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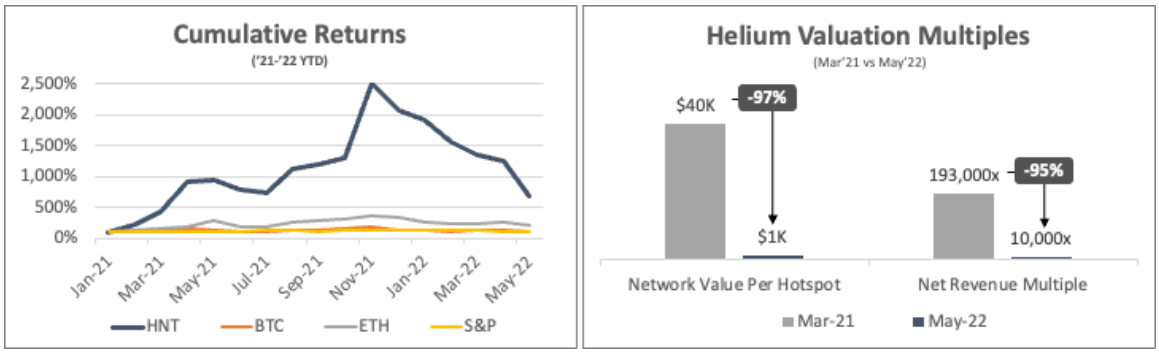
A (Value) Investor’s Take On Helium

“*I went from the favorite, to the most hated. But would you rather be underpaid or overrated?” — Shawn Carter*

Dear Partners,

Since November 2021, the Helium network has lost, on paper, more than 85% of its value. Accounting for growth during the period, Helium’s valuation on a *per-hotspot* and *per-revenue* basis has fallen by more than 95%. Anyone who bought HNT since March 2021 - when the network had only 3% of its current hotspots, 5% of current data transfer demand, and 6% of current approved manufacturers - is underwater. Unfortunately, 19 of 20 of Helium community members joined the ecosystem at a time when the network was valued higher than it is today.



Note: HNT has fallen from an inter-day peak of $55 to a current price of $8 per CoinMarketCap. As of March 2021, Helium had 25K hotspots (820K+ today), 2 manufacturers (33 today), and $5K annualized data transfer net revenue ($100K today).

Mahesh and I have had the good fortune to meet and work with many founders in the Helium ecosystem. For builders, HNT’s price action looks nonsensical: even if you completely disregard hotspot growth, the network is an order of magnitude more robust and scalable following the launch of validator support, light hotspots, proof-of-coverage, and 100+ other engineering releases during this time. How can HNT be worth 85% less than six months ago, when the network is so much stronger?

> *“Price is what you pay; value is what you get.”*
> *— Warren Buffett, 2008 Berkshire Shareholder Letter*

> *“Sometimes, companies get ahead of the stocks; sometimes, stocks get ahead of the companies.”*
> *— James Eisenstein, Co-Founder of American Tower*

Prices reflect the market's embedded expectations, which are sometimes — but certainly not always — reflective of economic *value*. When you combine venture capital economics with public market liquidity, the deltas can be even more extreme. Knowing the price of HNT is trivial: as of May 23rd, Mr. Market is willing to pay $8. But what's HNT *worth*? As value-oriented investors with concentrated exposure to the Helium ecosystem, we spend a lot of time thinking about this question. And as members of the Helium community, we know you deserve our unvarnished perspectives.

Valuation: Setting The Context

(*skip this section if you're already familiar with the economics of the Helium network)*

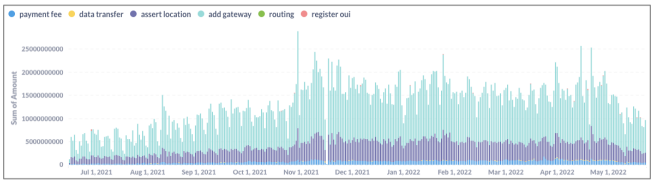
HNT is primarily a utility token; it can be burned to transfer data on the Helium network at a rate of 2.4MB for every $1 of HNT value (e.g., at the current price of $8, each HNT token buys 19.2MB of data transfer). Supply and demand for HNT provisions the right to transfer data on the Helium network.

Supply Overview:

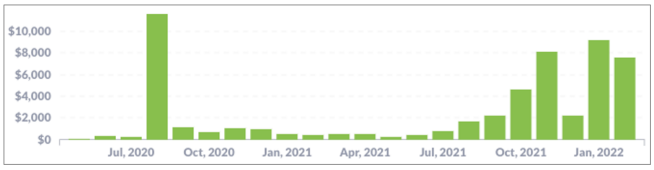
- **There are 120M HNT in circulation today.** Of these, 36M tokens (30%), are staked with a six-month lockup earning 5-6% yield; of the remaining 84M HNT, the average daily trading volume is roughly 2M tokens (~2%).
- **In 2030 there will be, at most, 220M HNT in circulation.** This represents 45% cumulative dilution over the next eight years (7.2% annualized); HNT's fixed supply schedule currently inflates by 2.5M tokens per month, with halvings every 2 years (next halving: August 2023).
- **Helium's capped net emissions incentive model deflates HNT supply as demand grows.** Once Helium reaches annualized net revenues of 600K HNT, every incremental unit of demand for data transfer burns HNT at the current oracle price; tokens burned in this manner reduces the maximum supply (currently 223M).

Demand Overview:

- **Total demand for HNT — which we call *Gross Revenue* — is roughly $100K per day (10B data credits), or $37M annualized, growing ~2x YoY.** However, more than 90% of gross revenue is driven by gateway and location assertion fees, which are one-time fees paid by miners to onboard new hotspots onto the network.



- **Demand for HNT for *the purposes of data transfer* — which we call *Net Revenue* — is roughly $100K annualized ($8K monthly), growing ~20x YoY.** This figure suggests roughly 225K sensors on the network in February 2022, assuming the average sensor generates 1MB of data transfer each year.



- **There is no composability for HNT tokens today.** Helium's blockchain does not support smart contracts, lacks cross-chain bridges, and is sparsely supported by major exchanges. For retail investors, FTX has minimal liquidity and Coinbase does not even list HNT (protip: try Binance). For institutional investors, both Fireblocks and Coinbase Custody lack HNT support (protip: try Copper). Until bridges with sufficient liquidity exist, there will be few use cases for HNT besides staking, sending, and burning tokens on the native chain; this limits ancillary demand for the token, and therefore value accrual.

Today, most investors value Helium on a gross revenue basis. With a ~$1B valuation and $37M of annualized gross revenue, HNT trades at a 27x multiple while growing ~100% YoY. By comparison, publicly-traded tower companies (e.g., American Tower, Crown Castle, SBA) trade at 12-15x revenues while growing 15-25% YoY. Given Helium's growth trajectory, many investors argue that Helium's multiples are not that different from legacy tower companies on a 2023E basis — in other words, they believe that Helium will grow into its "natural" multiple soon.

We think this line of thinking is fundamentally misguided. More than 90% of gross revenues are one-time fees paid by miners to onboard new hotspots onto the network — in other words, "revenue" is actually external capital injections required to build out the network in the first place. The same phenomenon occurred in 19th-century railway mania when, in a time of irrational exuberance for railroad stocks, both sophisticated and unsophisticated investors bought shares of "growing" railroad companies, only to later find out that the majority of revenues were generated the company shipping its own construction materials. In a brilliant lecture in 1892, William Menzies, Chairman of the Scottish American Investment Trust, had the following advice for newly-minted accounting graduates:

> *"We in this country ought to have a dread of new enterprises until there are some results to show, and even when the results are shown it is important that an investigation should be made to see these are honest results. A new [railroad] line often includes in its earnings for the first year or two a heavy freight upon the transportation of material for construction, and that, of course, ceases the moment the railway is made."*

In our view, *net revenue* - which includes HNT burned for data transfer (and, potentially, for transaction fees) - is the right metric on which to base Helium's valuation. At the current $1B valuation and $100K of annualized net revenues, Helium is trading at a 10,000x multiple while growing ~1,900% YoY.

Valuation: Framework & Assumptions

While there are many frameworks for valuing utility tokens, we propose the following thought experiment:

1. The number of devices and volume of data transfer on Helium grows exponentially.
2. HNT continues inflating as planned, reaching (up to) 220M circulating tokens by 2030.
3. Tokenholders have three options: a) hold spot tokens, b) stake to earn validator rewards, or c) provide full-range liquidity to a CFAMM pool.

With a few roll-forwards, we can build a model with parameters for market size, market share, and valuation:

- α : number of internet-connected IoT devices globally (#)
- β : average annual data transfer per IoT device (MB/yr)
- x : LoRa market share as a % of total internet-connected IoT devices (%)

- y : Helium market share as a % of total Lora-connected IoT devices (%)
- V : tokens in CFAMM pool as % of circulating supply
- K : discount rate

The first two categories, addressable market size $(\alpha * \beta)$ and Helium market share $(x * y)$, are straightforward. Valuation, however, requires some explaining. Recall that tokenholders in our thought experiment have exactly three options: hold spot, stake tokens, or provide full-range CFAMM liquidity. The first two paths are appropriate for bullish tokenholders who are unwilling to sell their tokens (and, in the case of stakers, are even willing to forego the option to sell for the next six months). Providing full-range liquidity is appropriate for slightly-less-bullish tokenholders, since, as demand for (and therefore price of) HNT increases, they effectively "sell into the rally" and reduce nominal HNT exposure. As more tokenholders choose this path (higher *V*), the Helium community is, in aggregate, less bullish on HNT. *V* is a function of the velocity of money — framing the experiment as a CFAMM provides a more intuitive relationship of velocity and implied value. The discount rate, *K*, is self-explanatory.

Key Assumptions:

- **Market Size:** our base case assumes there are 12B global IoT devices in 2022, growing at a **20% CAGR** to reach **52B in 2030** (consultant estimates range from 25B to 125B). We assume the average device requires 1.0MB of data transfer per year in 2022, growing at a **10% CAGR** to reach **2.1MB in 2030**.
- **Market Share:** our base case assume that LoRa's market share increases from 2.5% in 2022 to **58% of global IoT devices**, and that Helium's market share within LoRa grows from **1.0% to 73%**, both by 2030. This implies exponential growth for Helium, reaching 22B devices and $2B dollars of data transfer demand in 2030, or roughly 20,000x+ growth from today.
- **Valuation:** for simplicity, we assume that 30% of the network remains staked going forward. We assume the remaining tokens are **split evenly 50:50** between holding spot (more bullish) and providing liquidity (less bullish). We also assume a **discount rate of 40%**, commensurate with risks assumed in early-stage equity investing (Damodaran, page 15).

Under these assumptions, HNT is currently worth $10.

Model Output

Units in '000s

	Aug-2022	Aug-2023	Aug-2024	Aug-2025	Aug-2026	Aug-2027	Aug-2028	Aug-2029	Aug-2030
HNT Supply									
BoP HNT Supply	103,000	133,000	162,042	172,350	178,527	174,395	169,078	159,855	150,963
(+) Validator Rewards	1,800	1,800	900	900	450	450	225	225	113
(+) HST Rewards	9,900	9,800	4,650	4,500	2,175	2,100	1,013	975	469
(+) DC Transfer	7,800	7,350	3,450	3,225	1,500	1,388	638	581	263
(+) Proof of Coverage	10,500	11,250	6,000	6,375	3,375	3,563	1,875	1,969	1,031
(-) HNT Burn Post-BME	0	(958)	(4,692)	(8,822)	(11,633)	(12,817)	(12,972)	(12,643)	(12,136)
EoP HNT Circulating Supply	**133,000**	**162,042**	**172,350**	**178,527**	**174,395**	**169,078**	**159,855**	**150,963**	**140,702**
EoP HNT Max Supply	**223,000**	**222,042**	**217,350**	**208,527**	**196,895**	**184,078**	**171,105**	**158,463**	**146,327**
Helium Network Value (Circulating)	**$1,064,000**	**$1,355,957**	**$1,739,273**	**$2,541,333**	**$3,890,108**	**$6,225,046**	**$9,781,703**	**$15,129,560**	**$22,585,870**
Helium Network Value (Fully-Diluted)	**$1,784,000**	**$1,858,032**	**$2,193,392**	**$2,968,382**	**$4,392,001**	**$6,777,311**	**$10,470,102**	**$15,881,214**	**$23,488,811**
LoRa Data Transfer									
Global IoT Devices	12,000,000	14,400,000	17,280,000	20,736,000	24,883,200	29,859,840	35,831,808	42,998,170	51,597,804
(x) % LoRa Market Share	3%	12%	21%	29%	36%	42%	48%	53%	58%
Global LoRa-Connected IoT Devices	300,000	1,764,000	3,633,120	5,997,370	8,965,479	12,668,702	17,265,378	22,946,426	29,941,920
(x) Helium Market Share of LoRa	1%	16%	28%	39%	48%	56%	63%	68%	73%
LoRa Devices on Helium	3,000	279,594	1,034,440	2,351,066	4,332,243	7,103,743	10,818,866	15,663,888	21,864,619
(x) Avg Annual Data Transfer Per Device (MB)	1.0	1.1	1.2	1.3	1.5	1.6	1.8	1.9	2.1
Helium LoRa Data Transfer (GB)	3	308	1,282	3,129	6,343	11,441	19,166	30,524	46,869
(%) Bytes per Data Credit	24	24	24	24	24	24	24	24	24
Organic Demand for DCs	12,500,000	1,281,472,500	5,215,302,131	13,038,622,080	26,428,489,656	47,669,371,710	79,659,501,534	127,185,362,554	195,286,473,168
(-) DC Demand to hit BME	480,000,000	480,000,000	480,000,000	480,000,000	480,000,000	480,000,000	480,000,000	480,000,000	480,000,000
Net HNT Demand Post-BME (in DC'000)	0	801,472,500	4,735,302,131	12,558,622,080	25,948,489,656	47,189,371,710	79,179,501,534	126,705,362,554	194,806,473,168
Net HNT Demand Post-BME (in $'000)	**$0**	**$8,015**	**$47,353**	**$125,586**	**$259,485**	**$471,894**	**$793,795**	**$1,267,054**	**$1,948,065**
CFAMM Pool									
BoP Circulating Supply	103,000	133,000	162,042	172,350	178,527	174,395	169,078	159,855	150,963
(x) % in CFAMM Pool	32%	32%	32%	32%	32%	33%	34%	36%	38%
BoP HNT in Pool	33,365	43,083	52,491	55,830	57,831	57,831	57,831	57,831	57,831
(-) HNT Burn Post-BME	0	(958)	(4,692)	(8,822)	(11,633)	(12,817)	(12,972)	(12,643)	(12,136)
EoP HNT in Pool	33,365	42,125	47,798	47,007	46,198	45,014	44,858	45,188	45,695
(%) EoP USDC in Pool	266,920	352,500	482,358	669,147	1,030,508	1,657,301	2,744,928	4,528,780	7,335,099
EoP HNT Pool Price	**$8**	**$8**	**$10**	**$14**	**$22**	**$37**	**$61**	**$100**	**$161**

Our model is publicly available here.

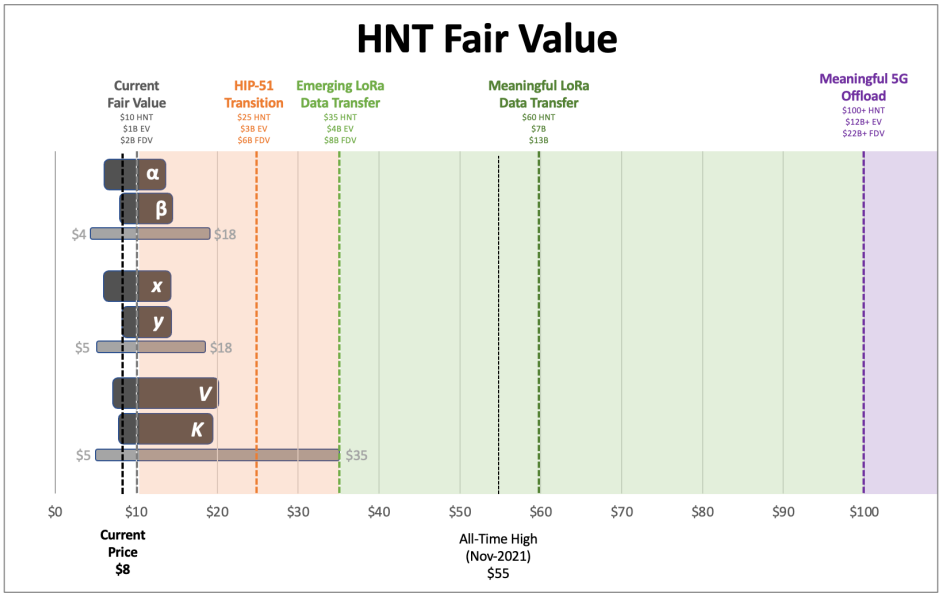
Valuation Sensitivity Analysis

What if we're wrong in our assumptions? Consider the following upside/downside scenarios:

	(In 2030E)	Downside	Base Case	Upside
α	Global IoT Devices	26B (10% CAGR)	52B (20% CAGR)	72B (25% CAGR)
β	Average Annual Data Transfer	1.5MB (5% CAGR)	2.1MB (10% CAGR)	3.1MB (15% CAGR)
x	LoRa Market Share of IoT	35%	58%	73%
y	Helium Market Share of LoRa	57%	73%	90%
V	Token Split (Spot:CFAMM)	25:75	50:50	75:25
K	Discount Rate	45%	40%	30%

Sensitizing our model within these ranges implies:

- At its all-time high of $55, HNT was priced as if Helium had successfully undergone the HIP-51 transition (which is still ongoing six months later) and as if the network was already generating tens of millions dollars of annualized net revenues (when it was actually making less than 1% of that amount). **As disappointing as it is for miners to see rewards fall 85%, the reality is that HNT is priced much closer to fair value now vs six months ago.**
- Velocity and discount rate are the biggest levers for value, with an implied range of $5-35 based on the upside and downside cases; HIP-51 addresses both of these factors by increasing the utility of HNT while also de-risking the addition of future subnetworks. **HIP-51 should be the top focus for the community — we believe implementing the DAO-subDAO structure and token-lock governance increases HNT's fair value by 2-3x.**
- Our downside case implies $4-5 HNT, suggesting that near-term token price could fall at least another 40-50% before it's a "no-brainer" for conservative investors. On the other hand, we recognize that **even in the most bullish of cases for LoRa, >$100 HNT (in present value terms) requires the success of 5G.**



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While tighter liquidity conditions seem to have tempered the market environment for the foreseeable future, every cloud has a silver lining.

First, history tells us that many of the best network investments of the past decade were volatile assets early in their price discovery. Facebook, Carvana, Etsy, Match, and Baidu shed, on average, more than half of their market cap shortly after going public, driven by investor concerns over competition, valuation, growth, lockups, and other FUD. These businesses would go on to compound at 29% for the better part of a decade (10x over nine years) for investors who held through the downturn — and for the rare few with the stones to double down against the market, these businesses presented generational opportunities to blend compounded returns up to 44% (27x over nine years). Finding the right networks early isn't easy; when you do, you don't let go.

	Post-Listing		From Listing		From All Time Low		Misguided Bears
	Max Drawdown	Months	IRR	Years	IRR	Years	
Facebook	-54%	4	19%	10	29%	10	Slower growth slows; lockups
Carvana	-42%	0.2	47%	5	64%	5	Valuation; lockups
Etsy	-58%	10	33%	7	58%	6	Amazon competition
Match	-24%	3	37%	6	45%	6	Valuation; share structure
Baidu	-83%	6	10%	17	23%	16	Google competition; legal risk
Average	**-52%**	**5**	**29%**	**9**	**44%**	**9**	

Second, there's a clear path to building value in the HNT token. The current market price is $8. We think it's actually worth $10. Transitioning to a DAO/subDAO structure and migrating to a new layer 1 can drive value accretion to $25. Growing the LoRa network to an early stage business (eight-figure annualized net revenues) can drive value accretion up to $35. Proving the LoRa network's growth at scale (nine-figure annualized net revenue) can drive value accretion up to $60-80. To see triple digit HNT, we need a successful 5G network with meaningful roaming volume.

> 💡 *Note: these figures are in present value terms, assuming a 40% discount rate. In risk-adjusted 2030 dollars, the same scenarios imply $500 HNT with an at-scale LoRa network and $1K+ HNT with at-scale LoRa and 5G networks. Our analysis does not include value from networks beyond LoRa and 5G.*

Third - and most importantly - **bear markets are for building**. When you're busy climbing towers, writing code, or answering support tickets, it can be easy to forget the sheer magnitude of the Helium community's ambition. Unlike many purported crypto use cases, telecommunications has a clear need for robustness against sovereign-level attacks — protecting freedom is serious business. By 2030, we believe the Helium network will:

- Bring internet access to the 5% of Americans, 40% of Chinese, 50% of Indians, and 80% of Ethiopians who still lack reliable internet access.
- Power autonomous sensor networks that create the first global, censorship-resistant databases for medicine, geology, astronomy, and more.
- Lower global capital costs via sensor networks that improve real-time underwriting for insurance, lending, and payments businesses.
- Power the world's most efficient cities, with devices from traffic lights, to air conditioners, to autonomous vehicles sharing data over the Helium network.
- Help an oppressed people protect their right to sovereign communication from an authoritarian government.

It's day one for The People's Network.

— Sal & Mahesh