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Dry Air MV GIS

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A large share of all switchgears contains the worst Greenhouse Gas known – SF₆

Gas insulated switchgear (GIS¹)

Traditional GIS with SF₆ gas



SF₆

25,200 x CO₂
GWP³ of SF₆

100 Million cars
Equivalent emissions p.a.

80% used in GIS
of SF₆ production

Exp. growth = 75%
From 2019 levels, by 2030

SF₆ is 25,200 times stronger² than CO₂



1) GIS = Gas Insulated Switchgear; A switchgear that is hermetically sealed from the environment and which contains a gas as insulation medium to protect against electric faults
 2) AIS = Air Insulated Switchgear; A switchgear that is open to the environment and therefore insulated by the surrounding atmosphere, i.e. "Air"
 3) GWP = Global Warming Potential: The amount of SF₆ multiplied by the GWP equals the amount of CO₂ with the same Greenhouse effect

“click”

Lifecycle SF₆ emissions in MV segment are higher than thought

Industry best practice

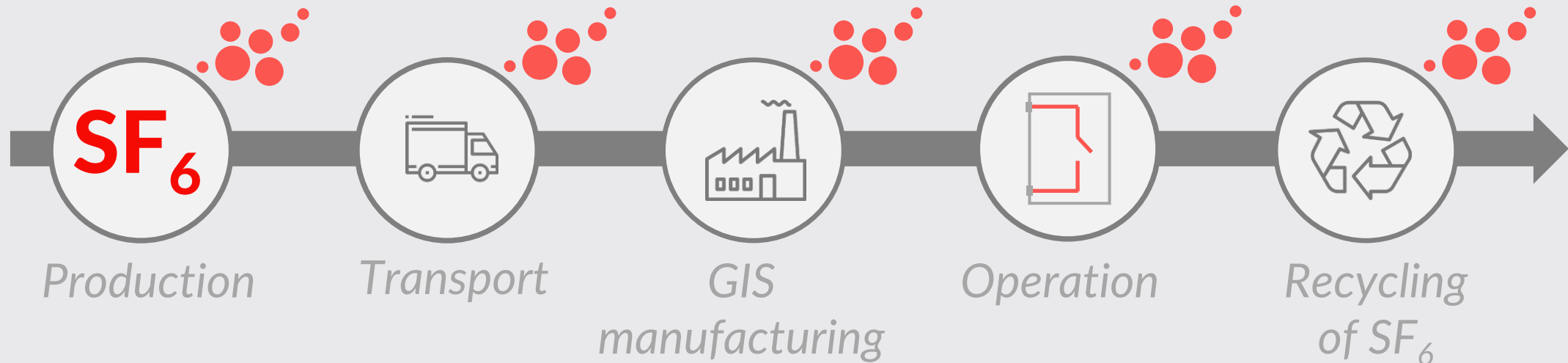
1.5%

Market worst case

40%

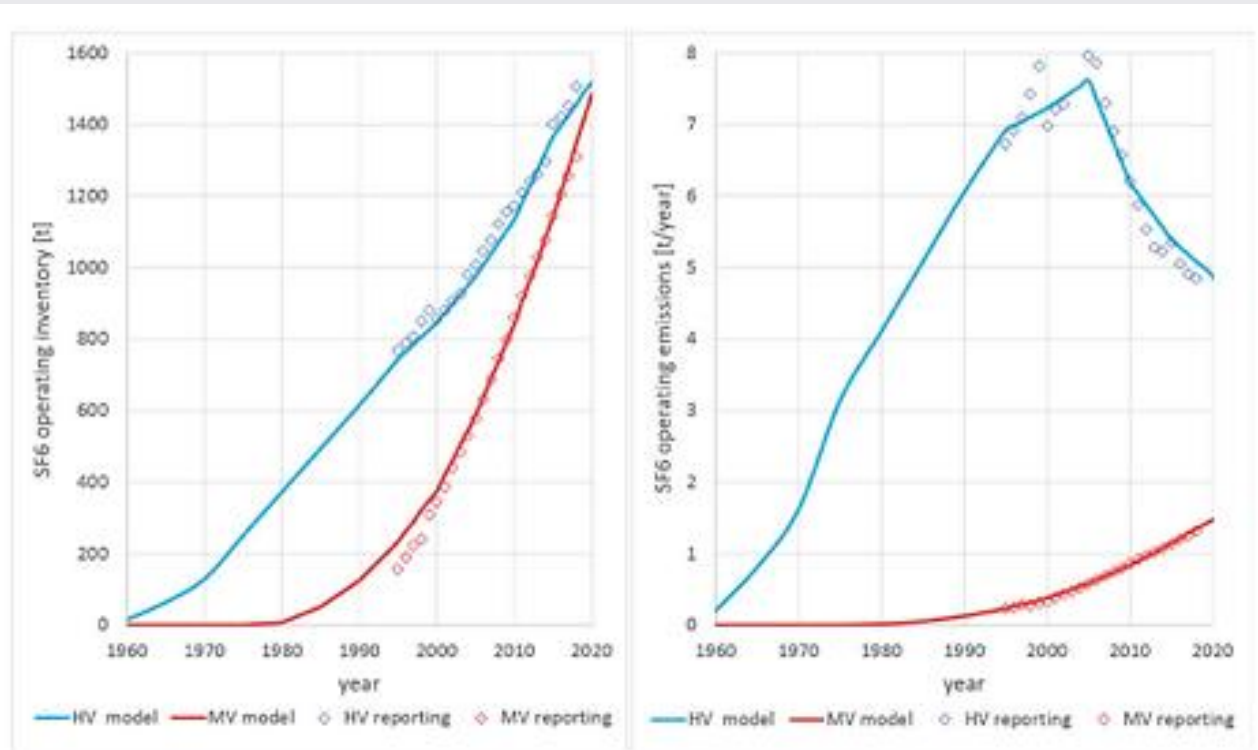
Best guess

10%




 - emissions


SF6 is as much a problem in MV segment as in HV segment



Source: annual german reporting to the environment ministry and environment federal office

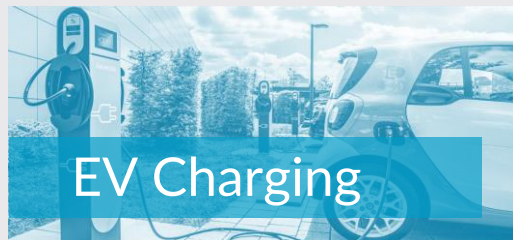
 MV SF6 inventory equal to HV

 SF6 emissions increasing since 1980s

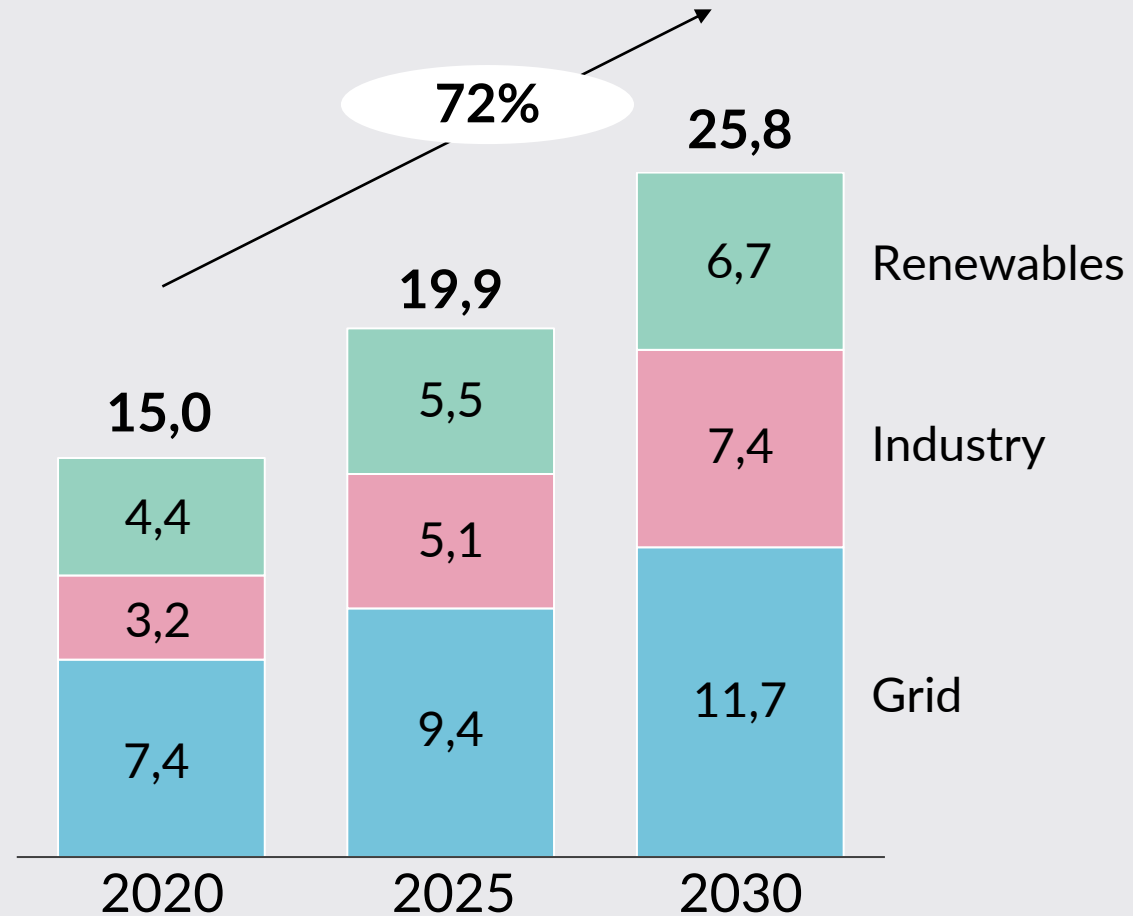
 Projection of 40% increase in MV installations by 2050

The energy transition drives the demand for medium voltage switchgear

Drivers for demand



Market for Medium voltage switchgear EUR bn



Regulators around the world ban SF₆ from switchgear



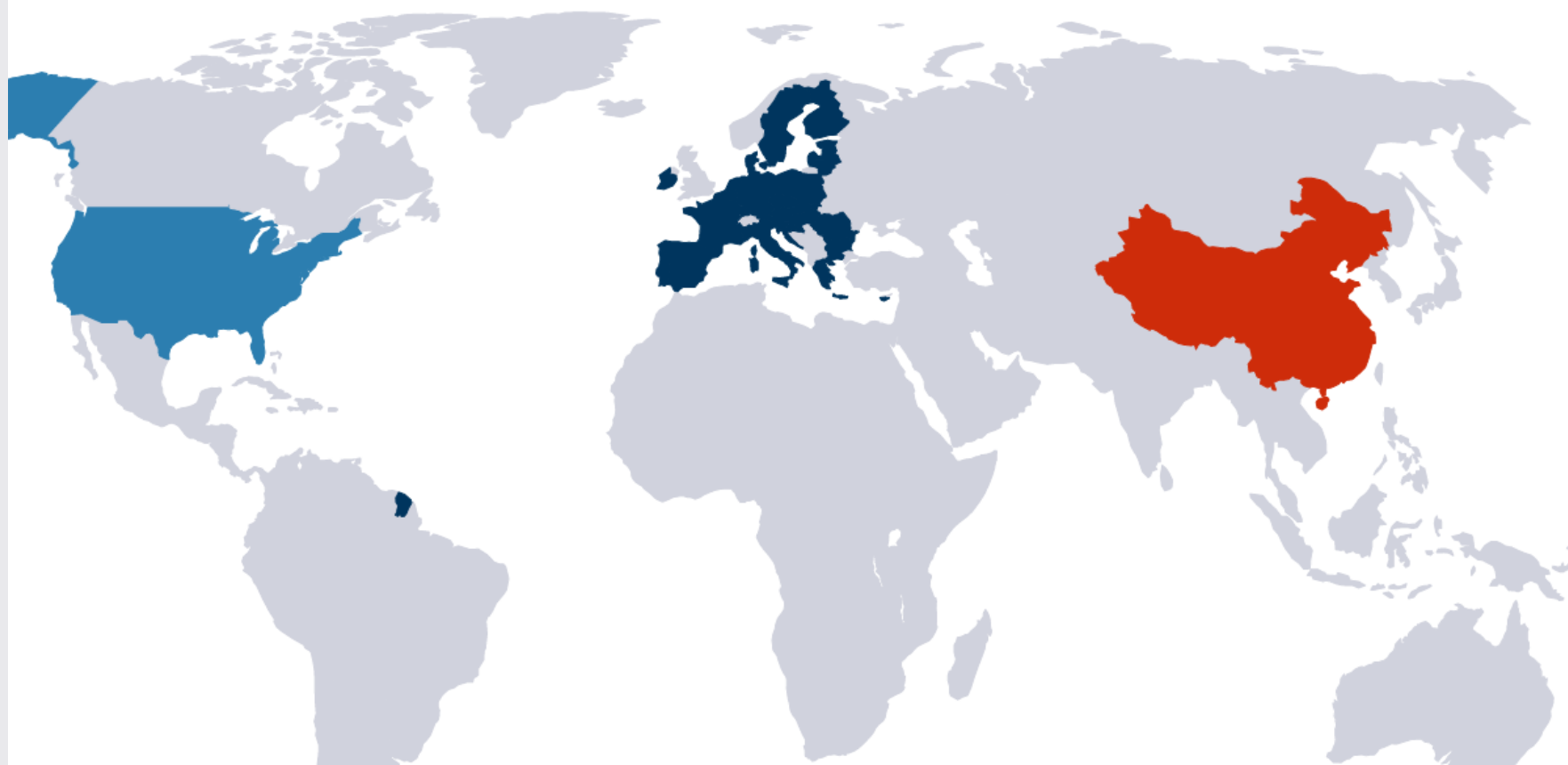
2025



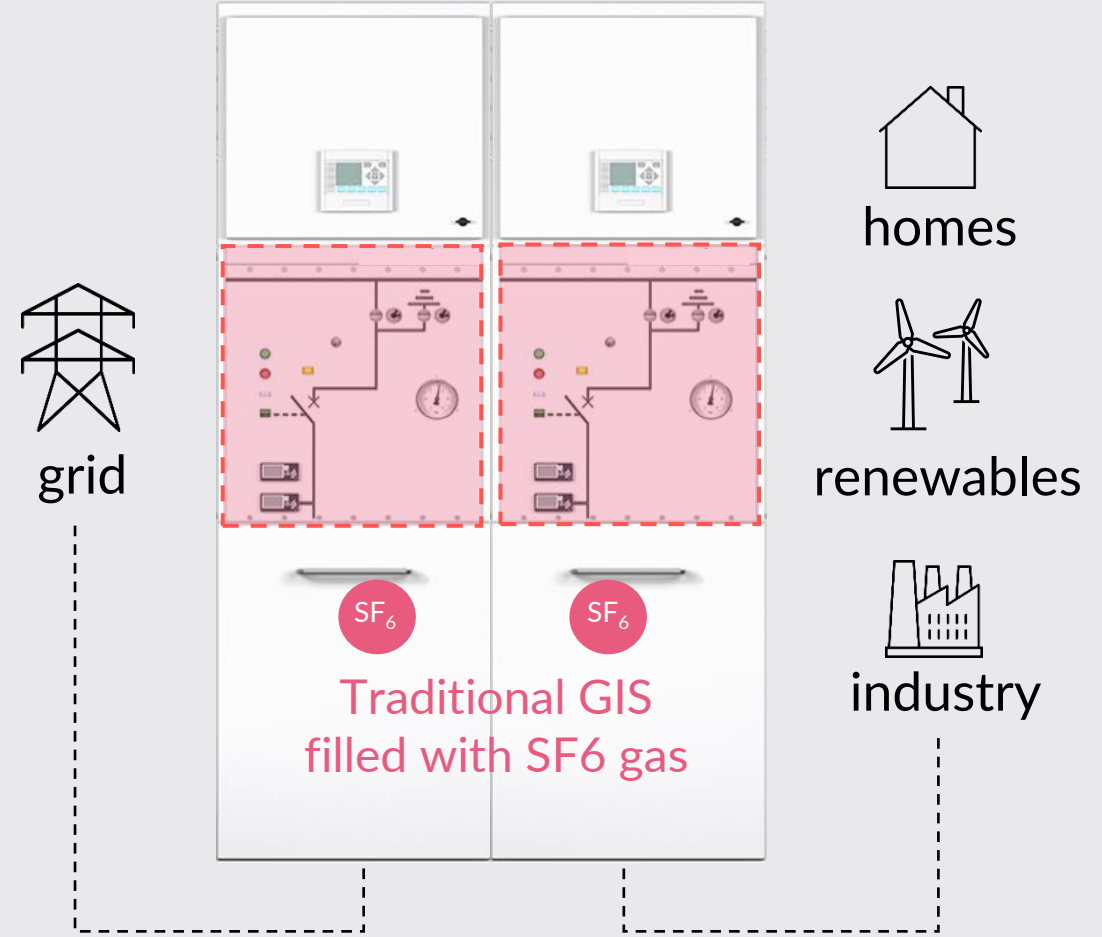
2026



TBA



GIS users are facing additional costs related to SF6



Natural gases will win Technology battle for SF₆ alternatives

Former battle of technologies

- Purely natural gases
- Mixtures with F-gases

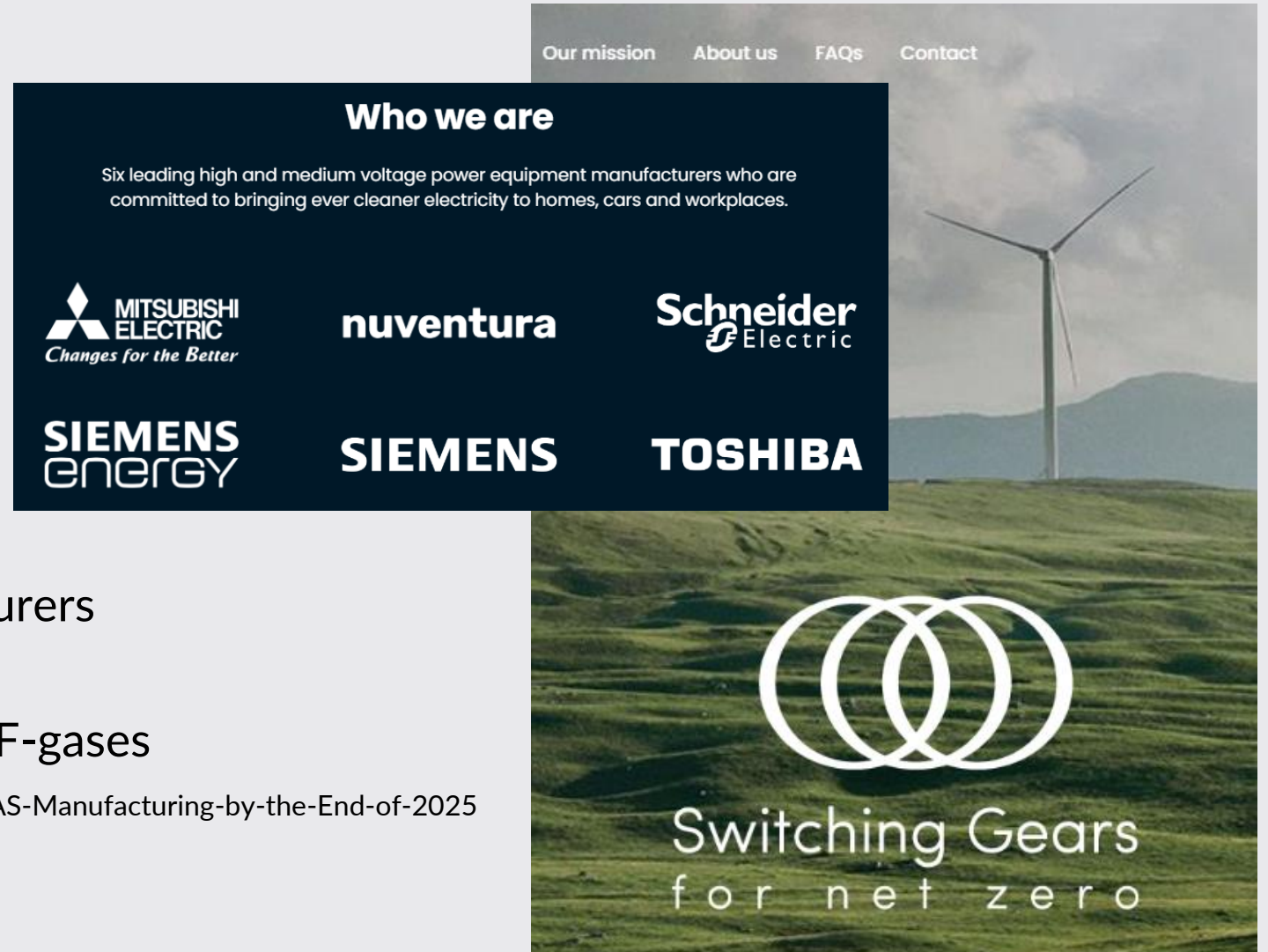
Natural gases will make the race

- 'Net zero' alliance of manufacturers

<https://www.switchinggearsfornetzero.com/>

- Production stop of alternative F-gases

<https://news.3m.com/2022-12-20-3M-to-Exit-PFAS-Manufacturing-by-the-End-of-2025>



Nuventura GIS use **DRY AIR**

Fully functional like SF₆

Fully certified

Operational in European grids

Cost competitive with SF₆-GIS




From lab stage piloting with a prototype...

Founded in Berlin

2017

Prototype pilot

2018

 innogy **WESTNETZ**



... through extensive testing and certification (type test)

Founded in Berlin


2017

Prototype pilot

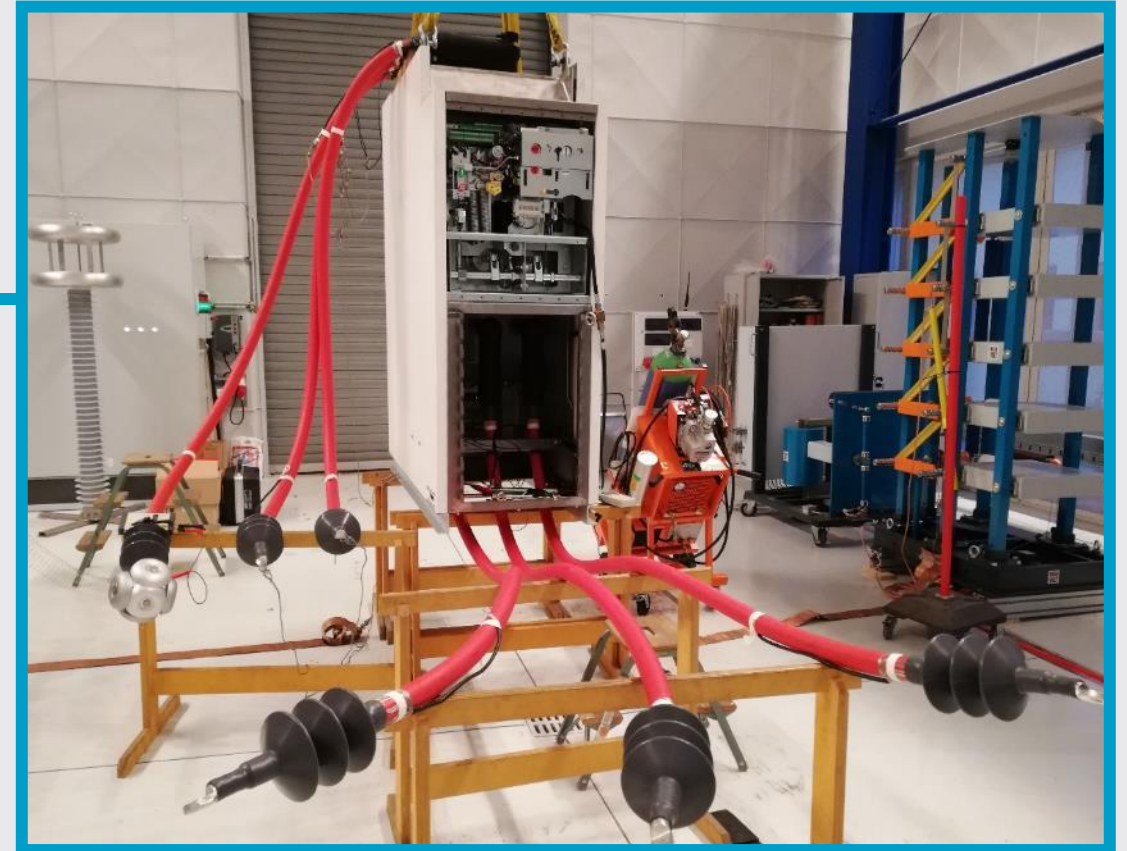
2018

1st product
type tested
















2020

 innogy **WESTNETZ**

KEMA Labs



References of nu1 Dry Air GIS

	Country	Customer	Project/ Segment		Country	Customer	Project/ Segment
2021	 Germany		Utility	2023	 New Zealand	EPC / DSO	Utility
	 Germany		Hydrogen		 Austria	EPC / DSO	Utility
2022	 Turkey		Demo	 Colombia	EPC	Demo	
	 Spain		Renewables	 New Zealand	EPC / DSO	Utility	
	 Canada		Certification	 Multinational	EPC / Industry	Mining	

Nuventura offers OEMs to enter the GIS market as it fits their capabilities

Benefits of each model

Value chain

R&D

Production

Customization

Installation

Service

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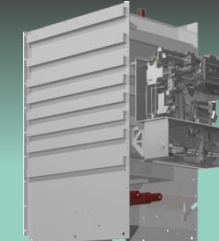
Full panel sale



Primary panel sale



Sub-assembly license



Switchgear distributor

Switchgear customizer

End-customer

Pilots & R&D
Full panel

Level 1:
Primary panels

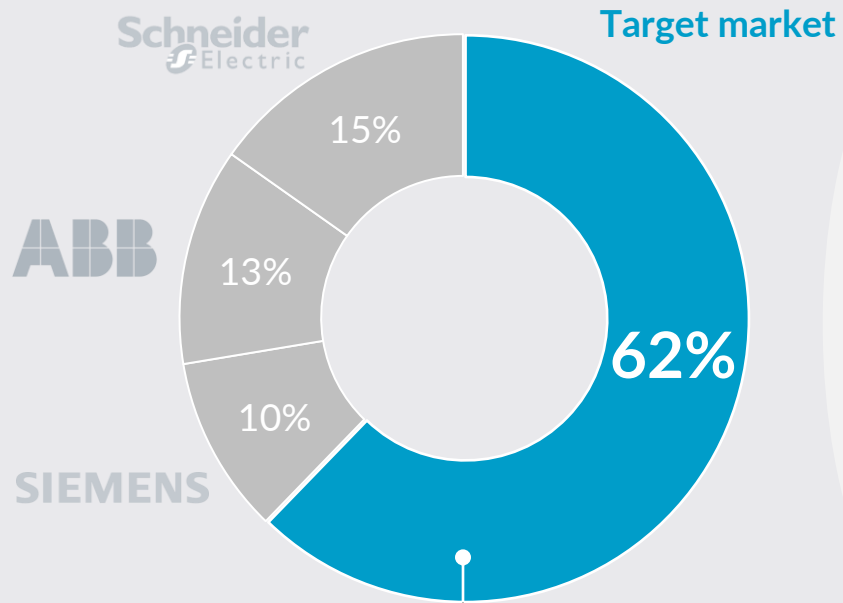
Level 2:
Core modules

Thank you!

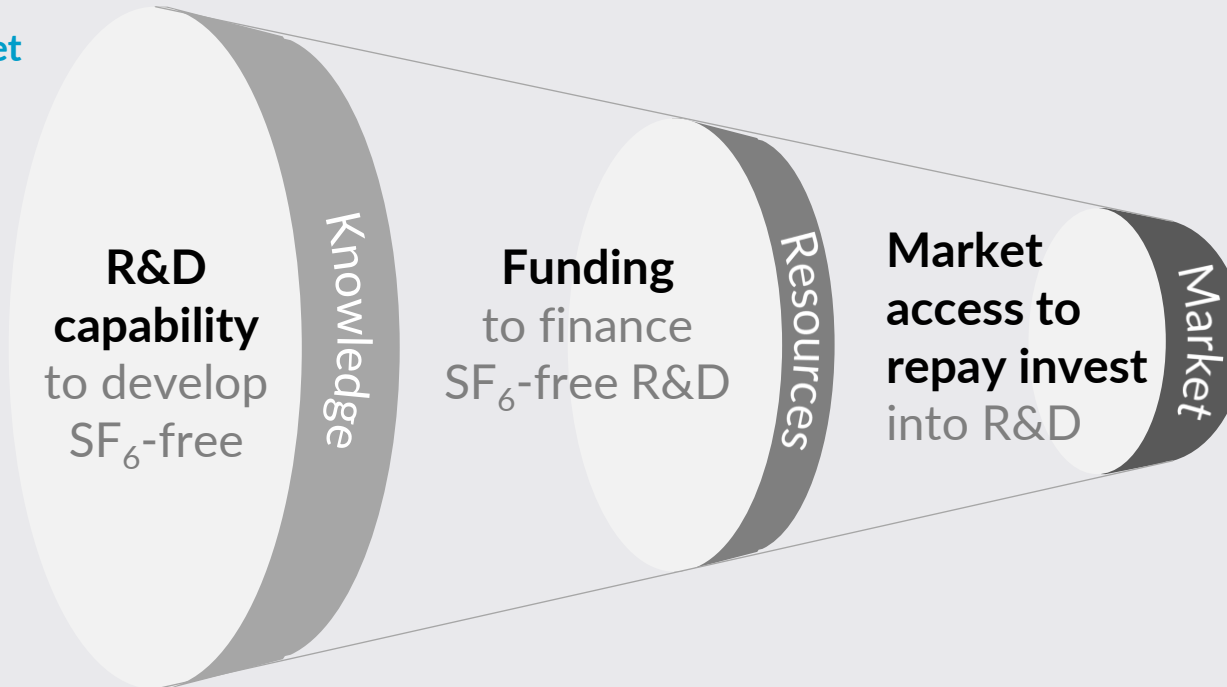


Except for a small elite, the majority of the market participants cannot develop SF₆-free switchgear

Global market share
for MV Switchgear 2016¹



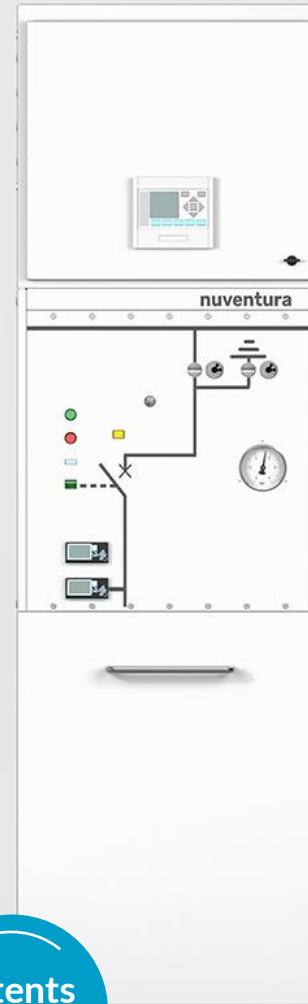
> 1000 Tier 2/3 manufacturers filtered out



SIEMENS
Schneider Electric
ABB
EATON
... any others?

1) Source: „Medium Voltage Switchgear Market“, Transparency Market Research (July 2017), own calculations

We enable manufacturers to offer SF₆-free GIS immediately



Dry Air
instead of **SF₆**
The strongest GHG
known to scientists

Deep dive
available

Patents
granted!

See us in action...



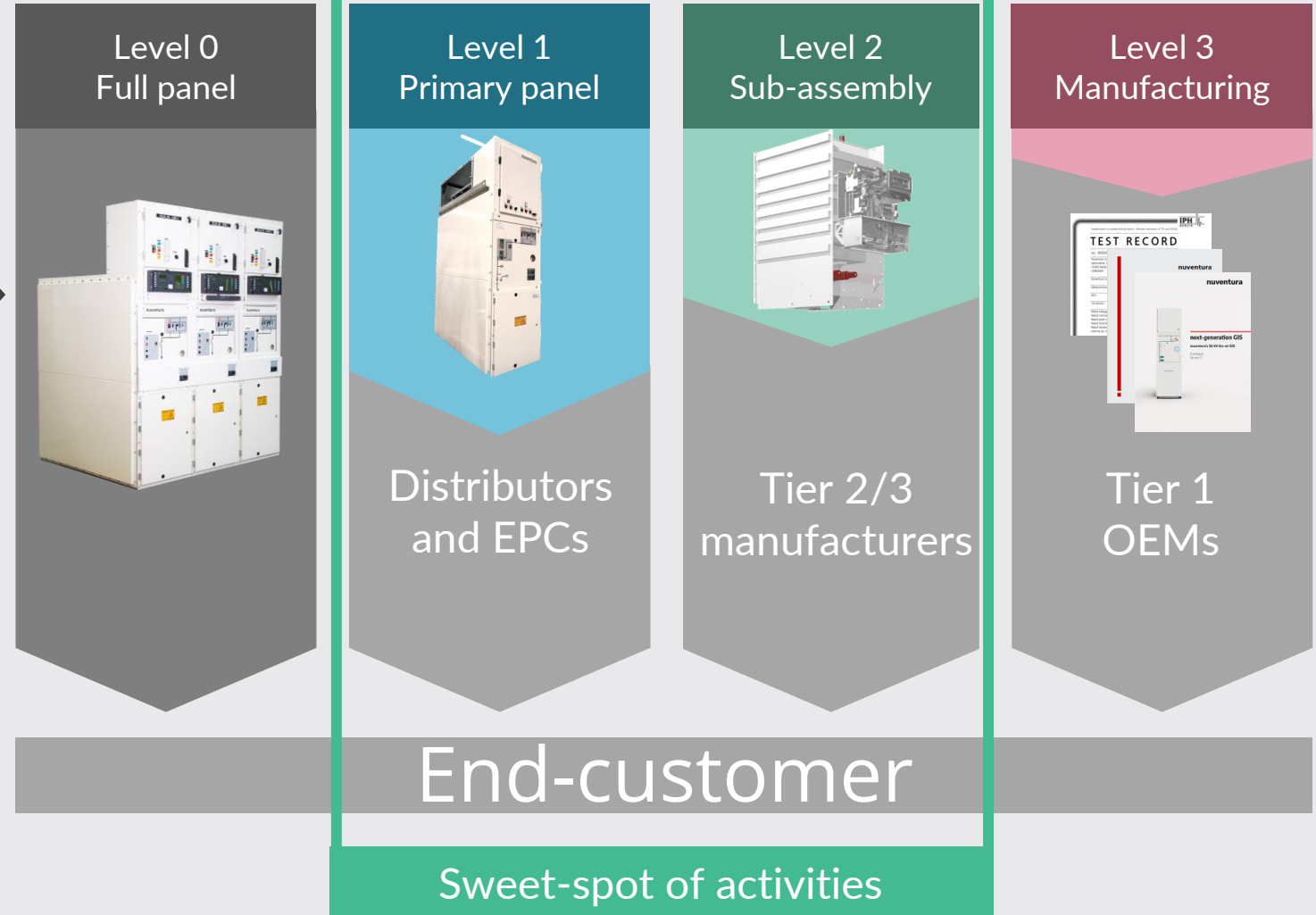
1) Access to patents, technical documentation, process descriptions quality assurance, processes, custom engineering included in a license to sell and assemble

Manufacturers of switchgear are enabled through different levels

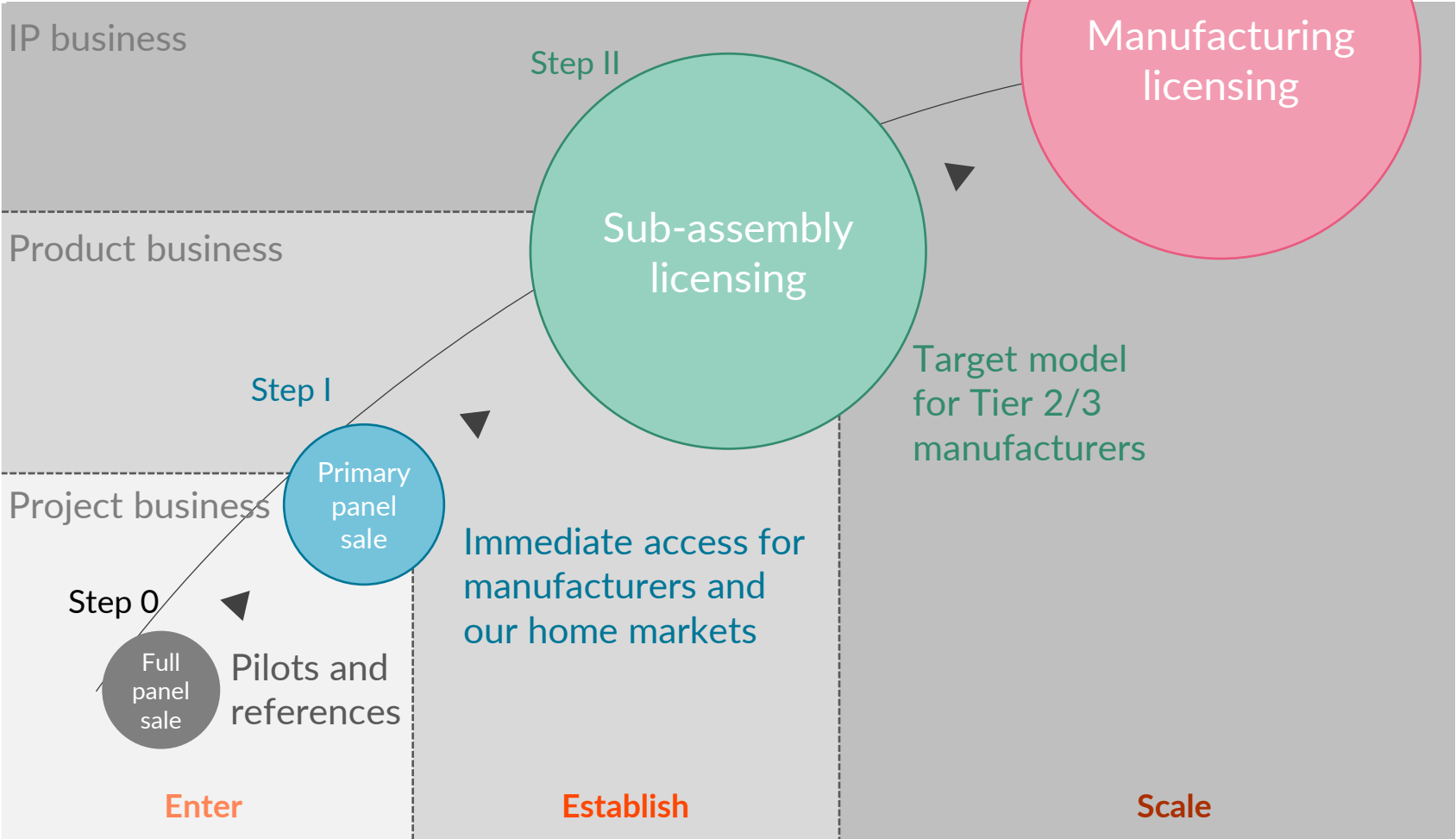
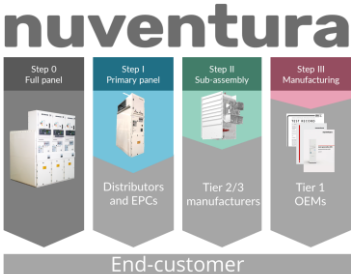
Value proposition

1. Immediate portfolio upgrade
2. Pay as you grow
3. Long-term partnership

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Win-Win: As Manufacturers' integrate upstream their LTV grows for us



We are the first mover in the high margin 36kV segment

Scaling down to lower segments is technically easy and cost efficient for us

Solution becomes more difficult >



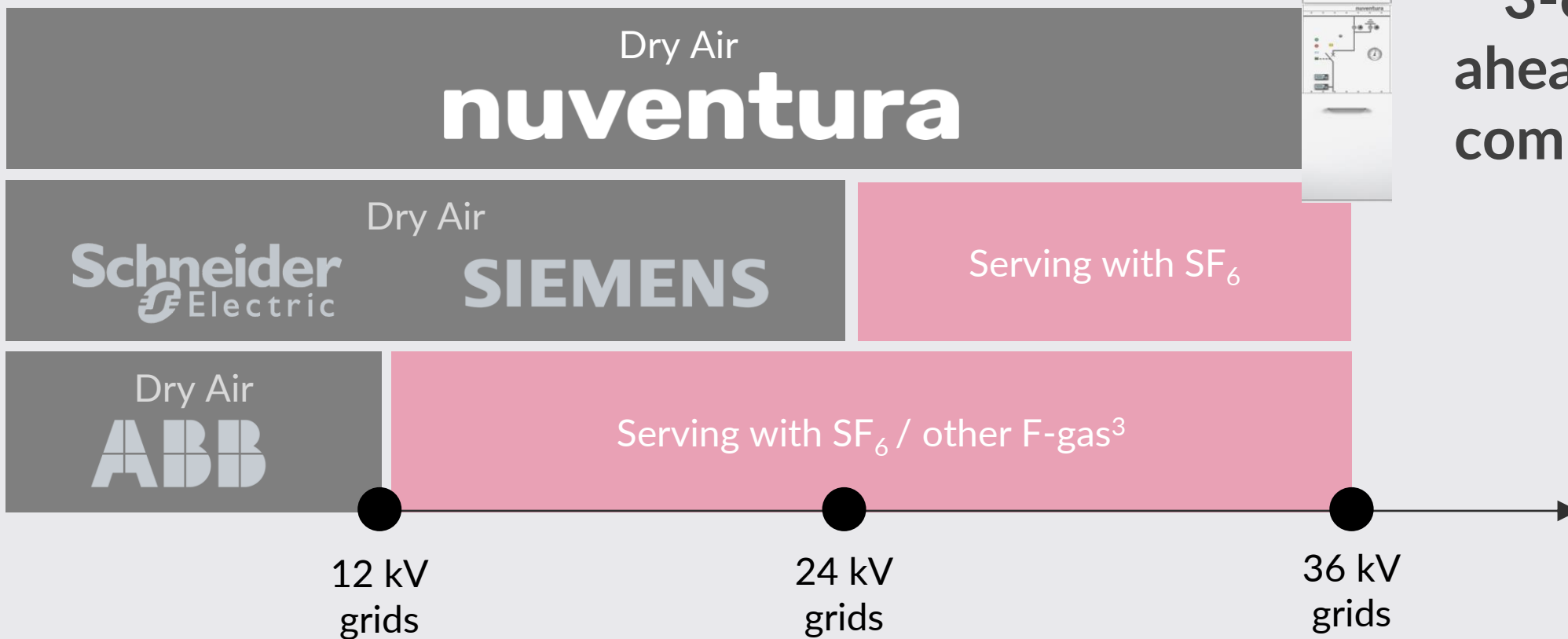
Patents granted!

3-6 years ahead of the competition²



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23



Deep dive available

1 The industry term is: technical air at 20% O₂ and 80% N₂

2 Source: [VDE FNN paper on SF₆ phase out](#) as published in 05/2021: The above manufacturers state that they need 6 years starting from 2023 to offer a 36kV product portfolio whereas nuventura will have the portfolio completed by 2023

3 ABB offers a F-gas called C5-Fluorocetone developed together with 3M in a mixture with a carrier gas. It is branded under the name "AirPlus" and has a smaller GWP than SF₆. But Like SF₆ it is a fluorinated gas with a high GWP factor and poses other unanswered technical and environmental challenges.

The current traction is a result of strong proof points from the last 4 years

Focus	Pure R&D	Product development	Proof of concept	Next financing
Funding	EUR 1.3m	EUR 4.1m ¹	EUR 4.5m	EUR ~10m
Year	2018	2019	2020/21	Q1/2 2022

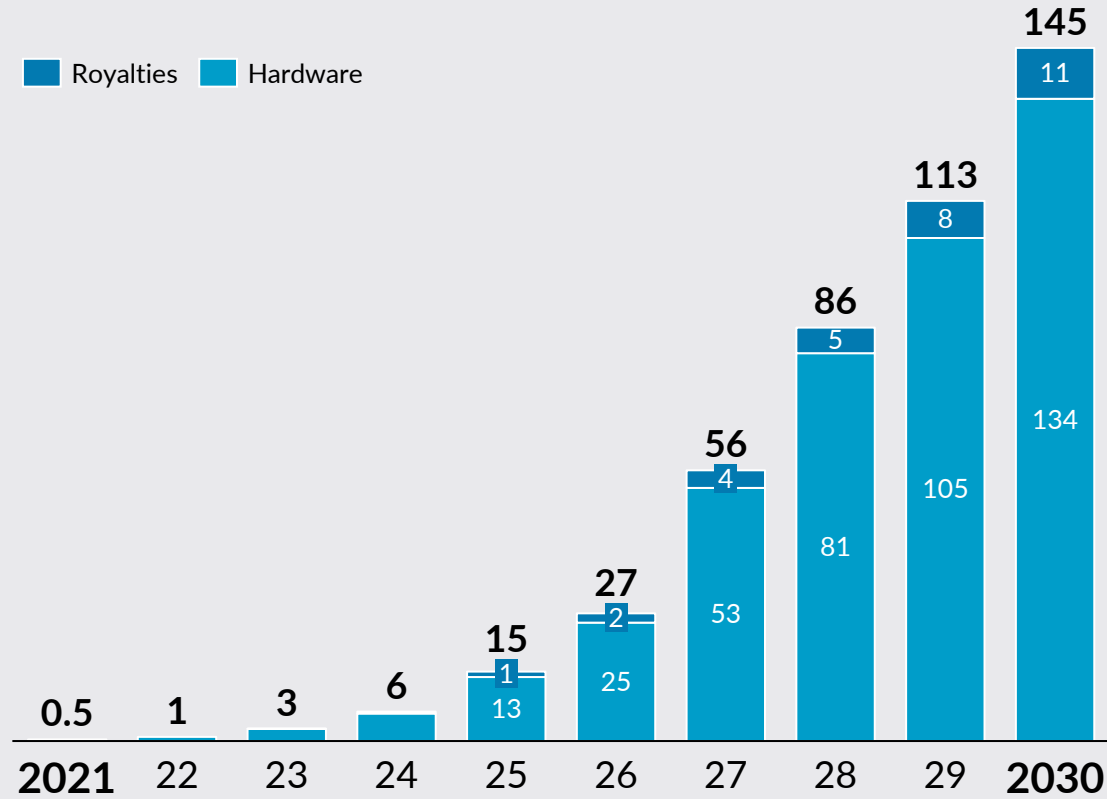


¹ Includes 1m loan, repayable from 2023 onwards
² Further certification of additional variants will onto throughout the coming years

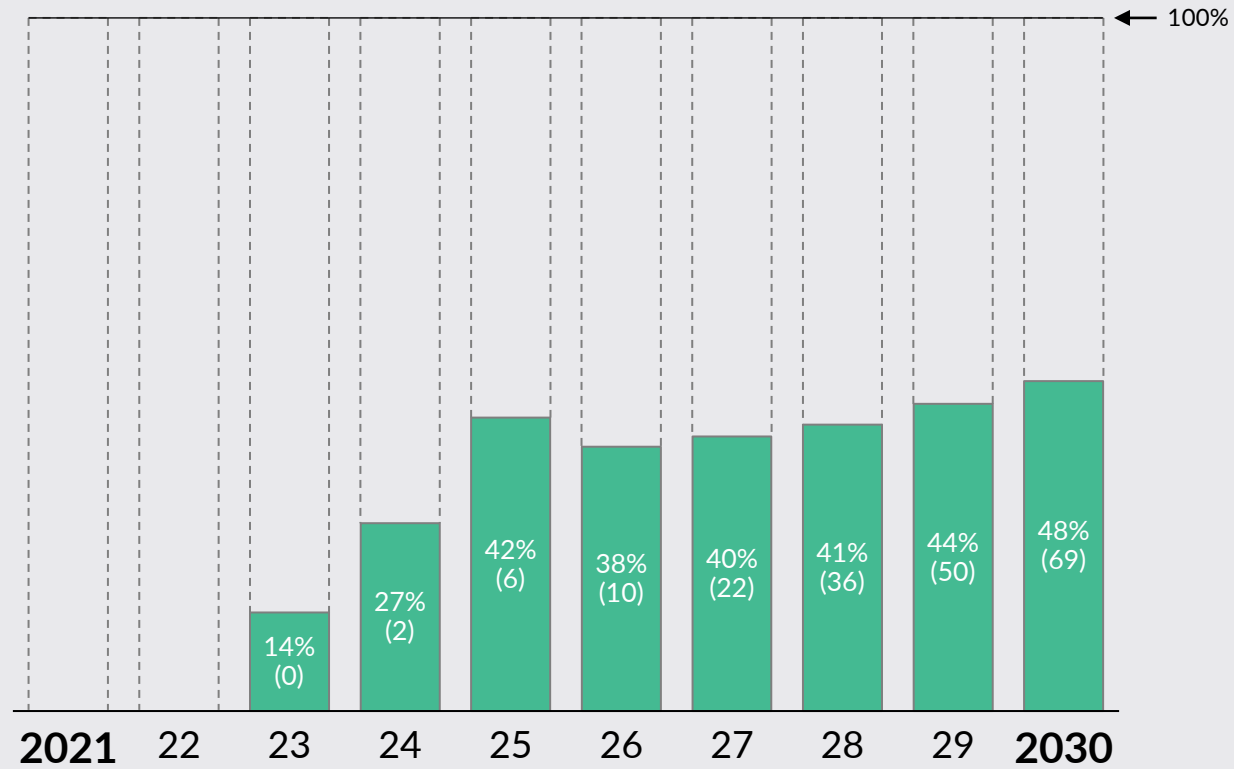
Deep dive to Funnel available

With 2022 order targets already secured, we are on track for scaling

Order forecast
€ million



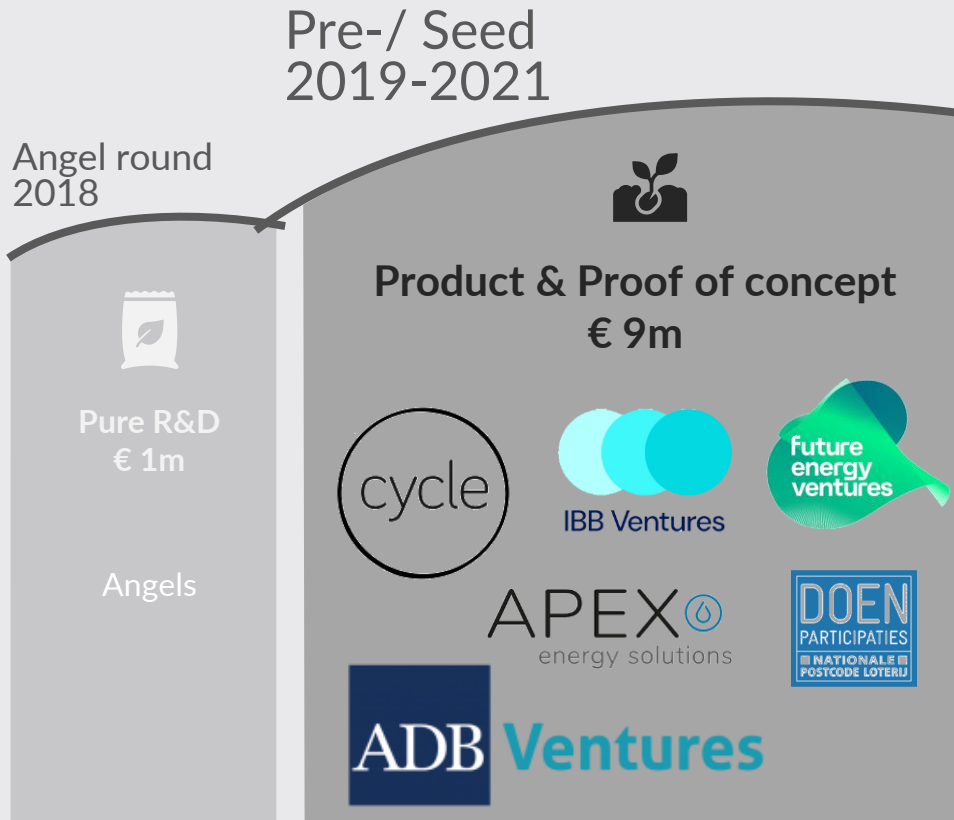
Gross Margin forecast
% (€ million)



Raising € 10m+ Series A to enable growth

Series A 2022

Commercialize & scale



Growth

- 10x Revenue
- Joint Venture in China

Operations

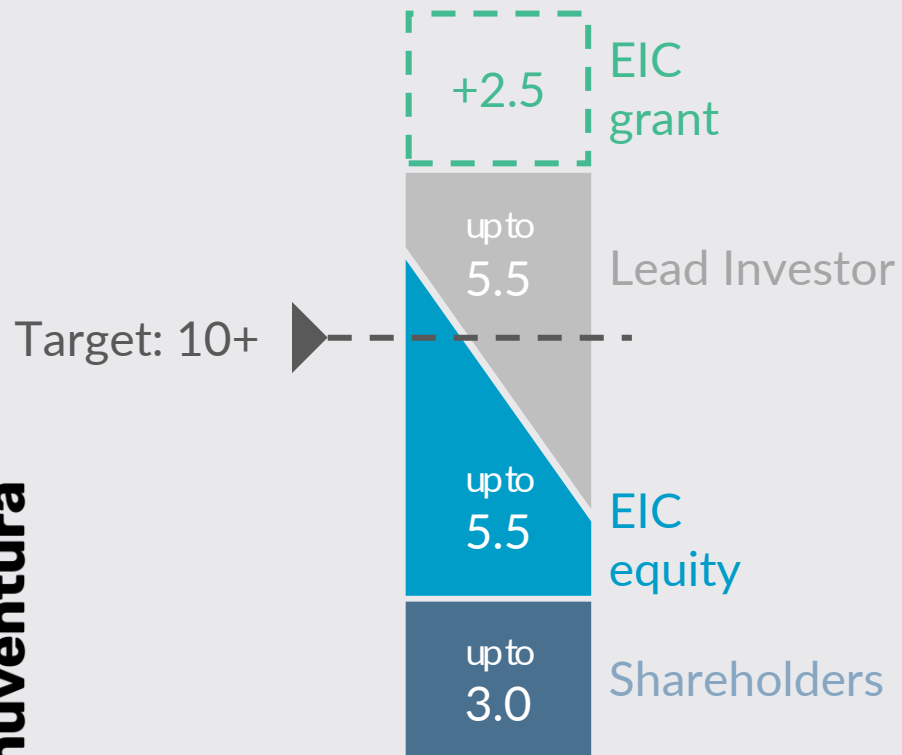
- Component Manufacturing India
- Training Center in Germany

Product

- Globalize portfolio

EIC co-investment option available (2.5m grant + 5.5m equity)

Series A – € 10m +



Commercialize & scale

Growth

- 10x Revenue
- Joint Venture in China

Operations

- Component Manufacturing India
- Training Center in Germany

Product

- Globalize portfolio



Equipped with IP, proof points and a leading position our team can't wait to scale up

Management



Manjunath Ramesh – CTO

- Electrical Engineer with > 10 years of R&D in switchgear
- Developed unique methodology to optimize SF₆-free switchgear
- Holds 2 patents for Nuventura and 3 more from previous positions



Dr.-Ing. Fabian Lemke – CEO

- Nuclear Engineer, top consultant and proven Entrepreneur
- Worked for utility companies for 5 years at McKinsey
- Founded and built Sanubi to a profitable Company and sold to PE firm



Tanja Glowka – CBO

- Master in Economics and MBA
- Scaled business operations at Uberall from 25 to >250 employees
- Negotiated and structured international M&A Transactions at Uberall



Sebastian Zache – Head of Product

- Electrical Engineer and MBA
- > 9 years switchgear experience in Marketing and Sales at ABB as Global product manager for SF₆-free products and digitization
- Project management in South America, China, Europe



Advisors



Prof. Dr. Kaveh Niayesh - Professor at the University of Trondheim

Kaveh is a Professor for power engineering at the University of Trondheim, Norway. He is also the author of “power switching components”, a reference for the industry. Kaveh serves Nuventura as a technical advisor and discusses technical challenges and solutions mainly with Manjunath while being a thought partner and challenger.



Dr. Arndt Neuhaus - Ex- CEO of RWE Germany

Arndt served as CEO of RWE Germany from 2011 to 2016 and was responsible for all technical developments at RWE. He oversaw investments in electricity grid innovations at RWE and now advises Nuventura on how to position itself in the industry.



Contact

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Key take-aways

- 1) **We are tackling a massive climate change issue from SF₆-gas equivalent to emissions of 100 million cars per year**
- 2) **We are the leader in SF₆-free medium voltage switchgear with a unique opportunity in this EUR 25bn market**
 - I. Technology years ahead of other R&D leaders like ABB, Siemens, etc.
 - II. Government regulation expected from 2023
 - III. Our unique business model enables manufacturers through long-term partnerships
- 3) **After 4 years of R&D we already secured 2022 sales targets and focus on scaling the company**

Nuventura in action

On the shopfloor



#ActionForClimate



With the customer



Pitching



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