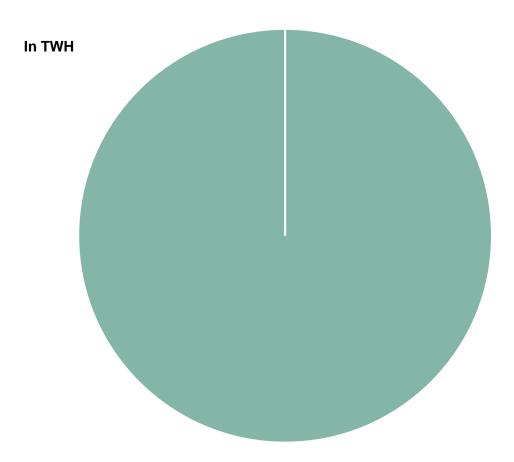
Technology enabling the 2°C climate goal of the Paris Agreement

Andreas Urschitz
Division President Power & Sensor System



Overall, the world consumes ~160.000 TWH of primary energy...



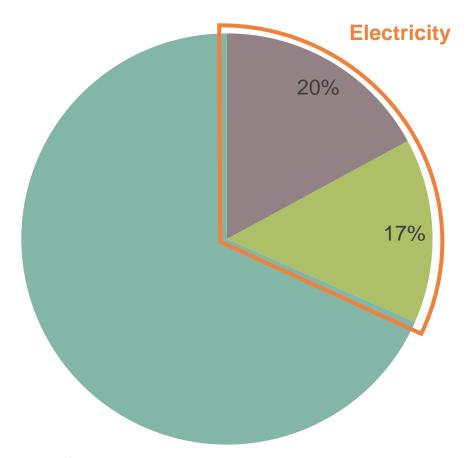


Primary energy demand (oil, gas, coal, wind, hydropower etc.)

Sources: BP: Statistical Review of World Energy 2020 69th edition; Umweltbundesamt, March 16th 2020 https://www.umweltbundesamt.de/daten/energie/konventionelle-kraftwerke-energien#wirkungsgrad-fossiler-kraftwerke; EIA, December 31st 2019, https://www.eia.gov/tools/faqs/faq.php?id=105&t=3#:~:text=How%20much%20electricity%20is%20lost,annually%20in%20the%20United%20States..; Umweltbundesamt April 8th 2020, Bilanz 2019: CO2-Emissionen pro Kilowattstunde Strom sinken weiter, https://www.umweltbundesamt.de/presse/pressemitteilungen/bilanz-2019-co2-emissionen-pro-kilowattstunde-strom; Infineon estimate

Overall, the world consumes ~160.000 TWH of primary energy... ~1/3 is consumed as electricity – but:



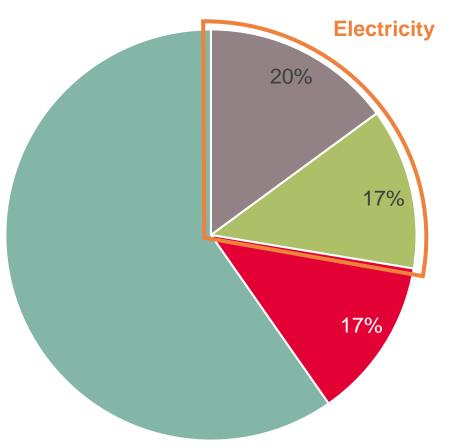


- Electricity from renewables and nuclear
- Electricity from fossil fuels
- Primary energy demand (oil, gas, coal, wind, hydropower etc.)

Sources: BP: Statistical Review of World Energy 2020 69th edition; Umweltbundesamt, March 16th 2020 https://www.umweltbundesamt.de/daten/energie/konventionelle-kraftwerke-erneuerbare-energien#wirkungsgrad-fossiler-kraftwerke; EIA, December 31st 201 https://www.eia.gov/tools/faqs/faq.php?id=105&t=3#::text=How%20mich%20leictricity%20is%20lost,annually%20lin%20the%20States..; Umweltbundesamt April 8th 2020, Bilanz 2019: CO2-Emissionen pro Kilowattstunde Strom sinken weiter, https://www.umweltbundesamt.de/presse

Overall, the world consumes ~160.000 TWH of primary energy... ~1/3 is consumed as electricity – but:





Losses in electricity generation

- The average fossil fuel plant has ~50% losses in electricity generation
- Another ~5% are lost in transmission and distribution
- ~490 g of CO₂ are emitted to produce one kWh of electricity



Saving electricity has an enormous impact!

- Electricity from renewables and nuclear
- Electricity from fossil fuels
- Losses from electricity generation fossil fuels
- Primary energy demand (oil, gas, coal, wind, hydropower etc.)

Everything we do aims at achieving the 2°C climate goal of the Paris Agreement









Enabling
renewable energies
with worldwide leading
semiconductor solutions

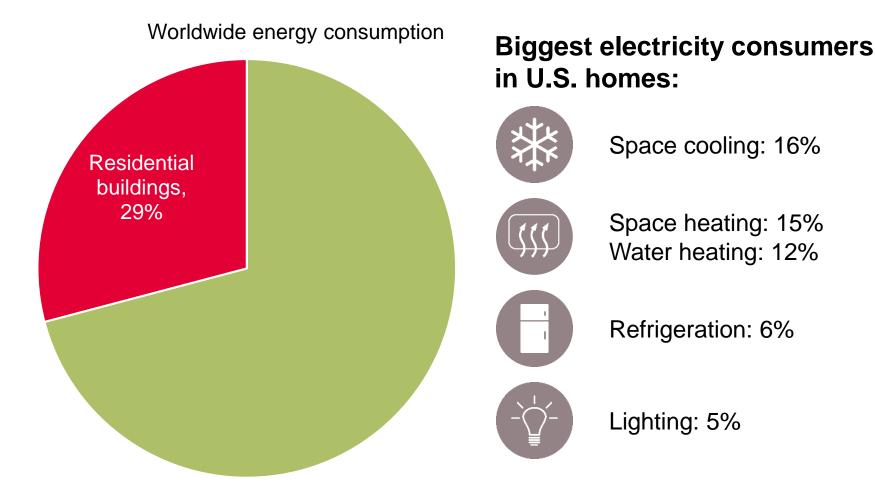
Increasing
energy efficiency
of electronic devices and
reducing losses

Reducing the CO₂ footprint of Infineon as a company



Within total worldwide electricity consumption, residential buildings make up 29%

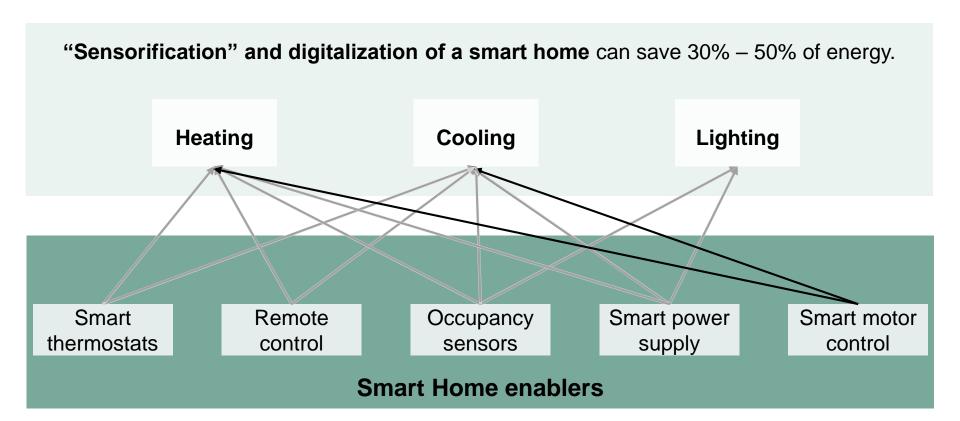




restricted

Digitalization in smart homes helps optimize the consumption of the biggest energy drains





Source: International Energy, Agency (2017). Digitalization & Energy. October 2017; Exponential Roadmap 1.5 Future Earth; Grözinger et al., IEA Digitalization and Energy; The Atmospheric Fund (2019): Smart Thermostats – Technology Assessment and field test findings in multi-unit residential buildings; Infineon estimates



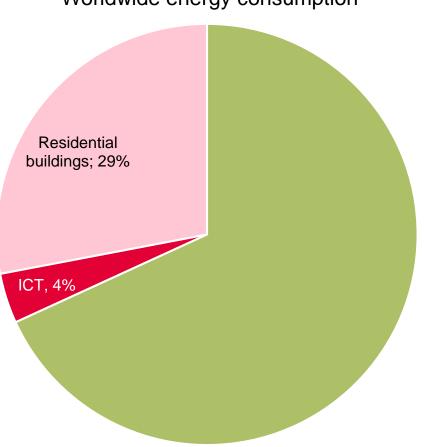
Example 2: A new age of data processing



Information communications technology makes up ~4% of worldwide electricity demand



Worldwide energy consumption



Consumption of data centers

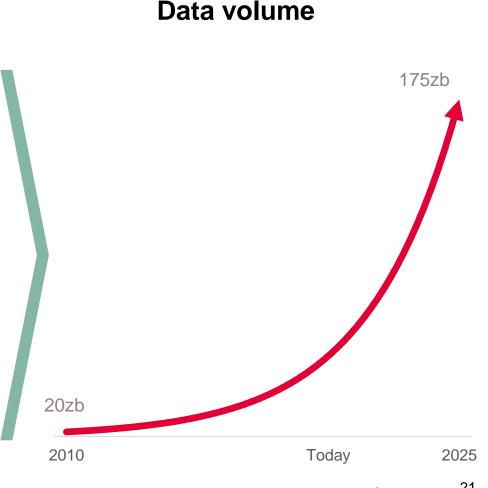
Data centers worldwide use ~205 TWH of electricity per year **Steep increase** expected out from data centers, artificial intelligence and 5G

Exponential growth in global data drives need for energyhungry for data centers & communication infrastructure



Drivers of data generation

- Only 50% world population presently online
- 1.7 mb of data per person per second
- Mobile device data increased by 40% through 2018-2019
- 13 devices per person by2022, 75bn devices by 2025
- Not yet including ADAS & Autonomous Vehicles, machineto-machine communication



zetabyte=10 ²¹

New semiconductor materials such as Gallium Nitride increase power efficiency



If every U.S. data center would use CoolGaN™...







4 billion kWh saved

289 million USD energy cost-savings

2 million tons of CO₂ emissions less per year

Sources: United States Data Center Energy Use Report, June 2016; All calculations are based on the overall data center server power consumption of US data centers as give in in this report, and savings are in comparison to a silicon alternative solution; EIA Electric Power Monthly August 2018 (average for US, industrial segment); Global warming potential of selected electricity sources, IPCC 2014

Infineon partners with the U.S. Department of Energy's Advanced Research Projects Agency-Energy on new semiconductor materials

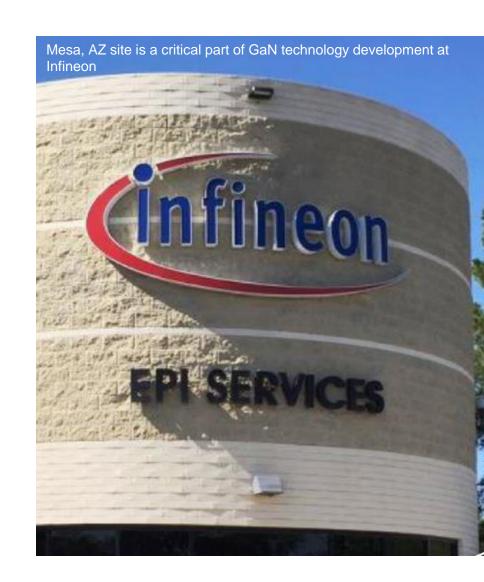


Goal of the ARPA-E CIRCUITS program

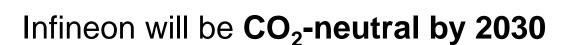
Accelerate development & deployment of a new class of efficient, lightweight, and reliable power converters, based on wide-bandgap (WBG) semiconductors

Infineon's contribution

Low Cost e-mode GaN HEMT Gate Driver IC, which enables Revolutionary Energy Savings in Variable Speed Drives for Appliance Motors









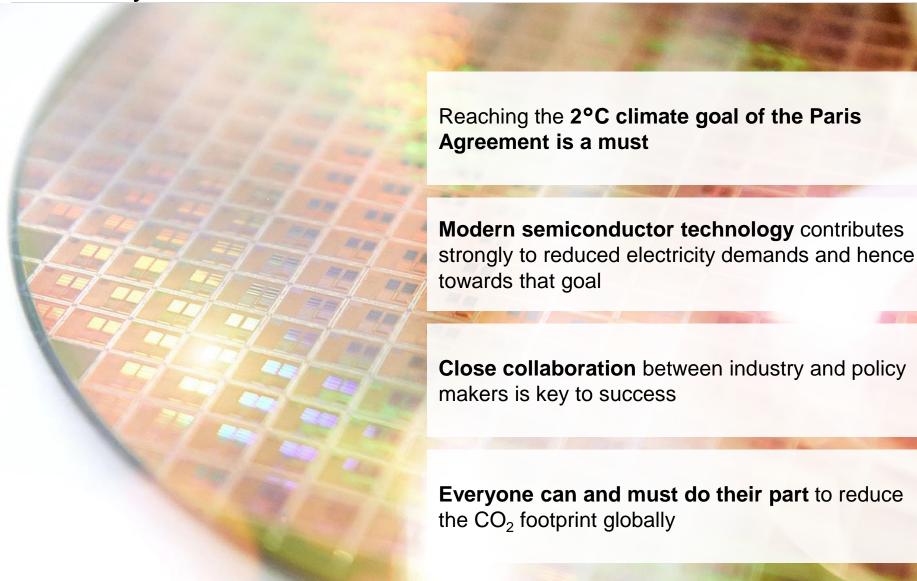


Measures to achieve a **70% reduction by 2025** (compared to 2019):

- Reduce greenhouse gas emissions by exhaust air purification
- Improve energy efficiency, migrate to most modern process technologies in manufacturing
- Switch to 100% green electricity
- Promote electromobility by expanding charging infrastructure at our sites
- Purchase CO₂ certificates (for emissions which cannot be viably avoided), supporting projects with ecological and social benefits



Summary





Part of your life. Part of tomorrow.