## Playbook for Investing in the **Energy Transition**

Li-ion ENERGY STORAGE

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## **Agenda & Flow**

Energy Transition Imperative & Inevitability

- (Why & When?)
- Energy Transition Mechanics & Implications
  - (What & How?)
- Energy Transition Opportunity Sizing
  - (How Big?)
- Energy Transition playbook for Investors
  - (How to Benefit?)





## Why Energy Transition?

### **Unintended consequence – Global warming**



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### **Unintended consequence – Global warming**





### The costs are real and rising

As climate change becomes more violent, the costs are rising, particularly from severe storms





### **Unintended consequence**





### Access to energy is fundamental to standard of living





### **Energy Transition drivers**





#### **Energy Security**

Making energy self-sufficient so we don't need to rely on others for our energy needs.



Affordability Reducing the cost of energy for consumers.

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**Cleaner Energy** 

Developing cleaner sources of energy like wind, solar and hydrogen



#### **Reducing Carbon Emissions**

Reducing emissions from greenhouse gases generated by the burning of fossil fuels



#### **Reduce Deforestation**

Reduce the extent of cutting down And clearing forests



#### Economics

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Contrary to what is generally thought– Economics is a compelling driver of Energy Transition



## **How Energy Transition?**

### World's greatest challenge





### **Enablers of Energy Transition**





### We have all the technology we need





A new cluster of technologies can replace the entire fossil fuel system



Energy efficiency is improving all the time thanks to better design, machines, electrification and digitization



The two-core primary renewable energy sources are solar and wind



The key carriers are electricity, batteries and hydrogen



The new prime movers include EV, heat pumps, ammonia powered ships and other non-fossil machinery





The cost of new energy technologies has fallen by 60%–90% in 10 years and counting





## What Energy Transition?

### Which sectors emit the most?



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The energy generation and transportation sectors contribute



## **Energy Transition Inflexion Point?**

### **Tipping point reached**





Source: Self made image



## **Energy Transition Implications?**

### We are past the peak in fossil fuel

- ICE sales are down by 20% since 2017
- Fossil fuel power station capex is down 26% since 2015
- Oil and gas upstream capex is down 41% since 2015
- Demand for fossil fuels in most European countries peaked in 2000–2005
- In the United States and Australia, it peaked in 2005–2010
- In much of Latin America, demand for fossil fuels peaked in 2010–2015
- And in many petrostates, it peaked in 2015–2018
- 60% of the world has already seen peak demand for fossil fuels

### **Renewables are 100x of Fossil Fuels**



- Humanity has unlocked a giant new energy source
- Renewables are, obviously, available everywhere
- Even if you massively constrain deployment, the world has annual renewable flows of over **100 times** fossil fuel supply
- Solar rooftops alone could supply us with all our electricity needs
- The Global South is especially abundant in renewable energy resources

### A changing of the guard





### The Energy Transition is a systematic change



#### Drivers

#### Implications

၀ (ဂ်) Resources	We are moving from opex-driven extracted fuels to capex-driven manufacturing resources by 2050,these resources will provide 40- 60% of global primary energy	Energy-only markets must adapt to the new reality to incentivize necessary investments
Supply	As solar and wind generation capacity grows rapidly, the supply side becomes less controllable Solar and wind power fluctuate with time, while coal plants are being phased out	Supply variability will rise, needing creative market design, demand response, energy storage, and low-carbon power
Transport	Transportation cost of energy over long distance will multiply It is 10x to 30x more costly to transport a unit of energy as H2 than as oil over 1,000 miles of pipeline	Global energy movement will decrease, and regional markets will become more interconnected
Storage	Storing energy gets tougher with the shift to electricity and hydrogen Electricity storage in Europe and the US is limited to under 2 hours, while oil and gas storage can cover over 1,000 hours	Energy storage will become more crucial and more expensive

The Energy "Transition" is a fundamental change in the way we relate to all aspects of energy generation, distribution and consumption



## **Energy Transition Pace & Quantum?**

### **Electrify what is possible**





### **Electrify what is possible**





Source: <u>Greenhouse gas emissions by</u> sector, World, 2018

### **Renewables are gaining pace**



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Clean energy Fossil fuels

Source: iea.org

### **Different Renewables to the fore**





### Solar leading the renewable push



Solar is versatile, scalable and flexible

It took 22 years for the world to install its first terawatt of solar power capacity. The second and third terawatts are now expected to arrive within five years.





## What does Energy Transition entail?

### Transitioning the entire value chain...





...through Renewables, Electrification & Efficiency

### **Pillars of Energy Transition**







## How to benefit from Energy Transition?

### **Opportunity of a lifetime**



### 66

I believe the decarbonizing of the global economy is going to create the greatest investment opportunity of our lifetime. It will also leave behind the companies that don't adapt, regardless of what industry they are in. And just as some companies' risk being left behind, so do cities and countries that don't plan for the future

#### Larry Fink

Chairman and CEO Blackrock



### What will the transition cost?



Average Annual Investment to 2050 (\$trn)	Source	Scenario, Scope or estimation method
3.5	Network for Greening the Financial System	Total investment in 1.5 C scenario
4.1	Boston Consulting Group	Total investment, drawn from range of estimates
4.4	International Renewable Energy Agency	Energy investment
3.5-5.1	BloombergNEF	Range of investment depending on technology path
4.5	International Energy Agency	Energy related investments
9.2	McKinsey	Broad view investments on demand side

Spend on Energy Transition may jump from current \$1 trn pa by 3 – 5x

### Non-linear growth scenario likely in renewables





TLSE - 1.5 Degree Temperature Limiting Scenario Estimate = Bull Case

### Sizing the opportunity



Exhibit 15: Global grid Investment by type in the NZS (2022-50) >60% the grid investments over 2022-50 will be directed to Power Distribution in BNEF Net Zero Scenario



Source: BNEF New Energy Outlook Grids (2023) Note: Data includes China ETS: Economic Transition Scenario, NZS: Net Zero Scenario

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### Sizing the opportunity



Exhibit 8: Comparing key capex streams under various scenario forecasts (US\$bn) Whichever scenario "comes to pass", significant growth in capex is required



Source: BNEF

### US is severely under-invested in the grid



Electric companies are spending between 34-37% of their T&D capex on Adaptation, Hardening, and Resilience 10,000 US Transmission miles added 40% Transmission Distribution 8,000 30% 6,000 20% 4,000 10% 2,000 0% Hardening & resilience Advanced Tech Expansion Replacement other 0 1963 1966 1960

Source: Edison Electric Institute 2022 surveys

Exhibit 54: Investment in electric T&D Infrastructure (%, 2022)

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Exhibit 56: Transmission wires added to US grid by year Less than 15% of total US transmission miles added since 2002



Source: EEI, FERC, and BofA GlobalResearch calculations

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## **Energy Transition Playbook for Investors**



### **Investing = Probabilistic Exercise**

Existence of a large opportunity is a necessary condition but not the only condition to make money.
It needs to be coupled with predictable environment and high entry barriers.

#### Investment framework



#### **Opportunity** Size

- Rich in possibilities
- High earnings growth
- Longevity
- Predictability
- Sustainability



#### Competitiv e

#### Advantage

- Network
- IP
- Regulat
- Brand
- Cost structure
  - Switching cost



#### Scalability & Sustainabilit

#### **y** Reach

- Reach
- Replicability
- Multiplicity of growth drivers
- Market adjacencies
- Technology adoption

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#### Managemen t

#### **Traits**

- Scrupulous
- Competent
- Aligned interes
- Efficient capital allocator



#### Asymmetric Risk-

#### reward

- Future possibilities
- Operating leverage
- S-curve
- Variant perception
- Numbers v/s Narrative

### **Bet on Probabilities not Possibilities**





Bet on probabilities not possibilities Large opportunity is not equal to automatic gains for investors This is about getting the odds in your favor Energy transition will drive growth across the board whether new age or old age Position in the value chain where there is higher predictability of value accrual and retention

### Study on ROICs across sectors support the hypothesis

Study of last 32 years of ROIC across sectors reveal - The dispersion of returns is generally lower for industrial sectors and higher in the technology sector – this is a result of low rate of change coupled with stable competitive dynamics in the former vs the latter.



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### What lends predictability





### Market sizing and positioning



	Area	Historical	2023-50 PSE	Absolute Delta (\$ bn)	Growth Multiplier (x)	Stage of market evolution	Scope of differentiation
Grid and Flexibility	Electric networks and grids	300	462	162	1.5	Mature	Medium
	Storage	9	67	58	7.4	Early	Unknown
Power Generation	Bioenergy	24	52	28	2.2	Mature	Medium
	Solar concentration	1	9	8	9.0	Mature	Low
	Geothermal	6	9	3	1.5	Mature	Medium
	Hydro (ex. Pumped)	40	103	63	2.6	Mature	Low
	Tidal	0	6	6	NA	Early	Unknown
	Solar PV (Utility and roof)	130	160	30	1.2	Mature	Low
	Wind onshore	57	139	82	2.4	Mature	Low
	Wind offshore	95	159	64	1.7	Early	Unknown
Energy Efficiency	Building	237	418	181	1.8	Mature	Medium
	Industry	40	212	172	5.3	Mature	Medium
	Transportation	19	201	182	10.6	Mature	Medium
Electrification	EV charging	8	118	110	14.8	Early	Unknown
	Heat pump	60	29	-31	0.5	Early	Unknown
	Transport	0	82	82	NA	Early	Unknown
Hydrogen	Electrolysis and infrastructure	0	23	23	NA	Early	Unknown
	H2 derivatives	0	2	2	NA	Early	Unknown
Carbon	Capture Carbon capture using CCS and BECCS	0	3	3	NA	Early	Unknown
	Recycling and circular economy	4	4	0	1.0	Early	Unknown

Source: International Renewable Energy Agency (IRENA)

### Focus area #1 – Transmission Grids



Transmission is a key cog in the wheel of electrification and thus a key enabler of energy transition



### Electrification not possible without the grid



- The IEA envisages 25-30% growth in electricity demand by 2030, but to reach Net Zero in 2050, electrification demands rise by >2.5x because we need to increase share of electricity in TFEC from 20% to 50% to decarbonise
- Consumption is changing, with electric vehicles (35% of sales by 2030; IEA), heat pumps (60m by 2030 in the EU; EC) and ultimately hydrogen (180mt demand by 2030; IEA) driving a fundamental shift in what we generate electricity and how we use it
- The bottleneck for much of this ambition for transition in generation and consumption is the grid through which the electricity must pass
- Not only is the installed grid old (>50yrs in parts of Europe and the US), but it needs expanding and upgrading with automation and control systems to enable more efficient operation
- Bloomberg BNEF estimates annual grid spend will rise 2x from US\$274bn in 2022 to US\$424bn pa by 2030 with no incremental regulation
- Spending needs to be even higher to hit Net Zero by 2050

IEA - International Energy Agency

### **Energy transition needs More, Smarter, Efficient grid**





### Few players dominate the market globally





**Global power transformers market share (2021)** Hitachi, Siemens Energy and GE are the largest non-Chinese suppliers



### Few players dominate the market globally





Source: B of A Global Research estimates, company report, Frost & Sullivan B of A Global Research

Global MV switchgear market share (2021)

Hitachi, Siemens Energy and Schneider are the largest MV switchgear suppliers



Source: B of A Global Research estimates, company report, Frost & Sullivan B of A Global Research

### Focus area #2 - Energy Efficiency



Path to achieve doubling of efficiency improvement through a range of key actions across sectors



Path to achieve doubling of efficiency improvement through a range of key actions across sectors

### Focus Area #3 - Shovel sellers > gold miners

#### Prefer equipment suppliers -

- Scope to differentiate is higher than EPC and developers given product has technology + service angle which allows for pricing power and good ROCEs.
- Equipment suppliers are more adaptable Don't carry the balance sheet risk in case of disruption if the asset becomes redundant.
- Business has inherent operating leverage which allows value maximisation in an upcycle

### **Positioning in the Value Chain**





### **Positioning in the Value Chain**





### **Players in the Mfg & Capital Goods Value Chain**



Old Economy Equipment	Companies
Conductors	Apar
Cables	Polycab
Transformers	Hitachi Energy
Turbines	Triveni Turbines
Boilers	Thermax
Generators	TD Power
Process Equipment	Praj
ZLD	Va Tec Wabag

Product offering	Companies
Compressors	Elgi Equipments
Pumps	KSB
Gears	Elecon Engineering
Motors	CG Power
Steel Pipes	Ratnamani

Note- The stocks mentioned above is for illustration purpose only and should be construed as buy/ sell recommendation.

### **Clean Energy Value Chain**





#### Market Size \$ bn (Cum 2023-2050)

37

#### Generation

Mining cos and their ancillaries

#### Transmission

Mining cos and their ancillaries

#### Application

Mining cos and their ancillaries, Recycling

#### Equipment Suppliers



Market Size \$ bn (Cum 2023-2050)

#### 61

**Generation** Waare, Suzlom, Praj, BHEL

#### **Transmission** Apar, Hitachi, Simens, GE, T&D,CG Powder, Genus,

Sterlite, TRIL, Bharat Bijlee

#### Application

Thermax, Praj, Siemens, ABB, Cummins, KSB, Triveni, TD Power, Va Tech, BHEL, Voltamp



**EPC** 

Market Size \$ bn (Cum 2023-2050)

**Generation** Sterling and Wilson, Engineers India

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#### Transmission

KEC, Kalpataru, Sterlite, Power Mech, L&T

#### Application

L&T, Engineers India, KEC, Kalpataru Operators/ Asset Owners



Market Size \$ bn (Cum 2023-2050)

68

**Generation** NTPC, Tata Power, JSW Energy

**Transmission** Power Grid Corporation, Adani Energy

> Application Manufacturers

#### Consumers



Market Size \$ bn (Cum 2023-2050)

NA

Generation NA

Transmission State utilities

Application

State utilities, Private industries, rooftops Financiers

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Market Size \$ bn (Cum 2023-2050) 68

**Generation** Govts, Banks, NBFCs

**Transmission** Govts, Banks, NBFCs

Application Govts, Banks, NBFCs

**EPC - Engineering Procurement and Construction** 

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# Additional opportunity — Equipment's within generation plants



- Typical electrical content would be inverters (for PV solar), switchgear, panel boards, conduit & fittings, and HVDC export cable systems (for offshore wind), solar cables etc
- This spending would not show up in traditional transmission & distribution capex, as these costs come from power generation capex.
- Wind and solar power generation is intermittent. However, the electrical equipment must be sized for peak load. Therefore, the electrical equipment content per MW generated is higher compared to fossil fuel generation.
- In addition, specific equipment to help maintain electrical voltage stability (e.g., static VAR compensators, synchronous condensers, capacitors) are needed.

#### Capital costs for new capacity additions

Electrical content is a sizeable portion of total construction costs for renewable power generation

Onshore wind	\$mn/GW	% of total
Electrical	136	9%
Other	1,365	91%
Total capex	1,501	100%
Offshore wind	\$mn/GW	% of total
Electrical	693	18%
Other	3,178	82%
Total capex	3,871	100%
Solar PV + battery	\$mn/GW	% of total
Electrical	381	19%
Other	1,584	81%
Total capex	1,965	100%

Source: US Department of Energy BofA Global Research

### **Energy Transition is the opportunity of our lifetime**



- Energy Transition is Imperative and Inevitable
- We have crossed the Inflexion point
- Energy Transition is the most important change happening since Industrial Revolution
- Energy Transition is a multi-decadal opportunity
- There are pockets of opportunity where technology has reached maturity, players are few and have the right to win
- Those will remain the protected profit pools and hence generate huge wealth for investors

### **Playbook for Investing in Energy Transition**



- Identify Maximum Delta
- Focus on value accrual and retention
- Focus on predictability i.e Rate of change Low and Entry barriers - High
  - Eg Transmission grids and industrial energy efficiency
- Focus on Shovel sellers over gold miners Differentiated and adaptable

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### Thank You

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