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### WEG

# Deep Dive: Double Upgrading to Overweight

We are bullish on WEG as it is uniquely well positioned to benefit from automation/decarbonization trends and our constructive view on global capex. We have boosted our 9year revenue CAGR to 14% vs. 10% prior based on a new proprietary bottom-up model.



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## Deep Dive: Double Upgrading to Overweight

WHAT'S CHANGED		
WEG	From	То
Rating	Underweight	Overweight
Price Target	R\$26.00	R\$39.00

**Overview:** Following an in-depth review of our WEG investment case, we are double upgrading the stock from Underweight to Overweight based on the following factors: 1) the company's favorable thematic positioning relative to automation, decarb, and electrification – long-term trends that are supportive of a premium valuation for a company that should continue to have the highest revenue/EBITDA growth and return levels among its world class peer set; 2) the constructive views on the global capex scenario of our multi-industry research colleagues, Joshua Pokrzywinski and Ben Uglow (i.e., spending mix shift favors WEG, notwith-standing a potential economic downturn); 3) a major upward revision of our estimated revenue CAGR for the company on a consolidated basis – to 14% for 2021-2030 from ~10% previously – informed by our new bottom-up model in which we mapped out and projected the company's different business segments by looking at total addressable markets; 4) our expectation that WEG's ROIC "normalization" will play out gradually over the next few years and that its return levels will remain at +20%, materially above its pre-pandemic levels. Our new R\$39 price target provides~30% upside with a bull/bear skew of 1.25:1.

STOCK RATING			
Overweight			
INDUSTRY VIEW			
In-Line			
PRICE TARGET			
R\$39.00			

**Resilient global capex picture.** Our multi-industry research colleagues, Joshua Pokrzywinski and Ben Uglow, see a resilient capex scenario globally. Joshua Pokrzywinski believes: 1) there's no excess like there was in the past downturns; on the industrial side, oversupply is typically what kicks off more difficult periods, and we are not seeing that today in most cases; 2) there are new spending vectors on electrification, automation, and decarb that are capacity-agnostic and productivity enhancing, so demand should hold up better; 3) developed

markets, particularly the US should be relative winners based on near-shoring and supply chain investments. He elaborates on those points in the section Global Capex and Thematic Growth Should Support Investment . His views aligns with WEG's message at our recent London LatAm conference, where it highlighted upside from industry demand for upgrading from low efficiency to more potent motors (with today's elevated energy prices), that it has not seen pressure on its overall backlog, and that the only place where it has faced some volatility in terms of intake is Europe, which represents ~15% of total revenues (as of 2021, see here) vs. ~25% for North America. Ben Uglow and team provide theirviews in the section A European Capital Goods Perspective . On the domestic side, WEG highlighted healthy demand for long cycle products with the mining and pulp & paper sectors doing well, and that the 2021 Sanitation Law could gain traction next year.

#### WEG (WEGE3.SA, WEGE3 BZ)

Latin America Transportation & Infrastructure | Brazil

Stock Rating	Ove	rweight				
Industry View		In-Line				
Price target	Price target					
Shr price, close (Sep 2	29, 2022	2)	F	\$\$30.14		
Mkt cap, curr (mm)			R\$	126,507		
52-Week Range			R\$40.6	8-22.63		
Avg daily trading valu	e (mm)		ι	JS\$47.4		
Fiscal Year Ending	12/21	12/22e	12/23e	12/24e		
Sales / Revenue (R\$ mm)**	23,563	29,723	34,737	39,799		
EBITDA (R\$ mm)**	4,679	5,234	6,391	7,322		
Net income (R\$ mm)**	3,586	3,901	4,736	5,469		
EPS (R\$)**	0.85	0.93	1.13	1.30		
P/E**	38.3	32.4	26.7	23.1		
ModelWare EPS (R\$)	0.85	0.93	1.13	1.30		
Div yld (%)	1.2	1.5	1.9	2.2		

Unless otherwise noted, all metrics are based on Morgan Stanley

ModelWare framework \*\* = Based on consensus methodology

e = Morgan Stanley Research estimates

LATIN AMERICA INSIGHT

Our proprietary revenue growth model. What perhaps most differentiates this report and the biggest factor behind our shift in view on the stock is the proprietary growth model we developed for WEG. To build it, we mapped out the company's different segments based on input from management and information the company has disclosed in the past. We then assessed its growth potential in each segment considering potential addressable markets and competitive dynamics, while also incorporating the views of our research colleagues. In this regard, we considered both the perspective of Miguel Rodrigues & team on growth of the solar market detailed in the section Legislation Changes to Front Load MMDG's Investments and the views of Cesar Medina & team on potential growth of IoT detailed in the section 5G Rollout Can Support Further IoT Adoption . There are many details to be considered across the spectrum of WEG's different businesses but the overarching growth model takeaway is that WEG can sustain the near average mid-teens growth rate it delivered in the past, supported by potential share gains mainly abroad on the Industrial Electro-Electronic Equipment (EEI) side, especially in automation, and by rising demand for Energy Generation, Transmission, and Distribution (GTD) products due to the transition to renewable energy. Without considering M&A or new segments/ markets it could enter, our revenue model suggests a 14% top-line CAGR for 2021 to 2030 (vs our prior 10% estimate).

ROIC should adjust down gradually and remain above historical

**levels**. Another pillar of our call is our view that the shift down in the company's return levels would be gradual in the near to medium term. It is well understood that the move up of WEG's ROIC to +30% last year was mainly driven by a combination of low capex levels, high capacity utilization at its plants and the BRL depreciation. This metric came down to 27% in 2Q22. We expect it to decrease further over the next two years but anticipate what could be viewed as a soft landing for returns: specifically, we project a ROIC decline to 24.5% in 2023 and to 24.0% in 2024 (then gradually stabilizing in the longer term at low 20s, above the historical average level of ~17%). Factors easing the pace of ROIC normalization are: 1) capex for 2022 should be lower than the R\$1.5bn the company guided to earlier in the year (helped by a stronger BRL), 2) some easing of commodity prices that should help the company's operating margins, and 3) reduced working capital demands next year.

WEG's favorable track record and its unique business model. Working on this deep dive gave us a greater appreciation of the business model's strengths and management's consistency on execution, another consideration behind the upgrade. Among other factors, WEG is distinguished by its elevated scale in Brazil, a high level of vertical integration in many businesses, a modular approach to capex, a focus on growing organically or through small M&As (which makes it easier to maintain or introduce its culture) and a long term investment horizon (WEG lost money for more than 10 years in China when it first entered, we understand, but it ultimately paid off).

Valuation. We arrived at our new R\$39 PT with a DCF approach and a WACC of 10.2% which we derived using a blended approach in which we considered the company's geographic exposure for determining our cost of equity. Our higher PT was driven largely by the increase in our top-line CAGR and an increase of our terminal growth rate by ~200bps to 8% (nominal). WEG currently trades at 2023 and 2024 P/Es of 27x and 23x, respectively (while our R\$39 PT implies that it can trade at 35x next year's earnings). Today's trading P/E is moderately above its average historical forward P/E of 26x since 2010, but is below the +35x average multiple if one only considers the past five years. One reason WEG could deserve a higher multiple today than it had historically is its exposure to the "mega trends" of demand for higher efficiency motors, renewable energy growth and electric mobility. It is also supported by our expectation that WEG's ROIC levels will remain at +20%, significantly above its average prepandemic levels.

Where could we be wrong? The biggest risk we see is the global economic downturn leading to a greater than anticipated slowdown in WEG's pace of top-line growth, which the market could assume would carry forward, leading to a stock de-rating. WEG could also have greater than anticipated difficultly gaining share abroad in the motor-related automation/gearboxes markets due to elevated competition. Additional risks relate to: i) a potential weakening of demand for solar kits in Brazil; ii) cost pressures in raw materials such as steel and copper hurting its margins; v) negative geopolitical developments and a worsening of the global macro scenario. WEG also has some upside/downside risk related to FX rates as  $\sim$ 25% of its revenues are manufactured in Brazil but sold abroad.

## Our Investment Thesis in 5 Key Points

We double upgrade WEG to OW from UW based on a major step-up in our top-line growth forecasts and a resilient return scenario; R\$39 PT (~30% upside). We summarize our investment thesis in five key points below:

1) Uniquely well positioned to benefit from mega trends and our colleagues' resilient global capex outlook. We believe WEG is uniquely well positioned to benefit from global automation/de-carbonization trends and from our colleagues' constructive view on global capex. Multi-industry analyst Joshua Pokrzywinski believes that a combination of a lower capex starting point as well as broader thematic drivers like supply chain and decarbonization should allow capex spending to remain strong even as the broader cycle is winding down.



Exhibit 2: ... While real PCE (goods) is notably above.



**2) Proprietary bottom-up top-line model gives a mid-teens CAGR by considering existing businesses alone.** Our proprietary revenue model, which entailed a comprehensive mapping of the company's different business segments and an in-depth look at their growth potential indicates a 14% 2021-30 net revenue CAGR without considering either new M&A or eventual entrance into new businesses/markets, sets the basis for our double upgrade. This is supported by still large potential share gains in motor-related automation/gearbox segments on EEI side, and the company's exposure to high growth renewable energy expansion in GTD.

Exhibit 3: MSe WEG's Top-Line Participation by Business Line

Top-Line Participation by Business Line	2022	2030	CAGR 5Y	CAGR 9Y
Industrial Electro-Electronic	46%	46%	15%	14%
Motion Drive	41%	39%	14%	13%
Industrial Motors	28%	24%	12%	11%
Drives and soft-starters	8%	9%	15%	14%
Gearboxes	4%	5%	18%	17%
Powertrain for electric traction	1%	1%	29%	23%
Electrification & Automation	4%	6%	23%	18%
Control, Automation & Electrification	3%	2%	7%	6%
Energy Storage	1%	2%	52%	35%
Recharge Stations for EVs	1%	2%	55%	37%
Digitalization	1%	2%	41%	32%
Generation, Transmission & Distribution	41%	43%	21%	17%
Solar	15%	21%	34%	25%
Wind	9%	7%	14%	11%
Transformers, Reactors & Substations	11%	10%	19%	15%
Generators & Alternators	7%	4%	8%	7%
Hydro	3%	2%	9%	8%
Steam Power	3%	2%	7%	6%
Others	1%	0%	8%	7%
Commercial & Appliance Motors	8%	6%	5%	6%
Varnishes	5%	5%	17%	15%

Source: Company data, Morgan Stanley Research



Exhibit 4: MSe WEG's Top-Line Growth by Business Line

Source: Company data, Morgan Stanley Research

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**3)** We see a resilient ROIC scenario for WEG. WEG's returns were boosted during the pandemic by BRL weakening, high capacity utilization and low capex levels. While we expect a further reduction in ROIC (from the +30% level seen in 2021 and 27% in 2Q22) we believe the downward movement will be gradual and that longer term the company can sustain a +20% level for this metric. On the specific outlook for 2H22 and 2023, pressure on ROIC could be minimized by lower capex for full year 2022 than the R\$1.5bn the company guided to at the start of the year, reduced working capital needs next year (i.e. lower inventories), and an easing of commodity prices (which could boost its margins).



#### 4) WEG has a highly favorable track record with a history of strong growth, disciplined capital allocation and smart strategic decisions,

in our view. One such decision during the pandemic was to operate with higher inventories of both components and finished goods, which allowed it to navigate the challenge of global supply chain constraints and gain share with customers, we understand, distinguishing itself as a more reliable supplier. Its business model is differentiated by its elevated scale in Brazil, a high level of vertical integration in many businesses, a modular approach to capex, a focus on growing organically or through small M&As and a long term investment horizon.

	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22
Consolidated	24%	43%	29%	37%	41%	29%	34%	34%	25%
EEI	21%	35%	31%	32%	22%	19%	28%	26%	26%
GTD	46%	59%	20%	32%	47%	40%	48%	60%	33%

Exhibit 6: Consistently delivering strong revenue growth in the last several years

Source: Company data, Morgan Stanley Research

**5)** Valuation. Although WEG has elevated multiples, we see a long valuation case for it today considering where it has traded historically, its premium quality and its growth profile (its high P/E is diluted quickly over time). WEG trades at 27x 2023e P/E, which is slightly above its average multiple since 2010 but below the +30x average it has traded at over the past five years. This 27x multiple also does not look rich to us relative to the peers when one factors in WEG's projected 15% EBITDA CAGR out to 2026. The average 2023 P/E of WEG's direct peer group is 20x but with an EBITDA CAGR of only 9%. Nidec, a Japanese motor company is the direct peer with the most similar growth profile as WEG. It trades at around the same multiples but has a significantly lower ROIC. The long valuation case for WEG is also supported to some degree by today's multiples level for select clean tech/solar names (see Exhibit 7).

We derive our R\$39 PT using a DCF approach and a 10.2% WACC, factoring in the company's geographic exposure. The boost in our PT at this juncture was driven by an average 25% increase in our top-line over our 9-year forecast period and a ~200bps increase in our terminal growth rate to 8% (nominal). We now project the company to post a 13% EBITDA CAGR in the 21-30 period, with a LT margin of ~18.5% and ROIC of 21.9%.

Company	Mkt Cap (US\$bn)	P/E 12 FWD	P/E 2023e	P/E 2024e	MSe Revenue (21-26 CAGR)	MSe EBITDA (21-26 CAGR)	MSe ROIC 2023
Direct Peers							
WEG	24	30x	27x	23x	17%	15%	25%
Nidec*	35	28x	30x	26x	11%	12%	11%
ABB	49	16x	17x	15x	2%	6%	17%
Siemens	76	12x	16x	11x	5%	9%	12%
Rockwell Automation*	25	20x	23x	20x	9%	10%	15%
Schneider Electric	62	15x	16x	15x	6%	9%	13%
GE*	71	15x	23x	14x	7%	9%	13%
Emerson Electric*	43	13x	14x	13x	7%	9%	12%
Average (ex. WEG)		17x	20x	16x	7%	9%	13%
Clean Tech/Solar Peers							
Shoals Technologies*	3	36x	71x	31x	56%	63%	NM
Solaredge Technologies**	14	30x	45x	27x	32%	33%	17%
SunPower*	4	46x	94x	39x	28%	76%	15%
Altus Power Inc**	2	43x	19x	75x	65%	63%	NM
Array Technologies*	2	22x	54x	18x	38%	NM	24%
Average (ex. WEG)		35x	57x	38x	44%	59%	19%
Total Average (ex. WEG)		25x	34x	25x	22%	26%	16%

#### Exhibit 7: WEG Comp Table

(\*) 21-24 CAGR, (\*\*) 21-25 CAGR. Note: ROIC was calculated using the same methodology for all companies, except Siemens. Source: Bloomberg, Company data, Morgan Stanley Research







Source: Bloomberg, Company data, Morgan Stanley Research





Source: Bloomberg, Company data, Morgan Stanley Research

Exhibit 11: Direct Peers' ROIC 2023e vs. P/E



Source: Bloomberg, Company data, Morgan Stanley Research

## How the report is structured

Our report has the following structure:

**Our Investment Thesis in 5 Key Points**. We summarize the main pillars of our WEG thesis, including valuation and provide some key supporting data.

**Risk Reward - WEG (WEGE3.SA)**. This section includes our summary investment thesis, our bull, bear and base case scenarios, investment drivers, risks and some key operational figures (like the company's geographic exposure).

Global Capex and Thematic Growth Should Support Investment.

In this section, Joshua Pokrzywinski provides his view on the global capex scenario. He makes the case that a combination of a lower capex starting point as well as broader thematic drivers like supply chain and decarbonization should allow capex spending to remain strong even as the broader cycle is winding down.

The Top-Line Growth Story & Revenue Model . One of our chief aims with this report was to assess WEG's longer term pace of topline growth, and evaluate whether it could sustain the average mid teen's rate of expansion it delivered in the past. For that, we built-up a proprietary bottom-up model of WEG's segment portfolio to derive estimates for each of its businesses. In this section we discuss the broad takeaways from the model.

**Discussion of Longer-Term Return Prospects**. In our view, one driver of the stock re-rating in the past five years was the favorable evolution of the company's ROIC which reached +30% last year, well exceeding a historical mid teens average. In this section, we explore the factors behind the move up and the outlook for the company's future return levels.

**The portfolio deep-dive**. For each of WEG's segments, we have individual sections addressing the outlook for each of them, and we break down each based on the sub-segments laid out in the 2021 WEG Day (see below) as well as the individual products within each sub-segment. Inside each product-dedicated section, we discuss our growth and overall contribution assumptions for the next years while also describing the market, products and competitors. Each product-dedicated section contains the following structure i) a summary of highlights in bullets, ii) our growth/contribution assumptions, iii) products description and iv) market description.

**EEI - Industrial Electro-Electronic Equipment**. In this section of the report, we delve deep into WEG's core EEI business looking at each of the segments and the products within the segments.

1. EEI - Industrial Electro-Electronic Equipment

#### a. Motion Drive

- i. Industrial Motors, Drives & Soft Starters and Gearboxes
- ii. Powertrain for Electric Traction
- b. Electrification & Automation
  - i. Control, Automation & Electrification
  - ii. Recharging Stations for Electric Vehicles
  - iii. Energy Storage System
- c. Digitalization

**5 G Rollout Can Support Further IoT Adoption**. Complementing our discussion of EEI and specifically the opportunities related to digitalization, Cesar Medina and team make the case for a good IoT adoption outlook in Brazil supported by rollout of 5G networks due to the new mobile technology's superior speed, latency and efficiency.

**A European Capital Goods Perspective**. Also adding to the EEI discussion, Ben Uglow and team provide perspective on WEG's leading European peers, ABB and Siemens.

**GTD** - **Generation, Transmission & Distribution**. Just as we did with EEI, in this section we provide an in-depth exploration of each of the GTD segments and the products within them.

- 1. GTD Generation, Transmission & Distribution
  - a. Solar
  - b. Wind
  - c. Transformers & Related
  - d. Generators & Alternators

**Legislation Changes to Front Load MMDG's Investments.** Complementing our review of the outlook for WEG's GTD business, Miguel Rodrigues and team comment on regulatory developments related to Micro and Mini Distributed Generation (MMDG) in Brazil and provide their growth outlook for the market. Today more than 90% of MMDG installed capacity corresponds to solar, so how it evolves is key to WEG's growth prospects for its solar business.

**Commercial and Appliance Motors** + **Paints & Varnishes**. We discuss the two remaining broad segments of the company.

Exhibit 12: WEG's Sub-Segments Disclosed at the 2021 WEG Day



Source: Company data, Morgan Stanley Research

### Risk Reward – WEG (WEGE3.SA)

Uniquely Positioned for a Continuation of Strong Growth in the Years Ahead

#### PRICE TARGET R\$39.00

Our price target of R39.0 is based on a full DCF model. We also expect a long-term EBITDA margin of ~18.5%.

Consensus Price Target Distribution	R\$23.00	R\$37.07	R\$52.00
Source: Refinitiv, Morgan Stanley Research		MS PT Mean	<ul> <li>Morgan Stanley Estimates</li> </ul>

#### **RISK REWARD CHART**



R\$46.00

#### **OVERWEIGHT THESIS**

• EEI share gains and renewables exposure enable mid-teens 9 year top-line CAGR. This was the takeaway of our proprietary top-line model in which we mapped out WEG's segments and assessed their growth potential.

Resilient global capex scenario. A low starting point, automation & decarbonization trends means that capex levels should hold up despite a potential macro downturn.

 New LT ROIC level @ 20s. Higher share of revs coming from GTD (larger returns) + WEG's vertical integration are supportive.
 Strategy, track record & capital allocation.
 WEG's differentiated approach to doing business & success with small M&As / new verticals should continue.

#### **Consensus Rating Distribution**



Source: Refinitiv, Morgan Stanley Research

#### **Risk Reward Themes**

Market Share:PositiveRenewable Energy:PositiveTechnology Diffusion:Positive

View descriptions of Risk Rewards Themes here

#### **BULL CASE**

#### 39x 2023e EPS of R\$1.20

Larger share inroads & faster renewable expansion; profitability improvement. In our bull case, we assume WEG delivers a 18% top line CAGR in 2021-30 jointly with higher EBITDA margins. In the longer term, we assume that revenue growth remains strong also due to M&As accretion/ entrance in new businesses and that EBITDA margin sustains levels around 20%.

#### BASE CASE

#### 35x 2023e EPS of R\$1.13

Sustainable strong 14% top-line 9 year

CAGR; ROIC at 20s in the LT. Backed by the energy transition to renewable and by share inroads in the EEI segment, in our base case we we assume WEG grows at 14% revenue CAGR in 2021-30. On the profitability level, we forecast an EBITDA margin of 18.4% for 2023, while ROIC comes down to low 20s.

### BEAR CASE

R\$39.00

17x 2023e EPS of R\$1.06

Difficulty in gaining share & sluggish renewable expansion; lower margins. In our bear case we assume WEG delivers a 10% top-line CAGR in 2021-30 and that the company goes through significant profitability pressure in the next several years. In the longer term, we assume topline growth decelerates to single digits and that EBITDA margin stabilizes at ~16%.

R\$18.00

### Risk Reward – WEG (WEGE3.SA)

#### **KEY EARNINGS INPUTS**

Drivers	2021	2022e	2023e	2024e
Domestic Revenues y-y growth (%)	40.8	40.3	17.5	14.1
External Revenues y-y growth (%)	30.3	14.3	16.2	15.0
EBITDA (R\$, mm)	4,679	5,234	6,391	7,322
EBITDA Margin (%)	19.9	17.6	18.4	18.4
ROIC (%)	25.9	22.8	22.4	23.0

#### INVESTMENT DRIVERS

• Further share inroads mainly in the automation market;

- Energy transition to the renewable landscape;
- Global capex & ability to supply projects;
- Pace of development of the new avenues of growth (EV mobility e.g.);
- Development of new business/M&A.

#### **GLOBAL REVENUE EXPOSURE**

- O-10% APAC, ex Japan, Mainland China and India
   O-10% India
   O-10% Japan
  - 0-10% Oupar
  - 0-10% MEA
  - 0-10% Mainland China
  - 10-20% Europe ex UK
     20-30% North America
  - 40-50% Latin America
  - 40-30% Latin America

Source: Morgan Stanley Research Estimate View explanation of regional hierarchies <u>here</u>

#### MS ALPHA MODELS



Source: Refinitiv, FactSet, Morgan Stanley Research; 1 is the highest favored Quintile and 5 is the least favored Quintile

#### SUSTAINABILITY & ESG



#### **RISKS TO PT/RATING**

#### **RISKS TO UPSIDE**

- Faster & larger share inroads in EEI;
- Stronger renewables expansion;
- M&As & development of new businesses;
- Lower copper & steel prices;
- Weaker BRL;

#### **RISKS TO DOWNSIDE**

- Market share stagnation;
- Disappointment in renewable growth;
- Higher commodity prices (copper & steel);
- Lower utilization in plants;
- Global recession;
- Negative geopolitical developments.

#### **OWNERSHIP POSITIONING**

- Inst. Owners, % Active
- Source: Refinitiv, Morgan Stanley Research

65.3%

#### MS ESTIMATES VS. CONSENSUS

FY Dec 2022e



♦ Mean ♦ Morgan Stanley Estimates Source: Refinitiv, Morgan Stanley Research

## Global Capex and Thematic Growth Should Support Investment

by Josh Pokrzywinski and Brandon McCann

Our views on global capex are geared around 3 key points:

## 1) There are few signs of excess that existed in past downturns. On the industrial side, oversupply typically heralds a slowdown and we don't see that today in most cases.

Looking at the trendline for capex vs. personal consumption expenditures over time, its clear that the COVID disruption has led to a period of below trend capex spend and above trend PCE. That said, more recently those are starting to converge to trendline. We believe the combination of a lower capex starting point as well as broader thematic drivers like supply chain and decarbonization should allow capex spending to remain strong even as the broader cycle is winding down. We see more of the risk levered to consumer spending which has been operating above trendline over the past two years.



**Exhibit 13:** Real PFI is below trend...

**Exhibit 14:** ...While real PCE (goods) is notably above.

Real Personal Consumption Expenditures: Goods (SAAR, Bil.Chn.2012\$)



Source: Haver Analytics, Morgan Stanley Research

Source: Haver Analytics, Morgan Stanley Research

2) There are new spending vectors on electrification, automation, and decarbonization that are capacity-agnostic and productivity enhancing, and should hold up better.

Supply chain, automation and energy transition/efficiency investments are driving a generational moment in capex. We have been calling for a capex supercycle based on decades of underinvestment in the wake of globalization and offshoring to low cost sourcing regions in an effort to drive margin expansion. More recently, tariffs, COVID, and other geopolitical risks have revealed weak points within global supply chains that have notably impacted growth coming out of the COVID recession. We believe this is a generational moment in capex demand spurred by investments in supply chains and energy transition/efficiency. Further, the conflict in Ukraine elevated the discussion around energy security/independence, while China lockdowns earlier in the year further enhance arguments for shortening supply chains. Even if we were to dip into a recession, we are of the view that these investments still need to take place as the problems do not get resolved simply with a moderating demand environment. In other words, the capex investments we envision and believe are necessary are incremental and largely cycle/capacity addition agnostic, despite carrying adverse margin impacts.

#### 1. Capex Super Cycle: Supply Chain & Automation Investments

We see a generational capex cycle over the next several years driven by supply chain investment, forming the basis for 2022 momentum in the EE/MI industry, particularly in capex over production and consumer verticals. Growth rates have accelerated markedly from a slow capex decade but have further momentum over the next several years. We forecast ~7.5% manufacturing capex over the next 3-5 years vs. historical levels closer to 4%.

We see the blossoming capex cycle as a particularly strong automation driver. Historically, US automation markets (using Rockwell as a market proxy) have not significantly outgrown equipment GFI (i.e., capex) even though they do outgrow IP. Following a significant increase in labor costs (evidenced by an upward move on the market bubbles in the above interactive model), we expect additional automation spend to offset the margin headwind. Discussions with consultants and integrators provide us with a framework on payback periods and customer objectives. Using the conservative end of the range on the required spend to normalize margins, we see an additional 2.6% growth in addition to the capex acceleration for automation markets.

Exhibit 15: Contribution (\$B) of Primary Components vs. Finished Goods to Industrial Production



Source: Bureau of Economic Analysis, Morgan Stanley Research

## **Exhibit 16:** Bull / Bear / Base Case Capex Spend With Nearshoring Bonus



## **Exhibit 18:** Labor Cost/Revenue Has Seen a Substantial Increase in 2017-2020 vs. Prior Periods

Labor Cost/Revenue % Increase



Source: Company data, Morgan Stanley Research

#### 2. Electrification

**EV infrastructure, energy transition, grid modernization, storage, and distributed power are converging to drive an Electrification supercycle.** While each of these vectors represent compelling growth and will transform the associated industry, the electrical equipment sector will provide the key enabling infrastructure for all of these opportunities. Electrification is one of the biggest growth opportunities in the industrial economy with a significant installed base that will need to be modernized and expanded over several decades to support societal goals around energy transition. Based on a substantial retrofit opportunity to enable EV infrastructure, onsite power generation and storage, and grid modernization, we see a 20-year runway of ~6% growth in electrical markets. This represents solid outgrowth vs. long-term LSD US Industrial Production growth and is incremental to what has typically been growth in excess of IP before the benefit of a retrofit supercycle. To be clear, we believe this supercycle is separate from and incremental to the Red-Hot Capex Cycle theme that we have written extensively on. Electrification, in our view, is a longer term theme and is incremental to the strong capex cycle. In fact, our analysis suggests growth should actually accelerate from 2025-2030.

## **Exhibit 17:** Historical Manufacturing Equipment Investment Growth vs. Our New Base Case of ~7.5%



Source: Bureau of Economic Analysis, Federal Reserve Economic Data, Morgan Stanley Research

**Exhibit 19:** Automation Growth Should Outgrow Capex Due to the Labor Component



Source: Company data, Morgan Stanley Research



#### **Exhibit 20:** Global Electrical TAM Expansion

**Exhibit 21:** United States Case Study: ~\$50B Incremental TAM from Electrification Over Baseline by 2040



#### 3. Building Modernization/Decarbonization

Large and aging installed base. Given the size and largely dated installed base, we believe this is a significant opportunity supported by large, complex and aging buildings. This is a key example of capacity cycle/capacity agnostic spending that needs to occur to achieve stated governmental GHG emissions reduction goals over the next 10+ years.

**Exhibit 22:** Commercial Building Installed Base By Age (MM Sq. Ft): Significant Aged Building Stock (20+ Years Old) That Has Not Been Upgraded



**Exhibit 23:** Commercial Building Installed Base By Feature Type (MM Sq. Ft): Small Proportion With Internet Connected / Smart Thermostat Solutions



Source: EIA, Morgan Stanley Research. Note: Feature types are non-exclusive, i.e. more than one can apply

**Our work supports \$350B of spending over the next 15 years to modernize the base, an additional \$140B over status quo levels.** Our spending model is driven by a close examination of the installed base, including equipment type, operating costs, building use, and technologies available on the market. We assume that large buildings with conventional commercial HVAC systems, representing about half the market, upgrade to more efficient controls and often replace end-of-life equipment with high efficiency options. Most of the incremental spending is generated by distributed sensors, controls, and continuous monitoring of the energy usage that is then used to adapt equipment settings. We see this as a capital-light, lower cost upgrade compared to history but one that will drive some equipment purchases and higher service intensity to maintain efficiency levels. Numerous incentives in addition to the shorter paybacks (government regulations, stimulus, and unique financing mechanisms) should act as key further catalysts, in our view.



Exhibit 24: Skylines of Savings: 6 Factors Converge at Once to Drive Significant Upgrade Cycle

Source: Morgan Stanley Research

## 3) Developed markets, particularly the US, should be relative winners based on near-shoring and supply chain investments.

We see an increase in US capex supported by supply chain investment, including both near-shored capacity as well as expansion of the current domestic base which has gotten more competitive on lead times and costs. Based on a thorough examination of US imports and domestic production across key industries, we believe normalizing supply chains and lead times will require spending ~\$65B on equipment capex with the majority of the incremental spending taking place over the next 3-5 years, representing ~7.5% growth vs. historical levels of 3-5%. We looked at 18 major industries' aggregate US demand across imports and domestic production and see the need for significant capex spend as companies shorten supply chains back to historical levels. While these support upside to capex on their own, we believe the larger, overlooked opportunity is the share gain of US companies, particularly in components. We see 2x the growth from domestic share gains as US companies that lost out to supply chain globalization reclaim share and increase investment. **Exhibit 25:** US Manufactured Good Consumption Trade Share 2020: North American vs. Asia by Labor Intensity



**Exhibit 26:** Contribution (\$B) of Primary Components vs. Finished Goods to Industrial Production



Source: Bureau of Economic Analysis, Morgan Stanley Research

In addition, we expect fiscal policy should be a bigger incremental opportunity in the US and Europe vs. areas like China given the much lower base. For example, the US the CHIPS Act of 2022 to bolster domestic semiconductor manufacturing. The bill provides ~\$52B+ of total spending to support US leadership in semis going forward - \$39B for manufacturing and \$13B for R&D. While only a portion of this spending gets realized by our companies, it's a significant boost to the ~\$200B of US manufacturing capex base (excludes IT, transportation equipment, and construction machinery). Another example of fiscal support within the US is the Inflation Reduction Act of 2022 which seeks to incentivize the transition toward greener energy with ~\$370B earmarked for Energy Security and Climate Change investments. On the European side, earlier this year Germany announced a ~€200B bill for investments in decarbonization and energy independence through 2026.

## The Top-Line Growth Story & Revenue Model

In this section, we provide a summary of conclusions on a segment-by-segment basis from our proprietary WEG revenue model. Our main takeaway is that our model output of a 14% 21-30 CAGR, without considering new M&As or yet to be announced new growth avenues, supports WEG continuing to grow at its past average mid teens rate with renewable energy and share gains paving the way. New avenues of growth will start contributing going forward, although foundations are already being laid. We go into further detail on the main assumptions later in the report.

Top-Line Participation by Business Line	2022	2030	CAGR 5Y	CAGR 9Y
Industrial Electro-Electronic	46%	46%	15%	14%
Motion Drive	41%	39%	14%	13%
Industrial Motors	28%	24%	12%	11%
Drives and soft-starters	8%	9%	15%	14%
Gearboxes	4%	5%	18%	17%
Powertrain for electric traction	1%	1%	29%	23%
Electrification & Automation	4%	6%	23%	18%
Control, Automation & Electrification	3%	2%	7%	6%
Energy Storage	1%	2%	52%	35%
Recharge Stations for EVs	1%	2%	55%	37%
Digitalization	1%	2%	41%	32%
Generation, Transmission & Distribution	41%	43%	21%	17%
Solar	15%	21%	34%	25%
Wind	9%	7%	14%	11%
Transformers, Reactors & Substations	11%	10%	19%	15%
Generators & Alternators	7%	4%	8%	7%
Hydro	3%	2%	9%	8%
Steam Power	3%	2%	7%	6%
Others	1%	0%	8%	7%
Commercial & Appliance Motors	8%	6%	5%	6%
Varnishes	5%	5%	17%	15%

Exhibit 27: MSe WEG's Top-Line Participation by Business Line

Source: Company data, Morgan Stanley Research

WEG's longer-term top-line growth should be mostly driven by renewables and EEI share gains, but also by mobility electrification and digitalization trends. The first and most notable takeaway from our bottom-up top-line growth analysis is that WEG's longer term growth is sustained, in our view, by two main pillars, being i) energy transition towards renewable sources, driving demand for GTD products (including energy storage longer term), and ii) prospects for share gains abroad on the EEI side, especially in automation. The mobility electrification trends (which should drive strong demand growth for powertrains and charging stations) and the digitalization business should also represent a long-term growth pillar although it could take more time for it to become a relevant contributor to WEG's top-line. On the legacy EEI side, a compelling story of market share gains, especially abroad... Looking at the legacy portion of the EEI business, we think the biggest growth upside relates to potential for market share gains in automation products associated with electric motors, especially abroad. More specifically, as we further explore in the report, we see a compelling story of market share gains in those products outside of Brazil, whereas on the gearboxes side we believe there is room for sizeable gains in both Brazil and abroad. On automation specifically, we note that WEG's market share in external markets currently lags significantly the level of share the company holds on the electric motors side (~8-10% for motors on a global basis compared to low single digit for automation products, we understand).

...while powertrains, charging stations and digitalization should start to become a key source of growth in the next several years. In our view, the most innovative portion of the EEI portfolio is represented by powertrains, charging stations and digitalization (apart from the storage portion of the business, which is more tied to renewable energy supply growth). We expect those products categories to significantly outpace the rest of the EEI business in terms of top-line growth in the next several years (2021-30 top-line CAGR of 23%, 37% and 32% for powertrains, charging stations and digitalization, respectively, compared to the 11% top-line CAGR for electric motors in the same period). As we explore further in the report, this growth profile is mainly due to increased penetration of vehicle electrification that is expected to occur in the next several years (both in Brazil and abroad, with Brazil as an emerging country much likely lagging other more developed geographies) and also IoT equipment adoption in industries supplied by WEG.

In GTD, WEG is poised to benefit from the global energy transition towards renewable sources... WEG's GTD portfolio is directly exposed to the global energy transition towards renewable sources, and that happens on all product fronts. On the wind side, the company offers a complete solution for wind energy plants including its turbine models (the one being sold currently with potency of 4.2MW, and also its recently announced 7.0MW expected to be produced by 2025) and a complete installation solution (while it purchases the wind blades and towers from third parties). On the solar side, the company also provides more complete installation services for centralized solar generation plants although it's mainly focused on distributed generation, the company produces the inverters while it purchases the solar panels themselves from third parties (mainly importing from China). ...with that benefit extending not only to the specific solar/wind portfolio but also to transformers. Although the transformers product is basically applicable to all categories of energy generation plants, that product line is also poised to benefit from expansion of renewables in a major way – as every single energy transmission system, no matter what source, needs transformers to regulate voltage levels across the network (a crucial process for energy transmission).

**Commercial motors & appliances and paints & varnishes are less relevant sources of growth, in our view.** Commercial motors & appliances, in a simplified manner, comprise electric motors for lower scale applications (explored later in the report), thus being a segment that tends to have a growth profile closer to overall economic activity, we believe. In the case of paints and varnishes, as it is applicable to several product lines from other WEG segments, we assume it's top-line contribution to be stable as a percentage of overall revenues as it's a complementary product.

Putting it all together. Boiling down our bottom-up assessments from our model, we expect WEG's 2021-30 top-line to expand at a 14% CAGR driven by GTD and EEI rates of 17% and 14%, respectively. For GTD, we expect a gradual increase on its consolidated top-line contribution, growing from 36% in 2021 to 43% in 2030, whereas EEI remains roughly stable at 46%. Beneath GTD, Solar and Transformers are the products leading the segment's growth by having an expected 2021-30 CAGR of 25% and 15%. On the EEI segment, although the stronger pace of growth may come from the emerging segments, electric motors and its related automation have the lion's share of the segment's top-line (an estimated ~90%), their expected CAGRs of ~10-15% may continue to anchor EEI's revenues evolution going forward. Finally, with all of the above, our proprietary growth model output of a 14% 21-30 CAGR gives support to the company maintaining its growth rate at the mid teens historical level by anchoring the top-line evolution on its existing products' expected performance throughout the decade.

## Discussion of Longer-Term Return Prospects

In our view, the stock re-rating of WEG vs. 5 years ago and earlier is explained in part by its favorable ROIC evolution. The company went from a reported ROIC of ~14% in 2016 to a consolidated ~30% in 2021 due to non-recurring factors explored below. We understand some normalization is warranted, but expect it to remain around 25% level in 2022-24 and then settle in the low twenties in the longer term, considering the increasing weight of GTD in the mix and rising scale.

The non-recurring factors driving returns upward. We believe WEG's favorable ROIC trajectory has been due in part to the company's disciplined approach to capital allocation, profitability improvements in Brazil and abroad (with the gradual "replication" of WEG's business model in international markets) and favorable product mix shift. That said, certain factors since the start of the pandemic have benefitted Weg that have or will phase out to differing degrees going forward. These factors include: 1) temporary labor cost curtailments that the company was allowed to implement on the back of the temporary production suspensions in some plants, 2) the major BRL devaluation that benefitted directly the portion of the business that is produced in Brazil and exported (which was 24% of the company's top-line as of 2021), 3) investments/ capacity expansions carried at stronger BRL levels that benefitted from major inflationary pressure on product prices due in part to a weakening of Brazil's currency; and 4) that the company operated at very high utilization levels during the pandemic and deferred some investments (evident from the historic capex to revenue levels seen in Exhibit 28). That such factors contributed to the company's upward return trajectory is clearly evident form how much ROIC increased in 2020 and 2021 (as highlighted in Exhibit 29).





**GTD's increasing share of revenues should limit margin expansion but not returns, we understand.** Looking ahead and considering how we expect WEG's revenue mix to evolve, we think we're unlikely to see major EBITDA margin gains in the years ahead with GTD's gradual increase in participation in the overall top-line mix. On the GTD margin profile specifically, although we understand that transformers on average should have margin levels closer to the industrial business (in the high teens), solar and wind have lower EBITDA margin levels, likely in the range of high single digit to low teens. As a consequence, some constraints on margin expansion could come from that shift in top-line profile factoring in that our GTD top-line CAGR of 17% in the 2021-30 period exceeds our 14% expected CAGR for EEI and 14% for WEG's overall business in the same period. That said, our understanding is that the amount of investment put in place by WEG in order to break into the solar and wind businesses was very low. As an example, in the wind business, the company took advantage of its existing infra from its motors and generators plants to build-up its turbine projects, we understand. Therefore, although the greater representativeness of the wind and solar business to WEG's consolidated top-line could constrain margin expansion, in terms of return it could mean a contribution to a higher level of ROIC going forward.



Exhibit 30: Historical Revenue Mix by Type

Exhibit 31: WEG's Cost Breakdown

Exhibit 33: BRL/USD vs. Gross Margin



As highlighted in the exhibit above around 60-70% of WEG's costs have corresponded to raw material historically, of which the metals steel, copper and aluminium are most relevant, accounting for roughly half of the total, we understand. WEG does not provide an exact breakdown of its materials costs but the most relevant ones are steel followed by copper, while aluminium's share of the total raw costs is significantly below the other two.

6.0

5.0

4.0

3.0

201

1Q17

2Q18

4Q18

FX

Source: Bloomberg, Company data, Morgan Stanley Research

2Q19



Source: Company data, Morgan Stanley Research

Avenues of growth such as powertrain, recharging stations and ESSs likely to have margins/returns close to WEG's "legacy" activities. As mentioned before, we expect those products to post high CAGRs in the coming years, likely outpacing the legacy operations'. However, as they still make only a small contribution to the company's overall top-line, our estimates imply it could take more years for them to become major contributors to the consolidated revenues. In terms of margins and returns, we believe those products have similar metrics compared to the legacy products as they have related natures. For example, the powertrains sold to big OEMs are basically electric motors coupled with frequency inverters, products which are already historically assembled by the company. Recharging stations, in turn, are products similar in nature to WEG's automation portfolio as they embed several components from this realm. The digitalization products, on the other hand, could have better prospects for margins and returns as, apart from electronic devices, they

also comprise software related solutions. Nevertheless, as with the other new growth avenues, this product still contributes little to the company's consolidated top-line, and we believe it will be small for some time despite its strong expected growth.

4Q19

2Q20

4Q20

Gross Margin

2021

We understand a further ROIC normalization going forward is likely to happen... Factors as a higher capex level to support the continuity of growth and WEG's international expansion leading to an increasing weight of external revenue for the company, add to a ROIC normalization, as we don't believe the company will be able to gain the same return levels abroad as has for its domestic operation. Supporting this, along with scale we understand that within Brazil, WEG has a high level of vertical integration, which is unlikely to be replicable abroad in full. For example in its home market, WEG has forests to produce its own packaging boxes for some of its plants. Consequently, we do anticipate some level of narrowing in the gap

34%

31%

28%

25%

2022

<sup>‡021</sup>

between WEG's ROIC and that of its peers ABB and Siemens, for example. For a fairer comparison between WEG's and its peers ROIC, we used a calculated ROIC using the same methodology for all companies, Exhibit 34 shows the high levels of WEG's ROIC when comparing to its peers mainly because of the factors previously mentioned and although we expect this difference to be narrower going forward, we still expect WEG to stay at higher levels.

...while we expect WEG's ROIC to remain at low twenties, above the mid-teens historical level. We forecast ROIC to decrease to 25.7% this year from 30% in 2021 and then to ~24% in 2023/24 after which we have it going down gradually to the low twenties over the remainder of the decade. Compared to the period prior to 2018 when WEG had a mid-teens ROIC level, we believe the company has changed in some ways in which a higher ROIC level should be feasible as the i) GTD return profile, ii) current scale and further gains in Brazil, iii) a high degree of vertical integration, iv) a disciplined approach to capital allocation and v) consolidating a strong position in markets abroad (further enhancing its efficiency) and replicating its modular approach to capacity expansions (limiting the potential for low utilization levels).



**Exhibit 34:** ROIC Evolution for WEG and Peer Companies

Note: ROIC was calculated using the same methodology for all companies. Source: Company data, Morgan Stanley Research

## EEI - Industrial Electro-Electronic Equipment

Founded in 1961, WEG began as a manufacturer of electric motors. Today electric motors are included in its EEI segment, which comprises a much wider array of products, including automation, digitalization, powertrains, EV solutions and ESSs. As of 2Q22, the EEI segment represented 48% of the consolidated revenues, where 32% came from the domestic market and 68% from the external market, with no further breakdown of this segment provided in the company's results releases. However, in its 2021 Investor Day presentation, WEG provided a more detailed breakdown of each segment. For EEI, the major sub-segments are **Motion Drive, Electrification & Automation** and **Digitalization**. The company also listed main products under each sub-segment. That information and what we gleaned from recent discussions with management were our starting points for doing a bottom-up assessment of EEI's overall prospects looking at the relevance and growth potential of the individual products.



Exhibit 35: Industrial Electro-Electronic Equipment (EEI) Dashboard

Source: Company data, Morgan Stanley Research

The foundation for long-term growth is already being laid with electric mobility, storage systems and digitalization products... In recent years WEG has been laying the foundation to participate in some important global long-term growth avenues, including electric vehicles (EVs), energy storage systems and the so called 4.0 industry. To be a little more specific, it has been establishing agreements with heavy and light vehicle OEMs to supply electric powertrains and EV recharging stations, and, on the digitalization side, it has created a dedicated area inside the company, and it has implemented a strategy to offer a full 4.0 industry solution with M&A (see Exhibit 58 ). The ESSs, in turn, will benefit from the energy transition towards renewable sources. We understand that EV, storage and digitalization related products have rapid growth potential (potentially organic CAGRs of ~20-35% throughout the decade), and could become a large source of revenues for WEG in the future, but today they are still at very early stages of development and it will likely be a number of years before they move the needle. In fact, we estimate that together they currently account for ~5% of the EEI revenues (<2% of consolidated), and could represent ~15% by 2030.

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...but motors are still WEG's "cash-cow" in the segment and will remain so for some time, we believe. We estimate electric motors account for +60% of EEI top-line currently, and in turn ~30% of WEG's consolidated revenues. Motors is a mature business and its growth potential is tied to the growth of the sectors to which it is exposed, the major ones being Oil & Gas, Mining, Cement and Sanitation. WEG is the dominant manufacturer of motors in Brazil, where it has a huge scale and a business model with high vertical integration, while it has been gaining substantial share abroad over the years. Looking forward, in the domestic environment we see it benefiting from its scale and participating in large opportunities as the Brazilian Sanitation landscape, which had its Law approved in July 2021, could potentially bring some R\$500-R\$700bn of investments over ~20 years. Abroad, we see the company making share inroad with its strategy of diversification and participating in a broad array of projects such as desalination plants in Chile and Saudi Arabia, irrigation projects in India and refineries across the globe. Also, the company could benefit from a relatively resilient capex scenario looking globally in the next few years despite a potential slowdown as argued by our colleague Joshua P. in the section Global Capex and Thematic Growth Should Support Investment . Considering the above, we see WEG's motors product growth likely coming in at the top end of the 5-10% expansion range anticipated for the global industrial motors market that WEG highlights in its institutional presentation (which we understand is based on the views of independent consultants). Consequently, we expect that this core product could still represent ~50% of its EEI revenue and ~25% of the company's total top-line at the end of this decade.

At the same time, WEG's major near to medium-term high growth opportunity lies with market share gains in automation and gear**boxes.** We understand that Motion Drive - which is basically made up of the categories of electric motors, automation, gearboxes and the electric powertrains - is by far the largest sub-segment under EEI accounting for roughly ~90% of its revenues. In the near to mediumterm, we understand the biggest high-growth opportunity within this sub-segment comes from potential market share gains in the automation and gearboxes markets. In the case of automation, the major share gain opportunity is abroad, while with gearboxes there is still major room for share gains both in Brazil and externally, we understand. Looking at automation, WEG has increased its share of the local market in the past decade and today this category represents approximately half of the EEI revenues it generates in Brazil, while we understand automation doesn't represent more than ~20% of its external EEI revenues. Of note, the global automation market is larger than the global motors market, we understand. On the gearboxes side, both in Brazil and abroad, WEG has a low share of a market which is dominated by the German player SEW. To catch-up in gearboxes, WEG has done some acquisitions (i.e., Cestari and Geremia) and has embraced a strategy of being a one-stop shop for customers. We estimate automation and gearboxes can grow at 14% and 17% 9Y CAGR, representing ~35% of total EEI revenues in 2030 (~14% of consolidated revenues in the same year).

### **Motion Drive**

Motion Drive includes the electric motors, motor automation products (drives  $\mathcal{F}$  soft-starters mainly), gearboxes and electric power-train.

## Industrial Motors, Drives & Soft Starters and Gearboxes

#### i. Key Points

- WEG's electric motors is a well established business, whose growth is mainly linked to activity in the O&G, Mining and Sanitation sectors but also to other diversified and large capex plans sectors (e.g. desalinization and irrigation plants globally, Brazilian sanitation);
- WEG's biggest motion drive near to medium-term growth opportunity lies with making share gains in the automation and gearbox markets;
- WEG is a domestic leader of drives & soft-starters, while it has a small position abroad; with gearboxes it has room to make major share inroads both within Brazil and in external market.
- We see automation and gearboxes growing at a 14% and 17% CAGR throughout 2021-30;

#### ii. Growth, Mix and Share Assumptions

**Motors.** We assume WEG's consolidated motor sales will grow toward the top-end of the 5-10% range expected for the global industrial motors market given i) the company's leading presence both locally and abroad (the scale of which enables it to take part in large capex deployments sectors as the Brazilian sanitation, for instance), ii) WEG's strategy of diversifying its sector exposition (participating in projects of desalinization for example, apart from the traditional O&G and Mining) and iii) taking into consideration our colleague Joshua P.'s constructive view on capex detailed in the section Global Capex and Thematic Growth Should Support Investment .

**Drives & Soft-Starters.** In the **domestic market**, we assume that automation growth follows the same evolution as what we have for the overall electric motors market. To project WEG's growth we then consider significant share gains based on an expected closing of the

gap between WEG's current automation share (which we understand is roughly 50%) and its share of motors (~80%). This is supported, we believe, by the company's scale advantages, the ability to leverage its customer base, its high degree of vertical integration in the business and its growth track record in the domestic portion of its EEI business. In Exhibit 36 we show WEG's consistent domestic EEI net revenue expansion in dollars compared to its peers performance in the Americas' (ex-US). Furthermore, we believe the largest drivers of this growth was automation, considering that WEG's domestic motor market share has likely remained stable and considering the feedback from WEG's management. Looking forward we project that WEG can reach an ~80% participation in the automation market by ~2030, and that from that point forward its share would be stable with the overall automation market growing in line with industrial motors. Consequently we reach a 14% CAGR for WEG's drives and & soft-starters revenues in 2021-30.

Looking abroad, WEG has a reasonably mature position in terms of electric motors with a 8-10% global market share. However, its foreign share is well below that in automation – at ~2% we understand - creating an opportunity to close the gap. The recent EEI external revenues prints could suggest that it has been making some share inroads against key rivals (such as Siemens and ABB) in automation, though we recognize each company division does not have a full overlap with WEG's EEI products and geographies. One could attribute some of the performance difference to WEG's peers possibly having faced greater difficulties with global supply chain constraints due to their lower degree of vertical integration compared to the Brazilian company, in our view (see Exhibit 37). With reduced levels of logistics normalization visibility caused by the pandemic, the Brazilian company has benefitted from its approach of operating with greater inventories and its strategy of being more vertically integrated (thereby reducing supply issues). This means that, once the supply situation normalizes, WEG may not be able to sustain the same pace of share gains. That said, we still believe it should be able to continue closing the gap given its track record, the strength of its products and its ability to expand its footprint by offering an integrated solution. Specifically we have it going from the 2% share mentioned above to low double digits in 10 years, driving a strong 14% revenue CAGR in 2021-30 for drives & soft-starters outside Brazil.

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<b>LAIIIDIL 30.</b> WEG VS. LEEIS LEITUITIAIICE III AITIEIICAS EX US

	2Q22 y-y	1Q22 y-y	21 vs. 20	20 vs. 19
Peers - Americas (excl. US)				
Siemens	13%	15%	82%	-40%
Siemens Energy	41%	48%	14%	na
Gas & Power	na	na	9%	-15%
ABB	7%	15%	19%	-13%
Motion	-9%	-10%	8%	na
Electrification	18%	24%	24%	na
Process Automation	-5%	16%	20%	na
WEG				
EEI Domestic	40%	17%	21%	10%
EEI Consolidated	36%	32%	19%	-2%

Note: Siemens and S. Energy FY is from Oct-Sep, thus figures are adjusted to match peers FY of Jan-Dec. Siemens Energy includes Siemens Gamesa results. Siemens does not provide segment data broken down by region. ABB had a different disclosure in 2019. WEG Domestic is Brazil only. Source: Company data, Morgan Stanley Research

**Exhibit 37:** WEG vs. Peers Quarterly Performance Globally (y-y revenue growth in US\$)



**Gearboxes.** As with automation, the company is aiming to increase its share both in the local and external markets, helped in part by recent M&A (see section "iv. Overview of Market Landscape" below). We believe WEG's gearboxes share could be around 10-20% in Brazil and low single digits abroad. With the assumption that WEG's gearboxes share could converge in the longer term with what it has for motors globally, we project a 17% revenue CAGR for the consolidated gearboxes business in 2021-30.

#### iii. Product Description

Together with electric motors, today WEG sells drives & soft-starters (automation equipment focused on electric motors) and gearboxes, thereby providing a complete motor solution. As of 10 years ago and earlier, most of WEG's business came from just selling motors such that customers would depend on other suppliers for the other related equipment. However, in the past ~10 years WEG has moved to become a one-stop shop for motor related products. Below we provide a brief description of the products.

 Motors. According to market consultants, ~30% of global electric energy consumption corresponds to use of electric motors. The equipment is used across different industries but the sectors that demand the most motors today are Oil & Gas, Mining, Cement and Sanitation, we understand. At its 2019 Investor Day, WEG disclosed that within the global low and high voltage electric motors market, which amounted to US\$17bn in 2016-18 (based on IHS estimates), those three sectors accounted for around 40% of demand. Looking at the

#### Exhibit 38: 2016-18 Global Motor Market Breakdown by Industry



Source: IHS, Company data, Morgan Stanley Research

breakdown of the U\$17bn figure, the breakdown between low and high voltage motors is roughly 70%/30%, with pumps and ventilators representing the lion's share of motors' category.

- Drives & Soft-Starters (main automation products). Drives
   & Soft-Starters are examples of motor automation equipment. They include frequency inverters, an electronic device which controls the motor rotation speed by adjusting the amount of electric current sent to it. Soft-starters, in turn, are devices designed to protect motor operation: it prevents sudden jumps or stoppages on rotation making movements softer. Jointly, drives & soft-starters represent the bulk of motor related automation products.
- **Gearboxes.** These are components attached to electric motors which, through a set of gears, mechanically adjust rotation speed which guarantees more efficiency and energy savings (an example of application is in conveyor belts).





Source: IHS, Company data, Morgan Stanley Research

#### iv. Overview of market landscape

As suggested above, motors, automation equipment and gearboxes are often sold as a package solution and WEG has leveraged its strength in the motors market to expand into the automation and gearboxes market. On the **motors** side, WEG is the market leader domestically with +80% share while it's also a top player abroad accounting for ~8-10% of global electric motor sales (taking into account both low and high voltage). In both geographies (Brazil and abroad), WEG faces competition from peers including ABB, Siemens, Nidec and Regal (the first two being the global leaders). On the **automation** side, WEG is the market leader in Brazil with a share of roughly half the market while abroad it significantly lags its peers ABB, Siemens, GE and Schneider in terms of share, we understand. WEG's effort to expand into the **gearboxes** market and to take share from the dominant global player, the German company SEW, is relatively new looking at both the domestic and international market. The company debuted in gearboxes in 2011 with the acquisition of Brazilian player Cestari, which at that time was one of the market leaders in the domestic market, and then in 2019 it acquired another domestic player, Geremia. In 2011 WEG acquired Austrian player Watt Drive, getting into the same segment abroad. With M&A and organic growth, WEG today has a gearbox share of ~10-20% in Brazil but a much lower one externally, we understand.





Source: WEG Institutional Website, Company data, Morgan Stanley Research

### **Powertrain for Electric Traction**

#### i. Key Points

- We assume WEG's powertrain revenue growth evolves inline with heavy electric vehicles (EVs) in Brazil, increasing at a 23% CAGR in 2021-30;
- The heavy EV market in Brazil is still in the early stages of development, propelled in part by large companies' ESG-related goals of reducing emissions tied to fuel consumption;
- WEG is a leading player in Brazil, having agreements in place with OEMs to supply electric powertrains; new entrants will likely not appear for some time due to what should be a small market in the next several years;
- Diesel is the power source for heavy vehicles in the country, while biofuel consumption could expand together with the electrification of the heavy vehicle fleet;
- There is an electrification trend not only of trucks and buses, but also of light commercial vehicles, forklifts, some water vehicles (which WEG has been positioning to supply as well).

#### ii. Growth, Mix and Share Assumptions

The heavy electric vehicles market in Brazil is still in early stages of development with electric fleet being still incipient compared to overall fleet. A study conducted by BCG and Anfavea estimates heavy EV in the country will likely represent between 1-3% of total fleet by 2030 and 2-6% in 2035, depending on the pace of penetration of the necessary technology and infrastructure (see Exhibit 41). At this early stage, we view the market growing on the back of agreements being closed between large companies such as Ambev and Pão de Açúcar and the heavy EV OEMs such as VWCO (see Exhibit 42) with end market heavy vehicle customers aiming to reduce emissions and fulfill ESG goals. This trend is going on not only with trucks and buses, but also with commercial use vehicles, forklifts, among others. WEG has been actively establishing agreements with OEMs like VWCO and Marcopolo to supply electric powertrains for the electric fleets as shown in Exhibit 44. Currently, WEG is one of the main players in the local market (as further explored in section "iv. Overview of market landscape" below), but as the heavy EV market is still in a nascent phase we view this segment as not being very relevant to the company's top-line prospects in the next several years even if we take into account the BCG scenario in which fleet increases at a faster pace. With the assumption that WEG grows in-line with the BCG and Anfavea faster increase case and giving a benefit from a possible international expansion of the business, we have it growing this segment at a CAGR of 23% in the 2021-30 period, reaching a participation of ~1% in the company's total net revenues in 2030.



Exhibit 41: Battery Electric Heavy Vehicles as a % of Total Fleet

Exhibit 42: Company Partnerships for Electric Vehicle Supply

	Company	Date	Description
Ī	WEG/Pandon	Oct/2010	WEG wil supply inverters and electric motors for the e-Sys
	WEG/ Kanuon	000/2019	system that equips Randon Implementos semi-trailers.
	VM/CO/Amboy	Oct/2020	VWCO first delivery of 100 electric trucks for Ambev. Part of a
	VVCO/Ambev	000/2020	1,600 electric vehicles acquisition project.
	Pão do Acúcar	Jul/2021	E-commerce deliveries using electric vehicles and 80 electric
	Fao de Açucai	Jul/ 2021	trucks.
	Americanas S.A.	Jul/2021	80 new electric cars for deliveries.
		Jul/2021	Coca-Cola Femsa acquires 20 e-delivey electric trucks from
	vvco/coca-cola	Jul/ 2021	VWCO
	BYD/São Paulo	Mar/2022	BYD delivers 12 "VLP"s electric buses to the city São José dos
	Government	11/2022	Campos, São Paulo, Brazil

Source: Local newswire, Company data, Morgan Stanley Research

Source: BCG, Anfavea, Morgan Stanley Research

#### iii. Products Description

WEG's powertrain product generally includes an electric motor and a frequency inverter. Depending on the project, WEG also provides auxiliary equipment such as compressors, hydraulic pumps, and A/C components. However, in most of its projects with its main partnerships, WEG has provided the electric motor + the frequency inverter that has varying parameters depending on the vehicle (see Exhibit 43). To give an example, for industrial light vehicles such as forklifts, WEG could implement ~24-72 Volts (cc) frequency inverters. For commercial vehicles, the company could use ~130-400 Volts (cc) frequency inverters while for heavy vehicles, WEG's main focus, it implements ~650Volts (cc) frequency inverters. Within this last segment, WEG also established a partnership with Randon back in 2019 to provide the electric powertrain (motor + inverter) to Randon's e-Sys (the company's electrified trailer product).

Exhibit 43: WEG Powertrain solution by vehicle category



**Light Vehicles** 



Solutions for light vehicles such as golf carts, industrial tow trucks, forklifts, etc.





Dedicated to cargo and public transportation vehicles such as delivery trucks and microbuses.





Dedicated to heavy electric vehicles such as buses and large trucks.

Source: WEG Institutional Website, Company data, Morgan Stanley Research

#### iv. Overview of market landscape

In the electric light vehicles market, although batteries are the component with the highest cost, motors are a strategic part of the vehicle. In this sense, although there are electric motors focused players such as the Japanese company Nidec, OEMs like Tesla prefer to design and build their own powertrain, we understand. In contrast, the heavy vehicles market has a different dynamic. As costs per vehicle are greater, some heavy vehicle OEMs are likely to refrain from manufacturing their own powertrains. Indeed we understand that today WEG's key global competitors in supplying the heavy vehicles electric motors or whole powertrain solutions are players like Nidec, though one can't rule out the possibility of the emergence of new entrants with similar know-how. That said, given Brazil's electric heavy vehicles market is still incipient and should take some years to reach a critical mass (as discussed in the above section), we view the global peers as unlikely to focus on the Brazilian market near to medium term. Consequently, WEG is currently the main domestic manufacturer and is likely to remain so for the foreseeable future.

#### Exhibit 44: Powertrain Timeline

Company	Date	Description
Usina de Itaipú	Sep/2009	Partnership with entrepreneurs in the business incubator center of Itaipú to develop the new brazilian electric vehicle, the "Triciclo Pompéo". The vehicle will be equipped with WEG's Powetrain as well as WEG's inversors and Lithium-ion batteries.
Busscar/Tutto/ Eletra/Ibrava	Nov/2009	WEG supplied the Powertrain system to electric buses in São Paulo, Brazil. Busscar, Tutto, Eletra and Ibrava are the main manufacturers of these vehicles.
Eletra Industrial	Dec/2014	Partnership with Eletra Industrial (Brazilian manufacturer) to supply the Powertrain for Brazil's first national electric bus (HibridoBR).
Metra/Local Government	Jun/2015	WEG supplied the Powertrain to the first bus fleet powered by hydrogen for urban transportation in Brazil. Metra (urban transportation company) received 3 vehicles from São Paulo State Government as part of a project financed by the Global Environmental Facility (GEF), from UN, and FINEP (Brazilian Inovation Agency), from the Energy Ministry.
MAN Latin America (VWCO)	Oct/2017	Partnership agreement with MAN Latin America for the construction of the first 100% electrically-driven light truck developed in Brazil, the e- Delivery, equipped with WEG's Powertrain system.
VWCO	Sep/2018	Partnership with Volkswagen Trucks and Buses (VWCO) for the development of the first hybrid Volksbus e-Flex designed in Brazil. The design is equipped with WEG's Powertrain system.
FuelTech	Sep/2019	Partnership with FuelTech to convert Diesel powered vehicles into electric vehicles. WEG will contribute with the Powertrain system.
vwco	Oct/2019	Continuing its partnership with Volkswagen Trucks and Buses to manufacture the first 100% elecric delivery truck in Brazil. WEG will take part in the e-Consortium, an electrical mobility new ecosystem in Brazil to be developed through the congregation of suppliers of the supply chain and leaded by VMCO. The initiative involves the production of a series of e-Delivery units. WEG will be responsible for suplying the Powertrain system as well as electric motors and inverters for auxiliary systems, advancing in the mass production of Powertrain Systems.
Randon	Oct/2019	Partnership between WEG and Randon to manufacture electric semi-trailers in Brazil. WEG will supply inverters and electric motors for the e- Sys systems, which equips Randon semi-trailers.
Grupo Protégé/Eletra Industrial	Jul/2021	Partnership between WEG, Grupo Protégé (Brazilian private security company), Eletra Industrial and MIB Blindados (brazilian motor vehicle manufacturer) for the launch of world's first fully electric armored vehicle. The vehicle is equipped with WEG's Powertrain system.
VWCO	Jul/2021	As part of the e-Consortium, WEG, together with VWCO Engineering developed a customized solution for the e-Delivery. WEG will advance with series manufacturing of Powertrain System for the e-Delivery electric vehicles.
Marcopolo	Dec/2021	Partnership with Marcopolo for the development of Attivi, the first electric bus manufactured with its own chassis. Marcopolo Attivi will be equipped with WEG Powertrain.
Espadarte	Apr/2022	Partnership with the startup of technology and solutions for boats Espadarte Group. WEG equipped the first commercial nautical boat with its Powertrains solution in Brazil.

Source: WEG Institutional Website, Company data, Morgan Stanley Research

### **Electrification & Automation**

Electrification & Automation comprises automation products that are not motors-related (including general machinery automation, electrical circuits protection, control systems, building electrification), recharging stations for EVs and energy storage systems.

### Control, Automation & Electrification

#### i. Key Points

- We assume this segment represents a modest portion of WEG's top-line and could grow at a 6% 2021-30 CAGR;
- We believe growth of the products are linked to industrial activity;
- We understand WEG has exposure both in Brazil and abroad to this segment, and assume the same regional breakdown as for the overall EEI business;
- We understand WEG faces competition here from many of the same players it competes against in motors-related automation – namely ABB, Siemens, and GE – in a market we consider to be consolidated.

#### ii. Growth, Mix and Share Assumptions

Demand for products under this category are all linked to the industrial activity, though some products are more tied to higher growth sectors than others (we provide a more granular view on each product in the section below). A couple of factors led us to take a simplified approach to projecting this segment and we assume it grows in line with global industrial activity, including: i) the challenge of assessing the exact product end markets, as some customers are re-sellers and ii) as this segment has a modest share of consolidated top-line. For control, automation & electrification products we project a CAGR of 6% for 2021-30, with its participation in the consolidated top-line slightly losing representativeness in the period.

#### iii. Products Description

**Automation.** Along with its motor related automation products such as drives and soft-starters, WEG also sells automation products which have uses that go beyond electric motors. This non-motor related automation category includes products such as automation panels (which consolidate all motors automation of a factory, for example, in one site), relays (switch), on and off devices, plugs, and AC/DC converters.

**Control.** Motors also need control systems to work properly. Control products are equipment meant to keep devices working under a certain set of parameters set by the user, for example, controlling torque of a tilting industrial furnace. Control products sold by WEG include PLCs (programmable logic controller, electronic computing devices used to control machinery operations), human machine interface (machinery screens) among others.

**Electrification.** Electrification products are linked to both buildings and factory sites and comprise plugs, electric-circuits protectors, bus-way (electrical connectors), and circuit breakers. A highlight within those products is WEG Home: a set of devices (such as cameras and sensors) connected to each other through IoT (Internet of Things), that together provide housing automation controlled by electronic devices (such as smartphones).





#### iv. Overview of market landscape

We view the market as consolidated with main players being the traditional ones such Siemens and also Emerson and Rockwell in Brazil and abroad. As it's complex to evaluate which product has a greater presence in each market, we assume WEG's geographical mix is the same as it is for the consolidated EEI business, or a third domestic and two thirds external market roughly.

### **Recharging Stations for Electric Vehicles**

#### i. Key Points

- WEG is positioned to be a major player in the domestic recharging station market. For now we don't assume that WEG competes outside of Brazil in this market. Outside Brazil we see a significantly tougher competitive landscape, with large-scale participants such as Tesla, BP, Siemens, BYD and more focused ones such as EVgo and Tritium;
- The light electric vehicle market in Brazil is likely to develop at a slower pace compared to developed markets. A BCG study points to EV corresponding to ~2-4% of total light vehicle fleet in 2030;
- We assume that the growth profile on the Recharging Stations front will be in line with the market and that it contributes to 2% WEG's top-line by 2030, equivalent to 5% of WEG's EEI revenue;
- WEG has been reaching supply agreements with big OEMs locally: Renault, Jeep, Peugeot

#### ii. Growth, Mix and Share Assumptions

We understand the growth of the market for EV recharging stations in the world will move in sync with the electrification of the overall



Exhibit 46: MSe EV Penetration Forecasts by Country

fleet. Looking outside of Brazil, our auto industry colleagues forecast that EV sales penetration will reach ~30% in the US by 2030, while they project penetration levels of ~55% and ~65% for Europe and China, respectively, for that same year. On the other hand, for the Rest of the World (ROW), penetration should lag developed markets potentially reaching ~20% in 2030. While we wouldn't rule out the possibility of WEG competing abroad in this market in the future (given its historical success with products such as transformers in the US), today it is only operating in its home market in this space. Our US colleagues do not breakdown LatAm estimates by country, but a BCG/Anfavea study points towards EV corresponding to ~2-4% of total light vehicle fleet in 2030. A slower development in Brazil will likely result from i) lack of robust government incentive programs (although at municipal/state levels there are some isolated initiatives as one in Distrito Federal); ii) a large market of bio-fuels such as sugar cane ethanol, LNG, biodiesel (today ~90% of light vehicles fleet are flex) and iii) batteries logistics being a worldwide concern, among other factors. Moreover, apart from the country's structural challenges, for WEG there's also the issue of competition from other OEMs such as BYD which has announced its plans to enter the Brazilian EV market and provide its own recharging stations. That said, WEG's brand and strong position in the local market should give it an advantage in attracting customers, taking into account risks of relying on aftermarket services provided by foreign players operating in the domestic market (see article here). BYD, specifically, plans to provide its stations free of charge for customers who acquire its Tan EV model, while WEG currently has partnerships with a number of different OEMs including Peugeot to be the official charging station provider (more details on the competition are provided in section below). All in, in spite of all the risks we still think WEG will be able to surf the local market growth, and therefore assume it grows in line with expanding electric vehicle penetration.





Source: MS Bluepaper, Morgan Stanley Research

Source: MS Bluepaper, Morgan Stanley Research

#### iii. Product Description

In Aug/19, WEG launched its electric mobility line – WEMOB - consisting of recharging stations for electric vehicles. In its catalogue, there are three types of devices: Wall, Parking and Station. WEMOB Wall is built for the residential environment. It is a device that goes on the wall in garages or parking lots of buildings, being able to charge one EV at a time at normal voltages (110/220V). WEMOB Parking is designed for shared use in public and private parking lots like malls, for example. This device can be attached to the wall or on a pedestal and has two connectors to charge two EVs simultaneously with a greater power than the WEMOB Wall. Lastly, WEMOB Station is meant to be used in proper charging stations or roads/highways being able to recharge EVs faster than the other two solutions. It needs a greater electric infrastructure to work properly. It's important to mention that all devices can be connected to the internet enabling the user to check their status virtually.



#### Exhibit 48: WEG EV Recharging Stations Solution by Category

Source: WEG Institutional Website, Company data, Morgan Stanley Research

#### iv. Overview of market landscape

Based on recent interactions with management, we understand WEG is one of the leaders in the domestic EV recharging stations market and that it aims to retain this position though it recognizes this segment could see tough competition from foreign players in the coming years. Based on recent news, we understand the fuel distribution companies in the country such as Shell and Vibra are already positioning themselves to take part in this market. For instance, Vibra has as its recharging stations suppliers WEG and the start-up EZVolt and Shell has inaugurated its first station in June this year (see here and here). As noted earlier, there are other prominent entrants to the market, one of them being BYD, which intends to provide its recharging stations free of charge to buyers of its EVs. WEG currently

charges for its devices and stands to benefit from the expanding market for them with either the buyers of EVs or with auto OEMs that include the charger in the price of the vehicles. We believe WEG will differentiate itself with aftermarket services (e.g mostly maintenance) and that it will grow based on its partnerships with range of OEMs, most of which do not have their own charging station production/distribution. In Exhibit 49 we highlight the OEM partnerships WEG has established to date. At a global level, there's an ample scope of competitors entering or already inside this market worldwide, which characterizes it as highly competitive, as of now: **traditional peers** (such as Siemens and Schneider), **ICE OEMs** (such as Hyundai and Renault), **EV OEMs** (such as Tesla), **focused players** (such as EVgo and Tritium), **energy firms** (such as BP and Shell), among others.

### Exhibit 49: Recharging Stations Timeline

	Company	Date	Description
	-	Aug/2019	WEG launches its Electric Vehicles Recharging Stations line - WEMOB.
	ABDI/Local Government	Oct/2019	Partnership with ABDI (brazilian agency of industrial development) in Distrito Federal, Brazil, under a government program to disseminate/facilitate the EV use in the region. WEG provided 35 WEMOB Parking stations.
	ABDI/Local Government	Sep/2020	Partnership with ABDI in Paraná state, Brazil, under a government program to stimulate the adoption of sustainable and innovative urban mobility solutions. WEG provided 10 WEMOB Parking stations focused on the local health secretary's EV fleet.
	Renault/Local Administration	Mar/2021	Partnership between Renault, WEG and Fernando de Noronha local administration to develop the region's EV infrastructure. WEG provided equipment to 6 solar carports, including the WEMOB Parking stations.
	Renault/EDP	Apr/2021	WEG & EDP partnership with Renault to be the infra supplier for the clients of the OEM's EV Zoe. Both companies will provide recharging stations to chosen dealerships, and also technical supervision and installation services to the vehicle owners.
	-	May/2021	WEG launches WEMOB Wall - rechargeable stations for residential environments.
	FIAT	Aug/2021	Agreement with FIAT to be the company's official supplier of its 500e EV rechargeable stations. WEG will be responsible for the technical supervision and installation services to the vehicle owners. Also, WEMOB Wall and Parking will be in FIAT's catalogue.
	Mercedes-Benz	Aug/2021	Besides implementing new energy distribution infra products in Mercedes-Benz plant in São Paulo, WEG has also installed WEMOB Stations in the site. Those are focused on heavy vehicles and are able to recharge electric buses in up to 3h.
	Peugeot	Sep/2021	Agreement with Peugeot to be the company's official rechargeable stations supplier for its EVs. WEG will be responsible for the technical supervision and installation services to the vehicle owners. Also, WEMOB Wall and Parking will be in Peugeot's catalogue.
	Stellantis	Nov/2021	Expansion of the agreement with Peugeot & FIAT to be Stellantis commercial EVs official rechargeable stations supplier. WEG will be responsible for the technical supervision, installation & maintenance services to the fleet owners. Also, WEMOB Stations and Parking will be in Stellantis's catalogue.
	Neoenergia	Jan/2022	Contract signature to be Neoenergia's exclusive rechergeable stations supplier for its EVs. WEG will be responsible for the technical supervision and installation services to the vehicle owners, apart from providing WEMOB Wall or Parking. Contract focus is on residential and commercial clients.
	DS Automobiles/ Stellantis	Feb/2022	Agreement with the argentine DS Automobiles (a Stellantis brand) to be the company's official rechargeable stations supplier for its EVs. WEG will provide WEMOB Parking to all DS's dealerships.
	Magnani Luz e Energia	Mar/2022	Partnership with Magnani, an electric materials company of the southern region of Brazil, to be the supplier of rechargeable stations to its "electric route". WEG will provide WEMOB Parking to 16 points in the route in Rio Grande do Sul state.
	Jeep	Apr/2022	Agreement with Jeep to be the company's official supplier of its Compass 4xe EV rechargeable stations. WEG will be responsible for the technical supervision and installation services to the vehicle owners. Also, WEMOB Wall and Parking will be in Jeep's catalogue and also installed in Jeep's dealerships in Brazil.
	BMW/ Energy Source	Apr/2022	Partnership with BMW Brasil and Energy Source to develop a rechargeable station for EVs based on solar energy - the Carport Solar Off-Grid. When not attached to the electric grid, solar panels recharge batteries provided by BMW/Energy Source to store energy and export the excedent to the grid.
	Renault	Apr/2022	Partnership agreement with Renault, where WEG will be supplying charging stations for the new Kwid E-TECH Electric car.
	TB Green	May/2022	Partnership with TB Green to expand the infrastructure required for electric delivery vehicles in Brazil. TB Green was responsible to acquire vehicles, design details and install WEG's charging station. In february, Ambev started the first phase of its electrification project, the company's fleet will be recharged with WEG fast charging solutions.
	Vibra/ EZVolt	Jul/2022	Partnership with Vibra to supply recharging equipments (model WEMOB Station) to Vibra's stations. The first station was launched on June 30th on a highway in Roseira, SP and is part of a project, which the goal is to install 70 stations until the end of 2023, most of them in highways, connecting 7 brazilian states.
	Stellantis	Jul/2022	Alliance expansion with Stellantis to supply equipment for the group's affiliates in Argentina. The agreement will make it possible to equip users and cars dealerships with the new PEUGEOT 3008 HYBRID4 in Argentina.
	Mercedes-Benz	Aug/2022	WEG was approved as the new official supplier of charging stations for the new eO500U model. Later this year, 100 units of the new eO500U electric bus will be delivered.

Source: WEG Institutional Website, Company data, Morgan Stanley Research

### **Energy Storage System**

#### i. Key Points

- Looking globally, the market is in an early stage of development, but it's expected to grow at a rapid pace for the next two decades;
- Our MS US colleagues estimate capacity deployments could grow at a ~30% CAGR between 2020-30;
- The main component of the product is the battery set a key variable to its development is battery pricing which could go down with greater production scale;
- Regions with greater exposure to renewable energy could have a greater penetration of ESSs; Brazil is one example and has a large potential market;
- Outside of Brazil the main players are Tesla and Fluence, while in the local market WEG is the leader, we understand;
- WEG entered the US market by acquiring NPS back in 2019

#### ii. Growth, Mix and Share Assumptions

Our US colleagues assessed the ESS market outlook in their Fluence initiation report published in November last year (see here). They estimate ESS deployments in US, China and Europe will together grow at a ~30% CAGR in the 2020-30 period, and will continue growing at a fast pace in the 2030s and beyond. The US net additions is expected to grow at a 31% CAGR in 2020-30 mostly on the back of "i) the continuously improving economics of renewables + battery storage both at grid scale (front-of-the-meter or FTM) and residential/commercial (behind-the-meter or BTM); ii) increased storage penetration required to manage renewable energy asset intermittency and grid reliability, and iii) increased demand for decarbonization solutions in the Commercial and Industrial (C&I) sectors as well as demand for distributed generation (DG) solutions to help lower utility bills." WEG has exposure to both the Brazilian and the US market in this segment as it acquired NPS in 2019, though we understand the local business is for now more relevant. In the domestic market, WEG closed several partnerships to provide ESSs to both government incentive programs and commercial applications, such as the Furnas and Copel agreements (see Exhibit 54). In the US, in turn, WEG has been focusing more on the commercial agreements, evidenced by its acquisition of Northern Power Systems' ESS business and the sales of some Utility Scale units. We see WEG's ESS sales growing in line with the market.



#### iii. Products Description

WEG has its own Energy Storage System product designated as ESSW (W for WEG). The product is an electrical energy storage and management system (usually ion-lithium battery based, but also flow batteries) that has a wide set of functions: from mitigating the intermittency of renewable generation sources to performing ancillary services in power substations. One of the main objectives of an ESS is to ensure higher efficiency and better use of energy resources, as well as to provide reliability of energy supply, being commonly, but not only, used in energy generation sites (see Exhibit 51). As renewable energy sites could have more intermittent characteristics compared to the standard generation, ESSs are often implemented in those environments, but are not limited to them, which is evidenced by the different nature of agreements WEG has closed since the 1st ESSW (see Exhibit 54). For that, the ESSW has different operating modes as peak shaving, power regulator, voltage and frequency regulator and so on. In a technical but very simplified way, main components of the ESSW are the batteries' bank, transformers, DC/AC switchboards (as shown in Exhibit 53) but they can be configured to meet its final application due to its modular characteristic. Of note, except for the battery set - which usually is imported from China or purchased from players such as Panasonic - WEG produces all the components of the ESS, we understand. However, the main version of the devices is the larger of the ESSWs sold to distribution/generation companies, thus the ones with a more usual commercial use, as "utility scale" (1.9MW of power/5.3MWh of capacity). This version was the one WEG sold to Viridity in 2018, for example.



#### Exhibit 51: Scheme of Possible Connexion Points for an ESS

Source: Company data, Morgan Stanley Research



Source: Company data, Morgan Stanley Research



#### Exhibit 53: ESS Layout of Main Components

Source: Company data, Morgan Stanley Research

#### iv. Overview of market landscape

According to our US colleagues and recent interactions with the company, the ESS market is still in the early stages of development looking globally. The same is true in Brazil, with somewhat of a lag compared to developed markets. Fluence and Tesla are the main global players in this market which together represent more than 50% of world storage shipments, as of 2021. Looking further at the competitive landscape, after the two mentioned leaders, come the larger regional players, namely NextEra, in the US, and Leclanche and Wartsila, in Europe, and WEG in Brazil (while the Brazilian player also has a foothold in the U.S. thanks to its acquisition of NPS in early 2019).

#### Exhibit 54: ESS Timeline

Company	Date	Description	Power/Capacity
Celesc/CERTI Foundation	Dec/2017	Partnership between WEG, Celesc (local electric utility company) and CERTI Foundation (local technology based institution) to install WEG'S ESSW100, an integrated EV's recharging station solution in Florianópolis, SC. It represents WEG's entrance in the energy storage market with their lithium-based Energy Storage System (ESSW).	ND
Supply agress Scale) to pr Scale) to pr construction Solutions Aug/2018 times, the consumption According to		Supply agreement with Viridity including a lithium-ion batteries ESSW in large scale (commonly referred as Utility Scale) to provide energy to Hinesburg's energy distribution company. The contract also embeds manufacturing, construction, commisioning services and technical support. In addition to supplying energy at peak consumption times, the system helps to control the voltage and frequency of the region's power grid, store energy when the consumption is less than the generation and supply the stored energy to the grid when the consumption increases. According to WEG, this was the first major commercial scale lithium-ion battery power project.	1.9MW/5.3MWh
Northern Power Systems	Feb/2019	Acquisition of the Energy Storage System business of Northern Power Systems (NPS) in Barre, Vermont. The company designs, develops and manufactures ESSs.	NA
Equatorial Energia/FAB	May/2021	Partnership with the Brazilian Air Force and the Brazilian Space Agency to supply a lithium-ion batteries ESSW in Utility Scale to a spacial launch center. The project also includes the development of a microgrid powered by several energy sources (incl. solar), which will be done by Equatorial, for the Alcântara Lauch Center (CLA) in northern state of Maranhão. WEG will be responsible for installment, commisioning and related services of the ESS.	1.0MW/1.0MWh
Copel	Jun/2021	Contract with Copel (state of Paraná electric utility company) providing four lithium-ion & flow batteries ESSW units and also the development of the entire microgrid powered by different sources to Copel. The project is part of ANEEL's initiative to promote ESSs into the national grid. Whole project also embeds WEG's photovoltaic generator sets, tranformers, low and mid voltage panels, automation and others. The contract also incl. manufacturing, construction, commissioning, service and technical support.	1.8MW/3.7MWh
Furnas/Base Energia Sustentável	Dec/2021	Partnership where WEG is the supplier of a Utility Scale Lithium-ion Battery ESSW for a green hydrogen generation study plant Furnas in Minas Gerais and Goiás states, Brazil. Partners are Furnas, the companies Base Energia Sustentável an PV Solar associated with the universities Unesp (Brazil); Unicamp (Brazil); Senai(Brazil); Brandernburg University (Germany). The project is regulated by Aneel (National Electric Agency) and the objective is to test the viability of the inclusion of intermitent and seasonal ESS into the country's energy generation system.	300kW/600kWh

Source: WEG Institutional Website, Company data, Morgan Stanley Research

### Digitalization

#### i. Key Points

- From our LatAm TMT colleagues, Brazil is one of the most attractive telco markets globally and 5G rollout could boost increased adoption of IoT, but there are challenges on costs, technology complexity and security;
- WEG's strategy in this segment in the past few years has been to grow via M&A so as to broaden its portfolio and to be able to provide a complete digital solution for its customers;
- It's one of newest sectors for WEG (only an estimated ~1% of it top-line) but with a strong expected growth potential (32% CAGR from 2021 to 2030) as it could sell IoT products to its existing customers;
- The main players within the industrial sector providing digitalization solutions at a global level are Siemens, ABB, GE, among others - big tech companies as Google and Amazon are providers of cloud based computing products, at least to WEG, we understand.

#### ii. Growth, Mix and Share Assumptions

In the section 5G Rollout Can Support Further IoT Adoption, our LatAm TMT colleagues pointed out that although Brazil lags developed countries in terms of IoT adoption, the country has one of the most attractive telco markets globally, having one of the largest percentages of firms with IoT initiatives among LatAm and 5G rollout could also increase IoT equipment domestically. As the main obstacles for a faster dissemination regards to equipment cost, technology complexity and security, solving them will be key to its development. Digitalization is one of WEG's newest business areas, having broken into the segment around three years ago. During that period, the company has been building up a position in the market via M&A with the aim of providing a complete solution for customers (see Exhibit 55 and Exhibit 56). The company can leverage its domestic scale and customer base to grow 4.0 product volumes as the market develops, though it should face meaningful competition from Siemens and ABB, for example (see Exhibit 57). Today this business doesn't contribute much to WEG's top-line, representing just ~1% in our estimates, as it's still ramping up. Even with strong growth (estimated CAGR of 32% from 2021 to 2030), we expect it to slightly increase its representativeness in the company's top-line in 2030 (still a modest contribution in our view). However, we understand this business has a great importance to WEG going forward as IoT adoption has positive prospects in the country and global industry will shift to the 4.0 environment, thus part of one of the main foundations WEG has been laying for the future.



Exhibit 56: WEG Digital Solutions Ecosystem



Source: Company data, Morgan Stanley Research

#### iii. Products Description

Through its WEG Digital Solutions ecosystem, the company offers a wide set of IoT products embedded in the 4.0 industry environment, aiming to interconnect sensors, equipment and virtual platforms for real-time data collection to, finally, enable the remote monitoring of different kinds of industrial processes. A simple practical example could be a working motor. Its variables such as temperature and rotation speed are measured by a sensor which, while connected to a network, sends those signals real-time to virtual platforms permitting constant monitoring, usually, from any place across the network. Depending on the product, those variables can be automatically analyzed, via AI, to predict whether the motor is working properly or if could fail at some point in the future. Within this environment, WEG's strategy is to provide a complete solution for companies moving to or already operating within the 4.0 industry, offering a wide range of products from sensors to software. It's important to note that WEG has big-tech companies (e.g. Amazon) as its suppliers for their cloud-based products. The company designs and sells all the other components of its products, but the cloud-computing and the data storage are services it contracts from big tech players. Below follows a brief description of some examples of its products:

- WEGnology: WEG's IoT tool is cloud-computing-based, designed to support the creation of digital solutions as dashboards, programs and workflows in a collaborative environment. Its main goal is to enable the configuration of different types of solutions in a multi-end connected and shared platform, maximizing effectiveness gains and digitalization of processes. The tool collects sensors and equipment data and facilitates its visualization and analysis as it's usually inserted into the big-data landscape.
- WEG Smart Machine: A cloud computing based platform, developed for OEMs to monitor performance of their machines remotely. Main features are: online access to machine performance data and also energy consumption, remote assistance, configuration of alerts sent via SMS or e-mail, remote program tuning, among others.
- WEG Motor Scan: A device which periodically monitors machinery data such as electric motors, for example. Information is collected and sent to the cloud through a smartphone or a gateway.
- **ESOS computer vision** (from **Mvisia**): An optical device able to, for example, count objects on a conveyor belt, measure

products dimensions, read 2D-codes. It is made up of an optical sensor coupled with basic features from a PLC (programmable logic controller) and a processor to support computer vision and AI algorithms.

- B-Aware (from BirminD): A platform designed to predict equipment failure based on the current state of the machine's variables. Through a predictive algorithm (artificial intelligence), this system is able to foresee energy consumption and performance, for example, based on the current situation of the equipment variables as temperature, vibration, current, voltage, power etc.
- Intelligenceware Suite (from V2COM): IoT platform combining hardware and software capable of integrating different equipment data to be monitored.
- PC Factory OEE (from PPI-Multitask): Online production management platform meant to reduce machinery stoppage, improve production efficiency and minimize industrial costs.

#### iv. Overview of market landscape

WEG's first formal step into the digital business was in mid-2018 when it launched the Motor Scan, but it was only a year later when it officially announced the creation of a business unit dedicated to the digital solutions, appointing a director to manage it (see material fact here). Later in 2019, WEG made its first acquisition, PPI Multitask, aiming to expand its 4.0 industry solutions portfolio and also initiating a series of acquisitions with the strategy of growing within this market (see Exhibit 58). A month after its first M&A, WEG acquired V2COM (IoT focused company) and then in 2020, Mvisia and BirminD, companies focused on AI solutions, computer vision, IoT and industrial analytics, further widening its catalogue. WEG's intention was to combine both its in-house designed solutions, such as WEGnology, with the portfolio of the acquired companies to increase its presence in 4.0 industry solutions. As those products have significant synergies with most of WEG's products, the company should benefit from its existing channels to increase adoption of its digital solutions among customers. It's our understanding that all the big industrial OEM names such as ABB and Siemens have their own 4.0 industry portfolio and have a significant market presence, including in Brazil. So, although WEG has been positioning itself to take part in the new industry transition, the Brazilian company is relatively new to the space and has a larger footprint in Brazil, where this market is still incipient compared to the developed countries.

Exhibit 57: Number of Mentions of IoT Platforms by Developers on LinkedIn (Bain Co study, 2020)



#### Number of developers on LinkedIn mentioning each platform (2020)

Notes: Data as of July 30, 2020; OEMs are original equipment manufacturers Sources: Bain analysis, based on data from LinkedIn and company websites

Source: Bain Company, Morgan Stanley Research

#### Exhibit 58: Digitalization Timeline

Company	Date	Description				
-	May/2018	Launch of WEG Motor Scan, device that enables periodical monitoring on electric motors by App or IoT platform. Fully manufactured by WEG.				
-	2019	Creation of a specific department for digital businesses.				
PPI-Multitask	Sep/2019	Agreement to aquire 51% of PPI-Multitask's share capital. PPI-Multitask Group specializes in Industrial Automation Systems Integration, Manufacturing Execution System (MES) Solutions, Industrial Internet of Things (IIOT) and software for the industry, expanding WEG's strategy to deliver Industry 4.0 solutions.				
V2COM	Oct/2019	Agreement to acquire 51% of V2COM's share capital, a company specialized in IoT (Internet of Things) and complete telemetering solutions for power and smart grid systems.				
-	Nov/2019	WEG launches WEG Motor Scan Gateway, a router that automatically sends information to the cloud via Wi-Fi, Ethernet or 3G/4G, allowing immediate remote monitoring of the electric motor performance. WEG Motor Scan Gateway expand the performance of the previous WEG Motor Scan sensor.				
Mvisia	Jun/2020	Acquisition of the startup Mvisia, which specializes in artificial intelligence solutions applied to computer vision in the industry. WEG will own 51% of the share capital of Mvisia, as part of its strategy of adding new features to WEG Digital Solutions and the IoT WEGnology platform.				
-	Jun/2020	Launch of WEG Motor Fleet Management, a fleet management solution based of cloud computing allowing real time monitoring.				
-	Jul/2020	New features for the WEG Motor Scan, now allowing immediate monitoring of performance of various equipments from a distance.				
BirminD	Jul/2020	Acquisition of the startup BirminD, a technology company active in the Artificial Intelligence market applied to Industrial Analytics. WEG will own 51% of the share capital of BirminD. This acquisition complements WEG's digital ecosystem and starts offering artificial intelligence technologies to both images and industrial analytics.				
-	Sep/2020	Launch of WEG Drive Scan, allowing the monitoring from new types of assets such as inversors.				
Memphis	Nov/2020	Agreement between WEG and Memphis (Brazilian perfume industry) to implement WEG Motor Fleet Managemnt and WEG Motor Scan to guarantee intelligent plant monitoring.				
Anatel/ ABDI	Nov/2020	Partnership with ABDI (Brazilian Agency for Industrial Development) and Anatel (National Telecommunications Agency) for the development of an innovative project for the execution of practical connectivity tests for 5G network. The project is named Open Lab WEG / V2COM and is performing real tests in a factory in Jaraguá do Sul, Santa Catarina, Brazil.				
Unigel	Nov/2020	Agreement between WEG and Unigel, petrochemical segment player, to install WEG's Industry 4.0 integrated technologies in Unigel's plant in Bahia, Brazil.				
-	Dec/2020	Launch of a free version of the IoT WEGnology platform, named SandBox.				
Nokia	Feb/2021	Announcement of Nokia as the new partner on tha Open Lab WEG / V2COM project to accelerate and develop Industry 4.0 solutions in the country with Nokia Digital Automation Cloud (DAC) platform.				
Orquídea	Mar/2021	Agreement with Orquidea (Tondo S/A, Food industry company) to implement WEG Motor Fleet Management to provide greater operational savings and productivity for their maintenance team when implementing predictive actions based on the status of the electric motors.				
	Jul/2021	WEG Motor Fleet Management is now WEG Motion Fleet Management				
BNDES	Nov/2021	accredited to a special credit line from BNDES (Brazilian Development Bank).				
DOCOL	Jan/2022	Agreement with DOCOL (sanitary materials company) to supply WEG's digital solutions WEG Energy Management and the WEGnology IoT Platform to optimize the use of energy of the company.				
-	Feb/2022	Launch of WEG Digital Solution Provider, a new partnership program focused on IoT and Industry 4.0, with the intention to connect and simplify the interaction between the colution providers and the final sustainers.				
Eletrojo	Feb/2022	Partnership between WEG Digital Solution Provider and Eletrojo to help aviculture companies with their energy system management.				
Crippa	Mar/2022	Agreement with Crippa (painting machinery OEM) to equip their machine with WEG Smart Machine. The machine will be exhibited in a furniture industry exhibition in Bento Gonçalves, RS, Brazil.				
Samae	Apr/2022	Agreement between Semae (Municipality Water and Sewage Service company in Jaraguá do Sul, Brazil) and BirminD (one of the WEG Group companies) to implement a system designed to detect water losses in the water distribution system.				
-	Apr/2022	WEG launches WEGnology Edge Suite, an artificial intelligence platform that helps customers from different sectors managing, controlling and obtaining data of industrial processes and electric systems.				
ComBer	Aug/2022	Agreement with ComBer (grains drying company) to automate and digitalize their machines and equipments, through WEG Smart Machine and Smart Connection WEG.				
Grendene S/A	Aug/2022	Delivery of 62 Operations Interfaces WEG cMTX to Grendene S/A (largest shoe exporter in Brazil). These interfaces are able to integrate the communication between equipments and their operators.				

Source: WEG Institutional Website, Company data, Morgan Stanley Research

## 5G Rollout Can Support Further IoT Adoption

by Cesar Medina, Ernesto Gonzalez and Gabriel Vaz de Lima

We think stable competition (link), robust infrastructure in main metropolitan areas and positive demographic trends make Brazil one of the most attractive telco markets globally (link). Thus, we highlight that the ongoing rollout of 5G networks (link) could drive increased adoption of IoT (internet of things) due to the new mobile technology's superior speed, latency and efficiency.

Exhibit 59: Improving competition, solid infrastructure and positive demographics make Brazil one of the best telco markets globally



MS Global Telco Market Ranking 2022 (Higher = Better)

On the mobile side, DM experience suggests 5G adoption is occurring faster than 4G (in Brazil, it took 4.5 years to migrate 50% of traffic from 3G to 4G). Meanwhile, Brazil also has attractive FTTH penetration, suggesting a solid backdrop for IoT deployments.

**Exhibit 60:** 5G adoption could occur faster than 4G, which coupled with...





Exhibit 61: ...strong FTTH penetration creates a good backdrop

Source: ANATEL and Morgan Stanley Research

Source: ANATEL and Morgan Stanley Research









Source: Ericsson, IMF and Morgan Stanley Research

Indeed, in our proprietary AlphaWise survey, we found healthy net intention to increase IoT adoption across all firm sizes (left chart below). We believe the broad based interest in the technology is associated with its wide range of applications (from surveillance/security to maintenance) across a broad range of industries (e.g. geo-location of assets in large mining operations, sensors to test soil conditions in agriculture, or quality control in industrial enterprises).





**Exhibit 65:** ...due to the technology's wide range of use cases across different industries



#### Morgan Stanley | RESEARCH

While we have positive outlook for Brazilian IoT adoption, the path forward is not without risks. Indeed, our own surveys reveal the obstacles for broad technology adoption in the country (left chart below) resonate with the specific hurdles for IoT usage the US (right chart). Hence, solving issues regarding cost, technology complexity and security is key for the success of WEG's IoT initiatives.

**Exhibit 66:** Solving issues like cost, technology complexity and security...

Exhibit 67: ... is key for the success of WEG's IoT initiatives



## A European Capital Goods Perspective

Ben Uglow & team

## Motion is a Core Focus for ABB Strategy – Siemens Less So

The European leaders in this segment are ABB and Siemens. We believe that the businesses are comparable in scope; however, Siemens provides less disclosure and has systematically been reducing its presence in this end-market while ABB has expanded. ABB sees its Motion division as a focal point of its overall strategy, whereas Siemens has a much larger automation offering and appears to be less involved in this area. We also need to make a careful distinction between the motors area and electrical and mechanical drives. Company disclosure does not make this transparent either. In principle, we see ABB accelerating its investment in its Motion division. Historically, this has been one of the most stable and successful divisions in the group.

• **ABB Targets**. ABB has ambitious targets for its ~\$6.4bn Motion division. ABB believes that ~45% of the world's electricity is converted into motion via electric motors, and that



Exhibit 68: ABB + Baldor - What The 2010 Acquisition Brought

Source: Company data, Morgan Stanley Research

it is a key supplier into a ~\$55bn end-market which comprises Industry (53%), Transport (24%) and Power Generation (13%). The company expects demand for electric motion to double by 2040. ABB makes a broad range of products, over ~1mn small motors and ~15-20 large motors per annum. The division was substantially enhanced by the addition of the Baldor North American business in 2010, which added an estimated ~\$2bn of revenues at that time and increased the US presence by one third.

Growth Mandate. Recent management changes (with the appointment of Tarak Mehta to head up the business) are focused on accelerating growth. Management has said that it has an acquisition mandate, and recently acquired the NA LV business from Siemens. There is also a drive to increase service revenues from 4% of revenues to 15% by 2025. ABB has increased its R&D spend by ~30% to ~\$270mn, or ~4% of sales. It hopes to grow its business in software-enabled motors and drives, and batteries. We have 300mn motors in the field not yet at the energy standard.

Exhibit 69: ABB: Product Offering – Full Range from Small to Large



Source: Company data, Morgan Stanley Research

#### ABB – Recent CMD Targets

**Messages**. At its 2022 Capital Markets Day, ABB estimated the global market size for electric motors and drives to be ~\$55bn in 2021, growing at 3% CAGR since 2016 (Exhibit 70). Within it, industry and transportation account for more than 80%. In addition, it also expects the demand for electric motion will double by 2040. Key segments of growth include hydrogen, food processing, HEV, district heating, and buildings HVAC.

**Details**. The motion division (low-voltage electric motors and drives) at ABB has 7 sub-divisions, each at top market share globally. For example, it has 8% market share (No.2 globally) in IEC LV motors and 15% share (No.1 globally) in low voltage AC drives (Drive Products). In 2021, the division achieved \$6.9bn in revenue with 17.1% operational EBITA margin (Exhibit 72). As part of the efforts to focus more on motors, ABB divested its Mechanical Power Transmission division (makes bearings, gearings, and transmission components) at the end of 2021, which runs at higher operational EBITA margin (~23%). Without this part of the business, the motion division achieved 6.4bn revenue and 16.6% in 2021.



Exhibit 70: ABB sees Motors and Drives Market Size at ~\$55bn in Exhibit 71: Drives & Electric motors end markets breakdown



### Siemens – Divisional Information

Siemens' motors and drives business had historically been able to achieve 8-13% adjusted EBIT margin (Exhibit 73). They were part of the Drive Technology division, which also offered compressors and mechanical components such as gears. In 2022, Siemens sold its North American motor business (NEMA motors) to ABB, who has the No.1 share globally in a c\$3bn market.







## GTD - Generation, Transmission & Distribution

Along with motors, transformers are a traditional product manufactured by WEG. In 1980s, WEG created a specific division, now called GTD, that included transformers as part of an effort to expand its product line to related areas. As with EEI, today GTD includes a much wider range of products, the majority of which are linked to renewable energy generation with a high domestic exposure (71% of total GTD revenues are domestic vs. 29% external as of 2Q22). The main products are wind, steam & hydraulic turbines, generators & alternators, transformers & reactors, substations and solar generation. Based on the conversations we had with the company, we grouped products in the following sub-segments: **Solar**, **Wind**, **Transformers** and **Generators & Alternators**, and we describe and assess each in the sections below.



Exhibit 74: Generation, Transmission & Distribution (GTD) Dashboard

Source: Company data, Morgan Stanley Research

WEG's GTD business is poised to surf the growth of the country's energy matrix capacity addition which will be heavily skewed to renewable sources... Currently Brazil's electric energy matrix is comprised of 85% of total energy generation coming from renewable sources, whereas ~79% of capacity addition from 2021-31 is expected to come from renewables, according to EPE's PDE 31. WEG is well positioned as solar and wind have strong expected CAGRs in the country, and looking specifically at wind, WEG has established itself in India, where wind has also an encouraging long-term expected growth potential. Of note, expansion of the solar/wind markets is very supportive of transformers demand and also generators/alternators, albeit this last category has been gradually losing relevance for the company as it has been focusing on the other products with greater growth potential. ... also benefiting indirectly via transformers sales both domestically and abroad. Domestically, WEG's transformers are a leading product and the company is one of the top players in this market. Another opportunity lies in the substations market, in which WEG started operating following the fairly recent acquisition of Balteau. However, the external market is where there is the largest opportunity with WEG positioned to gain significant share, particularly in the US where it has opened a third factory aimed at participating in large transmission auctions (it already has a significant position in the country's renewable market).

On Solar, despite a large anticipation of panel purchases encouraged by MMDG framework, we view the business continuing to grow at strong rates. Last January, government's approval of the Law 14.300/2022 that updated MMDG's legal framework gave large incentives to the purchase of solar kits on an anticipated basis, evidenced by SECEX data on imported panels (Exhibit 76). That, coupled with constraints in the global supply chain caused by the pandemic and the dependance of the business on panel imports from China, created some uncertainty regarding demand level in the next several years and consequently WEG's ability to keep its pace of strong results in domestic GTD. However, i) our colleagues' assessment that MMDG installed capacity will grow 30% in 2023 and ii) WEG's solar panel inventory anticipation strategy, has kept us constructive on its Solar business maintaining a robust rate of growth next year and beyond.

### Solar

#### i. Key Points

- WEG's largest sales exposure in the sub-segment is to distributed generation (DG) where installed capacity is expected to grow at a CAGR of ~19% in 2021-30, based on our Utilities colleagues assessment in Legislation Changes to Front Load MMDG's Investments;
- As of 2019, WEG was the second largest market player in the DG market, although we understand today it could be sharing the first position with Aldo, the former leader;
- A lower exposure is to the centralized generation, where, according to EPE's PDE 31, installed capacity is expected to grow at a more modest ~7% CAGR in the same period;
- There's a lower level of vertical integration with the DG product than there is with the centralized one, as in the first case WEG only produces the inverters and imports panels from China; while it offers a whole project solution is in the centralized segment;
- Taking into account both sub-segments, we consider that Solar business could grow at ~25% in the same period, also recognizing some upside from a possible internationalization of the business.

#### ii. Growth, Mix and Share Assumptions

Despite having plans to expand operations abroad (delayed due to the pandemic), WEG is mainly focused on the domestic market at this point. Broadly speaking, the solar energy business for WEG can be divided into two main segments: centralized generation – expected to grow its installed capacity at a 11% CAGR in the next 5y - and distributed generation (DG) – expected to grow at a ~29% CAGR in the

same period, based on our Utilities colleagues' assessment and EPE's PDE 31. Centralized generation refers to the larger solar energy farms made up of solar inverter stations and what is known as panels field (see Exhibit 81). DG, in turn, consists of the smaller generation units mainly embedded in residential and commercial complexes, but also comprising smaller MW solar energy farms. According to ANEEL and the new regulation, solar sites producing less than 3MW are considered as distributed generation. The approval of a federal Solar Regulatory Framework last January (further details provided below) created an incentive for an anticipation of purchases of DG solutions, leading to a surge of panel imports from the end of 2021 through March of this year (see Exhibit 76) and also boosting WEG's 1Q22 Brazil GTD sales which were up +100% y-y. We understand this sudden surge wasn't anticipated by the EPE's PDE 31 which was forecasting solar DG installed capacity this year to reach 11GW, whereas it actually already occurred by half of the year. On the other hand, panel imports could be affected by global supply chains constraints and the uncertainty with China's lockdowns curtailing its ports operations going forward (see Exhibit 77). However, we understand WEG has been anticipating some of its panels purchases to avoid not meeting demand for solar kits (evidenced to some extent by the increase in inventories reported by the company in 2Q22) a strategy which had already been successfully implemented through the peak of the pandemic. We in turn have adjusted our expectations for WEG's solar performance, and now expect it to grow +90% in 2022 and then +30% in 2023 (including centralized generation). Taking into account our Utilities colleagues' analysis, we assume WEG's DG Solar will have a boost in the short to medium term in capacity installed on the back of the incentive created by the bill approved, whereas we assume centralized will grow in line with EPE's PDE 31 expectations thus implying the whole solar business to grow at a ~25% 21-30 CAGR, assuming DG represents +80% of the solar business' revenues and the centralized the remaining portion.

46 9 21 6 37 15 2022E 2030E Solar - MMDG Solar - Centralized

Exhibit 75: MSe Centralized & DG Solar Installed Capacity in Brazil

Source: EPE, Company data, Morgan Stanley Research

### A closer look at the "Distributed Generated Energy Regulatory Framework"

**Overview.** On January 7 this year, Brazil's government approved a bill which put into effect a regulatory framework for micro and mini distributed generation in the country. With it, consumers and producers of renewable energy are subject to more specific regulations which aim to provide more transparency and legal protections for all parties within the space. The text also defines transition periods to charge producers and consumers the new tariffs based on the date of entrance in the country's DG system. More details can be found in the section Legislation Changes to Front Load MMDG's Investments , from our LatAm Utilities colleagues.

**Main implications.** Consumers and producers who already had their own DG sites before the law went into effect and those who apply to participate in the DG system within 12 months of the passage of the regulation, will benefit from not being subject to the new tariff framework until 2045. In contrast, those who join the system after 12 months from its passage will have a shorter transition period to the new tariff framework depending on the year in which they enter in system. With that, the new legislation created an incentive to join the system earlier, likely boosting the MMDG capacity additions in the short to medium-term in the country. In our view, this is evidenced by the spike in solar panel imports into the country shown in Exhibit 76.

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Exhibit 77: Newsflow on China Lockdown and Ports Operations

Date	Source	Headline
15-Mar-22	Estadão	Lockdowns in China are likely to further disrupt global supply chains
18-Apr-22	Valor Econômico	Lockdowns in China start to affect maritime transportation worldwide
20-Apr-22	Valor International	Crisis in China affects logistics in Brazil
19-May-22	CNN Brasil	Lockdowns in China and war in Ukraine congest major ports worldwide

Source: Company data, Morgan Stanley Research

#### iii. Products Description

Source: SECEX, Morgan Stanley Research

In the DG segment, WEG provides "solar kits" - a complete package of required components for a solar generator site. These kits include the solar panels (modules), the inverter and auxiliary parts as protection devices, electric equipment and fixing structures (see Exhibit 78). WEG purchases the panels from third-party producers (mostly based in China), while it produces the inverters and assembles the kits. We understand that most of the company's sales come from the commercial customers, such as malls, supermarkets and factories, niches that have had increasing demand as renewable energy generation gains more relevance in the country's overall energy matrix. It also had demand from residential buildings but this accounts for a lower share of its sales and residential customers are more price sensitive. **In the centralized** segment, different from DG, we understand WEG has a greater degree of vertical integration as it manufactures a large amount of the product's components, including, for example, the containers of the solar inverter stations (see Exhibit 79). At the same time, in the centralized segment, WEG offers a whole product solution (more than just a sale of components) which in some cases includes site development services, we understand.



#### iv. Overview of market landscape

WEG entered the solar generation business about five years ago and it has had a robust growth performance since then, which is correlated to the solar DG capacity addition in the country going from ~90MW in 2016 to ~9GW in 2021 (ABSOLAR data). With this growth, DG is already a relatively consolidated market in which WEG is one of the top 2 players together with Aldo (recently acquired by Brookfield), each possessing a share of ~20-30% (see Exhibit 80 ). Other players in this market include Intelbras and Renovigi. On the centralized side, we understand that WEG is also one of the market leaders and that there are fewer players competing with some DG market participants absent.



Note: Figures from 2019. We understand the top 2 players are Aldo and WEG, the others could include Renovigi and Intelbras. Source: WEG Day 2019, Company data, Morgan Stanley Research

**Exhibit 81:** Examples of WEG's Solar Generation Sites (Centralized on bottom, DG on top)



Source: Company data, Morgan Stanley Research

### Wind

#### i. Main Points

- We forecast WEG's wind business top-line could grow at a 11% CAGR over 2021-30;
- Bloomberg's BNEF currently projects Brazil and India onshore wind installed capacity will grow at a ~7% and ~6% CAGR from 2021-30;
- AGW147, a 4.2MW wind turbine, is WEG's main product today, we understand. That said, industry trends of increasing MW per turbine led WEG to announce its 7GW turbine to start being produced by 2026;
- WEG is competing in a highly consolidated market, and has a contracted backlog which represents a fraction of its peers. Notwithstanding, the company has performed fairly well in the Brazilian domestic market. Of note, it recently signed a R\$2.1bn revenue contract involving ~300MW of installed capacity;
- WEG's expansion to supply the Indian onshore market could be an important growth avenue for the segment considering BNEF's estimates. Its India turbine is in a process of being certified (which could take 4-6 months).

#### ii. Growth, Mix and Share Assumptions

As of now, WEG's main exposure is to the Brazilian onshore market. According to Bloomberg's BNEF as of 2021YE, Brazil had a total installed capacity of +20GW. The platform foresees that until 2030 the country will add roughly 16GW of capacity all onshore, reaching ~36GW in that year, implying a CAGR of 7% in the period. Although the bulk of WEG's sales correspond to the local market, back in 2017 it announced the construction of an industrial plant in India, though we understand it has faced several delays with the project. It is currently in the process of being certified which is expected to conclude in 2023. In terms of growth, to assess the Indian onshore market we also relied on Bloomberg's BNEF estimates which sees a capacity growth CAGR of ~6% for 2021-2030 for the region. As the latest company indications state that commercial efforts for contracts closing have not begun for now, we assume only 5% of WEG's wind business will come from India in 2023, ramping up to 30% in 2025 and then becoming stable in subsequent years. All in, we expect a 2021-30 top-line CAGR of 11% for WEG's wind business as a whole.



#### Exhibit 82: Brazil Onshore Installed Capacity Estimates (GW)

**Exhibit 83:** India Onshore Installed Capacity Estimates (GW)



#### Source: BNEF, Morgan Stanley Research

#### iii. Products Description

Apart form the announcement of the 7GW turbine which is being designed and expected to have its first units being produced by 2025, WEG portfolio currently consists of two wind turbines: AGW110 (2.1-2.2MW) and AGW147 (4.2MW, see Exhibit 84 ). The first one has a lower power capacity, requiring shorter wind blades (around 100-125m), while the second one is capable of producing more watts of energy thus requiring longer blades (>125m, see Exhibit 85 ). As we've discussed in more detail in our Aeris initiation (see report here), it's expected that the average potency of wind turbines will increase throughout the years, implying that the older models will become obsolete at some point. Moreover, as wind turbines represent the majority (around ~80%) of the cost of wind-site projects, the turbine OEMs typically sell not only the equipment itself but also address the installation process. However, WEG does not produce wind towers or blades, only turbines and related implementation service, we understand.





Note: WEG's 7GW yet to start testing phases. Source: Company data, Morgan Stanley Research

**Exhibit 85:** Evolution of wind power projects technology (world average)



Source: Aeris Initiation, Morgan Stanley Research

#### iv. Market Overview

WEG entered the domestic wind turbine market in 2012 when it announced its first contract of turbine supply to the Northeast region of Brazil through a JV with a Spanish group. A year later, in 2013, the company announced an agreement with an US-based wind turbine manufacturer, NPS, to improve its Brazil operations through a technology partnership. In 2016, WEG made a definitive move into the business with the acquisition of NPS. Looking at the competitive environment, the global wind turbine OEM market has seen a major consolidation in the past six years with GE acquiring Alstom (2014), Vestas forming a JV with MHI (2014), Nordex merging with Acciona (2016), and Siemens merging with Gamesa (2017). This movement has led to a marginalization of smaller OEMs and has increased barriers to entry, in our view. Indeed we understand that multiple players around the world tried to break into this market in years past with little to show for their efforts. In Brazil, specifically, most of the leading global OEM players manufacture turbines locally. Though WEG's contracted backlog is a fraction of the size of its global competitors, the company has carved out a meaningful position in the Brazilian market, we understand. Additionally, in 2017 it announced the construction of an industrial plant in India with an yearly capacity of 250MW, which we understand has faced several delays and is currently in the certification phase of the process (expected to conclude in 2023). As of the latest company indication, commercial efforts for closing of contracts have not begun.

### **Transformers & Related**

#### i. Key Points

 Growth in demand for transformers in Brazil will be driven in significant part by capacity expansion of renewable sources, representing ~79% of the country's expected capacity additions from 2021 to 2031;

- WEG's second most relevant market for this segment, the US, offers major growth upside due to potential share gains in the years ahead; the company also has a solid track record in North America having, for example, significantly turned around (profitability-wise) acquired plants in the US;
- Recent acquisitions in the US boosting growth expectations

   has increased sales 4x in 4 years, according to recent management interactions;
- It isn't difficult for WEG to replicate its transformer business in other geographies taking into account its know-how and its current global presence, we understand;
- We project 15% revenue CAGR for this segment in the 2021-30 period.

#### ii. Growth, Mix and Share Assumptions

Transformers have been part of WEG's product portfolio for several decades, with its first factory opened 20 years after the company's foundation in 1961. Since then, WEG has expanded its transformers business across other geographies outside Brazil, having North America become the most prominent region in the portfolio when looking at external markets. More specifically, in the United States, where WEG began the operations of its 3rd factory in the country in 2021 (the 5th in North America), is considered a growth avenue as it is an important step to participate in large transmission auctions as explored in section "Overview of market landscape" below. Of note, although WEG was already exporting transformers to that market through its Mexican plant, it wasn't until its first acquisition inside the US in 2017 that the business expanded significantly. As per management indications, the US transformers business has quadrupled its top-line since WEG's 1st acquisition, representing today the second largest transformer market for WEG and one of the greatest growth avenues for the company's revenues in the coming years. Jointly, we understand the Brazilian and the external markets (driven by US, mainly) could post a 15% CAGR in the next 9 years.



Exhibit 86: WEG Transformers Factories Worldwide

Source: WEG Institutional Website, Company data, Morgan Stanley Research

#### iii. Products Description

Although the main product within this sub-segment is the transformer itself, WEG has many others solutions as: substations, reactors, isolation equipment, for example. WEG produces three main types of transformers: i) power, ii) distribution and iii) dry transformers. Addressing their difference in a simplified manner, the **power transformers** are the largest ones, adequate for high potency applications (measured in VA) and they often come into play with big concessionaires auctions, long transmission lines, large generation plants and large industrial substations. Their power typically ranges between 3MVA and +400MVA. **Distribution transformers**, in turn, are used in lower power environments such as distribution systems, small substations, factories and generation centers, and urban posts. Their range is 30kVA-3MVA. Lastly, **dry-transformers** are devices which have their isolation system composed of a specific paper-type material, rather than oil, and they are commonly used in locations where there's inflammation danger such as shipments.

Exhibit 87: Transformers and Related Solutions Examples



### Distribution Transformers Compact Industrial Transformers Underground and Submersible Transformers Shunt Reactors and Transformers Transformers for Furnaces and Rectification Systems Pad Mounted Transformers Disconnectors Sta. Terezinha Power Plant, Tapejara/PR

Source: WEG Institutional Website, Company data, Morgan Stanley Research

#### iv. Overview of market landscape

Before the US-based plants inauguration, WEG exported transformers to the US market via its Mexican plant focused on the assembly of power transformers mainly supplying sectors as petrochemicals, mining and cement among others, we understand. With the acquisition of the 1st US-based plant in 2017 (the CG Power USA Inc), WEG began setting basis to participate in the renewable energy market as the acquired company already had a relevant position in transformers for wind and solar sites. Following the success of its strategy, in 2021, WEG announced the start of the operation of the 3rd US-based plant with the aim of increasing its capacity of producing transformers not only for the traditional concessionaires but also for renewable energy generation plants, thus paving the way for its gaining share in both markets. It is our understanding that WEG still has sizeable field to gain in the US transformers market. We view its strategy of consolidating its position in the renewable energy market, specifically, as a pillar for its long-term growth as it will enable the company to surf the energy transition to renewables (see Exhibit 88 ). On the Brazilian portion of the business, different from the US, WEG already has a consolidated business and well-known credentials. Similar to the US, however, the company will also benefit from the solar and wind site increases as a great part of the country's expected capacity addition in the next decade will be predominantly renewables (see Exhibit 89 ). Regarding competition, based on recent interactions with

management, it's our understanding that WEG is a top player in both power and distribution transformers in the domestic markets. An evidence of that was the acquisition of the Betim/MG factory, in 2020, from TSEA (before it was Toshiba's, an important domestic player) focused on power transformers. The acquisition granted WEG a more robust position in a market where main players are Itachi (former ABB) and GE-Prolec, to name a few.





Note: Data from the Stated Policies Scenario from the IEA study. Source: IEA, Company data, Morgan Stanley Research

**Exhibit 89:** Brazilian 2021-2031 Electric Energy Installed Capacity Addition (GW)



Source: EPE's PDE 31, Company data, Morgan Stanley Research

### **Generators & Alternators**

#### i. Key Points

- Although the segment has high exposure to renewable energy it could be hurt longer term with demand for batterybased storage systems displacing it for generators/alternators;
- In the past, it made an important contribution to WEG' topline and in special situations as energy cut risks in the country in past years, we understand;
- Today it accounts for a more modest portion of the GTD segment being not that relevant for WEG, we estimate ~7% of consolidated top-line;
- We estimate a 7% 9 year CAGR.

#### ii. Growth, Mix and Share Assumptions

Through **its alternators & generators**, WEG serves a wide range of sectors such as hospitals, malls, gas stations and events centers. **Its hydraulic and steam** power generators, on the other hand, are more linked to renewable and alternative energy sources such as biomass and waste. Although steam turbines are also implemented in non-renewable sources like thermal stations, WEG's exposure to renewable within the consolidated Generators & Alternators segment is more significant than non-renewable, we understand. Such exposure is also evidenced by WEG's hydraulic turbines & alternators sales

destined to small hydropower plants (PCHs and CGHs) which are considered as renewable energy sources. According to EPE's PDE 31, biomass & waste, PCHs and CGHs will increase its installed capacity in the country at a 1% and 4% CAGR in 2021-30. We assume WEG's sales breakdown in the segment is roughly 45% to hydro, 45% steam power and 10% to other sources. Despite having a sizeable portion of its growth associated to the renewable energy landscape, the Generators & Alternators segment tend to be gradually substituted by battery-based energy storage systems in the long term, thus limiting its LT growth. Taking this trend into account, on a consolidated basis, we expect the Generators & Alternators segment to grow at a 7% 9-year CAGR.

#### iii. Products Description

Alternators are an equipment that transforms mechanical energy (for example from pistons movements resulted by the combustion of fuel) into electric energy through an electromagnetic process. Such equipment is attached to the energy source, in the above case, the fuel-based motor. WEG has a sizeable alternators portfolio with an ample variety of applications, but, as indicated in the previous section, we understand as of now it mainly serves secondary or backup energy generation needs in malls, hospitals, events centers etc. **On the hydro and steam fronts**, WEG sells both the turbine and generators. Those types of energy sources need turbines, which will rotate with the water or steam flow, attached to generators (alternators) to effectively produce the electric energy in the site and then to the grid.



Exhibit 90: Generators and Alternators Application Examples



Cemig, Brazil



### Biomass

UTE São Sepé, Brazil

Source: WEG Institutional Website, Morgan Stanley Research

#### iv. Market Overview

Although this segment had already been important for WEG's EEI revenues and WEG is still one of the top players, it is now gradually loosing relevance for the company. **Regarding the hydro side**, the market can be separated in two: turbines and generators. In Brazil, the first one is mostly composed of WEG and smaller regional players, while in the second despite being competitors, WEG sometimes has the smaller players not as competitors but as customers. **Steam power**, in turn, is a more consolidated market containing large international players such as Siemens. Still, WEG is one of the main players since it has acquired the largest brazilian player, TGM, in 2016. Of note, WEG is not a player in the the gas-turbine market, only in hydro and steam.



Steam

Usina Rio Bonito, Brazil



Generator

Generac, Brazil

## Legislation Changes to Front Load MMDG's Investments

by Miguel F Rodrigues. Fernando P Amaral and Alexandre Zimmermann

**MMDG has been growing significantly in Brazil**. Since 2016, Brazil's Micro and Mini Distributed Generation (MMDG) installed capacity increased from 91 MW to 13.3 GW in mid-September/2022, requiring accumulated investments that surpassed R\$70bn, according to the Brazilian Solar Photovoltaic Energy Association (Absolar). MMDG represents ~6% of Brazil's total installed capacity. Main drivers behind MMDG's fast growth have been:

- i. Regulation enhancement and attractive incentives: Brazil's MMDG regulatory framework was first enacted in 2012 with the power regulator's (ANEEL) Resolution 482/2012. Among other things, it has authorized electricity consumers to generate energy for own consumption, created a net metering system that allows consumers to use excess generation credits to reduce electricity bills and provided incentives, such as discount on distribution charges (TUSD) for projects' developers. Also, energy generated from MMDG systems needs to come from renewable projects (e.g., solar represents ~98% of current total installed capacity);
- ii. Attractive development conditions: Developing conditions in Brazil are highly attractive given the country's solar and wind proper generation condition standards. Also, the technological developments over the years have helped to reduce implementation costs, making own generation investments a relatively profitable business in Brazil;
- iii. Brazil's relatively high electricity consumers' tariffs: Brazil electricity consumers' tariffs had ~12% CAGR (2014-21), and are currently at high levels, even after this year's average reduction. Thus, consumers are gradually increasing MMDG's usage focusing to alleviate electricity costs pressures.
- iv. Adequate financing availability: There are currently more than 70 financing lines (from public and private institutions) available for MMDG developers and customers, according to Absolar.





**Recently approved legislation has encouraged MMDG developers to accelerate the implementation of new projects**... In Jan/2022, the government approved the Law 14.300/2022 that updated MMDG's legal framework, basically aiming at greater transparency and gradual incentives reduction. For instance, among main changes, the law implemented new deadlines for maintaining the full discount on distribution charges (TUSD) as incentives for MMDG's projects' development depending on different levels of implementation stages, which we detail below. We note the changes will affect only the energy amount injected into the grid through the net metering mechanism, as the portion generated and instantly consumed should continue to save all tariff components.

- Operating projects, or those that file a request for access until January 7, 2023: TUSD 100% discount continue to be applied until 2045.
- Projects that file a request for access between January 8 until July 7, 2023: TUSD 100% discount continue to be applied until 2031.
- For new generators that file the request after July 7, 2023: gradual elimination of TUSD discount from 2023, achieving full discount elimination in 2029.

**Exhibit 92:** MMDG's incentive changes brought by Law 14.300/2022



Source: EPE, PSR, Morgan Stanley Research

...Likely boosting MMDG's growth in the mid-term. As the new legislation gradually eliminates new projects' incentives, it also encourages MMDG developers to start the projects' operations earlier, likely accelerating the MMDG capacity additions in the short to medium-term.

**Brazil's EPE forecasts for MMDG's growth:** Brazil's Energy Planning Entity (EPE) forecasts (in its PDE 2031 report) that the installed capacity of MMDG could triple by 2031, reaching ~37 GW (representing ~14% of Brazil's total installed capacity) and requiring ~R\$135bn investments for the 10-year period. For 2022-YE, the EPE forecasted an accumulated MMDG installed capacity of 11.3GW. Finally, EPE forecasts that ~91% of MMDG's incremental capacity by 2031 will be developed from solar sources.

We believe EPE's long-term estimates is reasonable, but we expect faster development pace, as MMDG's capacity as of Sep/22 of 13.3 GW already surpassed EPE's estimate for the year. Thus, we assume MMDG's capacity should reach ~14.6GW in YE-2022 (assuming that monthly growth rates until year-end should remain mostly in line with 2022's YTD CAGR), representing ~29% higher capacity than EPE's 11.3GW estimate this year.

In our view, although EPE's forecast already considered the latest regulatory changes introduced by the Law 14,300/2022, we believe the higher-than-expected short-term growth could be potentially explained by favorable factors in the supply and demand sides.

- From the supply perspective, utility-scale generation projects currently face challenges to be developed at attractive returns, possibly redirecting developers to invest in MMDG. This is mostly due to downward PPA price pressure (driven by the country's oversupply persistence for longer), good hydrology, and upward pressures in capex and financing conditions.
- From the demand side, final consumers' tariffs are at high levels even after this year's average reduction, which also supports consumers' growing demand focusing on lower electricity costs.

**Investments should peak this year, and gradually decrease after the complete elimination of incentives**. In our view, MMDG's capacity growth towards ~37GW in 2031 (from 8GW in 2021) should require ~R\$140bn; we assume an average capex per MWdc of R\$5.5mn during the period, considering a gradual reduction from ~R\$6.2mn/MWdc in 2022 to ~R\$5mn/MWdc by 2031.



Exhibit 93: We believe MMDG's growth will likely beat EPE's fore-



**Exhibit 94:** We expect MMDG's investments to reach ~R\$146bn in 10-year period



Source: ANEEL, EPE, Morgan Stanley Research estimates.

Back to the basics – What is Micro and Mini Distributed Generation (MMDG)? MMDG reflects energy that is selfproduced and distributed by consumers through smallscale power plants (mostly renewable sources, such as solar, wind and small hydro); also, net metering systems allow the use of excess generation as credits to reduce their electricity bills within 5 years. MMDG can take place at basically two models: i) Locally: generation at the point of consumption (i.e., consumers' rooftops); or ii) Remotely: when the energy generated by remote self-consumption (i.e., energy used in two or more units belonging to the same client) or shared generation (i.e., energy destinated to cooperatives or consortiums).

MMDG could be obtained by any renewable generation sources (including co-generation) that are connected to the distribution system through final consumers' own installations, with maximum installed capacity of 75kW for Micro DG and from 75kW up to 5MW for Mini DG. We note solar Mini DG limit was reduced from 5MW to 3MW after the approval of the Law 14.300/2022; for dispatchable sources, the limit of 5MW remained, though.

## Commercial and Appliance Motors

This segment comprises electric motors of generally lower voltage, usually implemented in consumer durable goods such as washing machines, drying machines and air conditioning. Other applications of such motors also include pumps, compressors and ventilators for commercial use apart from specific usages such as food processors. Those types of motors are also legacy products for WEG and tend to have more modest growth characteristics, likely keeping pace with the overall global economic growth, we believe. As of 2Q22, Brazil accounted for 40% of the top-line for this segment, with external markets accounting for the remainder 60%.



Exhibit 95: Commercial and Appliance Motors Dashboard

Source: Company data, Morgan Stanley Research

#### i. Main Points

- Such products are usually directed to lower scale applications related to overall economic activity, thus growth in this segment can be understood as a "macro play", in our view;
- This is a legacy business segment for WEG, representing 11% of consolidated net revenues as of 2021;
- Revenue mix is roughly 50% domestic, 50% external.

#### ii. Growth & Contribution Assumptions

Historically, the Commercial & Appliance Motors (CAM) segment has generally represented between ~10-15% of WEG's consolidated net revenues. In terms of growth, it's a segment related to both the

domestic and external economic activity. For instance, in 2020-21, in Brazil, the segment experienced strong growth of 23% and 47%, respectively, due to the pandemic effect. The Brazilian government had conceived a monetary incentive to the population as a whole to foment the economic activity during lockdowns period - the "coronavoucher". This was one of the reasons behind the segment's strong growth, roughly 80% vs. pre-pandemic levels. With the end of the government program and a tougher macro scenario where inflation has reached ~10% in 2021 and record prints throughout the months of 2022, CAM domestic top-line has decreased 26% and 23% in 1Q22 and 2Q22, respectively (also due to 1Q21 high comps) but somehow evidencing a lower overall consumption. Having said that, we understand the segment is linked to the overall economic activity, thus characterizing itself much more as a macro play.

#### iii. Products Description

Products underneath this segment are also legacy products for the company as it is comprised of electric motors aimed for different commercial uses. They are mainly single-phase motors for consumer durable goods - white goods, for example - as washing machines, A/Cs and water pumps. Dedicated commercial use motor lines as lawn mowers, concrete mixers, food processors, among others, are also part of this segment. But, as in motors under the Motion Drive subsegment, greater share of sales comes from pumps, compressors and ventilators. Of note, at its 2021 Investor Day, the company disclosed the Commercial and Appliance motors under Motion Drive's umbrella. But following the official earnings disclosure, we opted for assessing these products separately and under its own segment.

#### iv. Market Overview

We understand WEG is one of the local market leaders among the motors manufacturers, while abroad it faces greater competition, holding a lower market share. For instance, one data point provided by WEG at its 2021 Investor Day was its 11% share on the North American commercial motors market. As products are inserted into different niches and have a wide range of uses, it's more complex to assess the exact WEG's market share in the whole segment. However, as previously discussed, we believe WEG is a top-ranked player in the local market where it competes with the same players as in the external one, roughly, which are the ones it competes in other division as well, namely, Siemens and ABB, we understand.

## Paints & Varnishes

Paints & Varnishes are products sold as a complement to the bulk of WEG's sales - EEI, GTD and Commercial & Appliance Motors portfolio. It accounts for ~4-5% of the company's consolidated sales with ~80-85% in the domestic market. Main lines are liquid and powder coatings, varnishes and diluents.





Source: Company data, Morgan Stanley Research

#### i. Main Points

- Represents about ~4-5% of WEG's consolidated net revenues;
- Growth of the segment is historically in line with WEG's consolidated revenue growth and we expect it to maintain this performance in the long term;
- This business segment is composed mostly by complementary products to several product lines from other WEG' segments.

#### ii. Growth & Contribution Assumptions

WEG's Paints & Varnishes division represents about 4-5% of WEG's revenues and we expect this share to be maintained as this division's sales are mostly related to other WEG business segment's sales performance. Most of this division's products are sold along with other WEG products as they will require maintenance during its useful life, therefore we see the growth of this division in line with WEG's consolidated revenue growth (15% CAGR 2021-30).

#### iii. Products Description

Among the Paints & Varnishes division, WEG has 5 main segments: liquid coatings, powder coatings, impregnation varnishes, automotive refinishing and diluents.

 WEG's liquid coatings products fit mostly in two categories: industrial/anticorrosive and marine. The first category offer solutions for a variety of industries, such as agricultural implements, casting, chemical and petrochemical and also for other segments WEG is present in, such as transformers, motors and wind power. The second category focus on products for vessels, ships and offshore platforms. WEG also offers a variety of sustainable liquid coatings through the application of water-based component instead of solventbased component.

- **Powder coating** is a dry coating process and WEG offers a diversified line of products for different applications and purposes such as coating lines with weathering resistance, chemical and anticorrosive resistance or antimicrobial properties.
- **Impregnation varnishes** are products mainly focused on electric motors, electronic reactors and transformers because of its dielectric properties, flexibility, hardness, chemical resistance and adhesion protecting these equipment from difficult environmental conditions.
- WEG's **automotive refinishing and fleet** segment offers a variety of solutions for the automotive segment such as putties, primers, basecoats and clearcoats. The **diluents** are responsible for diluting the most varied type of paints and varnishes, reducing their viscosity and increasing their flow rate, therefore making the application of metals easier.

#### iv. Market Overview

Although WEG's Paints & Varnishes division represents a small share of the consolidated revenues, WEG stands out as one of the largest coating manufacturers in Latin America and exports their products to other continents as well. As mentioned before, we view this division's products as complementary to other product lines offered by WEG, such as motors and transformers. Because of that, we understand WEG has a solid position in the market, as customers may prefer to purchase coatings, repaintings and other maintenance services from the same company as the original equipment.

## Summary Financials

Exhibit 97: Summary Financials

Income Statement (R\$mn)	2019	2020	2021	2022E	2023E	2024E
Net Revenue	13,347	17,470	23,563	29,723	34,737	39,799
COGS	9,394	12,032	16,602	21,469	24,628	28,218
SG&A	1,802	2,161	2,609	3,032	3,578	4,091
Other	312	460	193	543	695	796
Total	2,113	2,621	2,803	3,575	4,273	4,887
D&A	397	451	520	555	555	628
EBITDA	2,237	3,268	4,679	5,234	6,391	7,322
% margin	16.8%	18.7%	19.9%	17.6%	18.4%	18.4%
Operating Income	1,840	2,816	4,158	4,678	5,836	6,694
% margin	13.8%	16.1%	17.6%	15.7%	16.8%	16.8%
Non-op expense (income)	(43)	(70)	172	20	1	51
Pre-tax income	1,797	2,747	4,330	4,699	5,837	6,745
Тах	172	351	673	745	1,026	1,189
Net income	1,615	2,341	3,586	3,901	4,736	5,469
EPS (R\$)	0.38	0.56	0.85	0.93	1.13	1.30

Source: Company data, Morgan Stanley Research

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Coverage Universe			Inv	estment Banking Clien	Other Material Investment Services Clients (MISC)		
Stock Rating Category	Count	% of Total	Count	% of Total IBC	% of Rating Category	Count	% of Total Other MISC
Overweight/Buy	1356	38%	304	41%	22%	596	39%
Equal-weight/Hold	1589	45%	349	47%	22%	716	47%
Not-Rated/Hold	0	0%	0	0%	0%	0	0%
Underweight/Sell	610	17%	90	12%	15%	225	15%
Total	3,555		743			1537	

Data include common stock and ADRs currently assigned ratings. Investment Banking Clients are companies from whom Morgan Stanley received investment banking compensation in the last 12 months. Due to rounding off of decimals, the percentages provided in the "% of total" column may not add up to exactly 100 percent.

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#### Stock Price, Price Target and Rating History (See Rating Definitions)



WEG (WEGE3.SA) - As of 9/28/22 in BRL

#### Stock Rating History: 9/1/17 : U/I; 11/9/20 : U/I

Price Target History: 4/20/16 : 4.62; 6/14/18 : 7; 7/17/18 : 7.5; 7/18/18 : 7.8; 10/24/18 : 8.25; 2/21/19 : 8.65; 4/23/19 : 8.5; 4/24/19 : 8.6; 7/24/19 : 9.75; 10/20/19 : 10.9; 10/25/19 : 11.75; 1/16/20 : 13.45; 9/10/20 : 23.1; 4/23/21 : 25; 4/29/21 : 27; 8/6/21:30;11/5/21:29;2/4/22:26

Date Format : MM/DD/YY Source: Morgan Stanley Research Price Target --No Price Target Assigned (NA) Stock Price (Not Covered by Current Analyst) — Stock Price (Covered by Current Analyst) =

Stock and Industry Ratings (abbreviations below) appear as ♦ Stock Rating/Industry View

Stock Ratings: Overweight(O) Equal-weight(E) Underweight(U) Not-Rated(NR) No Rating Available(NA)

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### INDUSTRY COVERAGE: Latin America Transportation & Infrastructure

COMPANY (TICKER)	RATING (AS OF)	PRICE* (09/26/2022)
Josh Milberg, CFA		
Aeris (AERI3.SA)	E (03/29/2021)	R\$1.95
Armac (ARML3.SA)	U (07/24/2022)	R\$13.94
ASUR (ASR.N)	U (02/07/2020)	US\$199.28
Azul SA (AZUL.N)	U (03/23/2021)	US\$8.01
CCR (CCR03.SA)	0 (05/05/2021)	R\$12.45
Copa Holdings (CPA.N)	0 (09/07/2016)	US\$66.89
Dexco SA (DXCO3.SA)	0 (06/02/2022)	R\$9.13
EcoRodovias (ECOR3.SA)	0 (05/05/2021)	R\$4.86
G.A. Pacifico (PAC.N)	E (02/20/2018)	US\$131.71
GMexico Transportes SA de CV (GMXT.MX)	E (06/26/2022)	M\$33.20
Gol Airlines (GOL.N)	U (03/23/2021)	US\$3.15
Grupo Traxion SAB de CV (TRAXIONA.MX)	0 (11/09/2017)	M\$19.01
Hidrovias do Brasil SA (HBSA3.SA)	0 (11/03/2020)	R\$2.29
Infraestructura Viable SA de CV (FVIA16.MX)	E (11/27/2016)	M\$25.50
lochpe-Maxion (MYPK3.SA)	E (11/09/2020)	R\$12.46
Localiza Rent A Car SA (RENT3.SA)	0 (08/29/2022)	R\$59.43
Movida Participacoes S.A. (MOVI3.SA)	E (08/09/2017)	R\$12.16
OMA (OMAB.O)	0 (05/22/2022)	US\$51.34
PROMOTORA Y OPERADORA DE INF (PINFRA.MX)	E (12/10/2018)	M\$140.49
Randon (RAPT4.SA)	E (06/02/2022)	R\$9.35
Rumo Logistica (RAIL3.SA)	0 (05/24/2016)	R\$18.19
Santos Brasil (STBP3.SA)	0 (01/21/2021)	R\$7.59
Sequoia SA (SEQL3.SA)	E (03/22/2022)	R\$5.78
Vamos (VAMO3.SA)	0 (09/05/2021)	R\$13.56
Volaris (VLRS.N)	0 (04/24/2018)	US\$7.33
WEG (WEGE3.SA)	0 (09/29/2022)	R\$30.14
Nikolaj Lippmann		
Cementos Argos S.A. (CCB.CN)	0 (01/22/2019)	Co\$3,286.00
Cemex (CX.N)	0 (09/10/2020)	US\$3.40
CEMEX Latam Holdings S.A. (CLH.CN)	E (03/19/2020)	Co\$2,990.00

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