Optimize For The End State

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Christopher Kalitin Blog (https://ckalitin.github.io/posts/end-state-optimization/)

Throughout the history of humanity, one of the best ways to succeed in a technical field has been to optimize for the end state.

This is in contrast too many start-ups around today which optimize for some short-term markets or worse yet optimize for some short-term fundraising opportunity, see orbital data centers (https://x.com/CKalitin/status/2065129104052240399?s=20).

The fundamental technologies and companies that we interact with every day have one common core feature, which is that from the beginning they were optimizing for the state. The founder had some particular insight about what the world would look like in 10, 20 or 50 years and they decided that they would start building that future today.

Terraform Industries

This summer I'm working at Terraform Industries. Terraform Industries was founded because Casey Handmer wrote a book about How To Industrialize Mars (https://docs.google.com/document/d/1pxQg51rGP6JtdD4Eix1xpVek1xX05eQVgc7Jbm6VtDw/edit?tab=t.0), and came to the conclusion that hydrocarbon synthesis is a requirement. Then, he realized you could apply the same process of taking CO_2 out of the air and hydrogen out of the water then combining it into CH_4 on Earth.

After doing this analysis he found that because solar costs are declining so steeply (https://ckalitin.github.io/projects/2026/04/07/terraform-solar-costs.html), in the limit this will be the cheapest way to make natural gas in the history of humanity. After that, we will conquer the rest of the Primary Energy Layer of Civilization (https://caseyhandmer.wordpress.com/2025/04/08/to-conquer-the-primary-energy-consumption-layer-of-our-entire-civilization/).

Terraform is a quintessential case of optimizing for the state. Casey came to a conclusion with regard to the optimal energy and material flows on Earth in 100 years, and decided to start working on it today.

Tesla

Another example is Tesla. When Elon was in college (https://waitbutwhy.com/2015/05/elon-musk-introduction.html#:~:text=4-,In,4) he realized that in the limit you have to electrify the economy, otherwise CO_2 emissions associated with the current architecture of energy flows of humanity will lead to global warming. Under the current system, in the limit we die. There's disagreement about when this will occur, but the equilibrium of energy on Earth is clearly shifting in the direction of higher temperatures.

From this insight, Elon realized a great first place to start is electrifying transportation, and hence we founded Tesla. This was an optimization for the end state, back when no automotive companies saw electric cars as an opportunity and the most successful electric cars in the world were golf carts.

Bessemer Steel

The reason the US came to lead steel production in the 19th and 20th centuries is because of the Bessemer process. Bessemer was an Englishman who created a process for refining iron by running cold air through a furnace continually to oxidize impurities. Bessemer was not able to scale this process in Britain because British capital was tied up in puddling furnaces for steel production and high phosphorous content of British iron ore.

Instead, Bessemer came to America and Andrew Carnegie financed the continent-scale build out of Bessemer furnaces and revolutionized steel production. Carnegie was eternally against the sunk-cost fallacy and pushed for continual process improvement even more previous furnaces paid themselves off. He saw the end state and continually dismissed short-term concerns in order to push towards the end state.

In the end, Carnegie was one of the men that contributed so much to American industry that we were set on an amazing path to thoroughly win World Wars 1 and 2 through sheer industrial might and lead the world.

Useful Intermediary Steps

I'll end with the point that you can't optimize for the end state if you don't have a path to get from the current state to the end state, as I've described before (https://ckalitin.github.io/technology/2025/04/30/useful-intermediary-steps.html).

Elon founded SpaceX to get a human to Mars. However, in the short-term (the decades after SpaceX's founding), there are zero economic prospects to sending humans to Mars at all. So, he found intermediary markets SpaceX could conquer (https://x.com/CJHandmer/status/2065672327443235228?s=20) before they set their sights on conquering Mars. These are the Falcon 1, Falcon 9, Starlink, and now they're finally in a position where they can build Starship to print infinite money with Starlink, orbital data centers, and spend all resulting profits on Mars.

In contrast, there are other companies where the intermediary steps are not clear. Such companies may be optimizing for the end state but they may not have a path to get to the end state from our current position.

Reflect Orbital is optimizing for an end-state in which satellite manufacturing and launch costs become cheap enough that reflecting sunlight from space onto Solar arrays becomes a valid economic case (on the right side of capitalism, producing profit). However, in the meantime they're likely one to two orders of magnitude from being competitive on cost. This poses severe problems for staying alive long enough to reach the end-state.

Here at Terraform Industries we have a natural intermediary step selling high-quality synthetic methane to users that require a lack of impurities (https://x.com/ianbrooke/status/2051847000082247760?s=20). This is a perfect beach head market before we drive costs down to the point in which we can compete in pipeline grade methane, like you would find coming out of your stove.

At here for ministries we have a natural intermediary step selling high-quality synthesis methane to users that required before we start Competing with lower quality methane like that which you would use in your stove.

End State

To summarize, some of the biggest and most successful businesses and technologies in the world have started from an individual optimizing for the end state of a given field. Through this strategy you can bring the future to the present. However, you must be vigilant and ensure you have a reasonable path to reach the end-state such that you're not burning money for 50 years until you're finally producing value instead of consuming it (ie. on the right side of capitalism).