

Reflections on DeWi Mining Economics (Nov'22)

Helium's \$MOBILE token - while it has not yet been listed on exchanges - is trading OTC with some level of liquidity around \$0.0005, implying a circulating market cap of \$12M (based on our projections for circulating supply at the end of the genesis period in Q1'23), or \$106M on a fully-diluted basis. With \$HNT currently trading at \$2.50, implying a fully-diluted market cap of \$530M, we struggle to rationalize relative valuations and the general attractiveness of mining \$MOBILE.

Each \$MOBILE token represents a claim on the \$HNT held in the subDAO's treasury. There is a maximum supply of 213M \$HNT, of which 132M are currently circulating and 81M are locked. Of the locked amount, 10M will go to LoRa miners and veHNT stakers (12%), 24M will go to \$HST holders (30%), and 47M will be distributed to subDAO treasuries (58%).

In theory, the fair market price of \$MOBILE/\$HNT should reflect:

- 1) MOBIL's percentage of the 47M subDAO HNT, as governed by HIP-51 utility scores.
- 2) an appropriate discount rate, given HNT earnings will occur in the (uncertain) future.
- 3) future \$MOBILE issuance, which dilutes tokenholders' claim to the treasury.
- 4) a potential speculative premium (or discount) to the underlying treasury assets.

We assume a discount rate of 6%, in line with HNT staking yields, and zero speculative premium. That takes care of #2 and #4. Then, at the current relative prices of the tokens, the market is telegraphing two key beliefs about #1 and #3:

- The market believes the majority (75%+) future subDAO rewards will go to MOBILE.
- The market believes \$MOBILE will be fairly-valued in the near-term ('23-25E supply).

Implied Fair Value of \$MOBIL					
		MOBIL SubDAO Score			
		25%	50%	75%	100%
\$MOBIL Supply	'23E	\$0.0005	\$0.0007	\$0.0010	\$0.0012
	'25E	\$0.0002	\$0.0004	\$0.0005	\$0.0007
	'27E	\$0.0002	\$0.0003	\$0.0004	\$0.0005
	Max	\$0.0002	\$0.0002	\$0.0003	\$0.0004

Is #1 justifiable? If so, the LoRa network (and future subDAOs) will be worth a tiny fraction of MOBIL. Helium's documentation suggests that - at least to start - LoRa will continue to earn the vast majority of rewards (70%+). MOBIL's utility score will ramp up following paid data transfer. The x-axis in the table above represents the blended average MOBILE utility score over *all future HNT rewards*. However, the nature of exponentially declining rewards means that the majority rewards will be distributed by Q1'25.... Driving paid data transfer onto the network *quickly* is the single biggest lever towards driving the intrinsic value of \$MOBILE (relative to \$HNT).

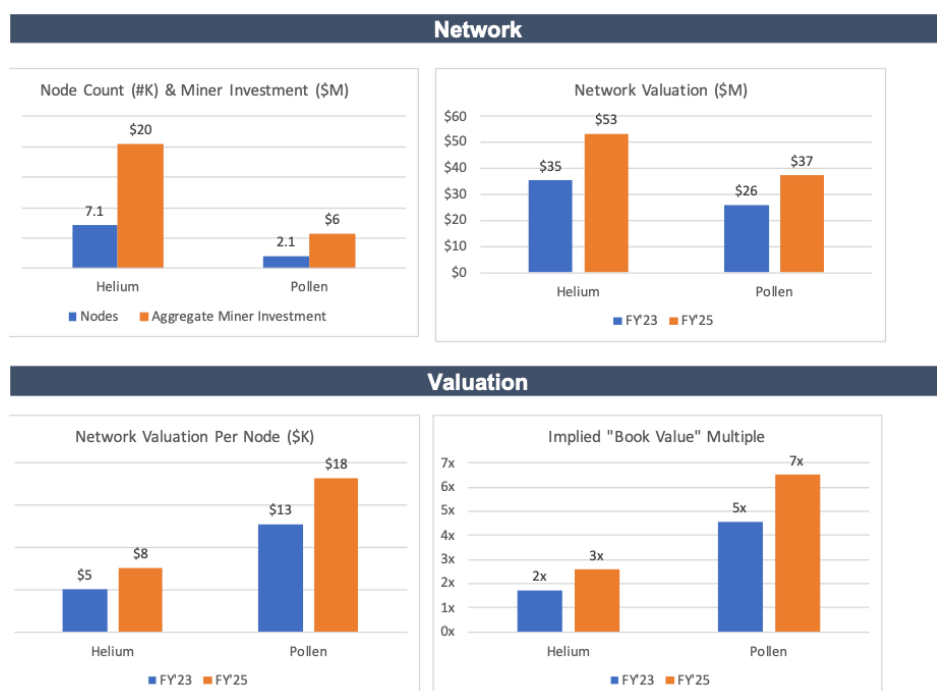
Let's assume the LoRa network stays stagnant from where it is today, with roughly 550K active hotspots and \$75 of daily data transfer demand. Let's assume Helium's MOBILE network grows the number of active nodes by 10x (7K → 70K) and that the average "active user" uses 20GB/mo of total mobile data, of which 25% is offloaded onto Helium at \$0.50/GB. The table below shows the range of veHNT delegates and active mobile users required to achieve a certain utility score under these assumptions. The green boxes - with a utility score >75% - show that MOBILE must win >75% of the veHNT vote *and* acquire >1M active users in order to reach these targets.

		MOBILE Utility Score			
		% of veHNT delegated to MOBILE			
		25%	50%	75%	90%
Active Users	10,000	4%	10%	25%	50%
	100,000	11%	26%	52%	76%
	1,000,000	27%	53%	77%	91%
	10,000,000	54%	78%	91%	97%

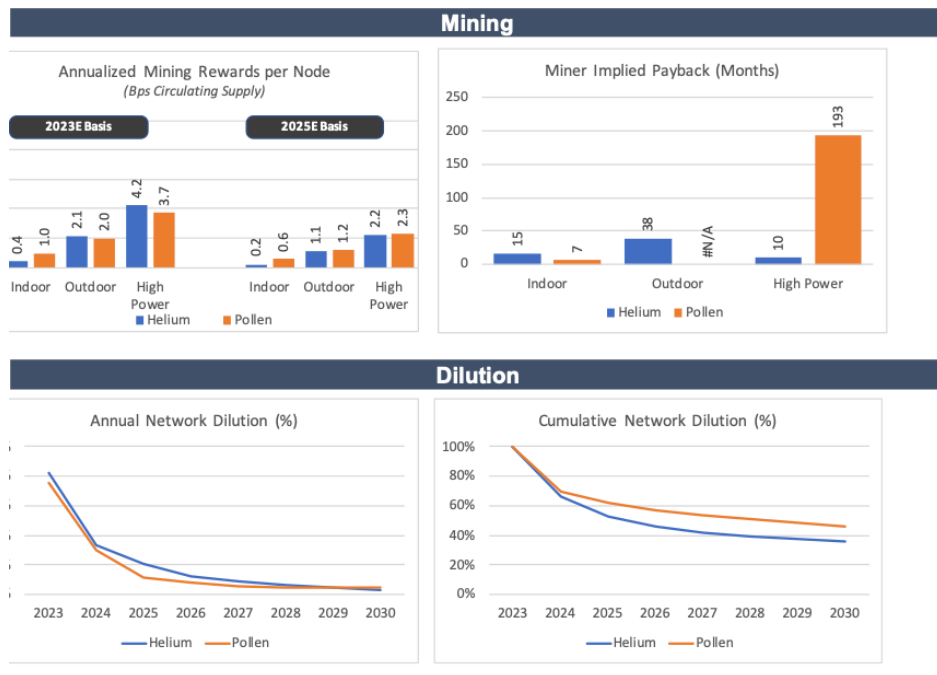
Is #3 justifiable? It's worth noting that the subDAO treasury provides \$HNT/\$MOBILE liquidity based on "all locked \$MOBILE tokens" (HIP-53), which we assume means max supply. In other words, the treasury would only pay out \$0.0003 worth of \$HNT per \$MOBILE, even though the pro-rata share of the treasury is worth more (\$0.0010 in '23E). With no treasury backstop, miners making economic decisions based on '23E or '25E supply are trusting a "greater fool" to do the same in the not-so-distant future.

All that said... crypto markets have - at least so far - mostly been willing to support circulating market caps while ignoring unrealistic FDVs. Clearly, this can be a recipe for disaster - especially in combination with leverage - and it remains to be seen whether the trend will survive in the post-FTX/Alameda era (see: [Chris Burniske](#) and [Jason Choi](#) letters).

DeWi teams have so far been reasonably respectful of fixed supply schedules, so we believe its reasonable to use '23-'25E, supply especially given <1-2 year miner payback expectations. This puts \$MOBILE's current valuation at \$35-\$53M (a median Series A valuation) and \$PCN at \$26-37M (a top-quartile seed valuation). Given zero data transfer of either network, we look at relative valuations on "book value" multiple basis, where book value = cumulative miner hardware investments.



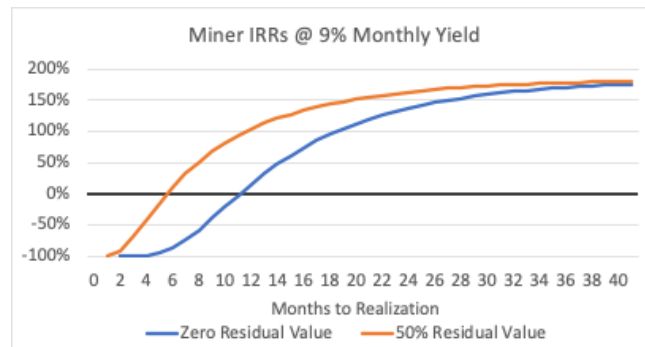
Based on our current best estimates of miner rewards and average costs, and at current market prices, we estimate DeWi miners earn 7+ month paybacks on consumer deployments and 10+ month paybacks on enterprise deployments. It's worth noting these returns are based on proof of coverage eras, which should normalize over time given enterprise radios' higher data transfer capacity (as well as idiosyncratic factors, like Pollen hex limits, temporarily reducing the rewards upside on outdoor / high-powered nodes). The cost assumptions underlying paybacks are supported by feedback from many of the largest active mining fleets, which we believe to be a representative sample of the broader network. Miners with structural cost advantages (e.g., an existing WISP or MVNO businesses) will see shorter paybacks.



Residual Value

For Helium LoRa miners - given the non-existent secondary market for consumer grade LoRa radios - it's common practice to measure returns in terms of "months to a 1x payback", implicitly assuming zero residual value. Cellular radios are a different story. Certain hardware vendors, especially their higher-end models, have real utility for ISPs. Secondary markets for CBRS radios are developing, and as the band sees more widespread usage we believe ISPs (3K across the US) will be natural buyers of last resort for certain (but certainly not all) radio models.

Residual value changes return profiles significantly, and the "time to 1x payback" metric fails to capture the economic reality. For example - the chart below assumes a 9% monthly mining yield. With zero residual value (LoRa method), this equates to a 12-month payback. However, if miners can sell radios for 50% of the original purchase price, the payback period reduces to 6 months. After twelve months, the difference is a 0% vs >100% IRR (naturally, on a long enough time period, returns converge to the same underlying mining yield).



Data Transfer Unit Economics

Another factor I believe is being under-appreciated by the DeWi mining community - perhaps by the biggest margin of all - is long-term data transfer unit economics.

What will be the economic reality when someone eventually transfers 10GB of data over the Helium network?

\$5 worth of HNT is burned, of which \$1.50 goes to HST holders (1), \$0.35 subsidizes LoRa and other networks (2), and the remaining \$3.15 is deposited in the MOBILE subDAO treasury (in HNT).



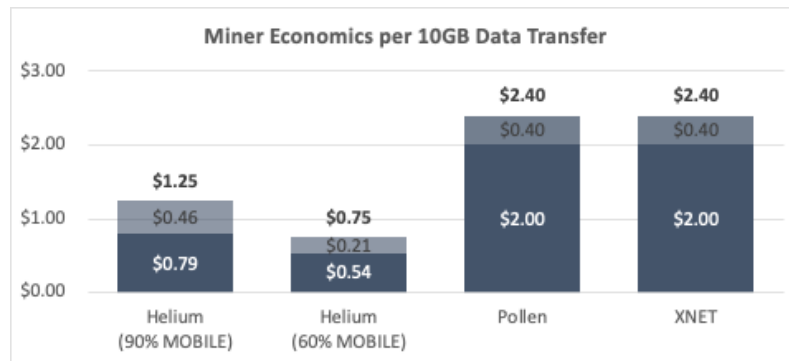
(1) The percentage of HNT rewards earned by HST holders is currently 32%, decreasing down to 15% over time. In total (blended average), HST holders will earn ~30% of all future HNT emissions.

(2) This optimistically (for MOBILE miners) assumes a 90% MOBILE subDAO utility score. Under Helium's current plans, achieving such a score would require millions of users actively roaming on the LTE network and >75% of veHNT delegating to MOBILE.

The subDAO treasury has many mouths to feed. Only 40% of MOBILE emissions reward actual data transfer (31% including pre-mined tokens), implying only \$1.00-\$1.25 of economic value accrual to MOBILE miners per every 10GB of data transfer.

More pessimistic readers may choose to consider the *redeemable* value: recall that HNT in the treasury is not (as far as we understand it) redeemable "at par", but only after accounting for the full remaining dilution in the network. For example, in Aug-2023, we believe roughly 25% of MOBILE's max supply will be unlocked, in which case \$3.15 in the treasury is redeemable for only \$0.79.

If you assume a more realistic near-term MOBILE utility score - say, 60%, which is still highly ambitious (requires 100K+ roaming users and 80%+ veHNT delegates) - then an *incremental* \$1 out of every \$5 of data transfer revenue would be redirected to LoRa rewards. In other words, continuing the case above, \$2.15 would be deposited in the MOBILE subDAO, the economic value to MOBILE miners would be \$0.75, and the redeemable value would be a mere \$0.54.



Note: dark vs light bars represent redeemable value vs intrinsic value for Helium; for Pollen/XNET, represents Ecosystem/Foundation tokens which may be issued to miners.

Pollen Mobile has a different model. Because it does not have to subsidize other subDAOs, 10GB of data transfer over Pollen's network results in \$5 of revenue, of which \$0.50 goes to Pollen Mobile LLC, \$0.50 goes to bumblebees and network growth, and the remaining \$4 is paid directly to the miner that transferred the data. Payments are, of course, in made in PCN — an asset that can dilute up to 40% to Pollen Mobile insiders (really 50%, if you include the Ecosystem Fund). But even after the dilution, PCN miners see \$2.00-\$2.40 of economic value accrual, compared to only \$1.00-1.25 for MOBILE miners. This is the most obvious argument against the network-of-networks approach: there are economic incentives for the most valuable subDAOs to be fully-independent.

XNET makes further improvements to the mode. By supporting full mobile architecture, XNET will be able to price data transfer at \$1/GB (vs \$0.50/GB for Helium and Pollen; which is in-line with telco pricing for roaming vs data-only offload). Each 10GB of data transfer results in \$10 of revenue: \$3 goes to XNETMNO, \$3 is used to support network operations, and \$4 is used to buy and burn tokens — effectively delivering the value back pro-rata to \$XNET holders. Similar to PCN, XNET is an asset that can dilute up to 40% to XNET insiders (really 50%, if you include the Foundation), meaning miners see \$2.00-\$2.40 of economic value accrual after dilution. The difference is that, by charging \$1/GB, XNET is able to offer best-in-class per-GB economics to miners, while generating 2x higher revenues for insiders and reinvesting 4-6x more capital into its network vs Helium and Pollen. We believe the aggressive reinvestment will drive a higher quality and more valuable network in the long-term.

Notes / Assumptions

- In lieu of more specific guidance, we assume the tokens allocated to the Helium and Pollen Foundations vest linearly over a decade. \$MOBILE tokens allocated to Nova Labs assume the same. \$PCN tokens allocated to Pollen Mobile team and investors unlock with a 3-year vest and 1-year cliff.
- During the MOBILE genesis period, miners earn a collective 100M \$MOBILE per day. This means the initial 10B allocation lasts for 100 days, and will run out on or around Nov 20th. The Helium team subsequently extended the genesis period, with no official end date but guidance towards Q1'23. Once genesis ends, MOBILE issuance will increase to 178M/day, of which 60%, or 107M/day, gets paid out to miners (the rest goes to Nova as mobile core admin, oracles, mappers, and stakers).
- Now that Genesis will extend longer than expected, \$MOBILE issuance will be 100M/day vs 178M/day for a period of time, reducing the maximum supply of \$MOBIL. We assume that Genesis lasts through March 31st 2023, which implies a maximum supply of 212B \$MOBIL. In order to keep funding Genesis rewards, Nova Labs donated 2.5B (of its original 15B) \$MOBILE pre-mine allocation, which effectively extends Genesis runway from Nov 20th to December 15th. That leaves another 10.6B \$MOBILE

shortfall to make it until March 31st. We assume this gets founded out of the Helium Foundation's share of tokens (to our knowledge, this hasn't been announced... but is just our conjecture).

- We also believe the accurate max supply for HNT is 213M (vs the typical figure we see thrown around being 223M) given block time delays over the past few years.
- Shoot me a note on telegram @salgala if interested to see the excel backup

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