

## The ten thousand plants perspective



Bob Mumgaard (Commonwealth Fusion Systems): "Imagine 2050. We've got *ten thousand* fusion power plants providing 20% of the world's energy consumption"

My take on this: This is the correct perspective.

- May seem over-ambitious, but
- If aim is <<20% of world energy demand, then what's the point?
- Question is: how fast can this be realised?

At the fastest, with 'infinite market pull'.

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## Private initiatives aim at 'fusion sooner', and are being funded! Bloomberg Law Free Newsletter Sign **Private Equity** Fusion Funding Soars as 'Serious Money' Bets on **Energy of Stars** 10. NUMBER OF PRIVATE FUSION COMPANIES IN EXISTENCE BY YEAR Dec. 2, 2021, 2:00 PM 0 Fusion firms have attracted a record \$2.6 billion this year Startups work to make commercial fusion reactors a reality (Source: Fusion Industry Association) 8 8 9 9 11 11 12 12 Nuclear fusion is starting to attract serious investors, a sign that the long struggle to power the planet with the energy of the stars may be inching closer to reality. Fusion companies in Europe and North America have attracted \$2.6 billion in backing this year, a record that dwarfs the \$302 million raised in all of last year, 11112222344455 BloombergNEE. This year's red by th TU/e Niek Lopes Cardozo – IAEA workshop 11 July 2022 4













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## **Conclusions** Fusion: not yet a demonstrated 'available' technology! To make an impact it needs to work and then grow. Linear growth: transition asks for annual investment of trillions (few% of global GDP) independent of technology limited by lifetime of product (so no, clean energy will not come as fast as the smartphone) Exponential pre-growth: needed to build industrial capacity. no contribution to CO<sub>2</sub>-reduction how to avoid technology lock-in? Fusion is a case study long build time - big jumps between generations - wide valley of death - slow learning mainstream roadmap: risk-averse, 1-dimensional, technology lock-in, no electricity before 2050 private companies: high-risk, parallel development of concepts, innovative, fast learning In the perspective of '10-thousand plants' investing in parallel innovation in early phase is the only sensible way to go. Needs capital now. TU/e 18 Niek Lopes Cardozo – IAEA workshop 11 July 2022