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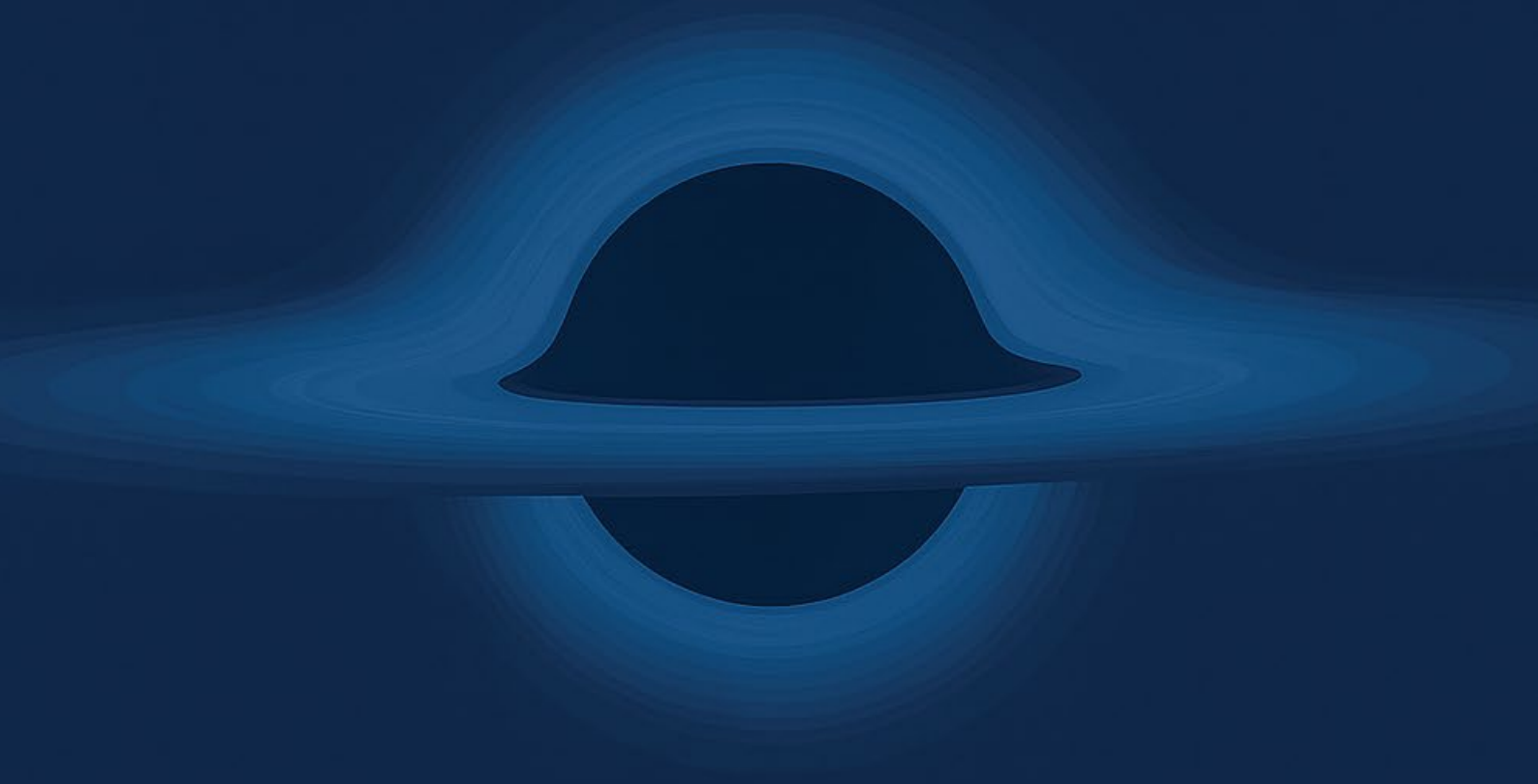
AGI by 2029

Calculation shows AI is almost smart enough, but still too expensive.

by Robin Harbort and Dr. Jens Lapinski



Technology Briefing Center
by ANGEL INVEST & partner SIGNAL IDUNA

Table of Contents

Toward a calculated forecast of AGI

Our calculation shows that Artificial General Intelligence (AGI) will emerge by April 2029. By that point, AI systems will exceed an IQ of 200 while operating at a lower cost than a human earning $70,000 per year. This combination of super high IQ and median labor cost, is our definition of AGI.

Our model reveals that AI will reach superhuman intelligence levels relatively quickly. However, the real constraint lies in inference costs - the primary driver delaying AGI. Intelligence alone is no longer the bottleneck. In fact, AI is already more capable than the median human for most white-collar tasks. The key question is when it will also become cheaper than median-paid knowledge workers.

This leads to a critical insight: The human labor most at risk of being replaced by AGI is the most expensive. Regardless of IQ, high earners will be attractive to be replaced first. In this report, we will further define AGI through economic utility.

AGI is often called the most anticipated technological breakthrough of the 21st century, yet it remains poorly defined. In the Microsoft–OpenAI partnership, AGI is described as "AI systems that can generate at least $100 billion in profit." Sam Altman sees AGI as "a system broadly smarter than humans," while Elon Musk describes it as "an existential risk if unaligned."

Rather than add to this ambiguity, we propose a practical, quantifiable definition:

AGI is reached when AI systems are smarter than most humans and operate at an equal or lower cost. In detail, we propose an IQ score of 200 while running on lower inference cost then a human with a $70,000 per year pay.

This definition grounds AGI in economic impact, not philosophical debate. It reflects the reality that intelligence without affordability offers limited transformative potential, while even modest intelligence at ultra-low cost could revolutionize labor, productivity, and global economics.

Unlike AGI predictions from Metaculus or Polymarket that rely on expert opinion or crowd-sourced bets, we introduce a data-driven, formula-based framework. By tracking two key trends:

- the rising IQ of AI systems
- the declining cost per task

Further, we can forecast personalized AGI moments: the point at which AI becomes smarter and cheaper than a human performing a given role. This report presents the methodology, required data inputs, and tools for calculating AGI timelines based on individual or organizational benchmarks.

The increasing IQ of AI systems

To meaningfully forecast the arrival of AGI, we require a quantifiable measure of machine intelligence. In our model, IQ serves as the central metric. While it is a simplification, IQ offers a standardized and intuitive scale to evaluate and compare the cognitive capabilities of AI systems against human benchmarks.

The median human IQ is set at 100, while highly capable experts - such as researchers, professors, or top performers in specialized domains - are typically in the 160 to 200 range. Also, humans don't get much smarter anymore. The median human IQ plateaued around the year 2000. As of mid-2025, state-of-the-art (SOTA) AI systems score approximately 136 IQ points, putting them well above the median person and approaching expert-level reasoning.

The growth in AI intelligence has been remarkable. In 2023, most models still lagged behind the median human. By mid-2024, top models had reached parity with the median IQ. Today, leading AI systems have entered superhuman territory, outperforming the majority of the global population on analytical, logical, and reasoning tasks. This rapid advancement is fueled by continued model scaling, improved training methods, the emergence of agentic architectures, and the integration of multimodal inputs.

To project when AGI will exceed key human intelligence thresholds, we model two future growth scenarios:

Bull Case

2.6% monthly IQ growth, based on the historic IQ growth from May 2024 to July 2025, in which AI increased its IQ from 100 to 136.

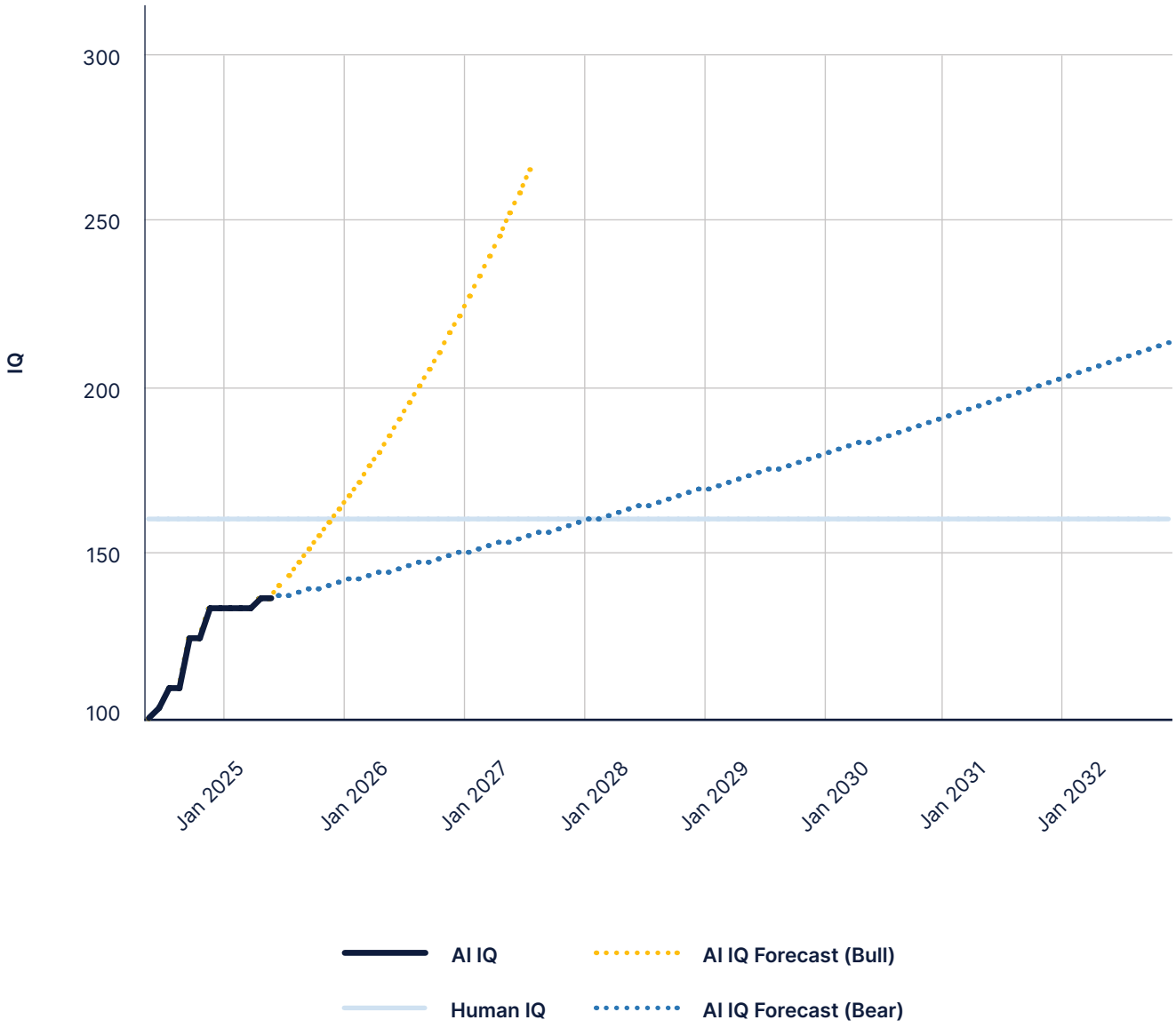
Bear Case

0.5% monthly IQ growth, based on historical improvements of other base technologies like storage, bandwidth, or compute.

These projections assume full utilization of an AI's context window - its short-term memory capacity - which is essential for solving complex tasks. Currently, SOTA AI models support context windows of one million tokens, with trends suggesting a tripling every year.

Increase of IQ for AI

Bull and bear case for achieving an AI IQ of 160 and beyond



The decreasing costs of AI systems

To assess when AGI becomes economically viable, it is not enough to examine intelligence alone - we must also understand the cost of delivering intelligence. In both humans and AI, this can be framed in terms of cost per task or request. For humans, a “task” can be approximated by a thought; for AI, it is a full prompt processed through its context window.

Today, the cost of a full AI prompt is determined by two variables: the inference cost per token and the size of the context window. Modern AI systems can process up to one million tokens per request, and this capacity is expected to triple annually - corresponding to 9.59% month-over-month (MoM) growth.

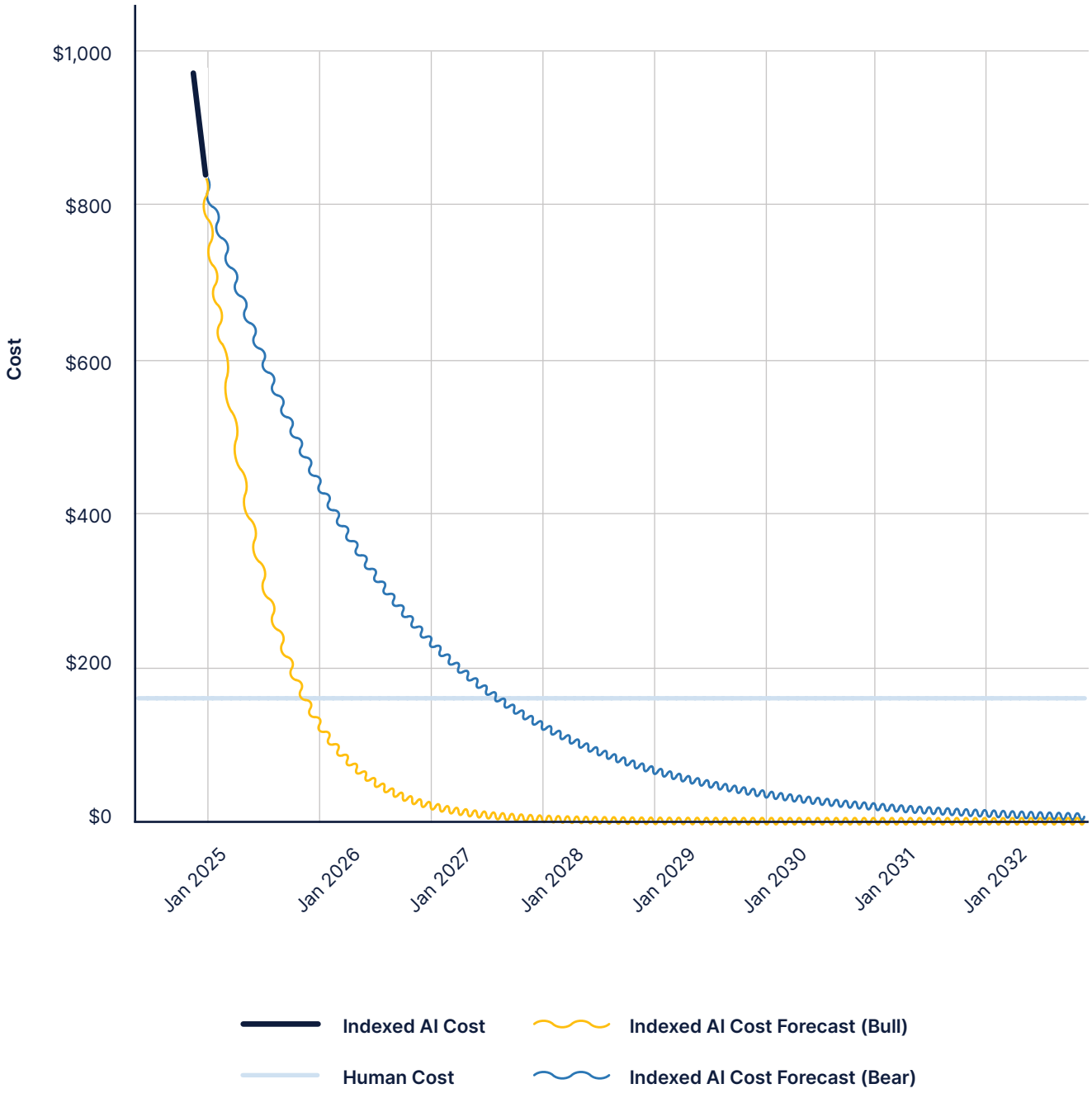
Simultaneously, token-level inference costs are dropping sharply, decreasing by 14.13% MoM in the bull case. This decline is reflected in the real-world drop in processing costs. Between 2021 and 2025, the cost to process 1 trillion tokens - roughly equivalent to 16 times the size of Wikipedia - fell from approximately $60 million to just $60,000, representing a 99.9% decrease in less than five years.

In the bear case, we assume future AI systems will require significantly larger context windows to reach peak performance. As a result, the cost must incorporate the growing size of these windows. Even accounting for this increased demand, the effective cost still decreases by 5.10% MoM, driven by the combined effects of cheaper inference and expanding memory. This still represents a substantial and sustained deflationary trend.

By contrast, the cost of human cognition remains relatively flat. A typical person generates approximately 60,000 thoughts per day, or 21.9 million per year. At a median annual salary of $70,000, the cost per thought is around $0.0027. For experts earning $300,000 to $1,000,000, the cost ranges between $0.012 and $0.039 per thought. Even assuming 3% annual wage inflation, labor costs would rise only ~20% by 2030 - a negligible shift when compared to the exponential cost deflation of AI. As such, wage inflation is not factored into our AGI forecast model.

Decrease of AI cost for one million tasks

Bull and bear case for achieving lower costs than a human earning $250,000 annually



Methodology to calculate the emergence of AGI

1

Define a Human Benchmark

Start by selecting the intelligence level you want AI to surpass: 100 for a median human, 160 for a top domain expert and 200 for top-tier human peak intelligence.

You also need the corresponding annual salary for that human. In the example provided, a domain expert earns $250,000 annually and is assumed to have an IQ of 160.

2

Estimate Human Thought Volume

Humans are estimated to have around 60,000 thoughts per day, which amounts to 21.9 million thoughts per year. With a $250,000 salary, this results in: $11,416 per 1 million human “tasks”.

3

Calculate Current AI Cost Per Task

AI cost is determined by inference cost per trillion tokens (e.g. $60,000 as of Jan 2025) and context window size (1 million tokens per request).

Therefore, $60,000 per 1 trillion tokens divided by 1 million tokens per task equals: $60,000 per 1 million AI tasks. This makes AI currently more expensive than human labor for the same number of tasks at the expert level.

4

Model AI IQ Growth

AI systems currently operate at 136 IQ (as of June 2025). We project IQ growth under two scenarios:

- **Bull Case:** +2.60% IQ increase per month
- **Bear Case:** +0.50% IQ increase per month

From this, we calculate when AI will exceed the selected human benchmark IQ (e.g., 160).

5

Model AI Cost Reduction

Similarly, we project inference cost decline under two scenarios:

- **Bull Case:** –13.40% per month (constant token cost, context fixed)
- **Bear Case:** –5.10% per month (accounting for future context window growth)

From this, we calculate when the cost per 1 million AI tasks drops below the human cost benchmark (e.g., $11,416 per million tasks).

Example: AI surpassing a $250K/160 IQ Expert

Using the values from the model:

AI crosses the quality threshold (IQ 160) by December 2025 (Bull Case) or February 2028 (Bear Case)

AI crosses the cost threshold by December 2025 (Bull Case) or August 2027 (Bear Case)

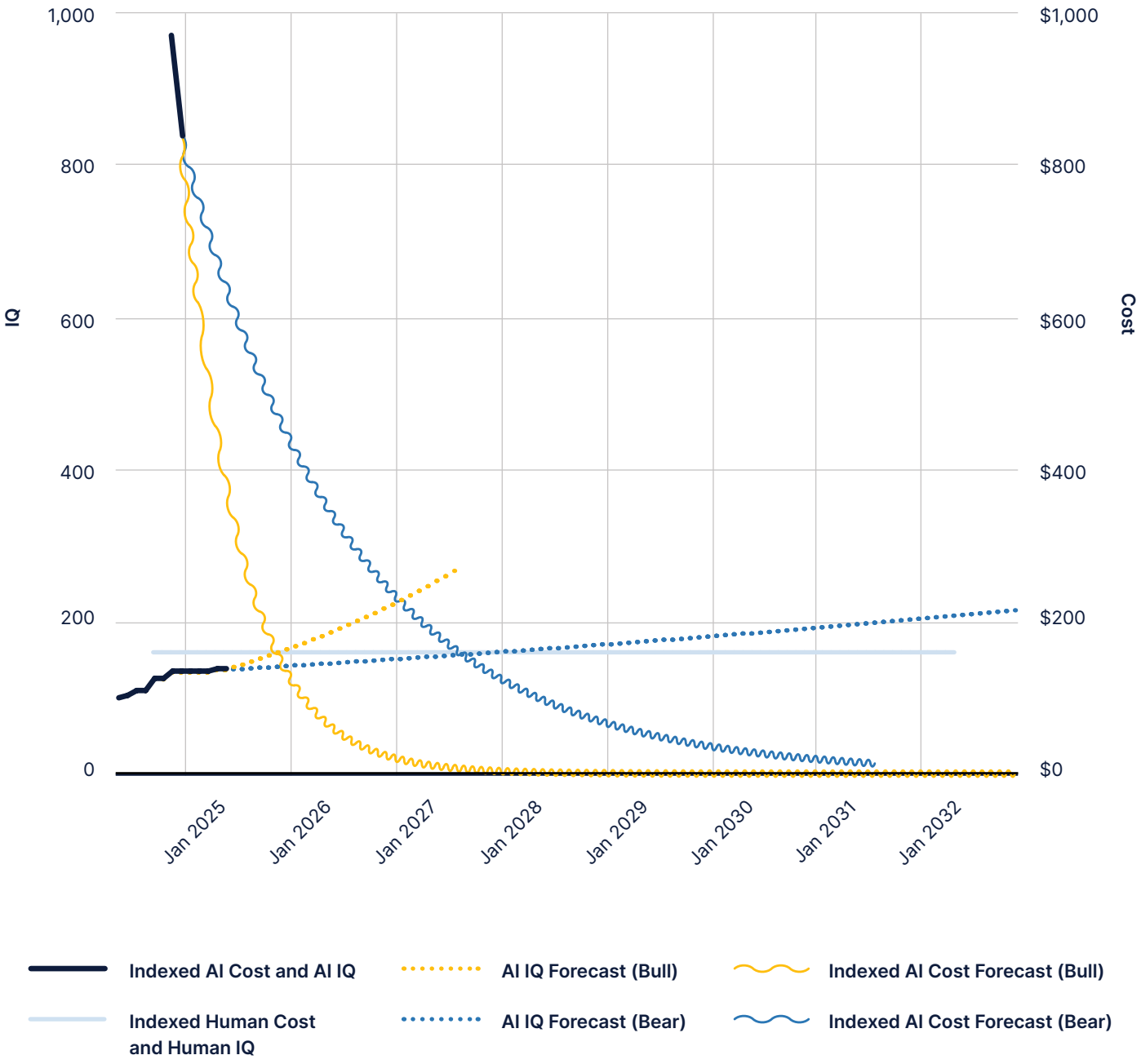
The moment when AI is both more intelligent and more cost-efficient than this human expert occurs between December 2025 and February 2028, depending on the growth scenario.

The following chart visualizes this individual AGI window for a human expert earning $250,000 annually with an IQ of 160. For clarity, the cost of 1 million human tasks is indexed to $160, forming the flat blue benchmark line. Unlike humans, whose cost and intelligence are assumed to remain stable, AI is progressing rapidly in both dimensions.

- **The dotted lines** represent AI IQ growth projections (Bull and Bear), which intersect the human IQ benchmark between December 2025 and February 2028.
- Meanwhile, **the wavy lines** represent the falling cost of AI tasks, which drop below the human cost benchmark between December 2025 and August 2027.

This dual crossover—on cost and quality—defines the AGI window: the point at which AI systems become not only cognitively superior but also economically preferable to high-performing human professionals.

Visualization of the AGI Window for a $250k/160 IQ Expert



Calculating the emergence of AGI

Using the pessimistic scenario with a human benchmark of IQ 200 and a $70,000 annual salary, the cost per 1 million human tasks is estimated at $3,196. AI, starting at 136 IQ in mid-2025 and costing $60,000 per 1 million tasks, improves over time.

Under the bear case, AI cost drops below the human benchmark by September 2029, while IQ surpasses 200 by November 2031. In the bull case, AI will be smarter and cheaper by September 2026.

The AGI window - when AI is super intelligent and cheaper than a median human - therefore occurs between September 2026 (bull case) and November 2031 (bear case). Therefore using the middle of these dates,

AGI will emerge by April 2029.

The projected AGI date, April 2029, marks a technical milestone but not an immediate transformation of the real world. Even when AI becomes smarter and cheaper than human experts, adoption will take time due to regulation, trust, and organizational resistance.

We are already seeing early signs of this shift, yet people are still hired because of soft factors like emotional intelligence, charisma, or strong personal networks. In the future, intelligence alone will no longer justify human labor. Leaders need to ask themselves what skills will remain valuable and how teams should be structured when AI is not just a tool but the main contributor.

This report is an invitation to start this discussion now while we still have the time to shape the transition.

Calculate your own personal AGI moment:

https://qr.angelinvest.ventures/agi

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Robin Harbort is an AI analyst at Angel Invest. With a background in Business Informatics and IT Consulting, Robin brings hands-on experience working with enterprise clients and a deep understanding of scalable tech solutions. He has worked with several of Germany's top 100 companies, led over 30 AI and digital transformation projects as a consultant, and hosted dozens of AI-focused events - bringing together more than 5,000 participants from over 300 organizations.

A tech optimist at heart, Robin sees AI as a scalable solution for the world's most scalable problems—driving both innovation and impact.

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Jens is one of Europe's most active angel investors, making 20 investments annually as Founding Partner & CEO of Berlin-based Angel Invest, whose 100+ portfolio companies are valued at several billion euros.

He was previously Managing Director at Techstars, launching its German fund and backing 40 startups that raised over €250m. Before that, he co-founded Forward Labs (now Forward Partners), which released monthly products using lean startup methods. The firm went public in 2021 and was acquired in 2023.

Earlier, Jens co-founded aiHit, a VC-backed automated data provider, acquired in 2015. He also served as VP of Analysis & Consulting at Library House (now Dow Jones).

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