



**BEYOND THE SUPPLY GAP**  
**Why Uranium Supply Cannot Repair Itself**

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**A Uranium Spotlight Briefing**

by Chris Frostad

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# EXECUTIVE SUMMARY

## Beyond the Supply Gap: Why Uranium Supply Cannot Repair Itself

### The Thesis

The uranium supply system cannot replace what it consumes on time. Within the ten year contracting window, scheduled replacement projects arrive too late to offset depletion. Even under optimistic assumptions, cumulative deficits persist. This is not a cyclical shortage. It is structural repricing. Prices will not spike and normalize. They will reset and persist.

### Why Supply Cannot Self Repair

Capacity is not supply. Reported operating capacity overstates deliverable production. Uranium operations consistently deliver below engineered throughput due to depletion, recovery losses, and physical constraints. The operating base is smaller and less dependable than assumed.

Replacement arrives too late. Few development projects have committed schedules. Replacement supply enters production only after deficits have already accumulated. Supply that arrives outside the contracting window does not influence market behavior.

Price cannot fix timing. Higher prices improve project economics but do not compress permitting, construction, or commissioning timelines. Historical evidence shows that production responds slowly and peaks well after prices move.

Geographic fragmentation multiplies constraint. Demand is fixed, while production is concentrated in jurisdictions that do not always align with Western utility requirements. Prices respond to accessible supply, not to global totals.

### Market Implications

Contracting becomes compulsory. Utilities extend coverage further out and prioritize delivery certainty over price optimization. Coverage risk replaces price optimization as the dominant concern.

Prices reprice, not spike. Once scarcity is accepted, price moves are abrupt and establish a higher baseline. Volatility occurs around this new floor. Mean reversion assumptions fail.

The snapback cycle is broken. The system no longer has idle capacity or a replacement pipeline capable of restoring balance after price moves. Price strength signals structural repricing, not temporary tightness.

Discovery carries strategic value. New supply enters a system with very limited self repair mechanisms. Credible exploration becomes strategically relevant as one of the few ways future availability can be altered.

## Investment Positioning

This market will not normalize through spike and reversion. Positioning must account for persistence rather than precision. The cost of being early is reduced. The cost of being absent is magnified.

Producers offer durability through deliverable supply and contracting leverage. Developers offer conditional exposure to the long-term price floor, filtered by timing and execution. Exploration regains importance as a strategic input into future supply rather than as discretionary upside.

Portfolio construction matters more than individual catalysts. The inflection is behavioral, not incremental. When utilities accept that replacement supply will not arrive on time, repricing follows. That repricing is structural.

## Bottom Line

The uranium market is not approaching the end of a cycle. It is adjusting to a different operating condition defined by persistent scarcity and structural repricing. The repair mechanism is broken. Investors waiting for normalization are waiting for something that no longer functions.

# PREFACE

Commodity markets are usually understood through cycles. Prices rise, incentives follow, supply responds, and balance returns. Disagreements focus on timing and magnitude, not on whether the system ultimately repairs itself.

That assumption sits quietly beneath most discussions of uranium.

For years, the narrative has been familiar. Supply was cut too far. Utilities delayed contracting. Prices fell below incentive levels. Eventually, higher prices would bring supply back and the market would normalize. Another cycle is completed.

This paper challenges that belief.

Not by forecasting demand growth.

Not by assuming disruption.

Not by arguing sentiment or policy.

But by asking a narrower and more uncomfortable question: can the uranium supply system still repair itself on time?

Much of the confidence surrounding future supply rests on what could exist rather than what is scheduled to exist. Capacity is treated as availability. Delay is treated as inconvenience rather than failure. Replacement is assumed to arrive simply because it is needed.

That distinction matters.

Uranium production does not respond to price the way most commodities do. Development timelines are long. Operating constraints are binding. Regulatory sequencing does not compress. Once the system falls behind, recovery requires sustained surplus, not eventual improvement.

If that surplus does not arrive, the market does not behave cyclically.

Prices do not spike and normalize.

They reprice.

And once reset to sustain scarcity, they do not return to prior levels.

This paper proceeds from that possibility and tests it.

Optimism is stripped away where it has been quietly embedded. Timing is enforced rather than smoothed. Replacement is measured by delivery, not aspiration. Price is treated as responsive, not corrective. The development pipeline is granted the benefit of the doubt and still asked to do the work required of it.

At each step, a familiar assumption is removed.

The result is not a forecast. It is a diagnosis.

If the conclusions that follow are correct, the uranium market is not approaching another phase of a cycle. It is entering a different operating condition altogether. One where scarcity persists, prices reset rather than revert, and the signals investors have waited for do not arrive as expected.

What follows is the case for that claim.

# PART I — THE ASSUMPTION THE MARKET RELIES ON

## 1. The Implied Belief About Future Supply

“Markets operate on expectations long before those expectations are tested.”

Uranium markets operate on a simple, largely unspoken premise: supply will grow.

That premise is not presented as a hypothesis. It is treated as a background condition. Production is expected to expand over time. Periods of tightness are assumed to be transitional. Higher prices are expected to unlock new output. Declining mines are assumed to be replaced. Long-dated projects are assumed to exist as a backstop, even if their timing is uncertain.

This belief does not require constant reinforcement because it is embedded in how the market functions. Utilities contract on the expectation that new supply will eventually appear. Investors value assets on the assumption that future production growth caps long-term scarcity. Policymakers plan reactor fleets assuming fuel availability adjusts as needed.

Within this framework, the central question is rarely whether supply will grow. It is when growth will occur and how quickly it will arrive. Shortfalls are interpreted as timing issues rather than as limits. Delays are treated as noise rather than as signals.

The belief persists because it makes the system legible. It allows long-range planning, supports valuation models, and aligns uranium with the behavior of other commodities where price has historically induced supply response.

But the belief itself is rarely isolated, named, or tested. It is simply assumed.

### Market Relevance

When supply growth is taken as given, market participants interpret tightness as cyclical rather than structural. Contracting behavior emphasizes flexibility. Price movements are read as incentives rather than warnings.

### Investor Notes

- Supply growth is treated as the default outcome
- Tightness is framed as temporary
- Valuations embed future production expansion

## 2. Where the Belief Comes From

**“Consensus rarely announces itself. It accumulates through repetition.”**

The expectation of uranium supply growth is reinforced by the way future production is described and catalogued.

Industry outlooks produced by organizations such as the World Nuclear Association and the OECD Nuclear Energy Agency and IAEA Red Book compile operating capacity, planned projects, and longer-dated potential resources into structured forward views. These publications are descriptive in form, but prescriptive in effect. They become the reference points against which expectations are aligned.

Over time, repeated exposure to these frameworks blurs an important distinction. Capacity is interpreted as future supply. Project listings are absorbed as expected outcomes. Potential becomes provision.

The process is incremental rather than explicit. No single forecast claims certainty. Yet the aggregation of operating, planned, and potential production creates a narrative of steady expansion that is rarely challenged. The presence of projects is taken to imply eventual delivery, even when timing, execution, and realizability remain undefined.

These outlooks are not treated as speculative. They are used as planning baselines by utilities, cited in investor materials, and referenced in policy discussions. Through repetition, they anchor expectations about what the supply system is assumed to deliver.

The result is a benchmark belief rather than a forecast. Supply growth becomes the assumed trajectory, and deviation from it is interpreted as delay rather than failure.

### Market Relevance

Shared outlooks allow coordination across the fuel cycle without requiring independent verification of each project. They reduce uncertainty by standardizing expectations, even when those expectations rest on untested assumptions.

### Investor Notes

- Outlooks function as belief-setters, not forecasts
- Capacity listings are absorbed as future supply
- Timing and delivery risk are implicitly discounted

### 3. Why the Assumption Persists

**“Assumptions endure when they allow markets to function smoothly.”**

The belief in uranium supply growth persists because it stabilizes behavior.

Utilities need to plan reload cycles years in advance. Investors need to value assets across decades. Governments need confidence that fuel availability will not constrain energy policy. The assumption that supply expands over time makes each of these activities possible.

It also aligns uranium with familiar commodity logic. In most resource markets, higher prices eventually induce new production. Applying that mental model to uranium simplifies analysis and reduces the need to treat the sector as structurally distinct.

Crucially, the assumption does not require continuous confirmation. As long as deliveries continue and inventories absorb variability, the system appears to function. Under performance is normalized. Delays are averaged out. The belief remains intact because nothing forces it to be tested directly.

In this way, supply growth becomes a stabilizing premise rather than an empirical claim. It frames how information is interpreted and how risk is priced. It is not debated because, until recently, it did not appear necessary to debate it.

The problem is not that the assumption exists. The problem is that it is relied upon without being examined.

#### **Market Relevance**

When supply growth is treated as normal, markets focus on price and timing rather than on deliverability. Structural risk is under weighted, and scarcity is assumed to be self-correcting.

#### **Investor Notes**

- The assumption enables long-range planning
- Market signals are interpreted through a growth lens
- Structural supply risk is understated

# PART II — WHAT THE SUPPLY SYSTEM ACTUALLY DELIVERS

## 4. Capacity Is Not Supply

**“Reported capability describes what could happen.  
Supply describes what reliably does.”**

Uranium markets speak in the language of capacity.

Production outlooks, corporate disclosures, and industry summaries describe supply potential in terms of nameplate throughput, licensed output, or engineered capability. These figures are routinely aggregated and presented as if they describe future availability.

They do not.

Capacity is an engineering statement. It reflects what an asset might produce under stable, ideal conditions. Supply is an operational outcome. It reflects what is actually mined, processed, delivered, and made available to the market over time.

The distinction matters because uranium production does not behave like scalable manufacturing or bulk commodities. Output is governed by physical systems that degrade, narrow, and constrain long before design limits are reached. Nameplate capacity describes intent. Deliverable supply reflects reality.

In uranium, those two diverge structurally.

ISR operations depend on groundwater chemistry and reservoir behavior that deteriorate as extraction progresses. Hard rock mines face declining grades, water inflow, and geotechnical limits that restrict throughput. Mills require stable feed blends and cannot be pushed without increasing downtime or recovery loss. Regulatory oversight further limits operational flexibility.

These constraints are not episodic. They persist regardless of price, intent, or planning horizon.

Treating capacity as supply therefore embeds optimism into market expectations. It assumes sustained recoveries, uninterrupted operation, and simultaneous execution across dozens of assets. The uranium system does not behave this way. It delivers unevenly, conservatively, and below theoretical capability.

Supply must therefore be defined not by what assets are designed to do, but by what they reliably deliver.

### Market Relevance

When capacity is mistaken for supply, the market overestimates resilience. Contracting assumptions, inventory policy, and price sensitivity are all distorted by the belief that additional material can be activated when needed.

## Investor Notes

- Capacity reflects design intent, not delivery
- Uranium output is constrained by physical systems, not economics
- Supply analysis must begin with realizable production

## 5. The Operating Base Is Less Dependable Than Assumed

**“The market begins with fewer reliable pounds than it believes it has.”**

Global uranium supply rests on a small group of operating mines. These assets form the base from which all growth expectations are constructed. Their stability is therefore critical.

That stability is often overstated.

Operating mines rarely sustain output at engineered throughput for extended periods. Declining recoveries, localized depletion, and operating interruptions quietly erode effective production even as assets remain technically active. These effects do not announce themselves through closures or headline failures. They accumulate gradually, making them easy to dismiss in aggregate narratives.

Viewed through realized production rather than reported capacity, the operating base appears thinner and more fragile.

In ISR systems, permeability declines and reagent efficiency degrades as fields mature. In hard rock systems, grade variability and water management increasingly constrain throughput. Across both, maintenance requirements and regulatory limits restrict the ability to push systems aggressively.

Operators respond rationally by prioritizing continuity over maximization. Stability preserves asset life and contractual reliability, but it suppresses output relative to nameplate assumptions. This behavior is not conservative error. It is standard operating discipline.

The result is persistent under performance that does not self-correct with time or price. Mines remain counted as producing assets even as their effective contribution declines.

Importantly, these effects are correlated. Similar geological and engineering constraints affect multiple operations simultaneously, particularly within the same mining method or district. Under performance compounds rather than offsets across the system.

When assessed on a realizable basis, the operating base delivers fewer dependable pounds than the market assumes, and it does so with less margin for absorbing disruption or delay.

## Market Relevance

A thinner operating base reduces tolerance for error. Contracting becomes more sensitive to disruption, inventories carry more strategic weight, and price response accelerates once stress emerges.

## Investor Notes

- Operating supply erodes quietly through depletion and recovery loss
- Under performance is structural, not incidental
- The base of the system is weaker than capacity figures imply

## 6. Timing Risk Is Treated as Noise

**“Delays are normalized even when their consequences compound.”**

Timing risk is pervasive in uranium supply. Projects advance slowly. Ramps underperform. Restarts slip. Yet these delays are routinely treated as temporary deviations rather than as structural features of the system.

The market assumes that timing variance averages out. A delay here is expected to be offset by acceleration elsewhere. Over long horizons, production is assumed to arrive even if schedules shift.

This treatment is inappropriate for a system where depletion operates continuously and replacement must arrive within defined windows to matter.

Supply that arrives late does not merely shift outcomes forward. It fails to replace pounds that have already been consumed. Lost time cannot be recovered unless future production exceeds requirements for a sustained period. In uranium, that condition is rarely met.

By treating timing failure as noise, the market discounts its cumulative effect. Each delay is assessed in isolation. The aggregate consequence is ignored.

This framing allows optimistic supply narratives to persist even as delivery repeatedly slips. Projects remain counted as solutions long after their relevance to the contracting window has expired.

The error is not that delays occur. The error is that they are treated as inconsequential.

Once timing is enforced as a binding constraint, many sources of apparent future supply cease to function as replacements at all. They may still exist geologically. They may even produce eventually. But they do not arrive when the system requires them.

This distinction cannot be resolved qualitatively. It must be tested quantitatively.

## Market Relevance

Discounting timing risk understates contracting pressure and overstates future flexibility. When delivery slips accumulate, price responds abruptly rather than gradually.

## Investor Notes

- Timing determines whether supply matters
- Late supply does not replace depleted pounds
- Treating delays as noise masks structural risk

# PART III — SUPPLY CONTRACTS BEFORE IT CAN BE REPLACED

## 7. The Operating Base Is Smaller Than Assumed

**“What matters is not how much capacity exists, but how much material actually reaches the market.”**

Once supply is defined in deliverable terms rather than capacity terms, the size of the operating base contracts materially.

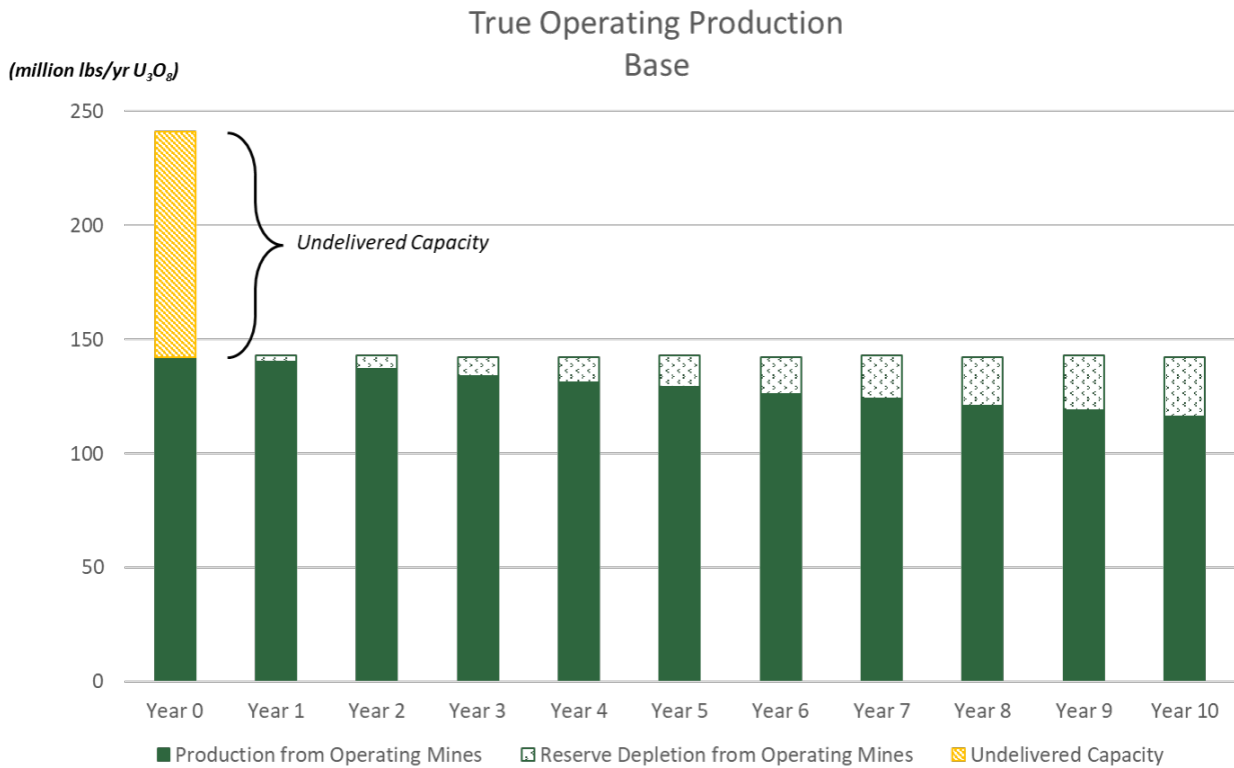
Uranium supply analysis typically begins with reported operating capacity and assumes that deviations between nameplate capability and realized output are temporary. In practice, those deviations persist across cycles and geographies. They are structural, not episodic.

Measured against historical production performance, operating mines rarely deliver at engineered throughput for sustained periods. Maintenance downtime, recovery degradation, grade variability, and operating conservatism suppress output below design assumptions year after year. These effects do not disappear when prices rise. They define the steady state of the system.

When capacity is adjusted to reflect realizable production, the effective starting point for global supply is materially lower than headline figures suggest. Expectations of growth that rely on capacity therefore rest on an overstated base.

This matters because the period that governs uranium contracting and price formation is measured in years, not decades. Pounds that arrive outside this window do not stabilize the market conditions utilities must manage today.

Supply that exists only in theory is irrelevant to that process.



## Chart 1: Reported Operating Capacity vs Realizable Operating Supply

### The assumption being tested

The chart tests the assumption that reported operating capacity is a reliable proxy for deliverable uranium supply.

This assumption underpins expectations about baseline availability and system resilience.

### What the chart shows

The chart compares reported global operating capacity with realizable production after enforcing system-level delivery constraints.

Reported capacity remains flat while realizable supply is materially lower.

The gap persists across operating periods.

### The conclusion that follows

Once this chart is accepted, reported capacity can no longer be treated as the system's starting point.

The supply system therefore begins from a smaller and tighter base.

Any discussion of replacement must begin from realizable output, not nameplate design.

## Market Relevance

A smaller operating base reduces the margin for absorbing disruption or delay. Contracting risk increases, inventories carry greater strategic weight, and price response becomes more abrupt when stress emerges.

## Investor Notes

- Reported operating capacity overstates deliverable supply
- Realized production defines the true starting point
- Supply resilience is lower than capacity narratives imply

## 8. Replacement Supply Fails on Timing

**“Projects that are not scheduled cannot replace what is lost.”**

Planned uranium projects are frequently cited as evidence that operating decline will be offset over time. That expectation depends not on the existence of projects, but on their ability to deliver supply on a defined schedule.

Across the global development pipeline, only a small subset of projects carries committed first-production dates supported by permitting, financing, and construction progress. Most planned capacity is associated with projects that provide only broad timing ranges or aspirational targets.

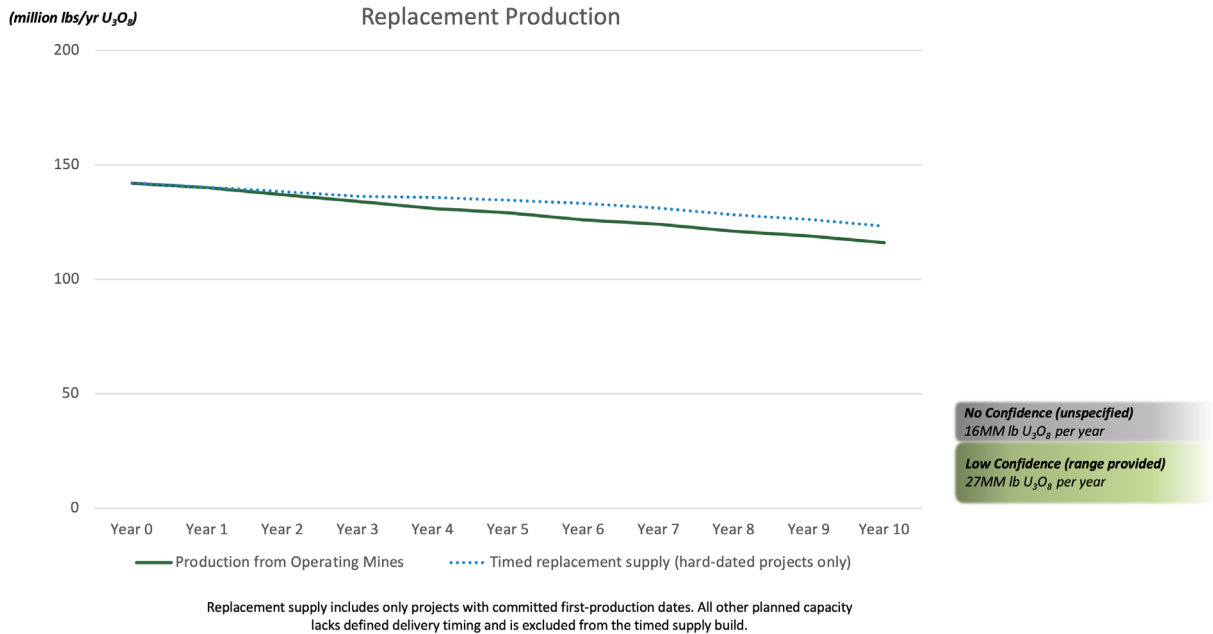
Supply that cannot be scheduled cannot be relied upon.

Replacement supply matters only if it arrives within the window that governs contracting behavior and price formation. Projects that deliver material after that window may exist geologically, but they do not function as replacements in an economic sense.

Even among hard-dated advanced projects, production ramps gradually rather than appearing at nameplate levels. Treating replacement capacity as instantly deliverable therefore overstates its near-term impact.

When replacement output is converted from nameplate capacity to realizable supply and ramped conservatively, its ability to offset ongoing depletion is limited.

Supply that arrives after coverage decisions are made does not compete for those contracts.



## Chart 2 - Operating Supply Decline vs Dated Replacement Delivery

### The assumption being tested

The chart tests the assumption that replacement projects offset operating decline in time to stabilize the market.

This assumption underpins confidence in future balance.

### What the chart shows

The chart rolls forward realizable operating supply under modest depletion.

Dated advanced projects are layered in using conservative ramp assumptions.

Replacement arrives late relative to ongoing decline.

### The conclusion that follows

Once this chart is accepted, replacement supply cannot be assumed to stabilize availability within the contracting window.

The supply system therefore contracts before replacement becomes relevant.

Any reliance on future projects must account for timing failure.

## Market Relevance

Reliance on future projects increases delivery risk during the contracting window. Utilities that assume replacement will arrive on schedule face greater exposure to shortfall and are forced to compete more aggressively for existing supply.

## Investor Notes

- Only a small portion of planned projects has committed timing
- Replacement must arrive within the contracting window to matter
- Conservative ramps still fail to offset depletion

## 9. Contraction Becomes the Default Outcome

**“When replacement arrives late, decline governs by construction.”**

Once deliverability and timing are enforced, contraction is no longer a scenario to be considered. It is the base case within the period that actually governs market behavior.

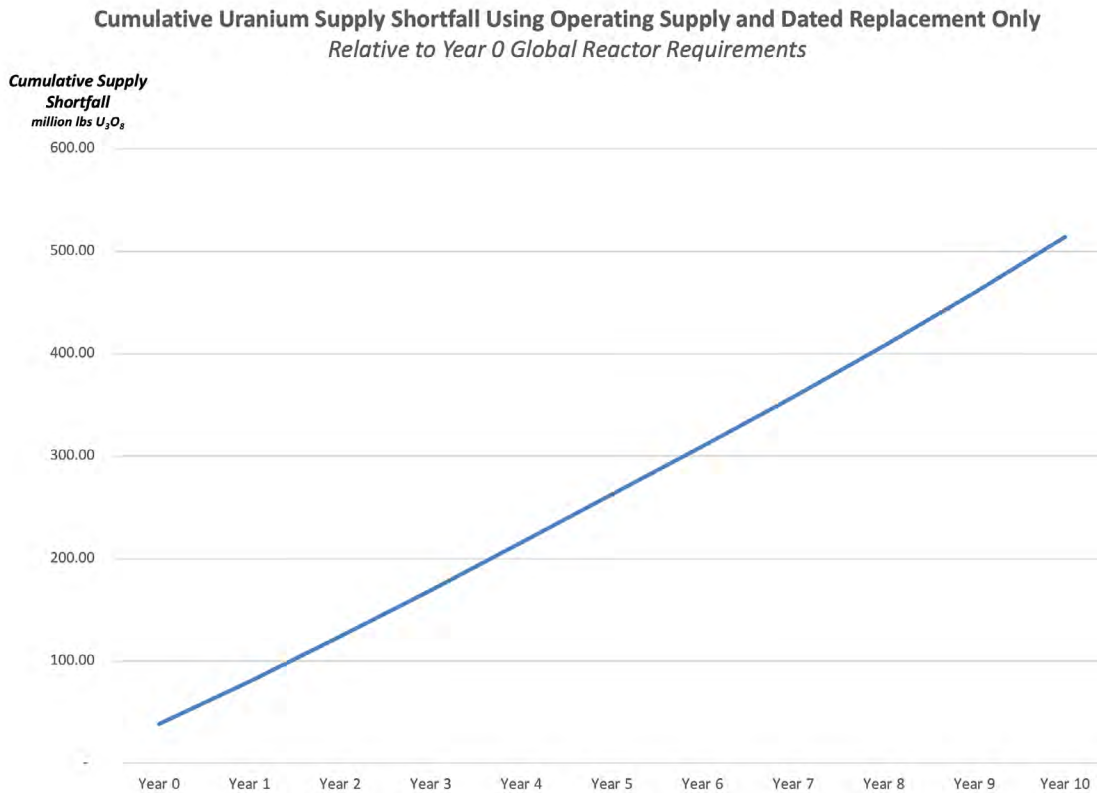
The relevant horizon is not fifteen years. It is the next decade.

Utilities contract to ensure coverage within a defined forward window. Price formation responds to availability inside that window. Pounds that arrive beyond it may exist geologically, but they do not influence the decisions that determine scarcity, contracting pressure, or clearing prices today.

Within that ten-year window, the arithmetic is unambiguous.

Operating supply declines continuously from a reduced base. Replacement enters only through a very small number of projects with committed schedules. Those projects arrive late and ramp gradually. At no point does supply exceed current requirements. Depletion dominates throughout.

This outcome does not depend on demand growth, disruption, or adverse scenarios. Demand is held flat. All scheduled projects are assumed to perform. Even under those conditions, the system contracts.



### Chart 3 — Cumulative Uranium Supply Shortfall Using Operating Supply and Dated Replacement Only

#### The assumption being tested

The chart tests the assumption that scheduled replacement is sufficient to stabilize the market over time.

This assumption underpins expectations that balance returns once dated projects advance.

#### What the chart shows

The chart accumulates annual supply shortfalls over a ten-year period.

Only operating supply and projects with committed production schedules are included.

No year generates surplus production relative to the baseline.

#### The conclusion that follows

Once this chart is accepted, recovery within the contracting window can no longer be assumed. The supply system therefore enters each successive period with a larger accumulated deficit. Balance does not return through scheduled replacement.

The shape of the curve matters. Early deterioration is rapid because the operating base is thin and replacement is minimal. Later years show moderation as dated projects enter production, but the level continues to rise. Slower deterioration is not repair. Lost pounds are not repaid.

This distinction is critical. Annual stabilization is often mistaken for resolution. It is not. Repair requires sustained surplus output. The scheduled pipeline does not produce it within the window that governs market behavior.

As a result, the system becomes progressively less forgiving. Inventory buffers erode. Delivery risk compounds. Contracting shifts from optional to compulsory. These dynamics emerge even in the absence of disruption because the system never regains flexibility.

Contraction, in this context, is not a failure scenario. It is the mechanical outcome of a supply system that cannot replace itself on time.

### Market Relevance

Within a ten-year window, contraction reshapes pricing dynamics. Utilities respond earlier and more defensively. Competition for near-term deliverability is intensified. Clearing prices rise as a function of persistence, not panic.

### Investor Notes

- The relevant horizon is the contracting window, not long-dated potential
- Scheduled replacement does not generate surplus within ten years
- Late supply slows decline but does not repair deficits
- Near-term deliverability carries outsized value

## PART IV — WHY PRICE CANNOT FIX THE PROBLEM

### 10. The Limits of Price Incentives

**“Price can expose scarcity, but it cannot compress time.”**

Uranium prices are commonly treated as a corrective mechanism. When supply tightens, higher prices are expected to accelerate production, unlock marginal projects, and restore balance. This reflex is deeply embedded in commodity thinking.

It does not hold here.

The contraction established in the prior section is not the result of insufficient incentive. It is the result of physical sequencing. Uranium production is governed by development timelines, operating constraints, and regulatory processes that price cannot materially accelerate once the system has fallen

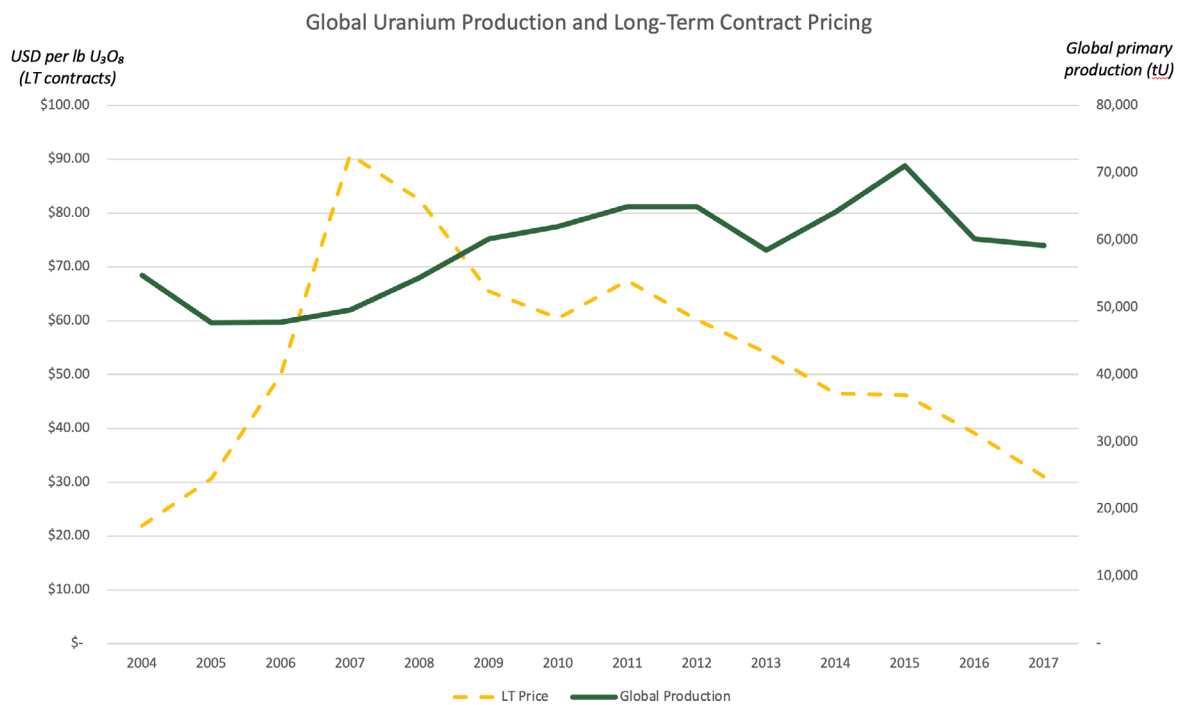
behind.

Within the ten-year contracting window, price arrives too late to prevent shortage.

Operating assets do not sit idle waiting for better economics. ISR wellfields are constrained by reservoir behavior and chemistry. Hard-rock mines are governed by access, radiation controls, and mill throughput. Output cannot be materially accelerated without compromising recovery, continuity, or long-term viability.

Development projects respond to price by improving economics, not by compressing delivery schedules. Permitting, financing, construction, and commissioning proceed in sequence. Price may determine whether a project advances. It does not determine how fast it can deliver pounds once approved.

Price therefore reallocates scarcity. It does not eliminate it.



## Chart 4: Global Uranium Production and Long-Term Contract Pricing

### The assumption being tested

The chart tests the assumption that higher uranium prices produce a timely and proportional supply response.

This assumption underpins the belief that price restores balance.

### What the chart shows

The chart plots realized global uranium production against long-term contract prices.

Prices rise sharply before production responds.

Production peaks well after prices and declines only gradually after prices fall.

### **The conclusion that follows**

Once this chart is accepted, price can no longer be assumed to correct supply imbalances on market-relevant timelines.

The supply system therefore responds to price with delay and inertia, not acceleration.

Any reliance on price to restore balance misunderstands the governing constraint.

The historical record confirms what the structure implies. During the mid-2000s price escalation, long-term contract prices rose sharply. Production responded slowly and peaked well after prices. When prices later collapsed, production declined only gradually. Output followed its own trajectory, constrained by physical systems rather than market urgency.

That asymmetry is structural. Uranium supply adjusts on geological and engineering timelines, not financial ones.

In the current cycle, this limitation is more binding than in prior periods. The operating base is thinner. Replacement timelines are longer. There is no reserve of idle capacity waiting to be mobilized. By the time price signals become decisive, the opportunity to prevent contraction has already passed.

Price reflects scarcity after it emerges. It does not prevent it.

### **Market Relevance**

Long-term uranium pricing does not function as a supply lever. It responds to imbalance rather than resolving it. Contracting behavior adjusts earlier than production, and price follows contracting pressure rather than preventing it.

### **Investor Notes**

- Price improves economics but does not accelerate delivery
- Supply response lags price by years, not quarters
- Scarcity is exposed, not cured, by higher prices

## **11. The End of the Snapback Cycle**

**“This market no longer resets. It tightens, then reprices.”**

Prior uranium cycles created the impression that supply would normalize after price spikes. Higher prices coincided with restarts, deferred production returned, and balance appeared to re-establish itself.

Those conditions no longer exist.

The snapback mechanism depended on three features that are now absent: a larger operating base, a pool of scalable idle capacity, and a development pipeline capable of delivering material within a single contracting cycle.

Today's system has none of those.

Global production is concentrated across fewer assets and fewer districts. Under performance no longer averages out. It compounds. Replacement projects advance individually, not as a coordinated response, and their delivery timelines exceed the period in which utilities must secure coverage.

As a result, price increases no longer trigger normalization. They trigger earlier and more defensive contracting.

This marks a structural break from prior cycles. In earlier periods, price spikes coincided with visible supply response. In the current regime, price spikes occur against a backdrop of persistent constraint. Production may eventually increase, but not fast enough to reset the system.

The consequence is duration.

Scarcity persists across multiple contracting cycles. Inventories lose their ability to buffer imbalance. Volatility increases, but it occurs within a tightening envelope rather than around a mean that supply can restore.

This is not a market waiting for relief. It is a market adapting to absence.

Once the snapback mechanism fails, price no longer signals an approaching surplus. It signals recognition that surplus is unlikely to arrive on schedule.

## **Market Relevance**

The failure of the snapback cycle changes how price should be interpreted. Pullbacks do not indicate resolution. They reflect timing noise, inventory behavior, or financial positioning. Contracting urgency continues regardless.

## **Investor Notes**

- The snapback mechanism is exhausted
- Supply erosion persists through price cycles
- Replacement arrives too late to reset balance
- This is a duration regime, not a single-cycle trade

# PART V — SUPPLY BIFURCATION AND FRAGMENTED AVAILABILITY

## 12. Geographic and Political Segmentation

“Uranium does not fail because it is scarce, but because it is not located where demand is fixed.”

Global uranium supply is often discussed as if it were a single, fungible pool. Aggregate production figures reinforce this impression, suggesting that material produced anywhere can ultimately satisfy demand everywhere.

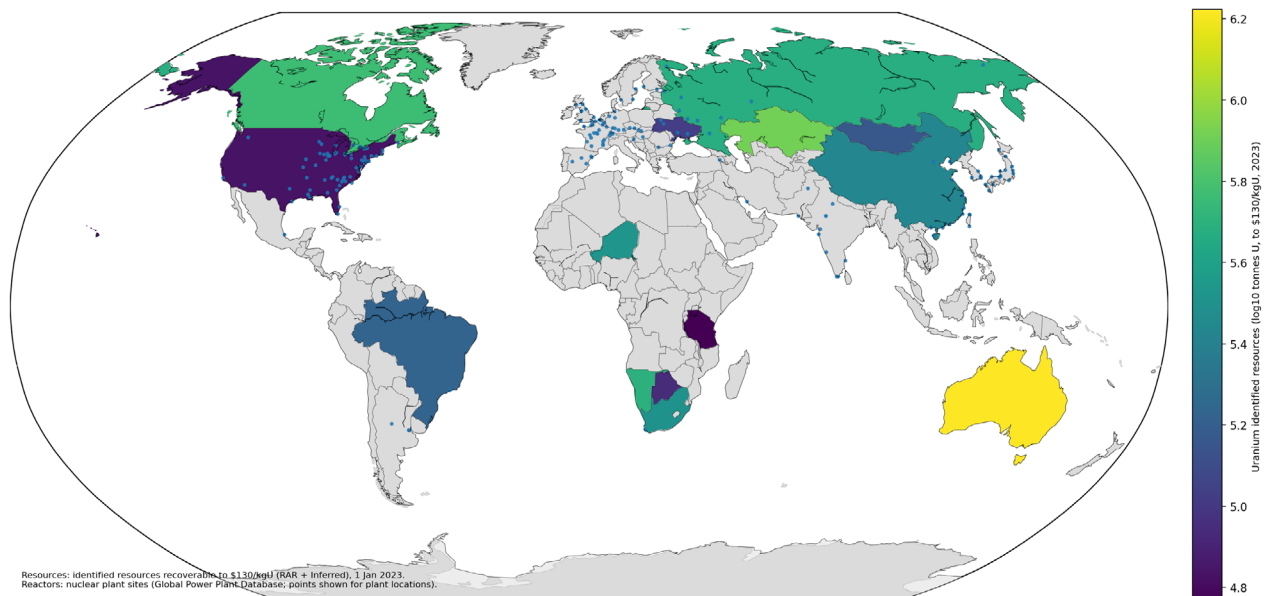
That framing is misleading.

Uranium demand is geographically fixed. Reactors cannot relocate, substitute fuels, or defer consumption. Supply, by contrast, is concentrated in a small number of jurisdictions, many of which sit outside the political, regulatory, or commercial alignment of Western utilities. Bridging that gap requires access, permission, and alignment. It is not automatic.

As supply growth slows and replacement arrives late, this geographic separation becomes binding. Pounds that exist outside the accessible market do not relieve pressure where contracting occurs. They may be produced and consumed elsewhere, but they do not compete for the contracts that set prices for Western buyers.

The result is segmentation rather than shortage.

Chart 5: Uranium Identified Resources and Nuclear Reactor Locations



## **The assumption being tested**

The chart tests the assumption that global uranium supply is geographically aligned with reactor demand.

This assumption underpins the belief that global production figures reflect availability to all buyers.

## **What the chart shows**

The chart compares the regional distribution of uranium production with the regional distribution of reactor demand.

Production is concentrated in a small number of jurisdictions.

Demand is concentrated elsewhere and cannot relocate.

## **The conclusion that follows**

Once this chart is accepted, global supply can no longer be treated as a single pool.

Availability must be evaluated relative to where demand is fixed.

Geography becomes a binding constraint as slack disappears.

This misalignment matters most when the system is already contracting. In a surplus environment, inefficiency can be absorbed. In a tight environment, distance and alignment turn into scarcity multipliers.

Segmentation does not require comprehensive sanctions or absolute trade barriers. Partial restrictions are sufficient. Preferred bilateral flows, strategic stockpiling, and informal alignment narrow the effective supply pool long before production is visibly cut off.

Once contraction is established, these frictions amplify its effect.

## **Market Relevance**

Geographic segmentation reduces the effective supply pool available to Western utilities. Contracting pressure intensifies earlier than global statistics imply, and prices respond to accessibility rather than aggregate production.

## **Investor Notes**

- Global production overstates accessible supply
- Demand is fixed while supply is geographically segmented
- Misalignment amplifies contraction already in place
- Price fragmentation replaces global clearing mechanisms

### 13. Contracting in a Bifurcated Market

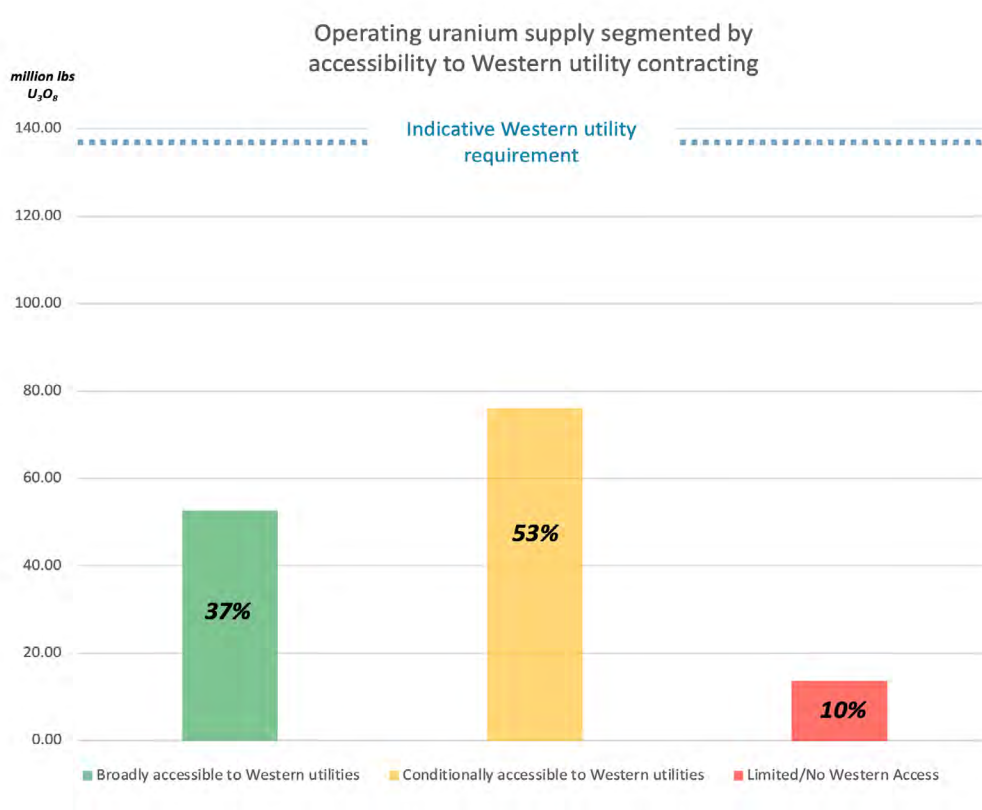
**“Price is set where utilities compete, not where uranium happens to be produced.”**

Uranium prices are not set by total global production. They are set by the marginal competition among utilities that must re-enter the market to secure coverage.

That competition occurs within a constrained subset of global supply.

Not all uranium production competes for the same buyers. Ownership structures, long-term bilateral agreements, domestic policy preferences, and delivery risk limit which pounds are available to which utilities. Material that does not compete for Western demand does not restrain Western prices, regardless of its physical existence.

As a result, the relevant measure of availability is not global supply, but commercially accessible supply.



**Chart 6 - Operating Uranium Supply by Commercial Accessibility**

#### The assumption being tested

The chart tests the assumption that all operating uranium supply participates equally in price formation.

This assumption underpins the belief that global production restrains price.

### **What the chart shows**

The chart segments operating supply into categories based on commercial accessibility to Western utilities.

Only a portion of production routinely competes in Western term contracting.

A material share is conditionally accessible or effectively excluded.

### **The conclusion that follows**

Once this chart is accepted, price-setting supply must be evaluated on an accessible basis.

Global production figures therefore overstate the supply that restrains price.

Fragmentation tightens the market before physical shortage appears.

Fragmentation precedes shortage.

As accessibility narrows, utilities lose the ability to treat the global market as a clearing pool. Contracting behavior adjusts early. Coverage is secured further out. Delivery certainty is prioritized over price. Inventory buffers are rebuilt defensively rather than opportunistically.

Prices respond to this behavioral shift, not to an absolute exhaustion of uranium. Clearing levels rise because buyers are competing for a shrinking pool of interchangeable supply.

This is why price can rise while global production appears stable. The constraint is not volume. It is access.

### **Market Relevance**

Commercial fragmentation accelerates tightening. Contracting pressure intensifies earlier, price sensitivity increases, and global supply statistics lose explanatory power.

### **Investor Notes**

- Price is set within a constrained competitive pool
- Not all operating supply restrains market pricing
- Fragmentation tightens markets before shortages appear
- Contracting behavior signals stress earlier than inventories

## PART VI — TESTING THE BENEFIT OF THE DOUBT

### 14. Testing the Benefit of the Doubt

**“A conclusion that survives optimism is not fragile.”**

Up to this point, the analysis has relied on supply that is scheduled, realizable, and relevant to the contracting window. That discipline was intentional. It removed hidden optimism and forced the system to stand on what is actually committed.

This chapter relaxes that discipline.

Undated development projects are now included. These projects exist within the global pipeline and are frequently cited as evidence that supply growth will eventually arrive and restore balance. They are not dismissed here. They are granted the benefit of the doubt.

To do so, undated projects are pooled and introduced using uniform, conservative timing and ramp assumptions. This treatment deliberately overstates the probability and speed of delivery. It assumes permitting, financing, construction, and commissioning proceed without interruption. It assumes projects perform as planned once production begins.

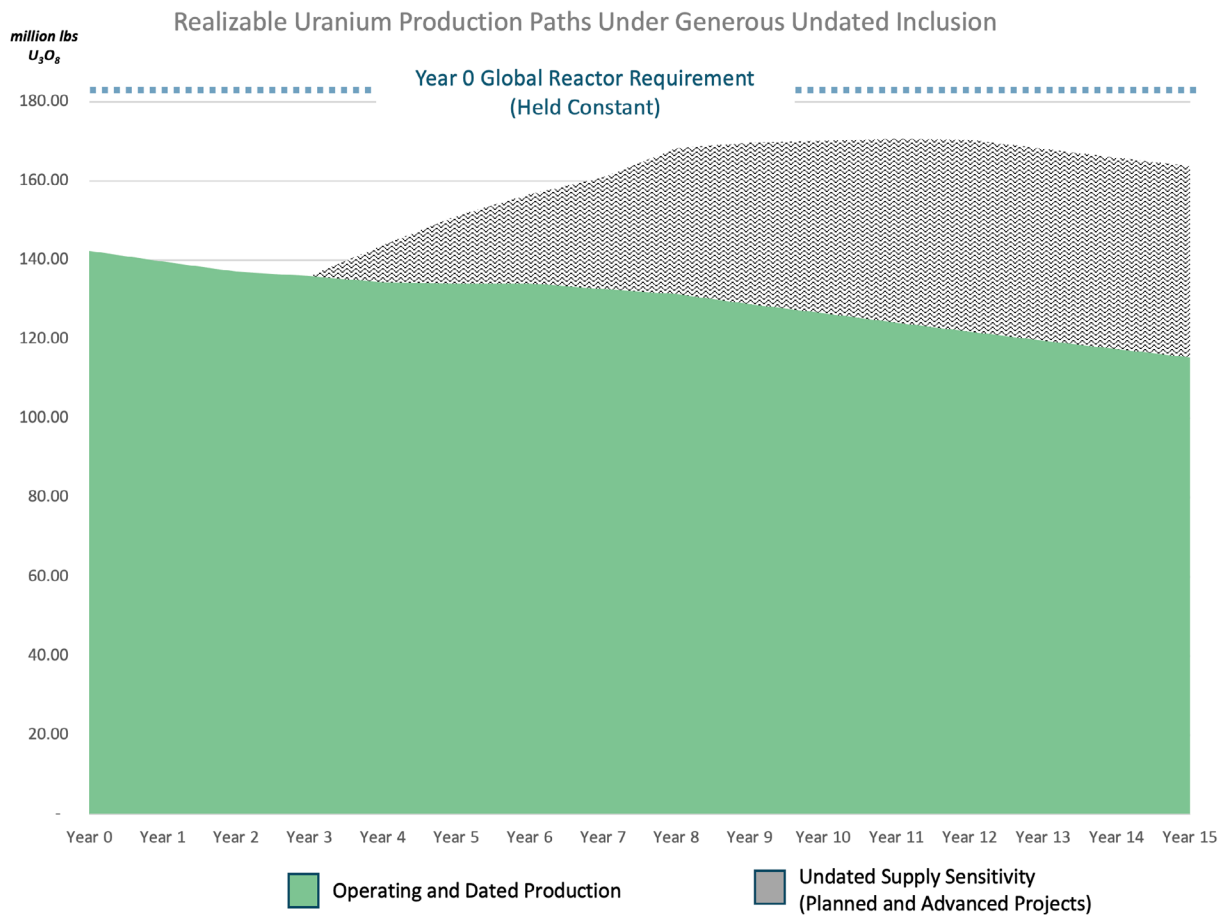
Demand remains flat. No disruptions are assumed. Operating assets continue to perform in line with realizable expectations.

These are generous assumptions.

The question is not whether supply improves. It does.

The question is whether improvement restores balance.

## Annual Supply Recovers but Never Clears the Requirement



## Chart 7 - Realizable Uranium Supply Including Undated Development Projects

### The assumption being tested

The chart tests the assumption that undated development projects materially restore supply balance over time.

### What the chart shows

Operating supply is extended forward, first with dated replacement and then with pooled undated projects introduced under conservative timing assumptions. The supply trajectory improves meaningfully relative to the base case.

### The conclusion that follows

Undated projects improve the annual supply profile. They do not generate surplus within the contracting window.

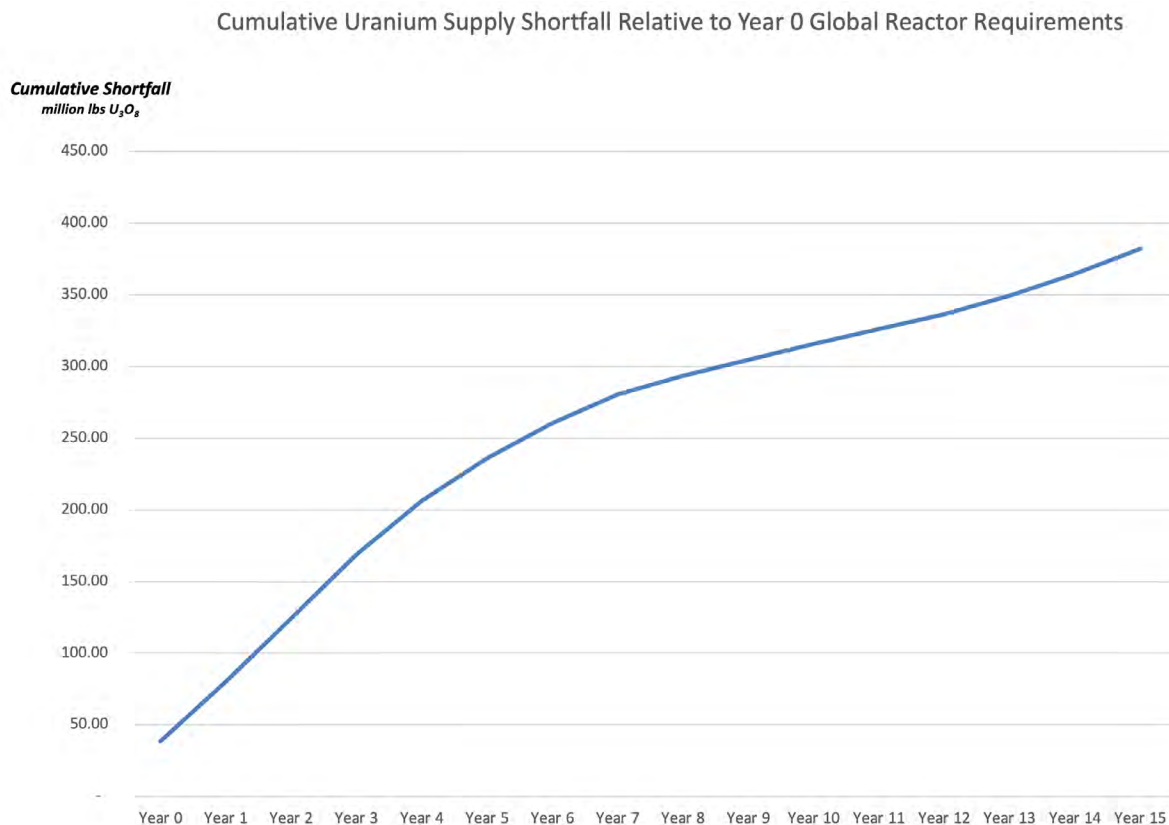
Annual output stabilizes later in the period. The decline slows. This visual improvement is precisely why

undated supply is often treated as corrective.

But annual stabilization is not resolution.

Balance is not restored unless supply exceeds requirements for a sustained period. Matching the starting rate merely halts further deterioration. Repair requires surplus.

That surplus does not appear.



## Chart 8 - Cumulative Uranium Supply Shortfall Including Undated Projects

### The assumption being tested

The chart tests the assumption that late-arriving supply eventually offsets earlier shortfalls.

### What the chart shows

Despite the inclusion of undated projects, annual supply remains below the demand baseline. Shortfalls accumulate year after year. No period generates surplus output.

### The conclusion that follows

Late supply slows the rate of failure. It does not reverse it. The cumulative deficit persists even under

optimistic assumptions.

This is the decisive result.

Undated projects materially improve slope. They do not change direction. The system remains in deficit throughout the period that governs contracting behavior, inventory strategy, and price formation.

Markets respond to levels, not trajectories. A system that is still short forces defensive behavior even if conditions are improving. Utilities contract earlier. Inventories are rebuilt. Delivery certainty is prioritized over price.

Improvement without surplus does not relieve pressure.

### **Market Relevance**

Granting optimistic assumptions does not restore balance within the contracting window. Contracting pressure persists, inventory behavior remains defensive, and price formation continues to reflect cumulative scarcity rather than improving annual flow.

### **Investor Notes**

- Undated projects improve annual supply but do not generate surplus
- Cumulative deficits persist under optimistic assumptions
- Late supply slows decline without repairing damage
- The conclusion survives the benefit of the doubt

## **15. - What Would Have to Change for This View to Be Wrong**

**“Structural conclusions can only be overturned by structural change.”**

The conclusions reached in this paper are not unfalsifiable. They rest on observable conditions and measurable outcomes.

For the thesis to fail, one or more of the following would need to occur within the market-relevant window.

First, a materially larger share of the development pipeline would need to acquire committed schedules and deliver on time. Undated projects would have to convert into reliable, sequenced supply rather than aspirational capacity.

Second, realizable operating supply would need to outperform historical behavior on a sustained basis. Depletion rates would need to slow materially, and operating assets would need to deliver more than precedent suggests.

Third, replacement supply would need to generate sustained surplus production. Not stabilization. Surplus. Multiple years of output above requirements would be required to repair accumulated deficits.

Finally, accessibility constraints would need to reverse. The pool of supply that actively competes for price-setting demand would need to expand meaningfully, reducing fragmentation and restoring fungibility.

Absent these changes, late supply cannot repair early deficits, and price behavior will continue to reflect persistence rather than resolution.

This chapter exists to impose discipline. It defines what evidence would matter and what would not.

### **Market Relevance**

Without structural change, temporary improvements in supply trajectory do not alter market behavior. Contracting urgency, inventory strategy, and price sensitivity remain intact until surplus is observable.

### **Investor Notes**

- The thesis is falsifiable but not fragile
- Surplus, not stabilization, is required
- Pipeline conversion and accessibility matter more than capacity
- Absent structural change, scarcity persists

## **PART VII — IMPLICATIONS FOR INVESTORS**

### **16. Scarcity Becomes the Base Case**

**“When supply cannot be rebuilt, time stops working against the shortage.”**

The uranium market is no longer governed by cyclical balance. Once depletion overtakes the operating base and replacement supply fails to arrive on time, scarcity ceases to be a transient condition. It becomes embedded. The system no longer oscillates around equilibrium. It remains under supplied until something fundamental changes.

Price behaves differently under these conditions. Higher prices do not accelerate normalization. They ration access. They redistribute margins. They expose fragility in contracting behavior. Volatility persists, but it does not signal resolution. It marks periodic recognition of constraints the market continues to underestimate.

This changes the nature of exposure. Uranium no longer functions as a timing trade driven by inflection points or sentiment swings. It becomes exposure to a condition that remains unresolved across multiple contracting cycles. Holding periods extend not because investors elect patience, but because the system offers no credible exit based on supply response.

The discipline required in this market is therefore different. Precision timing matters less than structural

endurance. Investors are rewarded for maintaining exposure through volatility rather than attempting to trade around it. Scarcity punishes impatience more reliably than it rewards clever entry.

## Market Relevance

Persistent scarcity tightens uranium availability regardless of short-term price movements. Prices reprice episodically without restoring balance. Utilities are pushed into earlier and longer contracting. Investors must evaluate exposure across extended horizons rather than discrete cycles.

## Investor Notes

- Treat uranium exposure as structural, not tactical
- Expect volatility without normalization
- Focus on endurance rather than timing
- Do not assume price resolves supply

## 17. Value Accrues to What Can Be Delivered

**“In a constrained system, value follows credibility, not aspiration.”**

Scarcity does not lift all uranium assets evenly. It reallocates value based on proximity to delivery, credibility of execution, and exposure to timing risk. As replacement supply repeatedly fails to arrive, the market increasingly distinguishes between pounds that exist and pounds that are merely promised.

Operating producers sit at the center of this reallocation. They control material that utilities require and cannot easily substitute. Higher prices widen margins faster than they enable growth. Volume remains constrained, but cash flow becomes scarce and increasingly valuable precisely because it is dependable.

Developers occupy a narrower and more selective window. Only projects that are permitted, financed, and close to construction gain relevance. Earlier-stage development assets remain subject to the same regulatory sequencing, engineering complexity, and commissioning risk that define the broader supply failure. Scarcity does not erase timelines. It exposes them.

Exploration plays a different role again. Discovery does not resolve near-term shortages, but it introduces future optionality into a system otherwise defined by contraction. As the market begins to accept persistence, the ability to alter long-range supply expectations regains importance. This is not speculative enthusiasm. It is a response to the absence of alternatives.

The result is structural valuation dispersion. Assets closest to delivery are repriced first. Assets dependent on long timelines are filtered aggressively. Assets capable of changing the future supply narrative are valued intermittently and often abruptly as scarcity becomes harder to ignore.

## Market Relevance

As uranium availability tightens, price increasingly rewards deliverable supply over theoretical projects. Contracting behavior favors reliability. Valuation dispersion across asset types becomes structural rather than cyclical.

## Investor Notes

- Prioritize credible delivery over theoretical scale
- Discount timelines aggressively
- Expect persistent valuation dispersion
- Separate dependability from optionality

## 18. Discovery Becomes a Strategic Asset

**“When replacement fails, discovery stops being discretionary.”**

Exploration reasserts its importance because the system demands it, not because sentiment improves. When operating supply depletes and development pipelines repeatedly fail to replace it, discovery becomes the only mechanism capable of altering future availability. In that context, exploration is no longer optional upside. It is strategic necessity.

This does not reduce risk. Most exploration projects will still fail. Timelines remain long. Capital will still be misallocated. What changes is the consequence of success. In a market defined by persistent scarcity, a credible discovery does not need to reach production to matter. It reshapes expectations about what supply might look like beyond the current contraction window.

In a balanced system, discoveries are incremental. In a constrained system, they are disruptive. They reintroduce the possibility of future relief into a market otherwise forced to ration through price alone. Even early-stage results can influence valuation because they represent something the system otherwise lacks: uncommitted future pounds.

Scarcity amplifies asymmetry. The absence of replacement supply increases the market's tolerance for geological risk, not because optimism rises, but because the cost of not discovering new supply becomes more severe. When the pipeline fails repeatedly, discovery itself becomes scarce.

This is why exploration investing changes character under persistence. It is no longer about chasing near-term development stories or marginal resources. It is about positioning for rare outcomes that can materially alter long-range supply expectations. The payoff is not predictability. It is leverage to outcomes the system cannot function without.

## Market Relevance

With uranium availability constrained and replacement supply failing, discovery influences long-term pricing expectations, supports extended contracting horizons, and introduces valuation upside discon-

nected from near-term production.

## Investor Notes

- Treat exploration as structural, not speculative
- Expect asymmetric outcomes
- Focus on geological credibility and district potential
- Value discovery for narrative impact, not timelines

## Conclusion

The uranium market has been misdiagnosed for years.

The prevailing belief has been that today's tightness is cyclical. That supply was cut too far, prices fell too low, and that higher prices would eventually restore balance in the way commodity markets are expected to behave. Timing may have been debated, but the outcome was rarely questioned.

That belief no longer holds.

This paper has tested the supply system as it actually exists, not as it is assumed to exist. It has enforced timing rather than smoothing it. It has distinguished deliverable supply from imagined capacity. It has granted the development pipeline the benefit of the doubt and still required it to do the work demanded of it.

At each step, the same conclusion emerges.

The uranium supply system cannot replace what it consumes on time. It does not generate surplus. It does not catch up. And price, while necessary, cannot fix that failure within the window that governs contracting and behavior.

That combination produces a different outcome than investors are used to.

In markets that can generate surplus, prices overshoot and normalize. In markets that cannot, prices reprice to a level that holds the system together and remain there. Volatility persists, but the baseline moves higher. The old floor disappears because returning to it would break supply again.

This is not a forecast. It is a consequence.

Waiting for normalization assumes a mechanism that no longer functions. Waiting for supply to arrive assumes timing that is not available. Waiting for prices to spike and fall back assumes excess that cannot be produced.

Those waits will not be rewarded.

The most underappreciated implication of this shift is what it means for new supply. When replacement fails and price cannot accelerate it, discovery is no longer discretionary. New pounds do not compete with abundance. They enter a system with very few ways to heal itself. That gives credible exploration a strategic role it does not have in balanced markets and a value that is often misunderstood.

The uranium market is not approaching the end of a cycle. It is adjusting to a new operating condition. One defined by persistent scarcity, a higher price floor, and a supply system that cannot repair itself quickly enough to restore the old order.

# Appendix A

## Supply Realizability and Timing Assumptions

This appendix clarifies how supply is treated throughout the analysis and why timing, rather than nominal capacity, governs the conclusions reached in the main body of the paper.

The objective is not to forecast production, but to determine whether the uranium supply system is capable of replacing what it consumes within the window that governs contracting behavior and price formation.

### Realizable Supply Versus Nominal Capacity

Throughout this paper, supply is evaluated on a realizable basis rather than a nameplate or theoretical capacity basis.

Nominal capacity reflects what assets are designed to produce under ideal conditions. Realizable supply reflects what they have historically delivered, adjusted for depletion, operating constraints, and ramp behavior. The distinction is critical in uranium, where production is rarely constrained by price alone and often limited by physical, regulatory, or geological factors.

Using nominal capacity implicitly assumes that all assets operate at design rates, ramp on schedule, and sustain output without interruption. Historical evidence does not support this assumption.

Realizable supply therefore represents the appropriate baseline for assessing replacement and timing risk.

### Treatment of Operating Production

Operating production is treated as a declining base rather than a static plateau.

This reflects observed behavior across both ISR and hard-rock operations, where depletion, declining grades, reservoir draw down, and maintenance requirements reduce output over time unless offset by new development. No assumption is made that higher prices materially alter this trajectory within the contracting window.

This approach avoids embedding optimism that operating assets can simply be “pushed harder” in response to price signals.

### Dated Versus Undated Development Projects

Development projects are separated into two categories based on the presence or absence of committed production schedules.

**Dated projects** are those with defined construction timelines, permitting milestones, financing pathways, and credible target start dates. These projects are included explicitly and sequentially, with conservative ramp assumptions applied.

**Undated projects** lack one or more of these elements. While they may represent potential future supply, they do not carry sufficient timing certainty to be treated as replacements within the near- to medium-term window. Their exclusion from the base case does not imply dismissal. It reflects uncertainty around delivery.

Where undated projects are later included, they are pooled and introduced under deliberately generous assumptions to test whether optimism alters the outcome.

### **Timing as the Governing Constraint**

The central constraint in this analysis is timing, not resource availability.

Uranium projects progress through permitting, financing, construction, and commissioning in sequence. These steps do not compress meaningfully in response to higher prices once the system is already behind. As a result, supply that exists in principle but arrives late does not relieve pressure during the period when utilities must contract. This is why the analysis emphasizes contracting windows rather than long-dated capacity projections.

Supply that arrives after coverage decisions have been made does not influence those decisions, regardless of its eventual scale.

### **Demand Treatment**

Demand is held flat at the baseline level throughout the analysis.

This is a conservative assumption. It avoids reliance on demand growth to generate scarcity and ensures that conclusions are driven by supply behavior alone. Any increase in demand would exacerbate the outcomes described, not mitigate them.

### **Price Neutrality**

No price-driven acceleration of supply is assumed.

Higher prices improve project economics and influence investment decisions, but they do not eliminate permitting requirements, compress construction timelines, or materially change ramp behavior. Treating price as a corrective mechanism would embed assumptions that are contradicted by historical performance.

Price is therefore treated as responsive to scarcity rather than as a tool to resolve it.

### **Scope and Boundaries**

This analysis is intentionally bounded.

It does not model extreme disruption scenarios, policy shocks, or speculative demand surges. It does not assume universal project failure. Where uncertainty exists, it is resolved in favor of inclusion rather than exclusion when testing robustness.

The conclusions that emerge do so under conservative and, in some cases, optimistic assumptions about supply delivery.

# Appendix B

## Sensitivity to Optimistic Supply Outcomes

This appendix examines whether the conclusions of the paper change under more optimistic assumptions about uranium supply delivery. The objective is to test robustness, not to refine forecasts.

The question addressed here is simple: **if the supply system performs better than expected, does balance return within the market-relevant window?**

### Purpose of the Sensitivity Analysis

The base case used throughout the paper relies on realizable supply, dated project inclusion, and conservative ramp assumptions. These choices are intentional and grounded in observed behavior.

This appendix relaxes those constraints.

Optimistic assumptions are introduced across multiple dimensions simultaneously. These assumptions are not presented as likely. They are presented to determine whether the central conclusion depends on pessimism or whether it holds even when the system is given the benefit of the doubt.

### Optimistic Assumptions Applied

The following adjustments are made relative to the base case:

First, a higher realizability rate is assumed across operating production. Decline profiles are moderated, and operating assets are assumed to perform at the upper end of historical ranges for longer periods.

Second, undated development projects are introduced earlier and in greater aggregate volume than in the base case. Timing uncertainty is reduced, permitting is assumed to proceed without delay, and financing is assumed to be available when required.

Third, ramp profiles for new projects are accelerated. Output is assumed to reach steady-state production more quickly and with fewer interruptions than has historically been observed.

Fourth, no negative disruptions are introduced. Geopolitical events, technical failures, and regulatory setbacks are explicitly excluded from consideration.

Demand remains flat, consistent with the base case. No demand growth is required to generate scarcity.

Taken together, these assumptions represent a favorable operating environment for supply delivery.

### Results Under Optimistic Conditions

Under these optimistic assumptions, the annual supply profile improves materially relative to the base case.

Decline moderates. Stabilization occurs earlier. Aggregate output is higher across much of the period. These improvements are visible and meaningful.

However, the critical result does not change.

Annual supply does not exceed baseline requirements on a sustained basis. No multi-year surplus emerges. Early shortfalls are not offset by later over performance.

As a result, cumulative deficits persist.

This outcome is not driven by a single constraint. It reflects the combined effect of timing, ramp behavior, and the scale of replacement required. Even when supply performs well, it does not perform well enough, soon enough, to repair the deficit accumulated earlier in the window.

### **Why Improvement Does Not Equal Resolution**

The distinction between improvement and resolution is central to understanding this result.

Stabilization halts further deterioration. It does not undo what has already occurred. Repair requires surplus production sustained over time. That surplus must be large enough to offset prior shortfalls while also meeting ongoing demand.

Under optimistic assumptions, the system approaches balance. It does not cross it.

This distinction is often obscured in supply discussions that focus on end-state capacity rather than path dependency. In uranium, the path matters. Late supply cannot retroactively satisfy contracts that have already been signed or inventories that have already been drawn.

### **Implications of the Sensitivity Results**

The persistence of deficit under optimistic assumptions indicates that the conclusions of the paper are not fragile.

They do not depend on conservative modeling choices, pessimistic delivery assumptions, or demand growth. They arise from structural characteristics of the supply system and the timing of replacement.

To reverse the outcome shown here would require a qualitatively different result: sustained surplus production within the contracting window. Incremental improvement is insufficient.

### **Boundary Conditions**

This appendix does not test extreme or implausible scenarios. It does not assume instantaneous permitting, unlimited capital, or simultaneous project success across the pipeline. Such assumptions would not be credible and would undermine the purpose of the exercise.

The objective is to demonstrate that even under favorable conditions, the system does not behave in a way that restores balance on time.

# Appendix C

## What Would Falsify This View

This paper advances a strong conclusion: that the uranium supply system cannot replace what it consumes on time, that price cannot correct this failure within the market-relevant window, and that scarcity therefore persists.

This view is not unconditional.

It rests on observable conditions and can be falsified by specific developments. This appendix defines what would change the conclusion, and just as importantly, what would not.

## What Would Change the Conclusion

The thesis presented in this paper would be undermined if one or more of the following occurred within the contracting window.

First, the supply system would need to generate **sustained surplus production**. Not stabilization. Not temporary balance. Surplus. Multiple consecutive years in which deliverable supply exceeds baseline requirements by a meaningful margin, sufficient to repair accumulated deficits rather than merely halt further deterioration.

Second, a **material portion of the development pipeline would need to convert into scheduled, on-time delivery**. Undated projects would need to acquire credible timelines, secure permits and financing, and enter production broadly in line with those schedules. Isolated successes would not be sufficient. The conversion would need to be systemic.

Third, **operating assets would need to outperform historical behavior on a sustained basis**. Decline rates would need to moderate materially, and realized production would need to exceed precedent across multiple asset types and jurisdictions. This would require evidence that operating constraints have been structurally alleviated, not merely managed.

Fourth, **commercial accessibility would need to expand meaningfully**. Supply that currently sits outside the price-setting market would need to become reliably available to Western utilities, reducing fragmentation and restoring fungibility. This would require observable changes in trade flows, contracting patterns, or policy alignment.

Absent these developments, the core conclusions of the paper remain intact.

## What Would Not Change the Conclusion

Several commonly cited developments would not, on their own, invalidate the thesis.

Higher prices alone would not be sufficient. Price improves economics, but it does not compress permitting, construction, or ramp timelines. Without surplus delivery, price strength reflects scarcity rather than resolution.

Announcements of future projects without committed schedules would not be sufficient. Capacity without timing does not repair deficits and does not alter contracting behavior.

Single-project successes would not be sufficient. The replacement problem is systemic. It cannot be resolved by isolated additions unless they are large enough and early enough to generate surplus.

Temporary inventory draws or releases would not be sufficient. Inventory can smooth short-term imbalance but cannot substitute for sustained production exceeding consumption.

Short-term volatility or price pullbacks would not be sufficient. Volatility within a constrained system does not imply normalization or resolution.

### **Evidence That Would Matter**

The evidence required to challenge this thesis is concrete.

It would include sustained, verifiable surplus production. Multiple projects delivering on schedule across jurisdictions. A visible shift in contracting behavior indicating reduced coverage urgency. A durable expansion in the pool of supply that actively restrains price.

Until such evidence appears, claims of imminent normalization rest on assumption rather than observation.

### **Purpose of This Appendix**

This appendix exists to impose discipline, not doubt.

It defines the conditions under which the analysis would need to be revisited and distinguishes between signals that matter and those that do not. In doing so, it clarifies that the conclusions of this paper are not ideological or speculative. They are conditional on realities that can be observed and tested.

# About the Author

## Chris Frostad, BBA, CA, CPA

Chris Frostad is a widely recognized voice in Canada's uranium exploration sector, known for his clear analysis of market trends and his ability to connect technical realities with investor insight.

As the author of *Behind the Curve: Understanding When the Uranium Market Turns* and host of the *Uranium Spotlight Podcast*, he has become a familiar presence at leading industry forums and a frequent guest on *The Crux Investor's Energy Show*, where he helps audiences understand the forces shaping uranium supply, demand, and price discovery.

With over four decades in resource development and capital markets, Chris draws on both field and boardroom experience to explain how the sector actually works—from exploration risk and mine development timelines to the broader economics of nuclear fuel supply.

Earlier in his career, he led several public companies through periods of rapid growth across the technology and mining industries, experience that underpins his pragmatic view of how discovery, finance, and strategy intersect.

A Chartered Professional Accountant, Chris began his career with Deloitte in international taxation before turning his focus to early-stage ventures and corporate development.

Today, as a founding partner and CEO of Purepoint Uranium Group, he continues to combine data-driven research with accessible storytelling to help investors navigate one of the most misunderstood corners of the energy market.

