to diverse drilling expenditures, reinforcing the policy's adaptability.

The IDC's Role in the Shale Revolution

The IDC deduction's design proved instrumental in fostering the shale revolution. Between 2007 and 2019, U.S. crude oil production more than doubled, and natural gas production increased by approximately 80%—transformations largely attributed to innovations in horizontal drilling and hydraulic fracturing. Perhaps most importantly, productivity rose dramatically. From 2007 to 2016, first-year output per well tripled while sector employment declined. This intensified through 2022, as confirmed by follow-up research at the Kansas City Fed. It showed that oil production continued climbing even as rig counts stayed below 2000 levels, driven by technological advances like longer horizontal drilling, multiwell pad systems, and enhanced proppant concentrations. Data analytics further improved drilling precision, ultimately doubling oil production per foot

after 2014 despite reduced workforce and investment.

The IDC Helps Mitigate Upfront Risk

The IDC deduction significantly contributed to this transformation by lowering the financial barriers associated with new and risky drilling techniques. A core challenge in developing unconventional oil and gas resources was the high upfront risk: advanced drilling operations often involved experimental well designs, advanced fracturing fluids, and extensive geophysical mapping. Notably, this is also true of the next-generation geothermal energy techniques that rely on the same technology.

During the early shale years, success rates were not guaranteed, particularly in tight shale formations where reservoir behavior was poorly understood. The IDC drastically reduced the cost of experimentation with new drilling techniques by allowing companies to deduct 60–80% of drilling expenditures rather than capitalizing them over multiple years.

Independent producers, which have historically been at the forefront of drilling innovation, benefitted disproportionately from IDC expensing. Unlike major integrated oil companies, these independents could deduct the entirety of their IDCs in the year incurred. This immediate deduction improved project economics, sometimes by 10–15%, and often determined whether smaller firms had sufficient cash flow to reinvest in additional wells or refine drilling techniques.

The IDC Supports Rapid Reinvestment and Innovation Feedback Loops

The effectiveness of the IDC deduction in shale was amplified by the fact that oil or gas from a successful well could generate near-immediate revenue. As soon as a well began producing, operators could sell hydrocarbons into the market, recover costs, and redeploy capital to drill further wells.

This tight linkage between expenditure, production, and reinvestment created a feedback loop that accelerated technology development. This feedback loop was supported by a broad, multi-decade policy structure that included research funding and cost-sharing for demonstration projects, supply-side tax credits and demand-side price incentives, permitting and regulatory changes, and accommodative macroeconomic policy. This policy structure supported the virtuous cycle of learning by doing that brought down drilling costs, accelerated innovation, and unleashed energy dominance. Key technological advancements supported by IDC deductions included:

- **Horizontal Drilling Refinements:** Drillers iterated on well-path designs and downhole steering technologies.

- **Hydraulic Fracturing Fluid Evolution:** Companies experimented with fluid chemistries, proppant mixtures, and multi-stage completions.
- **Enhanced Imaging and Mapping:** Firms invested in microseismic monitoring and 3D seismic imaging to optimize well placement.
- **Well Pad Optimization:** Multi-well pads reduced drilling costs and surface footprints by centralizing equipment and personnel.

All of these innovations were capital-intensive and carried uncertainty regarding their commercial viability, making the IDC deduction's risk-mitigation function critical. The combined effect was that smaller, more agile companies successfully challenged established industry practices, thus unlocking vast hydrocarbon resources in plays such as the Bakken, Eagle Ford, and Permian Basin.

The IDC deduction facilitated a "wildcatting" culture that combined technological ingenuity with rapid capital reinvestment, creating a fertile environment for innovation. Those lessons are especially pertinent to longer-cycle energy production, such as next-generation geothermal, which faces similar high upfront costs, technological uncertainties, and long development timelines.

The IDC's Structural Limitations for Long-Cycle Energy Production

Despite the IDC deduction's success in oil and gas development, fundamental differences in business models, development timelines, and corporate structures limit its usefulness for longer-cycle energy projects. This section explores why the current IDC framework—which functioned so well for shale—encounters critical obstacles when applied to next-generation geothermal energy.

Timeline Mismatch: Costs and Revenues Diverge

In shale oil and gas projects, the drilling of a successful well can yield marketable hydrocarbons relatively quickly, often in the same tax year. This immediate revenue helps offset drilling costs, allowing operators to utilize IDC deductions against current income. By contrast, next-generation geothermal projects typically require drilling dozens of wells for a single power plant. These wells must collectively tap into deep geothermal reservoirs, often at experimental depths or in challenging geological settings.

Throughout the multi-year drilling phase, geothermal developers incur substantial intangible costs: well site preparation, specialized rig mobilization, drilling fluids, directional drilling services, logging, stimulation, and more. Yet no revenue is realized until the entire field is sufficiently developed and the power plant is

constructed and interconnected to the grid— spanning several tax years. As a result, by the time a geothermal developer could theoretically use IDC deductions, the entity may have accumulated years of net operating losses and no near-term income to offset.

Geothermal Project Financing Structures Limit Usefulness of the IDC

Next-generation geothermal projects frequently adopt a financing model that is much different from the one used for shale oil production. In practice, a geothermal developer would put up the equity into a separate, project-specific LLC. Thus, the company investing cannot necessarily reap the redeployment benefits from the IDC.

Current U.S. tax law does not generally permit transferring intangible drilling cost deductions (or net operating losses) between distinct legal entities. Consequently, even if the operating LLC eventually generates profitable electricity sales, the upfront drilling expenses are put up by the geothermal developer, which typically has no taxable income to offset. This corporate partition, though sensible from a project finance standpoint, prevents the practical utilization of IDC deductions precisely where they could be most impactful—during the capital-intensive development phase.

Furthermore, project-level LLCs tend not to have any taxable net income because all revenues are contracted or distributed to different parties. When combining the intangible value of wells with project-level depreciation after commercial operation date (COD), projects typically do not generate sufficient taxable income to fully utilize the depreciation benefits. This creates a two-fold problem: projects cannot monetize the IDC during the drilling phase, and they cannot benefit from it during operations. During the operational phase, depreciation from generation facilities and tangible well components, combined with the project's revenue waterfall structure, typically reduces taxable net income to zero. Consequently, there is never an opportunity to offset taxable income with IDC, either during the drilling period or throughout the project's operational life, effectively nullifying the intended benefit of this tax treatment for geothermal development.

Upfront Capital Expenditures with Extended Payback Timelines

Like shale drilling, next-generation geothermal often requires significant upfront expenditures for advanced drilling techniques, reservoir stimulation, seismic imaging, and specialized materials like high-temperature drilling muds. Whereas a shale producer might recoup investments within a year of striking a productive well, geothermal developers face a multi-year lag before any electricity—and hence revenue—flows. Given the longer production timelines, the capital intensity of advanced geothermal is more comparable to offshore oil projects,

although the timeline to revenue is even longer due to the complexities of constructing power plants and their associated transmission lines. This capital intensity is further amplified for EGS and AGS, which aim to exploit heat from deep subsurface rock by circulating fluids through engineered reservoirs. Achieving commercial viability can require extensive R&D, multiple test wells, and refined drilling/stimulation techniques to maintain rock permeability at high temperatures. The cumulative effect is a drawn-out gestation period without revenue, during which the current IDC deduction provides minimal direct support.

Market Structure and Regulatory Complexities

Unlike oil and gas producers operating in a global commodities market, geothermal power producers function in regulated electricity markets. Revenue typically arises through long-term power purchase agreements (PPAs) with utilities, where pricing may be fixed for an extended duration. While PPAs can provide stable revenues once a plant is operational, they do little to alleviate the interim financial burden of drilling and field development. Furthermore, multi-year permitting processes, environmental reviews, and interconnection constraints often delay the timeline for delivering power to the grid, thereby exacerbating the mismatch between incurring costs and generating revenue.

The inability to fully utilize IDCs negatively impacts precisely those geothermal technologies that hold the greatest promise for scaling up the sector. Unlike conventional geothermal, which is limited to naturally occurring hydrothermal reservoirs, EGS and AGS aim to create or enhance geothermal systems in a wide range of geologies. If successful, these technologies could unlock geothermal resources across vast new regions, delivering clean, baseload power around the clock. Yet, realizing this vision requires substantial early-stage drilling and experimentation that the current IDC structure, in practice, fails to support.

In effect, the same policy mechanism that fueled the shale boom—by bridging the financial risk of drilling—struggles to do the same for geothermal because of asynchronous timelines and fragmented corporate structures. The next section explores how converting IDCs into a refundable or transferable tax credit can resolve these mismatches.

The Case for Establishing an IDC Credit

Establishing a transferable or refundable tax credit for IDCs would better serve the original congressional intent of encouraging innovative energy technologies while accommodating modern project development structures. The IDC deduction could remain intact and continue to serve the interest of the crucial shale patch. However, a tax credit available to those not utilizing the deduction

could adapt the timing of benefits to meet the needs of capital-intensive, multi-year energy projects. Longer-cycle energy producers, from offshore oil producers to next-gen geothermal developers, could utilize a tax credit and open up capital for more investment.

Making the credit transferable or refundable would allow developers with little or no current tax liability to receive a direct payment from the government, equivalent to the tax credit's value, providing immediate cash flow when it is most necessary—during exploration and well-field development. This structural shift addresses the core problem facing longer-term energy developers for projects like offshore or enhanced geothermal: large intangible drilling costs incurred long before any revenue is generated.

Applying the same logic to IDCs reflects Congress's historically stated intention to promote alternative energy sources, from oil shale to geothermal. Furthermore, a refundable tax credit would improve project finance for geothermal development. By guaranteeing construction lenders that a portion of the drilling costs will be reimbursed, the refundable credit makes geothermal projects more bankable at the riskiest period of project development. The refundable tax credit structure enables geothermal developers to leverage their financial position to attract private investment and larger loans.

Because so many geothermal developers operate under a two-entity model, a transferable or refundable credit would solve the issue of intangible drilling cost deductions being "stuck" in the development LLC. With transferability or refundability, the development LLC could monetize the credit for drilling expenditures in the tax year incurred, thus bridging the gap that can otherwise hinder investment.

The precedent for this policy goes back to the Section 29 unconventional gas production tax credit that boosted the shale sector in the 1980s. As Jason Burwen and Jane Flegal wrote in 2013:

> *"The… creation of production-based credits opened up a new domain of financing available for gas well operations… Since many small operators did not have substantial enough liabilities to take advantage of tax credits, they effectively "sold" their credits to larger firms in tax equity financing transactions. While the level of tax equity investment was modest, nonetheless Section 29 credits generated more investor interest and leveraged more private dollars in unconventional gas than existed previously. Perhaps more importantly, the credit stimulated industry to drill more wells and collect more data, contributing to applied knowledge of well operators. This learning-by-doing drove incremental improvements in technology, finding rates, and well productivities, thereby keeping unconventional gas resources economic*

even following the expiration of the Section 29 tax credits in 1992."

Innovators in next-gen geothermal would more easily absorb failures or partial successes and apply lessons to the next iteration of well design or reservoir stimulation methodology. This acceleration of the learning curve is crucial for advanced geothermal, which remains in the early phases of technology commercialization.

Preserving Policy Continuity with Minimal Structural Changes

Establishing a transferable or refundable IDC credit does not require scrapping the existing statutory framework. Many aspects of the current IDC regime—such as definitions of qualifying costs and the differentiation between independent producers and integrated firms—could be applied to the credit. The principal modification is that instead of offering just a deduction for IDCs against taxable income, developers could instead elect to receive a tax credit equal to the deduction's value if their taxable income is insufficient.

A technology-neutral credit would help increase investment for all long-cycle energy produced by means of drilling—from offshore drilling to next-gen geothermal. Of course, offshore drillers utilize the current IDC deduction because they often have enough taxable income that it's advantageous. Establishing a credit would do nothing to limit the usefulness of the existing deduction — firms could decide which tax treatment they prefer. There are important design questions for further consideration, such as the appropriate percentage level of the credit against the IDCs or regulatory interpretations to ensure the credits are cycled back into investment. But again, such tax credits are not without precedent, as described earlier regarding the Section 29 unconventional tax credit. The Small Business Health Care Tax Credit allows eligible businesses to receive a refundable credit, even if the amount exceeds their income tax liability.

To advance its vision of "American energy dominance," the administration should leverage insights from the transformative shale revolution while preserving the Intangible Drilling Costs provision's vital role in fostering energy security and technological advancement. As the Tax Cuts and Jobs Act approaches its sunset, Congress has an opportunity to expand support for emerging long-cycle energy sources, particularly next-generation geothermal development. By introducing a complementary IDC tax credit, policymakers can reinforce America's pioneering position in energy innovation—especially in capital-intensive drilling operations where financial barriers to entry remain highest.

Conclusion

The IDC deduction's historical success in supporting oil and gas innovation, particularly during the shale revolution, underscores the power of well-designed tax policy to accelerate energy technology development. However, the same structural characteristics that made IDCs so effective in shale—near-immediate revenue generation, integrated company structures, and rapid capital turnover—are lacking in next-generation geothermal projects, which face protracted drilling timelines, siloed LLC structures, and multi-year revenue delays. Given the imperative to boost energy production, including firm energy sources to meet demand associated with a manufacturing boom and data centers, it is imperative that Congress modify the tax code to boost long-cycle energy production.

Establishing a complementary IDC tax credit reflects a thoughtful evolution of this proven policy tool. By aligning the timing of benefits with the actual operational and financial realities of EGS and AGS, Congress would better fulfill its original mandate to support a wide array of domestic energy resources. The refundable model would not only help innovators overcome high upfront costs and uncertain R&D outcomes but also catalyze faster technological progress, driving down costs and expanding the geographic reach of geothermal energy. The technological advancements in drilling technologies that led to the shale revolution were catalyzed by the oil and gas industry's effort to deduct intangible drilling costs. Intangible drilling costs make up 60-80% of total well costs, and the IDC deduction allowed companies to write off those expenses, effectively reducing drilling budgets. The IDC pre-tax benefit provided financial relief at a pivotal time, enabling companies to accelerate shale development by bringing more wells online without increasing costs. This supported the surge in domestic oil and gas production and propelled the country to energy independence. We have a similar opportunity now to produce America's next energy revolution by implementing policies that lower costs for geothermal development. A refundable or transferable tax credit for geothermal energy would strengthen our energy security by providing a firm domestic power source that hedges against oil and gas price volatility and geopolitical market dynamics.

This transformation comes at a time when policymakers increasingly recognize the vital role geothermal can play in delivering clean, baseload power. EGS and AGS technologies have the potential to transcend the limitations of conventional geothermal, tapping heat from much broader geologic regions. Realizing this potential, however, depends on public policy that actively bridges the financing gap in the long period between drilling and revenue generation. By building on the IDC's century-long legacy and adapting it to modern project finance structures, a refundable or transferable IDC credit would maintain consistency with historical policy objectives while advancing current energy and climate goals. It would also reinforce America's positionas a leader in cutting-edge

energy technology—a position that requires continued support for innovation and significant capital investment in novel energy systems. As Senator Ribicoff suggested decades ago, the scale and cost of developing alternative energy resources demand "greater governmental encouragement."

Transforming the IDC into a refundable or transferable credit provides exactly that: an effective, targeted tool to drive renewable energy breakthroughs in geothermal, enhance the nation's energy resilience, and sustain U.S. leadership in global technology innovation. According to the EIA, leveraging the existing infrastructure and expertise of the oil and gas industry could drive down next-generation geothermal costs by nearly 80%. Turning the IDC into a refundable or transferable tax credit could further accelerate cost reductions by fully unlocking the financial advantages that have long benefited the oil and gas industry, allowing them to be applied to geothermal development. In this sense, the shift from a traditional deduction to a tax credit is not merely a policy tweak; it is a strategic recalibration that aligns with both the spirit of the past and the imperatives of the future.

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