
PODCAST

How ABB motors and drives help keep the world sustainability in motion

ABB Decoded

For the latest episode of ABB Decoded, we're on the move – or more accurately, we're in motion, with the President of ABB's Motion business, Morten Wierod. In a revealing interview, he explains how high-efficiency motors and drives, which can power almost every aspect of our daily lives, are an invisible ally in the fight against climate change and how widespread use of existing technology, of the kind pioneered by ABB, can bring significant sustainability benefits. See acast.com/privacy for privacy and opt-out information.

Anthony: Hello! And welcome to episode seven of ABB Decoded, the podcast that tries to press pause on our fast-moving lives and shine a light on to some of the technology and trends that are reshaping our world.

In this episode, we're on the move – or more accurately, we're in motion, as we'll be speaking to Morten Wierod, who's President of ABB's Motion business, about the vital importance of energy-efficient motors and drives to almost every aspect of our daily lives.

As we discover, there's barely a single aspect of the day that isn't touched in some way by motors and drives, whether they're in the elevator that carries us between floors in the shopping mall, or in the local water processing plant, providing pressure for a morning shower.

And it's because motors and drives surround us – even when we can't see them – that their role in driving energy efficiency and meeting sustainability targets is so vital.

There are already more than 300 million motors and drives in daily use around the world and that number is set to grow. And as a new European Union regulation comes into effect, which mandates a higher minimum efficiency standard for all motors, it's a timely moment to explore their sustainability benefits. Morten Wierod is our guide.

Morten: Hello, I'm, Morten Wierod and I run our Motion business in ABB. I've been with ABB, our company, for 23 years and that has been a very interesting journey. Starting in Norway, moving on to China, and now the last nine years here in Switzerland. ABB has been a company from, after my education as an electric engineer. And I always stayed because it's been a great company with great people where I have always had new challenges and I feel that what we do really makes a difference in the world.

Anthony: Thank you, Morten. So, as you mentioned, you head ABB's Motion business. Could you tell us a bit more about Motion – perhaps what it does and why it's actually called 'Motion'?

Morten: And, you know, Motion is something that goes way back, when you talk about making movement, making things happen. And that's really what we do. In the old days, when we talked about having the harnessing power of water and winds and mills, but then with the great inventions of electricity and electric motion by people like Westinghouse, Tesla, and Edison, we were able to replace the steam engine and using energy far away from its original source. So, that is really what we do in Motion, we're able to put things in movement close to the applications. We do that with electric motors and variable speed drives and they really enable over modern way of life, even that most of us maybe don't think about it on a daily basis as they are pretty invisible in our daily life.

Anthony: Can you tell us more about this idea that Motion is like the invisible power that drives our everyday lives? And perhaps you could give us some specific examples that people may not even be aware of.

Morten: Absolutely. What I mean is that it really, electric motion, it touches your life several times a day. And even though you're not aware of it, but let's give you a kind of a very basic and a simple example. Taking in every day in a person's life. She may wake up in the morning and the first thing she does is go to the bathroom, having a shower, brushing your teeth. The water pressure on the tap is created with large motors and drives, running pumps and usually on the outskirts of the town. Also, motors and drives are behind the pumps in the water-cleaning process.

Now, let's imagine that she steps out of your house jumps on the next train or the Metro and most of those cases, those trains are all run by electric motors and traction converters that again, pulls electricity into movement.

So, those type of trains, and now in the equipment we do enable emission-free and smooth travel. And in many cases, they're also regenerative that means you can save the electricity when you brake and turn that back into battery system, or back on the network. When she would arrive in the office, the elevators, escalators, they are all powered by electric motion, which means, again, motors and drives. And coming into the office building, the air she breathes is optimized for temperature, humidity, and the right oxygen levels so you stay fresh during the day. Heating as well, ventilation and air conditioning systems, these are all run with big fans and how those fans turn is about electric motors, and again, the right speed with a variable speed drive.

Anthony: Ok, so motors and drives really are with us every step of the way from the moment we wake up.

Morten: But then she had lunch, you go out to eat, in the local cafeteria, having vegetables, maybe manufactured in another country. To grow those tomatoes, for example, you would need irrigation systems. Again, we're talking about pumps, pushing the water, you know, out in the fields and to take care of this, you need a cold change, you know, refrigeration systems, all these, again, powered by electric motors.

So, I guess you get the point. This is where it's used on a daily basis. So, the buildings we live in and we work in, they're made of cement and steel which these manufacturing process, so those materials rely again on motors and drives. This begins to really from the moment that raw materials are mined, refined, and used. So, that is everything from clothes we're wearing, chemicals industry to get the right colors, and all what we need in our daily life. You would need some movement, again, created by motors and drives. So, all around us in the world there is more than 300 million motors and drive system, subsystem that are installed. And this gives the, or really enables how we can live well and have the right quality of life that we all want.

Anthony: Thank you, Morten. That gives us a great insight into this sort of invisible network around us that we perhaps don't appreciate all the time. And just to help our listeners, could you explain what a motor is, what a drive is and the basic differences between them?

Morten: We are talking about is the electric motor. So, using electricity instead of petrol or other type of fossil fuels, and we use the electromagnetic fields and controlling those to be able to create the movement in an electric motor to make it turn. And the variable speed drive is probably less known in the general public but that is a device, I call it a box of energy efficiency. Inside that box sits power semiconductors

and electronics that is used together with software, to create the right speeds and torque to control the motor.

In the old days, we control the speed of a motor often by brakes. And this, you can take again in your daily life in a car where you would run at full speed, hitting the accelerator, you know pedal to the metal, and then you would use the brakes to get the right speed.

That's not a very efficient way to drive your car. So, what we do instead is to put in a variable speed drive that is putting the right speed and the right torque for every motor. In that way, you're able to get the right energy efficiency level and you save a lot of energy and you save the environment as well. So, that's why I call it the energy efficiency in a box.

Anthony: So, what kind of energy efficiency gains are we talking about with a variable speed drive, in percentage terms?

Morten: By applying a variable speed drive, you can say from 25% and up to 40%, even to 50% of the energy compared to running a motor at full speed, as we would do without any speed control. So, it is really a great opportunity for saving in electrical applications.

Anthony: And what might be a typical application for a variable speed drive?

Morten: It is used in all kinds of industry as what I refer to. If you're running pump, you need a motor. And instead of running that pump always at full speed, you would again use the drive to control it. It would be in the elevator. When you start a motor at full speed start would not be a very comfortable ride in an elevator. You need a ramp up and then it hits full speed and then a ramp down, so you have a smooth kind of landing on the floor that you're aimed to. So, these are all examples and the same you would see, for instance, when you go to a supermarket or a mall where you have all the escalators, and you will see that they were run on a pretty slow pace before you are going into the escalator and then it picks up speed. This is all possible by use of a variable speed drive because it saves a lot of energy for the shopping center and you, as a customer going there, you also feel that this is an easier way to enter an escalator. So, that's a couple of very practical examples of use of variable speed drives.

Anthony: I must ask just, this, as a little side question, do you sort of see motors where the rest of us wouldn't, if you're in a shopping center, for example or at a train station? If you're in an elevator, do you sort of visualize what the motor is doing, do you see things in a different way?

Morten: Yes, I do. And I often try to see which brand is it, you know, is it our motor or is it our drives? And because you can see there might be some side door and my wife is always accusing me of, it's a bad habit working damaged or what you would call it. If a cabinet door would be open, I would normally look into it and see, you know, what kind of equipment did they choose when they designed it? and I would normally know that if I go into a corner high in an elevator, and it says Corner, you know, or Schindler, that would be normally with our drives that brings me up to the at least I know I'm safe.

Anthony: Now, a question I'd like to ask you is how can you explain the idea that Motion keeps the world turning, while saving energy every day. What do you mean by that? And are there any examples you can use to explain the point?

Morten: As I said earlier, we need to make the world turning because that is really part of our daily life, but as important is also saving energy every day because electric motors, they all do consume a lot of energy, about 45% of the global electricity to be precise. So, with this, we need to have the right and the most energy efficient motors available and use them to save as much energy as we can. I can give you a couple of examples. There is one, especially from Australia that I like. That is with one of our customers called Campbells and they are a large food and beverage manufacturer. And in one of their plants in Queensland, in Australia, they wanted to implement a more sustainable manufacturing process. they have also made, as we have in most companies these days, strong commitment to reduce their energy consumption and the CO2 emissions.

So, looking at their plants, what can we do? It's really about making the energy efficiency audit, looking at their whole installations. So, over time there, we replaced all the old inefficient motors in their

compressors and cooling systems with new modern, what we call synchronous reluctance motor technology, which is the top of the range when it comes to energy efficiency. And we were able here to save 14% of their energy consumption and also their CO2 emissions by 131 tons per year.

So, this was a real win-win situation where we started even with a sustainability strategy, but it ended up also for Campbells as a really good business case as they had less than 12 months payback on the whole project. So, I believe this is a great example of how you really work together with customers and partners and with a common goal to reduce their energy footprint and coming up with even more efficient production process. Because that I believe, over time, is the only way that we can make a more sustainable future, is to make a business case out of it and use the existing technology that we have today available and really use that in all applications. This is how we can really make a difference in the world and save energy every day.

So, this is one story of how we work with customers. But if you're looking at the, really the bigger pictures, here ABB as a leading supplier of motors and drives in the field of motion, we're also looking at what kind of impact do we do. And over the course of 2020, we had more than 198 terawatt hours of electricity savings. And, that is just to put it in perspective, this is more than three times the total annual consumption of Switzerland. And by 2023, it's estimated that the expansion of our installed base of motors and drives that will help customers to save an additional 78 terawatt hours of electricity per year. And that is even more than the annual consumption of Chile and other country.

Anthony: That's an amazing statistic. And to pick up on your point there, you're saying that by increasing the use of energy-efficient motors and drivers, we're actually helping to mitigate climate change?

Morten: Yes. That's why exactly why we should be doing and using the technologies that is really available. The global population, that will keep growing and we all want a better life and better standard of living. So, at the same time, we see a request for better life, more energy available, at the same time we need to cut CO2 emissions. And there are only two ways really of doing this. It's one, is to grow the power generation of carbon-free power like solar, winds, and the different renewable energies. But the other one is continuously to improve the energy efficiency. So that's the two options we have at hand, and I think we have to adopt both.

I really like solar power, I like wind power and they're all their renewable initiatives. But unfortunately, we will not be able to replace all our existing carbon-based energy sources fast enough with the renewable energies. That's why energy efficiency needs, they have to be improved, and we need to be adopted faster. The great thing I think is that we have these technologies already made available. And companies, like ABB, and the industry is able to help customers and the general society to implement that technology. As an example, our synchronous reluctance motors and dry packages. With that, we are taking kind of the energy standards to the, what we called the level five, while today industry still stays at level two. So one of my main goals here in this year, and in the times to come, is to continue that we drive technology and drive to set the new standards higher, and make those technology available worldwide so we can really get the energy efficiency and the savings that we need to do to be able to create the future that we all want.

Anthony: Ok. So, what's stopping us from moving faster to increase the use of energy-efficient motors and drives? What is needed to accelerate this process?

Morten: That's a good question. It's all about collaboration. You need to be a more better and stronger collaboration between all stakeholders. When I talk here about stakeholders, those are businesses like ABB and our peers in the industry. It's about the government setting regulations and standards. You know, the city is setting also standards for how they would like to organize and set up the infrastructure in the different cities and countries and also for the non-governmental organizations and even investors to push the greener energy agenda. So overall, as I see as ABB, together with other global technology companies, is to always provide the most energy efficient technologies and products and the solutions to continue and innovate for more. We should also let everybody know that these technologies and innovations are available so that they can really be taken into use.

But as I said in the beginning, we can't do this alone. We need commitment, collaboration, and actions from all the stakeholders. We need to set public decision-makers and government regulators. We need

here to both incentivize the rapid adaptations, but also setting the right standards of the futures for businesses, for cities and countries. We need to be aware of what are the opportunities and we all have green cities and green agendas at the moment, but there energy efficiency is one of the key elements to be used to achieve those goals. And I'm happy to see good progress here, for instance in the European Union, putting the eco design with the energy levels of what we called IE3 being valid from now from July 1st, 2021. And going to the IE4, which is the next level of energy efficiency in 2023. But we can do much more because new technologies are already available. I believe industrial energy efficiency, more than any other challenge, it has the single greatest capacity for combating the climate emergency.

Anthony: I believe you've described this before as the world's invisible climate solution?

Morten: I think it is essentially the world's invisible climate solution with high efficiency motors and drives that power most of the critical process around us. We can keep the world turning while saving energy every day.

Anthony: So in your view, inside the Motion business, does this feel like the time when incandescent bulbs were banned by the European Union, which was at the time was a very controversial decision, but which in hindsight, was undoubtedly the right way to go. Do you think energy-efficient motors could be seen in a similar way?

Morten: Absolutely, this is a great example of how such a change can be achieved and it touches what I've said already. The easiest way to save energy is of course not to consume it – to turn off the light. But we don't want to sit in a dark room or a dark house, we want to enjoy life. So, we must use the energy more efficiently and LED lighting is by far much more energy efficient than the old light bulbs. And the same applies to electric motors. We want to travel, we want to have air conditioners, but we must do it in a more sustainable way. And therefore, energy efficiency is not real luxury, it's just a must.

Another good example, of course, electric vehicles and the charging infrastructure that is needed. Therefore, I'm also so proud that the ABB, we are the titled partner for ABB Formula E as leading the pack and creating awareness around what is possible.

Anthony: Morten, could you tell us about the Energy Efficiency Movement that ABB has developed, and explain the thinking behind that and what it will mean in reality?

Morten: At ABB, we are very passionate about energy efficiency, but we believe it's a great opportunity also to address the climate change or the future.

So, we want to raise the awareness, get energy efficiency higher up on everybody's agenda. And I'm so happy to see the response we have received in the initial phases from customers, from partners, but also from academia, some governments who want to support this initiative and see how we can go further. This is not the movement from ABB alone. We really want to engage all our competitors and partners in the industry and help here the world to become more energy efficient in the future. And a lot here is due to the lack of awareness and because as I say, motors is often invisible in your applications and therefore we need more awareness around it. And that's really why we started the whole energy efficiency movement.

Anthony: And of course, the energy efficiency movement fits completely within ABB's overall 2030 sustainability strategy, and the idea that sustainability has to be embedded in everything we do.

Morten: Sustainability and transforming industries and societies is part of the purpose of ABB and making the world turn and saving energy every day is what drives the passion in my team, in our Motion team of ABB. Because it is an area where we can make a difference and really make a difference for a better future for us and for our children. And that is also why when I say making the world turn while saving energy every day is why I see so passionate people in my team who is really eager to address the challenges of the future and to make a difference for a better world.

Anthony: Thank you, Morten. That's a great thought to leave us with. And that's where we'll conclude this episode of ABB Decoded. If you've enjoyed what you heard, don't forget to like, subscribe, and share, wherever you download your podcasts. Until next time.