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## Ed's note: Smart electrification, an energy transformation commodity

 By **Nicolette Pombo-van Zyl** July 3, 2023



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**A climate change strategy is only one of the many building blocks of a sustainable future. The others include the greening of infrastructure and the availability of 'green' money. Then there is a systematic smart electrification approach targeting the end user.**

In defining these building blocks, we know that one-size-fits-all solutions don't exist. Strategies and implementation vary between countries. Even so, without guidelines and readily available, well-researched information, governments will simply not explore the options that do exist.

ello, how can I help?

Guidelines and toolkits give impetus to exploring the **decarbonisation** of energy production and decarbonising of the end-user sector. This route is paramount because electrification of end uses enables a reduction in the total global energy consumption.

Think of smart electrification as energy efficiency on a grand scale.



## The upside to decarbonising end-use sectors

There is also a link to meeting the 2015 **Paris Agreement** goals on climate change. As stated by IRENA, achieving the climate change goal requires the share of electricity in the energy mix to rise from 22% in 2020 to 51% in 2050.

We can accomplish this with growth in electric-powered technologies— both those already available and those under research and development.

The Association also believes that by 2050, global electricity demand will reach three times what it was in 2020. This demand growth poses challenges for power systems and raises the importance of **energy efficiency**.

Also, smart electrification is an opportunity to accelerate economic growth, improve energy security, reduce the impacts of climate change, and achieve other UN sustainable development goals.

The IRENA report, *Innovation landscape for smart electrification: Decarbonising end-use sectors with renewable power*, concentrates on three end-user markets to facilitate our smart electrification evolution. The areas are mobility, heating and cooling, and green **hydrogen**.

## The ups and downs of smart electrification

While technologies are readily available to facilitate the transition, there are unique obstacles.

For example, the cost of **electric** vehicles and the charging infrastructure they require can deter the maturation of the transportation sector. However, as the transition accelerates, economies of scale and continued innovation should hopefully reduce costs, unlock investment and boost sales. When this happens, clean transportation benefits will take to more cities' roads.

What we need is government support and clear strategies for deploying public charging and ensuring interoperability among charging services. By addressing these challenges, **China** is currently dominating the EV market. The **Chinese government steered the market** through policy incentives, including subsidies, tax breaks and procurement acts.

According to China Electric Vehicle Charging Infrastructure Promotion Alliance (EVCIPA), as of January 2023, the country has deployed 5.411 million charging units. Carrying out a prolific focus on charging has seen EV retail sales increase 22.4% year-on-year to 1.31 million cars.

Meanwhile, other markets are straggling. The *Automotive Export Manual – 2023 – South Africa* report puts high purchasing costs and higher production costs (related to battery production) as inhibiting the uptake in South Africa's domestic EV sector.

## The case for digitalisation in the transition

As the smart electrification model grows, so will the prosumer market, where end users increasingly produce energy. This expanding market will look at the ease of use through digitalisation and the security thereof. A basic example of using digital technologies to manage power is HVAC and distributed energy resources (DERs) management systems. In the case of DERS, these include rooftop solar, battery storage or EVs.

DERs make it more challenging for grid operators to maintain power stability and reliability, but they also offer significant opportunities for a more efficient and robust power system. For example, plugged-in EVs can help prevent expensive load peaks, reduce the need to expand the grid and make it easier to incorporate variable renewable generation.

On that note, you will find this article of interest: [Small EV can act as productive use of energy catalysts for rural minigrids.](#)

Furthermore, considering peak cooling demand and peak solar energy coincide, the growing demand can couple with solar PV. This makes it easier to increase solar PV market penetration. In addition, cooling enables ambient heat and cold sources that might otherwise not be used.

Then there is the digitalisation of HVAC to leverage intelligent devices and sensors for data on past operations for accurate forecasting. Also, using artificial intelligence to control heating and cooling loads in ways that improve overall operations. A digitalised HVAC system will help policymakers to make better regulations, enable new businesses and inform end users to support better decisions.

The world can gain much traction on Paris Agreement and UN SDGs by addressing sectors' smart electrification. The advantages are plentiful, including healthier, prosperous living conditions for people in cities and communities. However, more innovation is needed to develop energy management platforms and address cybersecurity and data protection issues.

Until next week.

Nicolette

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