



CSAFE Participant Seminar

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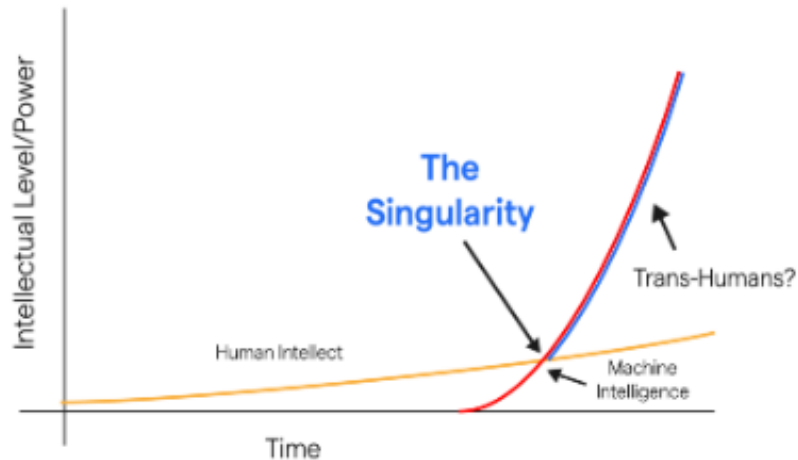


Futurism: Black & White Swans, Artificial Minds & Robots

Computation Goes Exponential Reaching Singularity

Artificial Intelligence (AI) becomes Artificial General Intelligence (AGI)

Technological Singularity

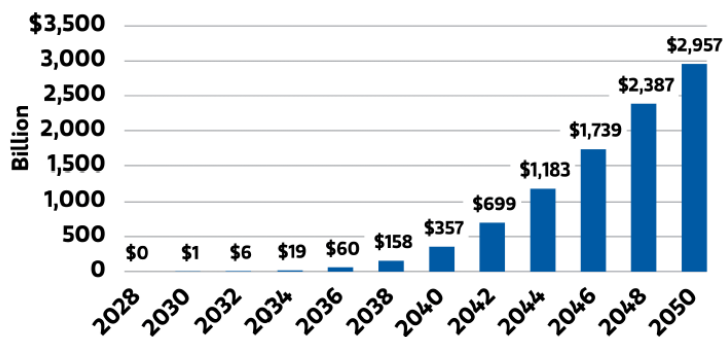


- Data Collection
- Artificial Intelligence (AI)
- Artificial General Intelligence (AGI)
- Machine learning & deep learning
- Autonomous Cars: Robots in vehicular form, data collection for machine learning
- Automotive FSD: leads to generalized perception
- Generalized perception leads to autonomous robotics in humanoid and non-humanoid forms
- Humanoid forms maximize human interaction and actions within human infrastructure
- Non-Humanoid forms are intelligently designed for efficiency within an eco-economical niche
- Cybernetic Links

Autonomous Humanoid Robots: Labor Market Implications

- The potential market for humanoids appears huge.
- As of November 2023, the US labor force comprised about 162 million people. At an average annual salary of \$59,428. The US labor market is worth just shy of \$10 trillion.
- According to data platform Statista, approximately 3.4 billion are employed globally. Given an average \$9,000 per worker annual salary, the global labor market is \$30 trillion.
- In our US model, we forecast a humanoid population of 8 million units by 2040—a \$357 billion wage impact—and 63 million units by 2050—a \$3 trillion wage impact.

Forecast Cumulative US Wage Impact of Humanoid Population



Source: Bureau of Labor Statistics, Morgan Stanley & Co. Research, Morgan Stanley Wealth Management Global Investment Office as of June 26, 2024

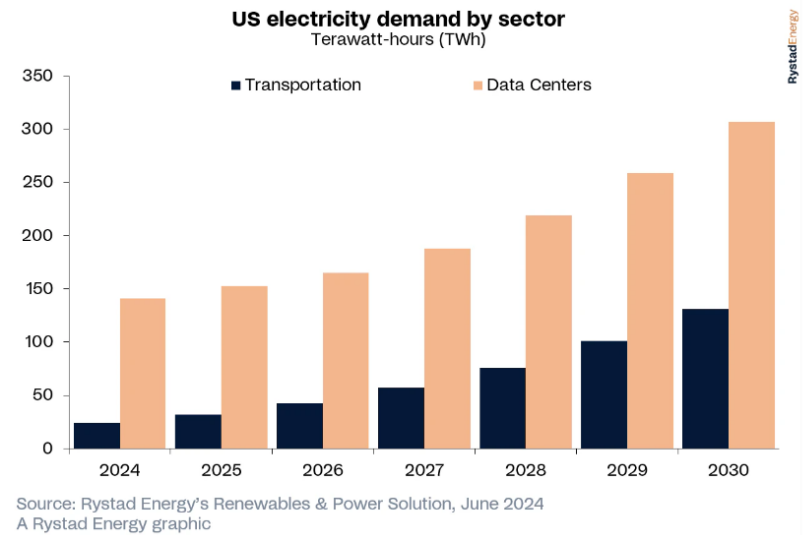
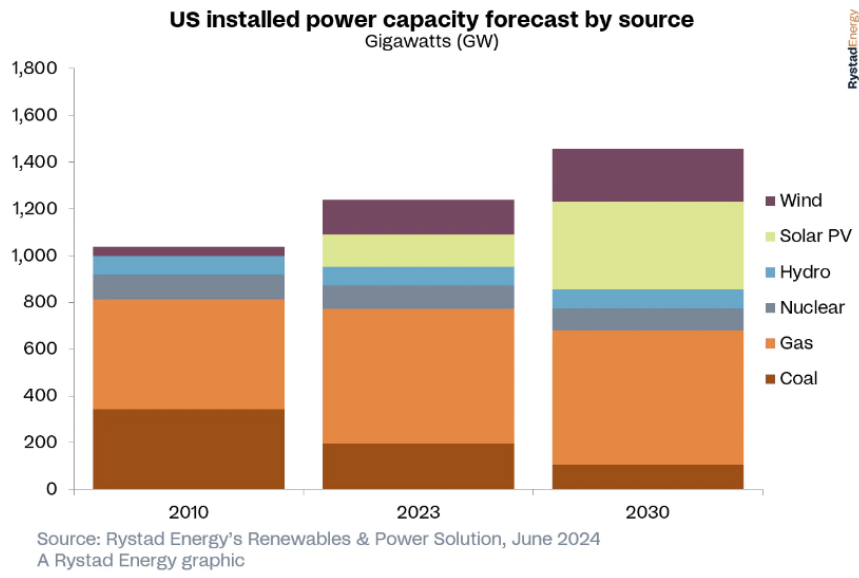
Potential Hurdles to Humanoid Adoption

Hurdles to Humanoid Adoption

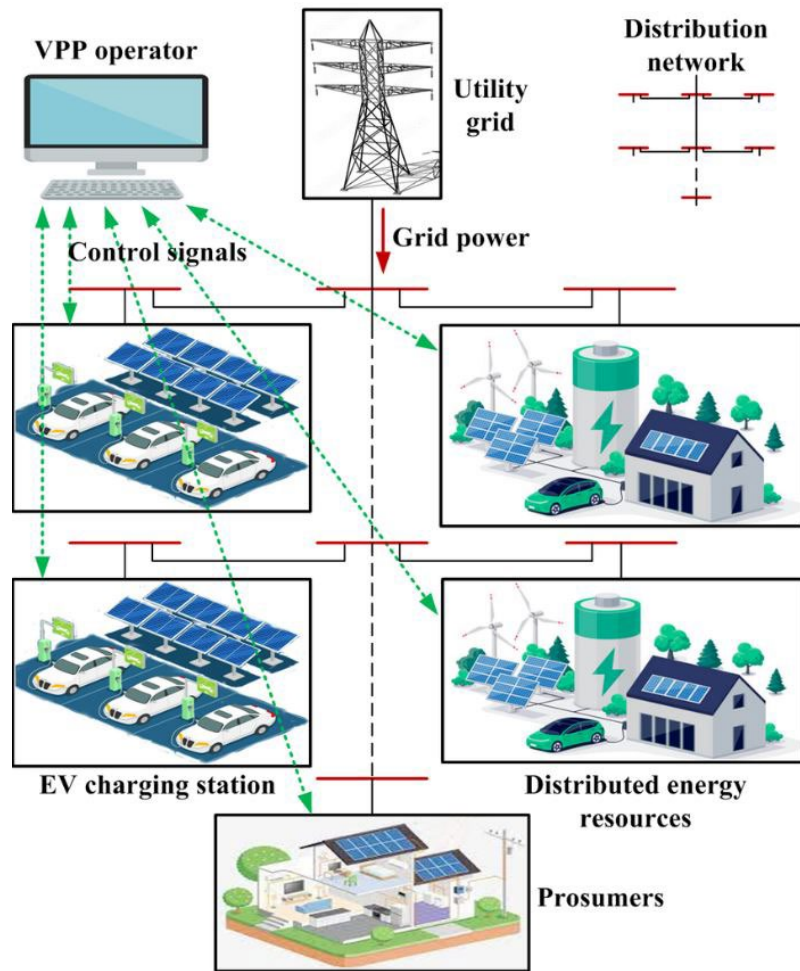
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|------------------|---|
| Mechanics | <ul style="list-style-type: none"> ▪ Precision actuators for delicate manipulation ▪ Sensors capable of processing vast arrays of multimodal inputs ▪ Synthetic materials that prioritize both strength and light weight |
| Uptime | <ul style="list-style-type: none"> ▪ Limiting/predicting/detecting potential wear and tear ▪ Energy-dense batteries able to support the required operational times ▪ Efficient supply chains and repair networks |
| Cost | <ul style="list-style-type: none"> ▪ Component cost ▪ Energy and operational costs |
| AI | <ul style="list-style-type: none"> ▪ Development of Gen-AI models applicable to humanoids ▪ Efficient training both in physical environment and with digital twins ▪ Navigating the nuance of human tasks and environments |
| Social | <ul style="list-style-type: none"> ▪ Satisfying various workplace and household safety regulations ▪ Political/social pushback to the elimination of jobs ▪ Humans learning to operate and work alongside humanoids |

Source: Morgan Stanley & Co. Research, Morgan Stanley Wealth Management Global Investment Office as of June 26, 2024

Electric Power Demand Offsetting Green Demand Side Initiatives



Stored Energy & Distributed Energy Resource Management



Direct-controlled virtual power plant.

Source: www.researchgate.net



Source: [Tesla Announces A New, Utility-Scale Energy Storage Product Called Megapack \(forbes.com\)](https://www.forbes.com)

- Stored Energy – kWh / \$, kWh / kg, kWh / m³
- Distributed Energy Resource Management (DERM)
- Virtual Powerplants (VPP)
- The Rise of Prosumers (Avatars, Robotics, Cyborgs, Fabrication, Neuralinks)
- Techno Optimism versus Cyberpunk Dystopia

Impacts on Communities & Local Government

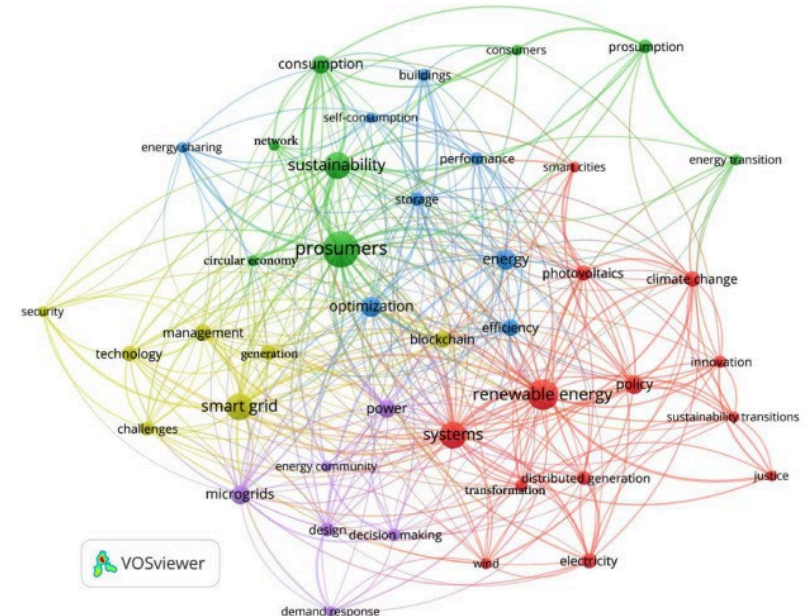
- Homes
- Traffic, Parking & Infrastructure Design
- Public Transit
- Retail
- Taxation
- Labor Markets
- Zoning



Source: affordhomes.com/blog/homes-of-the-future/ (L), hotcore.info/babki/Underground-Parking-Lifts.htm (M), sciedirect.com/science/article/pii/S266618882400008X (B)

Prosumer Homes

- Intergenerational
- Flexible Rooms
- Bedrooms (replaced by “apartments”), Income producing
- Car Lifts
- Fabrication & Robotics
- Food Production
- Energy Production and Storage
- Water Reuse
- Effects on Value of Existing Homes



Source: researchgate.net/publication/248960237_From_consumers_to_prosumers_Housing_for_a_sustainable_future, en.wikipedia.org/wiki/Prosumer, business.comcast.com/community/browse-all/details/5-technology-trends-impacting-state-and-local-governments, laborcenter.berkeley.edu/wp-content/uploads/2023/01/Technology-in-the-public-sector-and-the-future-of-government-work.pdf

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