Course IV:

DeFi Risks and Opportunities

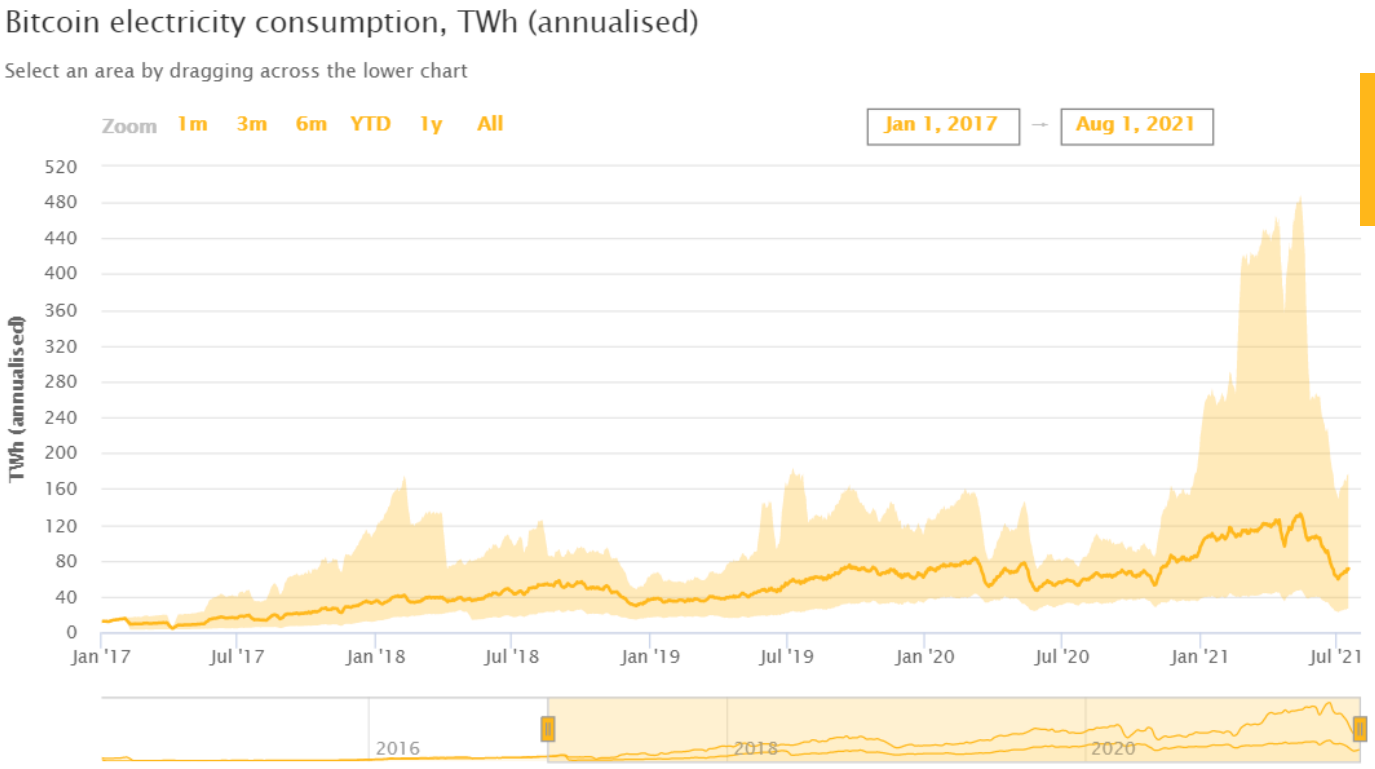
4. Regulatory and Environmental Risk

(iii) Environmental Risk

Risks: Environmental risk

Proof of Work

- ETH and BTC's greatest strength is also its greatest weakness



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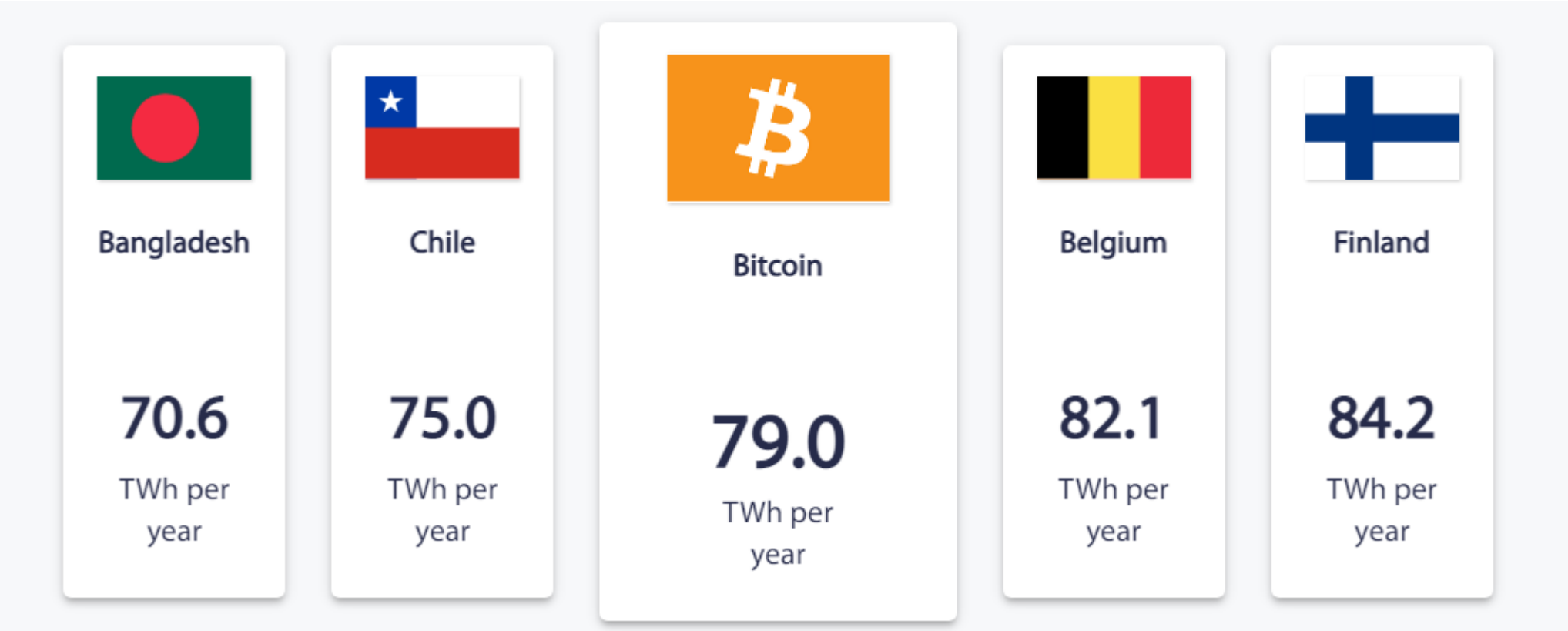
Risks: Environmental risk

Proof of Work



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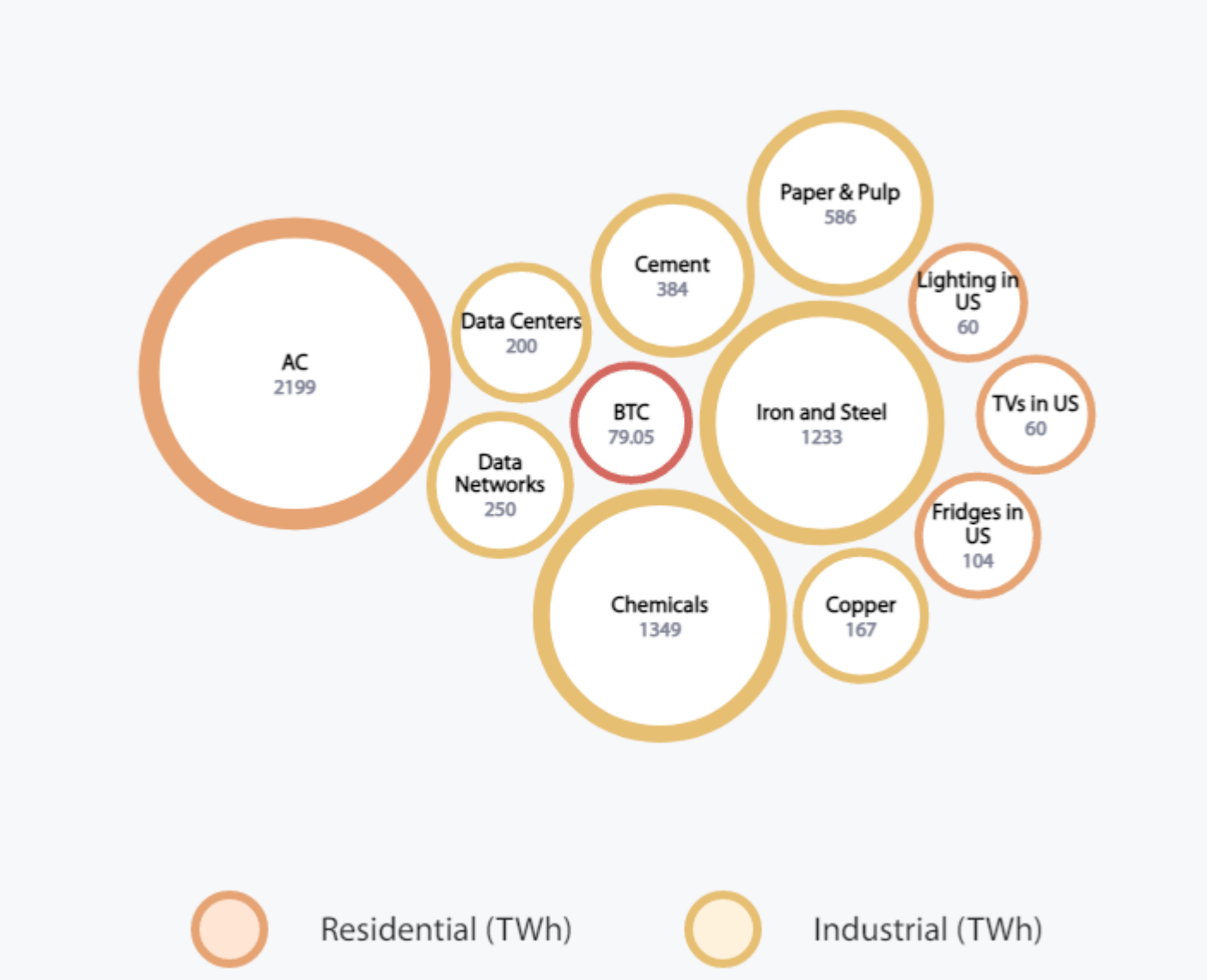
Risks: Environmental risk

Proof of Work



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Risks: Environmental risk

Proof of Work

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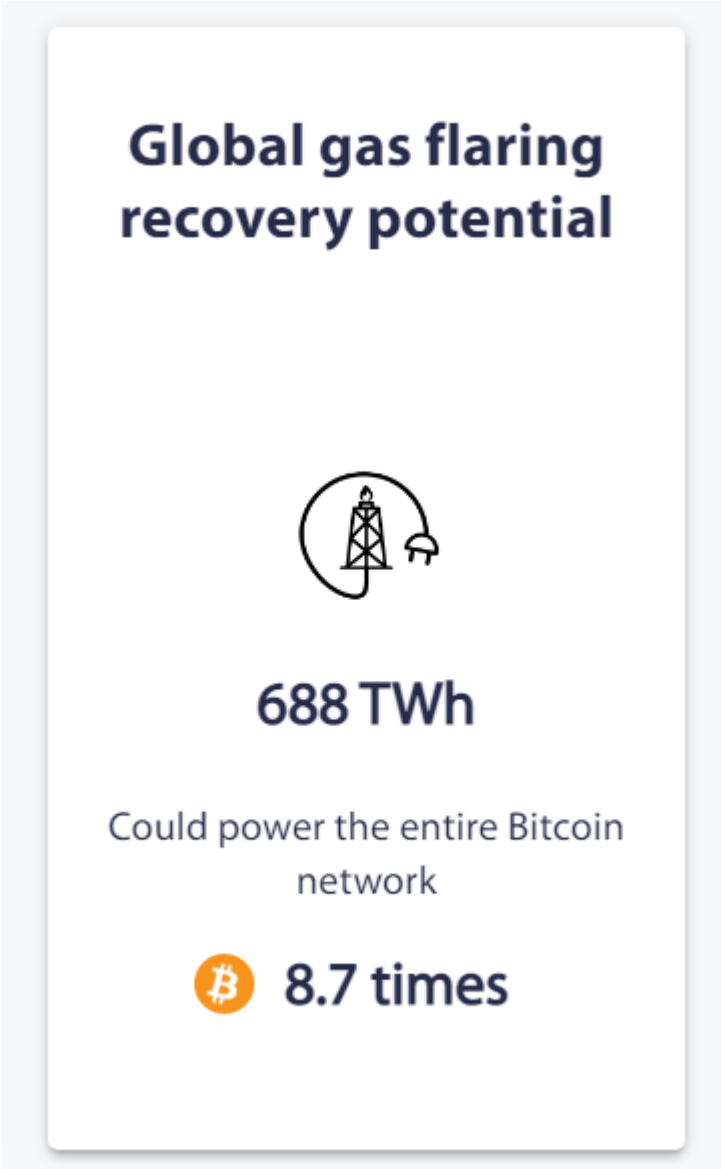

https://cbeci.org/

Risks: Environmental risk

Proof of Work and Proof of Stake

- Unlikely that BTC will shift from PoW to PoS (the miners would not support the move because the value of their equipment would go to zero)
- ETH will transition to PoS. It is a question of “when” not “if”
- Currently BTC using the energy equivalent of the country of Argentina
- What if investors purchased carbon offsets? How would be think about valuing those offsets

Risks: Environmental risk

Proof of Work

- Back of the envelope calculation
- Assumptions: World bitcoin energy production the same mix of fossil fuels as the US

Carbon calculator

Cost per marginal BTC

Cost per transaction

					Notes
U.S. energy production		4,130	Twh		https://www.eia.gov/tools/faqs/faq.php?id=427&t=3
U.S. carbon from energy		1,720	million tons		https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions
U.S. carbon/Twh		0.416	million tons		25% of GHG from electricity https://www.eia.gov/energyexplained/energy-and-the-environment/where-greenhouse-gases-come-from.php
Bitcoin energy use		65.95	Twh		https://cbeci.org/
Carbon use in 2021		27.466	million tons		Assumes same energy mix as US
Number of new bitcoin 2021		328,725			=6.25*6*24*365.25
Carbon per new BTC		83.553	tons		
Cost per ton	$	50.00			Assumption
Marginal cost per BTC	**$**	**4,177.63**			
Number of blocks per year		52,596			=6*24*365.25
Number of blocks per day		144			https://www.statista.com/statistics/730806/daily-number-of-bitcoin-transactions/
Avg number of transactions per day		310,000		= 3.6	transactions per second https://www.blockchain.com/charts/n-transactions
Total number of transactions		113,227,500.00			
Carbon per transaction		0.24	tons		=total carbon output/total transactions
Carbon cost per transaction (on chain	**$**	**12.13**			

Risks: Environmental risk

Issues

- There are two important qualifiers here. First, what if that bitcoin is traded?
- The $4,000 should not apply to every trade. So the trading volume needs to be taken into account.

Risks: Environmental risk

Issues

- Second, what if I choose to buy a bitcoin that was mined in 2012 where the carbon footprint (assuming the same carbon cost) was likely only a few cents.
- There are 18m bitcoin and most of them mined in the period where very little energy was needed.

Risks: Environmental risk

Issues

- So to do this correctly, we need the history of the hashing power and energy use.
- We could then calculate the average carbon cost of a single bitcoin. My guess is that number is about $1-$5 range.

Risks: Environmental risk

Issues

- Next, you would have to divide by the trading volume which would reduce this even further.
- Again, trading volume would have to be estimated. Trading volume is no easy metric given that most of the reported volume is fake in world exchanges.
- One asset manager has calculated $55 per coin as a reasonable carbon offset

Risks: Environmental risk

Why is bitcoin's problem important for DeFi?

- Bitcoin is the leading cryptocurrency in terms of market capitalization
- It does not, at this time, fulfill the vision of Satoshi as a transaction mechanism
- However, it is an important (but risky) store of value
- It is used in many different DeFi protocols as a wrapped token

Risks: Environmental risk

How will this play out?

- National governments will ban mining in areas where electricity is generated with fossil fuels
- Mining will migrate to places with “locked” clean energy like Iceland

https://www.youtube.com/watch?v=f0HC1Udk6-E

Risks: Environmental risk

How will this play out?

- In the future, all energy will be cheap and clean. Indeed, we have plenty of energy from the sun – it is a technology problem
- Hence, bitcoin will survive the short to medium term environmental risk