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Czech Path to Net Zero

A challenge or an opportunity for our economy?

PERSPECTIVES ON THE IMPACTS OF THE NET ZERO TRANSFORMATION TO CZECH ECONOMY

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Key takeaways

- The transformation towards Net Zero greenhouse gas emissions is accelerating, creating both threats to traditional economies as well as unprecedented opportunities. In the few upcoming years, the redistribution of wealth triggered by the green transition will decide the winning countries of tomorrow that will offer an increasingly better quality of life.
- The target for greenhouse gas emissions is the same for everyone (Net Zero), but starting positions differ. Czechia still has one of the most polluting economies in the EU (both per GDP and per capita). We also have a worse starting position in terms of natural resources (e.g., for wind, solar and hydro power generation), which will need to be offset through even stronger innovation drive and investments.
- Our model shows that keeping pace with other countries will require approx. 3,200B CZK of investments cumulatively (1.5%-3% of GDP per year), out of which approx. 1,200B CZK will be required by 2030. Whether the investments are spent mostly on domestically produced or imported technologies will be a large determinant of how well the standing of the Czech Republic improves among leading economies.
- A fundamental transformation will be required, which will significantly affect the part of the economy responsible for 10 % of Czech GDP (energy sector, ICE related part of Czech car manufacturing, remains of heavy industry, transport); another 20 % of GDP will be moderately affected (the rest of manufacturing, agriculture, waste management) by the EU-wide transition.
    - In the energy sector, we expect an increase in electricity consumption from approximately 74 TWh to 125 TWh by 2050, in parallel with the switch-off of fossil fuel sources, which will require the construction of large and small nuclear reactors (tripling of current block capacities), solar panels (15x larger installed power than today) and wind power plants (8 times more installed power).
    - In industry, the current blast furnaces will need to be replaced by electric arc technology; in industrial heating, fossil fuels will need to be replaced by heat pumps, electricity, biomass or hydrogen; and in cooling, the coolants that are used today will need to be replaced by ecological alternatives.
    - In transport, we will need to replace cars using internal combustion engines with electric cars, including investment in charging infrastructure, and make up for the loss of excise duty on fuels.
    - Localization of the production of batteries, which represents a significant part of the value of a new car, will also be important in car production. Import of these batteries would result in a drop in GDP of up to 4-5%.
    - Even after all the measures mentioned above, there will remain roughly 20 million tons of CO2 (about 17% of current emissions) that will not be technologically possible to reduce; it will therefore be necessary to invest in carbon capture, utilization, and storage technologies (so-called CCUS).
- Failing to actively manage the transformation will result in relatively falling behind other countries in terms of GDP growth, or even in absolute decline of GDP in the worst-case scenario (in combination with other factors), mainly due to the following risks:
    - An increasing export/import imbalance triggered by the need to import green technologies, if the production of these technologies is not localized

- Decreasing international competitiveness, if the slow decarbonization of industry and services results in carbon costs being imposed resulting in an increase of production costs
- Higher electricity prices for consumers and industry, if a too-slow onset of renewable sources combines with increasingly higher-priced emission allowances and insufficient strengthening of the distribution network

- On the other hand, the transition presents opportunities to step up the pace of economic growth, if Czech industry and services are transformed, thanks to the export of technology to European countries facing similar challenges. We have identified five areas where the Czech Republic can gain a head start, and which represent an opportunity for Czech companies worth hundreds of billions of CZK:
  - Production and development of Battery Electric Vehicles (BEV) and their parts, including batteries
  - Development and production of safe and reliable technologies and software for renewable energy sources (RES)
  - Localization of part of the Small Modular Reactor (SMR) technology supply chain
  - Involvement in hydrogen technologies
  - Production of heat pumps and related technologies
- 27 specific measures have been recommended to the government to support the transformation, including e.g.:
  - Cross-sector measures: establish a National Net-Zero coordination center at the government level to drive this agenda across sectors, launch a positive communication campaign that explains and highlights the opportunities of transformation to people, etc.
  - Energy: modernize the ERÚ and SÚJB and strengthen their capacities (e.g., in terms of personnel), prepare legislation to accelerate the introduction of RES, support the deployment of the first small nuclear reactor within ten years, etc.
  - Industry: prepare a plan for carbon capture, utilization, and storage (CCUS), prepare subsidy programs for replacing process technologies and industrial heating technologies with carbon-free or low-carbon alternatives, etc.
  - Transport: Boost electric vehicles (EV) adoption through the construction of 100,000 public chargers by 2035, prepare incentives for EV use, etc.
  - Car production: prepare infrastructure (incl. several zones) to attract at least two gigafactories with a combined annual capacity of over 140 GWh, identify SMEs endangered by the end of the ICE vehicles and prepare targeted support for the transition, etc.
- It will be the actions of this and a few upcoming governments that will determine the economic position of Czech Republic for decades to come. If we do not manage to set the right course now, it will have to be done later at a significantly higher overall cost and with a negative impact on the growth potential of the Czech economy

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Preface

BCG's North Star objective is to enable and accelerate transitions to Net Zero emissions by 2050. We engage with our clients, partners, and society to drive climate action and maximize our impact. BCG has committed to reaching Net Zero climate impact by 2030 and then becoming net positive.

This report is an independent view on the economic impacts of the Net Zero transition to Czech Republic. It provides a factional and analytical basis for subsequent discussions with public and private stakeholders. This report was prepared as a part of a pro-bono project with The Aspen Institute Central Europe

The Net Zero ambition as the largest transformation of our time

The transition towards a greener economy with a Net Zero greenhouse gas emission ambition by 2050 is accelerating across Europe. It is generally agreed to be necessary for stopping climate change and increasing quality of life in the long run. As a result, new policies and regulation are being enacted on the EU level, and countries are preparing their transformational pathways. Motivation to do so is not purely environmental, but also to create a spark and boost economic performance. This presents a once-in-a-lifetime opportunity with a potential to redraw the economic map of Europe.

> *The next decades will see the greatest industrial transformation of our times – maybe of any times. And those who develop and manufacture the technology that will be the foundation of tomorrow's economy will have the greatest competitive edge.*
>
> – Ursula von der Leyen @ World Economic Forum 2023

A massive shift of production and capital is expected from economies dependent on polluting industries towards those that produce goods without GHG[1] emissions. A substantial part of countries' GDP will be part of that shift – for instance, up to 10% of Czech GDP will be at high risk, and up to another 20% will be affected and potentially threatened due to tight relation or dependance on grey technologies/energy sources (see the chapter Economic perspective of the transition). Thus, green technologies will be required to maintain and increase companies' long-term competitiveness and the resilience of the whole economy in the long term.

Another factor impacting countries' GDP will be the immense investment required for the transition. On the one hand, this poses the threat of an export/import imbalance, as green technologies are currently produced mainly outside the EU (e.g., China made up over 80% of global solar panels production capacity[2]). On the other hand, it creates an opportunity to thrive on emerging and currently heavily subsidized & supported markets of tomorrow (e.g., the already-approved 800B EUR Just Transition Fund).

In 2023, the Czech government is to prepare and present an updated National Plan of Climate Change Policy and updates to the Energy Policy of the Czech Republic. Furthermore, the discussions on ETS2[3] are already ongoing and the European Commission will propose a Net-Zero Industrial Act. The purpose of this document is to provide a baseline of the projected investments from a long-term perspective and economic impacts based on the likely decarbonization pathway, and to discuss necessary actions to ensure that the Net Zero pathway will be economically positive for the Czech Republic, especially with respect to other countries.

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[1] Green House Gasses
[2] Source: IEA Energy Technology Perspectives 2023
[3] Amendment to EU Emissions Trading System - to also include buildings and road transport

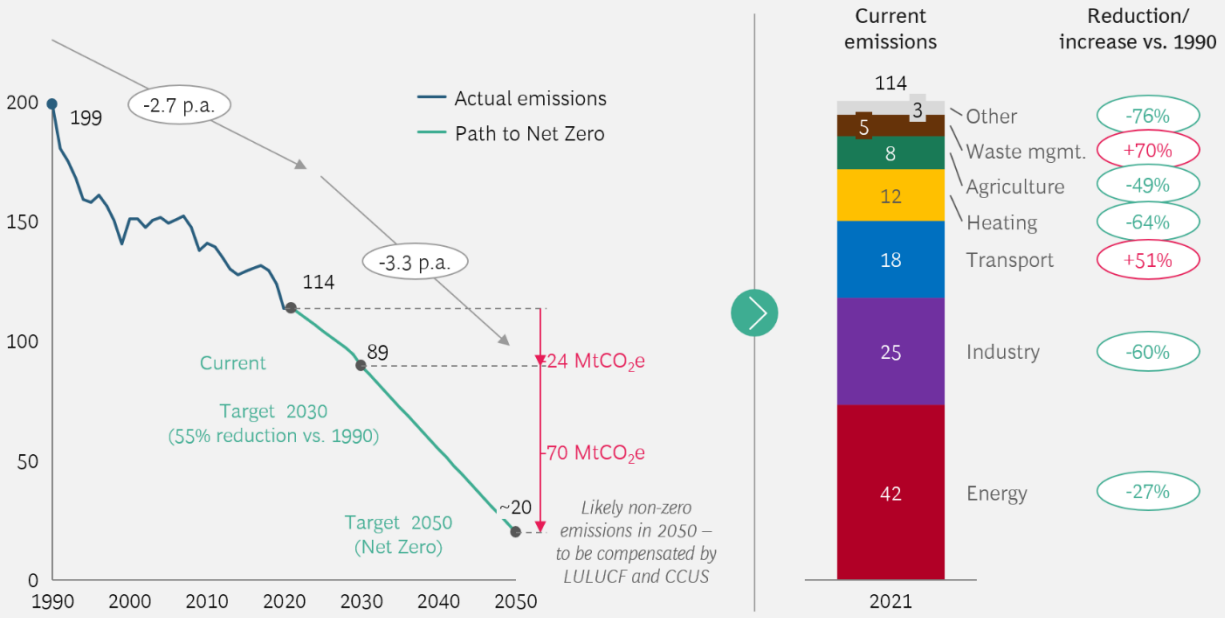
Starting point and required pace of decarbonization for Net Zero

The decarbonization target is the same for everyone, but countries' current positions vary. The Czech Republic still produces more emissions per GDP and per capita than the majority of other EU countries (CZ is third worst in both measures). Thus, the reduction of emissions will need to be relatively faster and unfortunately with less favorable natural conditions - less sun and lower wind potential[4], limited space for carbon capture and storage[5], and comparatively minimal potential for hydro power.

Czech GHG emissions have declined by 43% since 1990 (from 199 $MtCO_2e$[6] per year to current 114 $MtCO_2e$ per year[7]). This happened mainly due to industry transformation (closing of heavy energy intensive industries) and more-or-less voluntary[8] decarbonization, with positive business cases induced by regulation[9] and financially driven by private investments with some public subsidies. Going forward, the economy will be subject to even more stringent regulations introduced to push the reduction of the emissions in sectors with currently lower returns on investments.

Exhibit 1 – GHG emissions development & structure

$MtCO_2e$ excl. existing LULUCF



Source: Source: Eurostat/EEA, BCG analysis

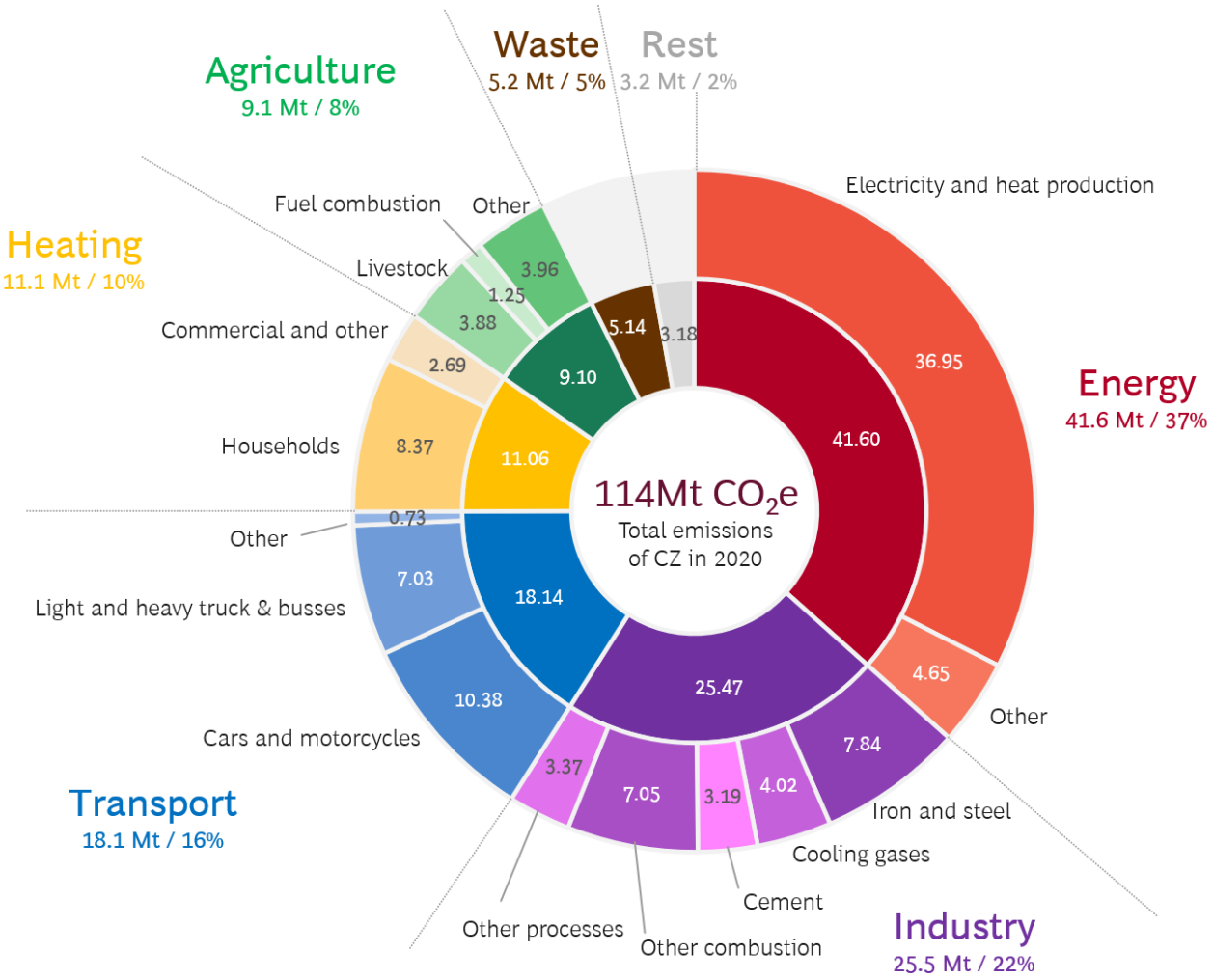
[4] While the overall wind potential is lower when compared to coastal areas in western and northern Europe, studies shows that areas such as Krušné hory, Krkonoše, Jeseníky and Vysočina have favorable conditions to build wind turbines
[5] Latest storage capacity estimate published by Czech Geological survey (project EU GeoCapacity) estimates total capacity to approx. 850 $MtCO_2$
[6] All GHG emissions are calculated as equivalent of the amount of CO_2 with same effect
[7] Source: Eurostat/EEA
[8] Indirect effect of regulation e.g., making non-green technologies less competitive
[9] Mainly ETS - EU Emissions Trading System

The most polluting sectors in Czech Republic remain Energy (37% of current emissions, mainly electricity production), Industry (22%, of which 10pp industrial processes, 9pp industrial heating and combustion, 3pp cooling gas leakage) and Transport (16%, of which 9pp personal road vehicles and 5pp commercial road vehicles), followed by commercial, public, and individual heating (10%), agriculture (8%) and waste management (5%).

Maintaining the historical pace of reduction (2.7 $MtCO_2e$ p.a.), which was in the past driven by closing of heavy industry due to economy reorientation towards western markets, would be sufficient to achieve 55% reduction target by 2030. However, an increased pace of reduction will be needed to achieve Net Zero by 2050. Furthermore, as not all emissions can be avoided, it will be necessary to invest into CCUS[10] technologies and LULUCF[11] to address the last remaining ~20 $MtCO_2e$[12].

Exhibit 2 – Czech GHG emissions by source and historical development

$MtCO_2e$ excl. existing LULUCF



Source: Source: Eurostat/EEA, BCG analysis, faktaoklimatu.cz

[11] Land Use, Land Use Change and Forestry
[12] it is not expected to avoid all emissions by 2050, the residual for Czech Republic can be between 10-20 $MtCO_2e$

Economic perspective of the transition

While the exact decarbonization pathway can be discussed from both technological and political angles, some of the effects can be already anticipated regardless of approach. In this and the following chapters, we summarize the economic impacts (costs, benefits, opportunities) of the transformation across individual sectors. It is based on the projected rate of decarbonization to achieve Net Zero by 2050, assuming required actions and investments needed for the transition. The impact on GDP is modeled through investment multipliers based on detailed structure of the required spend.

Modelling approach

Our approach to calculation of the economic impacts is based on the investments needed to decarbonize the most polluting sectors and implied changes to other sectors to adapt to the transformation.

As a first step, we listed initiatives required for decarbonization of the Czech economy. The level of investments was estimated for each initiative across the sectors. Calculation for each investment was done separately, taking into consideration primary and secondary effects of the initiative. Various sources, such as industry experts, internal BCG experts, past BCG projects, industry reports and Czech market expert interviews, were used to set the assumptions for calculations.

As a next step, the timing of the initiatives and investments was estimated according to specific hypotheses, such as: technology readiness, regulatory requirements, incentives, interdependencies between the initiatives and business specifics of the industry and individual enterprises. Required investment for each initiative was then split between different sectors of Czech economy and expected import of goods or services.

Total GDP impact was calculated as a sum of the impacts on all industries, less imported goods and services. Each industry impact consists of direct, indirect and induced effects calculated through industry multipliers. Direct effect is a contribution of sector salaries and income. Indirect effect consists of supplier's income. Induced effect is the impact of employee salary spending in the economy. Total industry multipliers (expressing the aggregate effect of the spending to the economy[13]) were applied to each sector for each initiative. As a result, the total monetary impact on GDP was calculated individually for each year and cumulative by 2050.

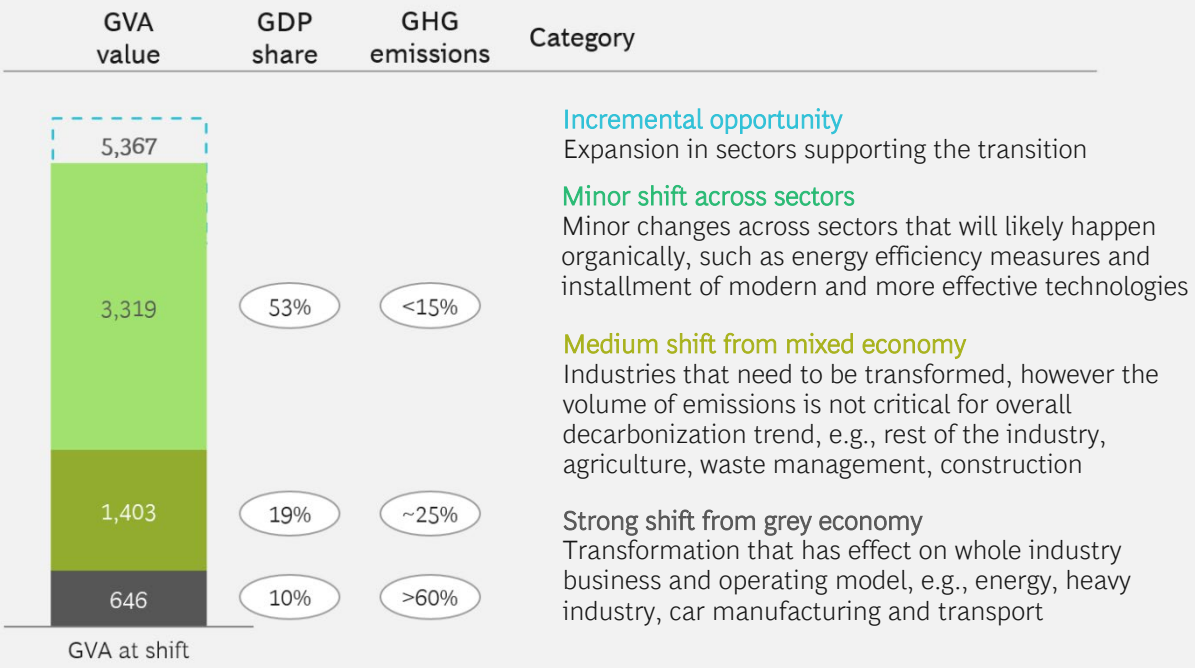
Calculations were performed on current prices of common goods and services, yet we project a moderate decline of costs and gradual maturing of green technologies (based on internal BCG perspectives and expert interviews).

[13] Multipliers are the ratio of direct and indirect output effect of input spending. In a simplified way it represents how much value is retained or additionally created in the economy per 1 unit currency spent. For each country the multipliers are derived based on based on Input-Output tables, which describe the sale and purchase relationships between producers and consumers within an economy.

We can also estimate the "value at shift," expressed as the amount of GDP in segments of the economy that will be affected the most based on GHG emissions and dependency on grey technologies and energy. Our analysis shows that approx. 10% of Czech GDP (~650B CZK) will be subject to strong changes in the most fundamental technologies used to produce outputs in the new "greener" world and therefore potential risk due to the transition from the grey economy. The transition will affect the entire business and operating model of industry (e.g., fossil fuel energy, heavy industry, ICE[14] car manufacturing, transport). An additional 19% of GDP (1,400B CZK) is produced in sectors that will need to be partially transformed with e.g., selective new technologies required but retaining its business model and way of operations.

Exhibit 3 – Split of the economic output by impact category

Gross Value Added, GDP (B CZK, %), GHG emissions (% of total), 2021



Source: BCG analysis

Investments required

Our bottom-up model (see details in Key structural changes from the economic perspective) shows that a substantial investment of over 3,200B CZK (approx. 100-200B CZK per year until 2050, 1.5-3% GDP) will be needed to sustain the pathway in majority of industries and make a turnaround in segments with increasing emissions (transport and waste management).

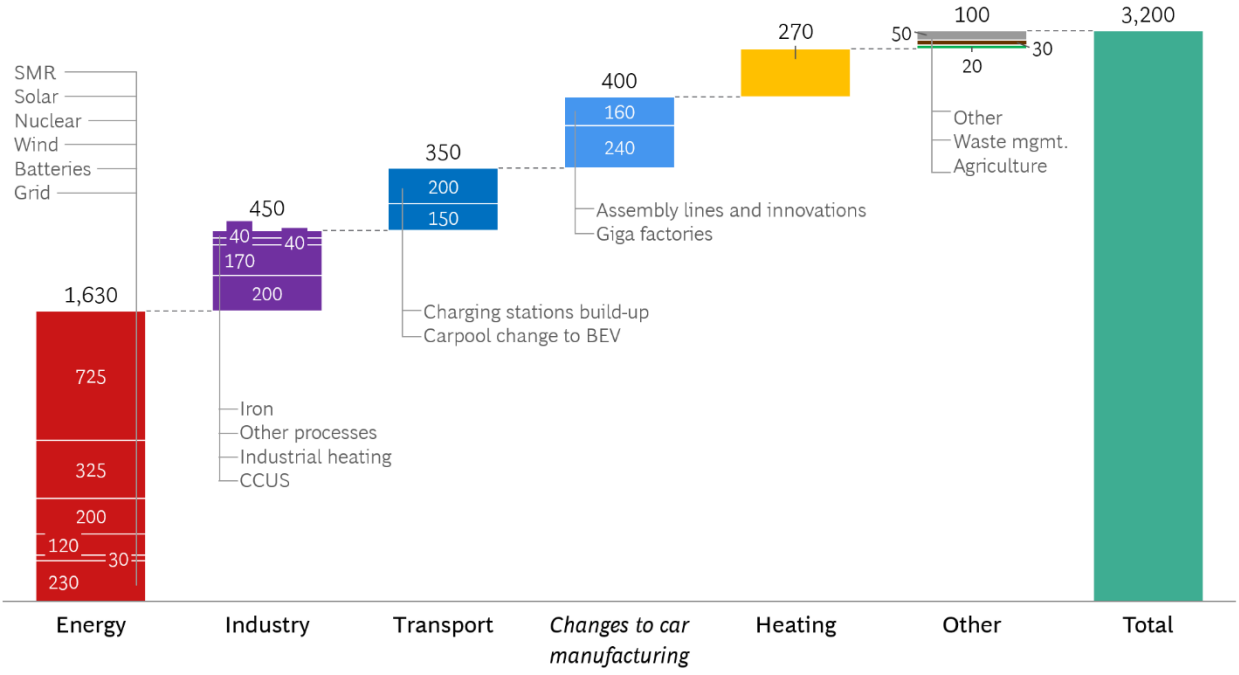
Majority of the 3,200B CZK investments (~2,500B CZK) will be required to decarbonize the three most polluting sectors (energy, industry and transport). An additional 400B CZK will be required to transform the Czech car manufacturing industry[15] as a result of the switch to EVs (without a direct

[14] Internal Combustion Engine
[15] See details in Car manufacturing

environmental impact in production of cars but required to maintain production of EVs instead of current ICE cars). Similar levels of investments (relative to GDP and current decarbonization status) are reported across EU countries. Some are targeting an even faster pace of reduction (e.g., Net Zero by 2045) to accelerate the transition.

Exhibit 4 – Transition investments by sector

Billions CZK, cumulative by 2050



Source: BCG analysis

Approximately 1,200B CZK investments (38% of total) will be required by 2030. Out of this, over 900B CZK is expected to be invested by companies, with the remaining 300B CZK split equally between the state (e.g., strengthening of the power grid and preparation of infrastructure for hydrogen and CCUS) and citizens directly (e.g., modernization of individual household heating). On the other hand, approx. 1,000B CZK will already be available in the same period for the Czech Republic from EU funds. It will depend on the government decisions how to distribute the funding to support the private investments.

The abovementioned investments are not entirely incremental, as there is no alternative. Companies have already started to rethink investments from the Net Zero perspective. For instance, ČEZ expects to invest over 600-700B CZK by 2030 (approx. 50% is aimed for activities on top of regular maintenance, 80B CZK will be invested into distribution networks in next 5 years), Škoda Auto has increased its investment expectation 4 times to 5.6B EUR (over 130B CZK) in the next 5 years, focused on electromobility and digitalization. Liberty Ostrava signed a contract for new electric arc furnace for 8.6B CZK, Třinecké železárny plans to spend 12B CZK for new furnaces. Numerous other companies are installing own off-grid RES, switching to BEV fleets, etc.

Potential scenarios for the Czech Republic and its economy

The Czech Republic can adopt one of the three following approaches:

Approach	Scenario and impact
Passive	Wait the transition out with a hope that it will fail, no public investments and support - Saving public investments in the short term, but most likely losing in the longer game Some industries will invest privately to remain competitive but will be restrained by legacy regulation 10% of Czech GDP will be at high risk, an additional 20% will be less competitive, income from EU will decrease (as it will be bound to the transformation), export will collapse, cost of debt will grow **Leading to decline of GDP in absolute terms and potentially state bankruptcy (in combination with other negative trends[16])**
Reactive	Limited investment (still substantial ~2,500B CZK) and support – Focusing on necessary actions only to keep the pace with regulation Negative impact on net export due to reliance on import of technologies, decrease of export due to lower ability to compete in the changing environment, suboptimal use of EU funds due to lower readiness, lower value-add usage of funds **Leading to falling behind champions - relative decline of GDP vs other countries**
Driving	Proactive control, substantial investments (3,200B CZK as mentioned above) and support – only approx. 30% higher costs but with better timing and focusing on localization Transform the endangered sectors proactively to keep the GDP performance (gradually replacing segments in decline with new green tech manufacturing) **Keeping pace with the transition-powered growth of the other EU countries**

These investments will not only allow the economy to continue to competitively participate on the European market, but they can also partially drive local economic growth (as opposed to losing competitiveness due to regulatory and customer driven requirements on carbon free supply chains). On top of the direct and indirect multiplier effects, they will have continuous impact on GDP by creating local markets for new industries and services (e.g., EV chargers' rollout and maintenance, RES operation and maintenance, Hydrogen technologies…).

Factoring in these elements, the marginal societal cost (see box) of achieving Net Zero is far lower - approximately 1,300B CZK (currently 0.8% GDP per year if distributed equally). Furthermore, if the subsidies from EU are considered (at

[16] Ageing of the population, pension and tax system without major reform

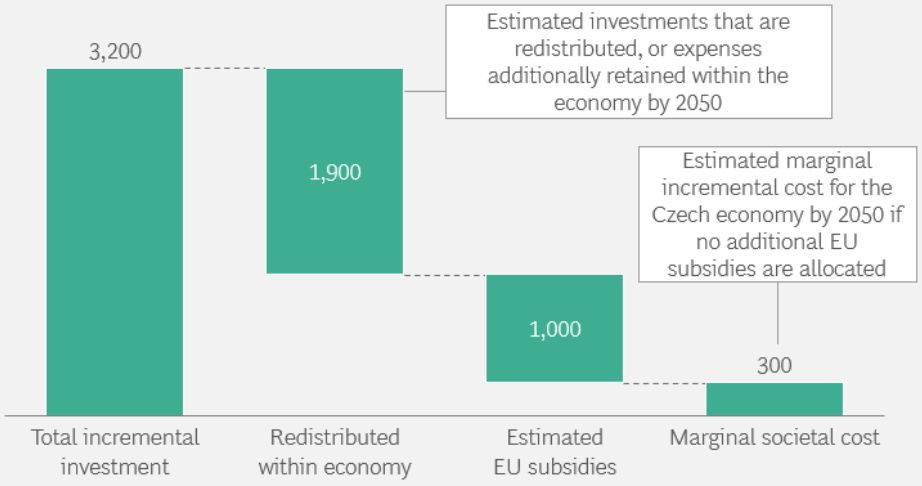
the level of ~1,000B CZK, the marginal societal cost will decline to ~300B CZK (currently 0.2% GDP per year if distributed equally). On a per-capita basis, the total cost works out to 100 CZK per month per person (current prices). The alternative of not investing into transition and falling behind in the EU would have significantly higher cost.

Marginal societal cost

A theoretical concept of incremental cost of the transformation to all parties if considering aggregate investment required and subtracting the projected amount that stays in the Czech economy (using estimated decomposition of the investment by sector and type and GDP multipliers). Furthermore, we can subtract net subsidies coming from EU funds related to support the transition.

The per-capita calculation is purely averaging the marginal societal costs. Naturally the distribution of total cost and economic benefits will not be equal. Therefore, the observed cost for individuals will be higher.

Billions CZK, cumulative by 2050



Key structural changes from the economic perspective

The transition will naturally impact the most polluting sectors (energy, industry and transport) but also indirectly other sectors (e.g., manufacturing, construction), consumers, and inevitably also public accounts.

From the economic perspective, the key transformation is driven by changes of the fuel mix. The overall raw energy consumption will remain at approximately current levels due to increased efficiency. However, the fossil fuels (oil, gas, coal - vast majority imported) will be replaced by electricity from RES, which will be generated locally. This will affect the net export balance from a long-term perspective. The ongoing import of fuels will be replaced by investments into RES technologies[17] (likely to be imported to large extent), deployment and O&M. Ability to engineer and produce RES and related technologies locally will be a key factor impacting the overall economic impact and returns on investments.

The Czech car manufacturing industry will be the second largest sector impacted from the economic perspective. Not only will the ICE related part of the sector (engines, transmissions, exhaustion) cease to exist, but also the transformation of the carpool towards BEV is redrawing the competitive landscape across Europe. Incumbent players are trying to establish themselves on the market with EV product lines, and new entrants have already entered the market or are planning to do so (Tesla, BYD, NIO…) and with disruptive business models. This will pose a challenge to local car-related supply chains, and thus to the Czech economy, as car manufacturing is one of its main pillars.

An overview of key changes in respective sectors is provided in following chapters:

Energy

Energy is the largest polluting sector, responsible for 37% of total GHG emissions. A majority of that (87%) is caused by coal combustion, followed by gas (9%) and other combustion (~4%). Two main changes will happen in the energy sector:

- Decarbonization of production by transition to RES
- Increase in production to provide clean energy as replacement for fossil fuel combustion in other sectors and households

This will require approx. approx. 1,700B CZK of investments by 2050.

Gross consumption (and production) is projected to grow on top of the transition from fossil fuels from 74TWh currently (of which 52% yet to be transformed to RES) to 125TWh in 2050. The increased demand (51TWh) will be approximately equally divided between increased demand from electrification of industrial processes and transport and expected production of

[17] Including wind turbines (blades, generators, towers…), PV (PV panels, invertors, substructures, transformers…)

Hydrogen. Baseline energy demand increase driven by economic growth is expected to be offset by efficiency improvements.

A feasible pathway based on PLEXOS[18] model consists of the decommissioning of legacy coal plants, a gradual replacement of peak gas plants (CCGT[19] - to ensure always available capacity), new traditional nuclear plants and SMR[20], a boost of solar[21] and wind installations and building battery storage for balancing. Based on estimated capacity requirements, we estimate that approx. 1,400B CZK investment into RES generation will be needed (120B CZK wind, 325B CZK solar, 200B CZK nuclear, 725B CZK SMR, and 30B CZK for installation of new battery capacity), 230B CZK into increasing grid resilience and balancing. Decommissioning of legacy coal and gas plants and region revitalization will require approx. 100B CZK investments, but it will be offset by 120B CZK savings in operations, maintenance, and upgrades.

Assumed capital cost for installed capacity

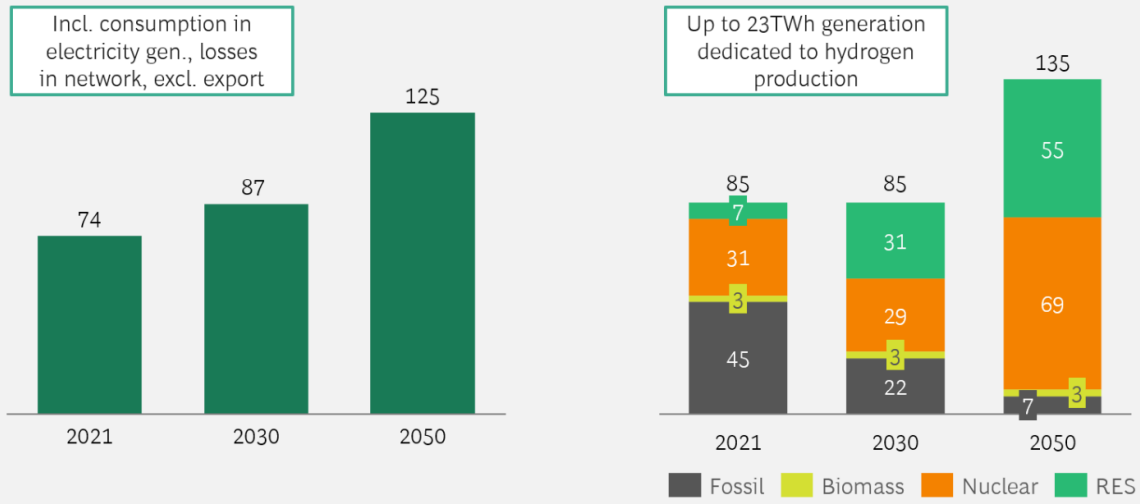
(CZK thousands)

Source	2021	2030	2050
Nuclear	149	115	101
Gas CCGT	23	23	23
Solar PV	18	11	8
Wind	36	33	31

Source: International Energy Agency (2022), Global Energy and Climate Model Documentation 2022, IEA, Paris

Exhibit 5 – Gross consumption and local production of electricity by 2050

TWh



Source: PLEXOS model for Czech Republic, BCG analysis

On top of the transition to RES, Hydrogen production (up to 15Mt capacity in 2050) is expected to play a role in the energy mix (partially as fuel and for

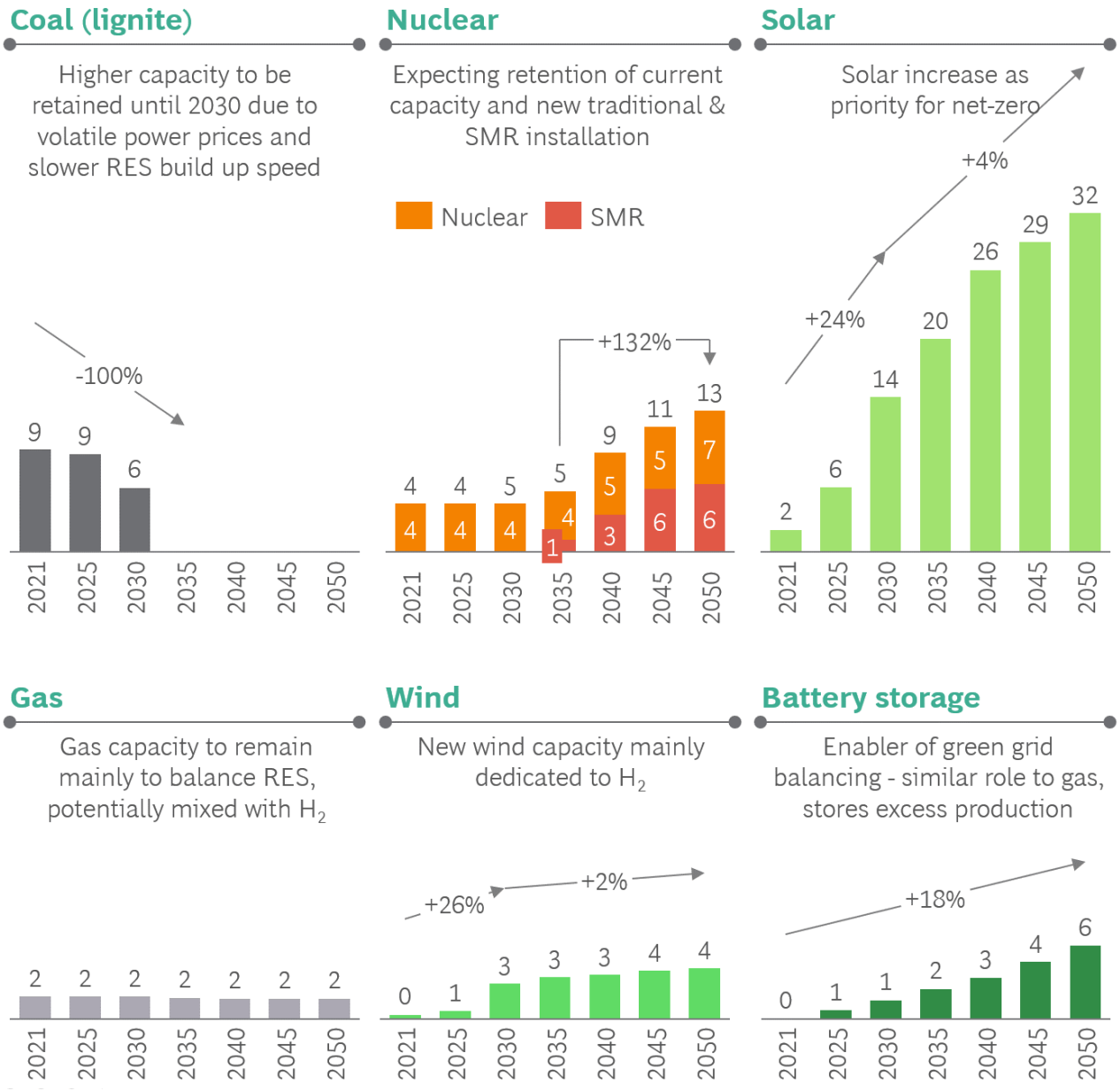
[18] Power systems model on European level
[19] Combined Cycle Gas Turbine
[20] Small Modular Reactor (nuclear)
[21] Massive deployment of PVE will require approx. 30,000ha which is 0.8% of utilized agricultural area (UAA) or 9% of current Rape fields; For comparison approx. 5,000ha of arable land is transformed to construction zones every year

decarbonization of industrial processes). Approx. 85B CZK of investment[22] will be required for the installation of local electrolyzers.

Approximately 450B CZK will be required by 2030 for the abovementioned investments, two thirds of which are expected to be provided by the state. The investment into the energy sector is expected to have a mildly positive impact on GDP – the total invested amount will return cumulatively in terms of increased GDP by 2050 (mainly through increased local electric energy generation as opposed to importing fossil fuels).

Exhibit 6 – Key changes to the Czech energy production

GW installed production capacity



Source: PLEXOS model for Czech Republic, BCG analysis

[22] Assuming decline of unitary cost from current 32ths. CZK to 11ths. CZK/kW capacity in 2050

Industry

The industry sector is the second largest source of Czech GHG emissions. Approx. 44% of sector emissions is produced by industrial processes, 40% by combustion in industry and the remaining 16% by cooling gas leakages (GHG gasses with thousands of times the warming potential of CO_2).

Our model projects that the decarbonization activities will require approx. 450B CZK of investments split between industrial process decarbonization (250B CZK investments) and replacement of fossil fuels for industrial heating (200B CZK investments).

The most polluting individual processes (approx. 30% of total industry sector emissions) are iron & steel manufacturing and cement & lime production, requiring approx. 30-50B CZK investments to continue at current production levels. For iron and steel manufacturing, it is already decided that 3 out of 4 blast furnaces[23] will be replaced by electric arc furnaces. For the remaining one, it will depend on electricity prices and carbon costs. The transition in cement and lime production will likely happen rather after 2030 due to high dependance on CCUS.

[23] Based on public announcement of the two main manufacturers (Liberty Ostrava and Třinecké železárny)

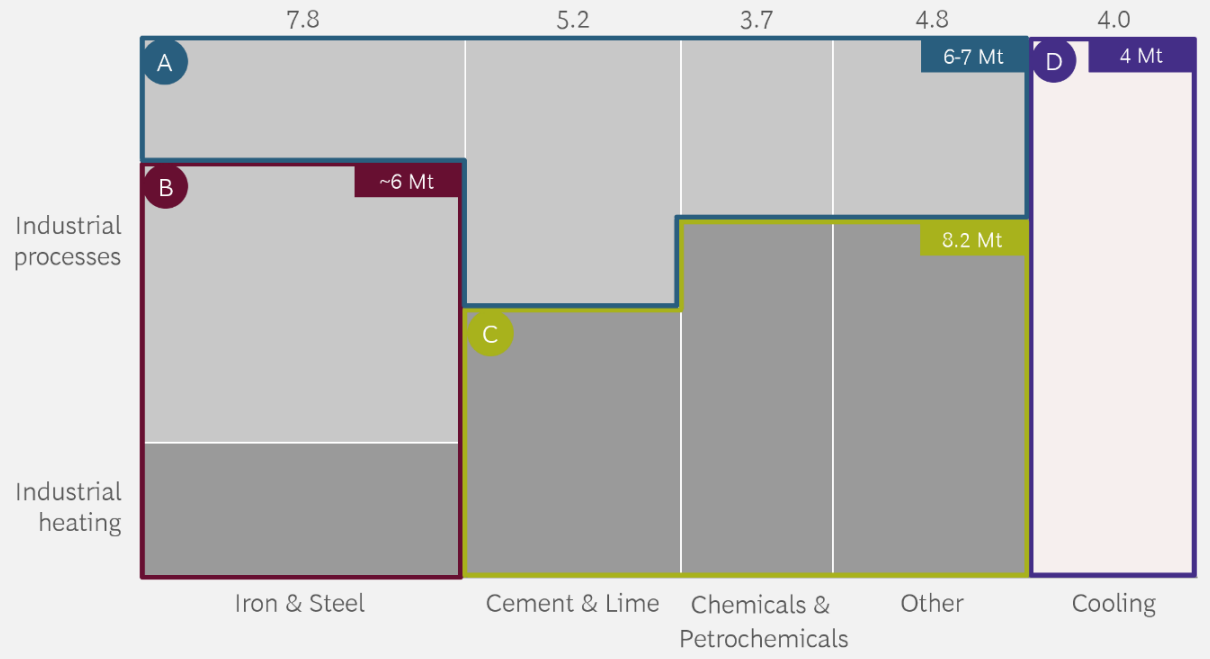
Our model shows that approx. 85% of this investment will materialize as incremental cumulative gain for Czech GDP. Full return will not realize due to increased import of technologies from abroad. Further smaller scale changes (but fragmented across industries causing another 30% of sector emissions) are expected gradually in other processes including, e.g., ozone replacement for cooling technologies.

However, it is unlikely that emissions in industry production will be reduced to zero as the non-carbon technology is not available for all processes or its use is highly uncompetitive. The residual will need to be covered by CCUS technologies (larger scale deployment expected beyond 2030) that will require substantial infrastructure investments of approx. 200B CZK with 30% GDP return by 2050. However, the technological advancement may improve the economy of CCUS.

Industrial heating (heat generation for various processes) is responsible for 40% of industry sector CO_2 emissions. The substitution options (and unitary costs)

Exhibit 7 – GHG emissions industrial split and decarbonization approach

$MtCO_2e$



A – Carbon capture technology roll-out
Installment of carbon capture technology to capture remaining CO_2e emissions

B – Electric Arc Furnaces deployment
Replacement of existing blast furnaces with EAFs technology (3/4 decided, 1/4 TBD)

C – Other Industrial heating replacement
Replacement of current industrial heating with heat pumps, biomass, electric resistance and hydrogen

D – Cooling fluid replacement
Replacement cooling fluids with green alternatives, will happen organically – no additional investments needed

Source: BCG analysis

for fossil fuels depend on required temperature from heat pumps (for the lowest temperatures up to 150°C), through biomass (150°C - 500°C), electricity (500°C - 1300°C) to hydrogen combustion (for temperatures above 1300°C). Overall investments are projected at approx. 200B CZK (based on the total energy consumption and replacement technology costs) with 60% GDP return. The investment is expected to come mainly from private sources, driven by increasing carbon costs (level public subsidies can be considered to maintain competitiveness).

Transport

The changes to the transport sector will be driven by an EU ban on ICE personal vehicles by 2035 and later gradual transition of commercial vehicles to BEV[24] and FCEV[25]. We expect that this transition will require approximately 350B CZK of investments, of which 150B CZK will be due to the temporary delta between ICE to BEV purchase price[26] (expected to equalize in 2030), and 200B CZK for new infrastructure - public charging stations network and related grid investments. Over 90% of these investments are projected to originate from private sources driven by regulatory push.

The fiscal impact of the transition to BEV is projected to be potentially negative due to a major gap in commodity tax incomes (currently up to 100B CZK p.a.). Selective taxes on electricity for transport or substantial increase of road tax would be required to compensate this effect.

The end of the production of new ICE personal vehicles will not immediately mean personal car decarbonization on its own. If current the age structure and replacement rate is maintained, the emissions will only halve by 2050. Other measures will need to be introduced to speed up the transition.

While the BEV path (and FCEV path for part of heavy-duty vehicles) is generally accepted as the future standard, the transition may be partially impacted by synthetic fuels – as temporary alternative prolonging the life of ICE cars or further reducing emissions during the transition. With synthetic fuels, current internal combustion engines are used, but fuel is replaced by a less polluting alternative (e.g., Synthetic Hydrocarbons or Dimethyl Ether). However, broad deployment of synthetic fuels would require new production capacities, changes to distribution infrastructure and minor retrofitting to current engines. Thus, the availability and use of such fuels is rather in question.

Car manufacturing

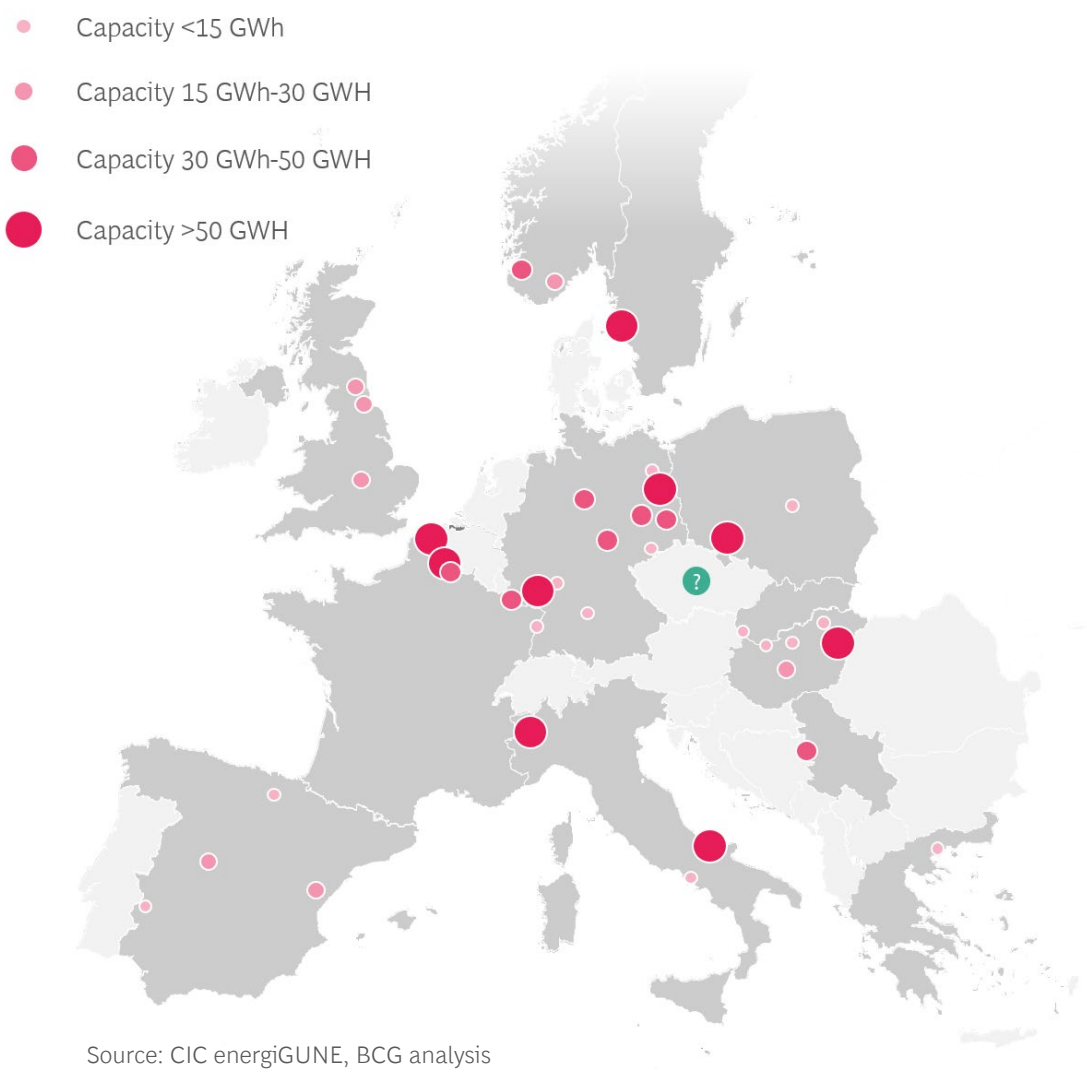
While the car manufacturing sector is not directly one of the main sources of GHG emissions, it will be substantially impacted due to EU-wide end of new ICE cars' registrations. It is assumed that at least 180B CZK out of the current approx. 550B CZK GDP contribution will be at high risk (as it is driven by production of technologies used only in ICE cars). Approx. 400B CZK of investments will be required for the transformation of the impacted part of the

[24] Battery Electric Vehicle
[25] Fuel Cell Electric Vehicle (hydrogen powered)
[26] Currently new BEV car costs 26% more than ICE car due to battery costs and higher average segment, expected to gradually equalize by 2030 (otherwise constant prices assumed)

car manufacturing industry, out of which 160B CZK will be required for changes to assembly lines and other adjustments.

To prevent a decline of sector GDP driven by a change in the value-add contribution structure[27] of car manufacturing, it will be necessary to secure electric engine and battery manufacturing capabilities in the Czech Republic. Investments into two currently considered giga factories (each for approx. 120B CZK additionally) would prevent a potential loss of approx. 4% of sector GDP. Additional structural risk may pose availability and cost of materials.

Exhibit 8 – Confirmed Giga factories in Europe



Source: CIC energiGUNE, BCG analysis

Other

Based on our model, the remaining sectors (responsible for 15% of carbon emissions combined) will require approximately 350B CZK of investments, out of which the majority (~250B CZK) will be used for reducing emissions of commercial, public, and individual heating. These changes and investments were not assessed in detail in this report.

[27] Overall value is similar, but source is different - Lower complexity of manufacturing, shift of value from engine & transmission part to battery, electric systems and SW, higher qualification of workers is required

Risks

Besides the reactive overall approach to the transformation without focus on localization of the investments leading to slow-down of the economy, there are currently three most prominent risks that should be mitigated locally:

- **Inability to transform the economy towards green tech** - missing the chance and investment programs to innovate and change the economy towards the green technologies of tomorrow. This could be caused by inefficient motivation and subsidies (investments consumed inefficiently e.g., by legacy technologies) or slow setting of regulation for innovative markets. It would lead to a long-term export/import imbalance and a decline of overall productivity.
- **Slow decarbonization of industry and services** – an inability to reduce GHG emissions by individual producers would likely lead to lower competitiveness on the EU market through increasing carbon costs and implicit trade barriers, as other players will continue to decarbonize their entire supply chains. It can also lead to lower attractiveness for investments and harm the overall industry reputation.
- **Inability to comply with decarbonization targets in the energy sector** with negative impacts to industries through higher electricity prices driven by the ETS scheme. Achieving 2030 (and 2050) targets will require aggressive RES deployment to offset coal decommissioning. As the focus was recently put more on the individual RES (off-grid installations), it will be necessary to build approx. 1GW p.a. of on-grid RES capacity. The increasing production from RES needs to be upfront backed up by sufficient "always available" capacity, likely in the form of peak gas power plants and battery storage. Furthermore, the transmission and distribution grid will also need to be strengthened and grid balancing developed ahead of the deployment to handle the fluctuations and and increases in demand. Insufficient capacity of "green electricity" can also harm competitiveness of the industry as it will not be able to fully decarbonize its supply chain.

Failure to act would have severe negative consequences for the Czech economy: From a slowdown and falling behind other countries in terms of GDP growth, to massive closures, mainly in the manufacturing sector, to a decline of GDP in absolute terms and potentially state bankruptcy (in combination with other negative trends). Such a situation would consequently impact public accounts through lower tax revenues and higher social expenses and the whole society through layoffs, unemployment and a decreasing standard of living.

It would also mean the loss of the once-in-a-lifetime opportunity granted by such a large transformation and value redistribution. It will be the actions of this and a few upcoming governments that will determine the economic position of Czech Republic for decades to come.

Transformation as an opportunity

Decarbonization will be accelerating across Europe, resulting in a shift of value creation from legacy technologies and an establishment of new markets. The global market for clean energy technologies is expected to triple by 2030. The Just Transition Fund and other instruments will pour 800B EUR (over 19,000B CZK) to the transformation market. Furthermore, an unhealthy raw material and technological dependence on countries outside EU (China in particular) is observed, which triggers a launch of several programs to mitigate it.

The EU Commission has announced to propose a Net-Zero Industry Act to identify goals for net-zero industrial capacity and provide a regulatory framework suited for its quick deployment. The framework will be complemented by the Critical Raw Materials Act, which will aim to ensure sufficient access to materials like rare earths, which are vital for manufacturing key technologies, and the reform of the electricity market design. These acts will be supported by faster access to financing through streamlined processes. It is also expected that existing EU funds will be rescoped to support clean tech innovation, manufacturing, and deployment.

Vision for Czech Republic

As has been stated in previous sections and supported by multiple public statements of EU leaders, this is a once-in-a-generation opportunity. The Czech economy can use this transformation to grow beyond its current baseline and mitigate potential negative economic impacts (mainly from decline of local industry and shift towards import of technologies).

Despite not having as favorable natural conditions for RES generation as the Nordic countries, coastal countries or southern countries, Czech Republic has a good balance between the ability to engineer green tech solutions (legacy engineering and industrial focus of the economy) and a still relatively affordable workforce for local production of systems with higher added value. Naturally, the lower value-add components will likely be produced elsewhere.

The Czech Republic as a prosperous Net Zero country with successfully transformed industry and services – regional engineering and production leader in BEV and its parts including batteries, hub for safe and reliable RES software and technologies (heat pumps, SMRs, H_2…)

In the following five key innovation areas, the Czech economy can potentially achieve an edge; these should be explored, developed, and supported:

EV battery supply

Vision: Czechia will become the regional leader in battery production as car manufacturers' production will shift to BEV. This will contribute to the overall replacement of ICE specific parts production which will be critical for maintaining the automotive GDP contribution. Czech Republic will successfully leverage one of the largest Lithium reserves in the EU.

EU annual market potential: 1,000-1,500B CZK

H_2 components production

Vision: Czech traditional heavy and tech industry will become an important player in selected parts of the H_2 generation and transportation value chain. Existing experience with the so far niche segment will be leveraged to capture a portion of the strategic fast-growing market (10Mt of green H_2 expected to be produced in the EU per year, add'l 10Mt to be imported).

EU annual market potential: 80-120B CZK

Smart grid software

Vision: The Czech SW development industry (with strong foothold in cybersecurity), along with a traditional focus on resilient transmission networks, will become a European hub for secure smart grid network software development.

EU annual market potential: 200-250B CZK

SMR technology

Vision: Czechia will become the leader in SMR deployment. Although modular reactors will likely not be of Czech original design, the Czech Republic is already one of the most advanced countries in exploring SMRs' possibilities for commercial deployment (expected in late 2030s). Local R&D capabilities in nuclear physics and experience from constructing and operating traditional nuclear power plants will capitalize the know-how in engineering, construction, and operations.

EU annual market potential: 50-150B CZK

Heat pump production

Vision: Czechia will be one of the main producers of heat pumps – a growing segment with even more demand expected from industrial heating replacements. Local research and supporting ecosystem are already present as well as production capacities (so far for mainly foreign companies).

EU annual market potential: 150-200B CZK

We estimate the EU market for all the above-mentioned areas at 1,500-2,200B CZK; this is still only a smaller part of the entire transformation.

Furthermore, opportunities are arising also in the consumer segment. Willingness to pay for sustainable products is continuously increasing, especially when sustainability is linked to other benefits, such as health, safety and quality. Climate leaders will also gain substantial competitive advantage in terms of higher revenue growth from green products, carbon cost savings, lower regulatory risk, access to cheaper financing, easier talent hiring and retention.

Strategic priorities and required actions

While the ambition, taxonomy and directional regulation is agreed on the EU level, it remains to individual countries to prepare and adapt to the changes. Sectors and companies will try to adapt and transform but it is up to the legislators and government to set up the environment to enable the transition with positive outcomes for the economy.

There are three strategic priorities for the Czech government:

1. **Support the transition of the economy towards green tech** - provide targeted incentives for companies to invest in green technologies and innovations, set up the regulation (and public support) to attract investments and allow its efficient use for green tech innovations and production, and set up reasonable taxation keep competitiveness and retain fiscal incomes
2. **Enact strong regulations and subsidies to support decarbonization of industry and services**, including setting targets for carbon reduction. Additionally, invest in research and development to create low-carbon alternatives to current local production processes and technologies.
3. **Prepare a comprehensive action plan for acceleration of new RES deployment** and start to update the transmission and distribution network immediately (increase network investments, start to improve management capabilities and cooperate with industry to capture its expected requirements); Continue[28] to simplify regulation to speed up the RES deployment (e.g., special zones for RES)

Operationally, it is highly recommended to establish a climate transition coordination center at the government office level to drive this agenda across sectors (update plans to secure maximal EU funding, propose legislative agendas to set up regulations and policies, oversee execution in individual sectors…). As with most tangible actions, it is needed to revise the National recovery plan to prepare the economy for the transition.

It is critical to realize suggested actions in advance of the actual development. Failure to act now would cause the Czech Republic to fall behind with respect to other countries, which would harm the Czech economy through an increased need for imports of technologies and services and lower international competitiveness.

On the EU level, it will be important to protect the economy during the transition, as the hard Net Zero is primarily an EU topic. Other countries, including China and the US, are also advancing in the green tech sector, but in a more opportunistic way and primarily with the ambition of protecting their economies and establishing their positions on the field.

[28] Such as recently approved legislation update allowing to build wind turbines and PV sources without changes to the zoning plan

Strategic actions

! 1. Establish National Net-Zero coordination center at government level and nominate strong leader to coordinate and prioritize initiatives across sectors

! 2. Start positive communication campaigns to build societal consensus and explain negative impacts of avoiding the transition

3. Prepare and present national decarbonization strategy and include it in the legislation, streamline overall legislation

! 4. Review all activities required for Net Zero targets and National recovery plan from the net-zero perspective, design strategy for efficient investments redistribution

5. Start to pre-finance strategic project regardless of support and target and secure maximum EU funding

! 6. Pledge extra 4B CZK per year to fund green tech research and innovation agenda

7. Expand NRB mandate to boost the financial support of the net-zero transition beyond commercial financing instruments

Energy

! 8. Prepare new versions of SEK/NKEP/NAPSG documents with clear path to net-zero

9. Modernize and strenghten ERU and SUJB to be able to drive the changes in the energy sector

! 10. Pass legislature to speed up RES and strategic grid deploym.

11. Prepare new energy act reflecting the RES transformation and new tariff structure reflecting distrib. RES

! 12. Mandate CEZ to deploy first SMR by 2032 (finish licensing by 2024)

! 13. Implement GO-TO zones for large scale RES into Czech law and define 30 sites

14. Prepare new financing programs for off and on-grid RES

15. Prepare action plan for winding down coal and restructuring regional industry for green tech

Industry

16. Prepare and present national CCUS plan and coordinate with neighbor countries

! 17. Define industry decarbonization goals and schedule and prepare additional subsidy programs for technology and services

18. Identify companies endangered by end of ICE vehicle production and prepare targeted support for the transition

! 19. Prepare infrastructure and attract 2-3 giga factories (combined capacity over 140GWh)

Transport

! 20. Boost EV and H2 adoption through building 100k public chargers by 2035

21. Boost EV adoption through purchase incentives for mass market and adjust regulation aimed at large companies

22. Remove <EURO5 cars from the roads through taxation and incentives to replace most polluting cars

Other

! 23. Implement “Green public procurement” – mandatory carbon related criteria for public tenders

! 24. State and municipal running on own (or PPA) 100% RES by 2030

25. Enforce fossil-free heat in almost all reinvestment – exclude fossil fuels from any subsidies as of 2025

26. Tie housing construction support with Net-positive living - subsidized housing construction with sustainable materials and technologies

27. Introduce mandatory renovation schedule for inefficient buidings

! Immediate action required

Appendix – detailed action plan

#	Activity	Description
1	Establish National Net-Zero Opportunity Center to coordinate and prioritize initiatives across sectors	Build a standalone (independent) overarching institution at the government level to coordinate and prioritize initiatives across sectors Nominate reputable head and mandate to hire and contract most recognized experts, advisors, and top talents – provide similar conditions as e.g., ČNB,[29] as it will be coordinating key activities for the future of the Czech economy It should focus on strategic advisory and planning to the government, preparing key materials and plans, monitoring, and supporting technological development, proposing regulatory and subsidy frameworks and its parameters Empowered with own budget for its activities, attracting top experts including external advisors and to fund academical and commercial research and development
2	Start positive communication campaigns to build societal consensus and explain negative impacts of avoiding the transition	Start to educate the public about the transition, its costs and benefits based on the national strategic plans (for decarbonization, energy, hydrogen, CCUS…) Provide long term vision and plan including budget requirements (for multiple election terms), demonstrate negative consequences if falling behind Introduce and provide measures for support of the most negatively affected, ensure fair burden-sharing across the society
3	Prepare and present national decarbonization strategy and include it in the legislation, streamline overall legislation	Transfer EU net zero targets into Czech legislation. Set targets and limits with proposed timing Link the priorities and targets with specific actions (legislative) and align all strategic documents at all levels. Review existing legislation and streamline it, taking into consideration new priorities and targets Establish central monitoring of the progress and publish results
4	Review all activities required for Net Zero targets and National recovery plan from the net-zero perspective, design strategy for efficient investments redistribution	Include Net-zero criteria for all investments in the National recovery plan Provide a "net-zero" score for all calls for investments in related fields – mainly infrastructure and green transition but also industrial research and innovation (chapter 5.3),

[29] Czech National Bank

		education and labor market development (3.3) and others Design a strategy for efficient funds redistribution Add a program chapter for specific green-tech research Monitor utilization of funds towards net-zero Increase funding for RES (currently 6,6B CZK) and expand its investment focus (currently on PVE and central heating distribution)
5	Start to pre-finance strategic project regardless of support and target and secure maximum EU funding	Identify all available funds and ensure its transfer to the local budget (with necessary co-financing programs) Communicate the programs in advance enable its efficient and strategic use (avoid last minute funding of anything available) Improve the approach: Start and pre-fund multiple local projects based on country strategy (fund what we need in any case) and then secure financing possibly in larger scale (also for already proven viable projects rather than passively wait and search for any project that would fit to the purpose).
6	Pledge extra 4B CZK per year to fund green tech research and innovation agenda	Define strategic research areas for green-tech (SMRs – parts of value chain, H_2, heat pumps research, smart grid SW…) Pledge extra at least 4B CZK yearly for predefined period for academic and applied/industrial research related to green technologies Mandate GAČR[30]/TAČR[31] to prepare additional programs or mandate the newly established central coordination office to allocate the funds even faster for targeted research
7	Expand NRB[32] mandate to boost the financial support of the net-zero transition beyond commercial financing instruments	Mandate NRB to play more active role in the net zero transition to support private investments at favorable terms – fill the gaps where standard commercial financing would not be sufficient Coordinate support with the central office
8	Prepare new versions of SEK[33]/NKEP[34]/NAPSG[35]	Prepare new version of key strategic documents that will reflect the accelerated transition

[30] Grantová agentura České republiky - Czech Science Foundation
[31] Technologická agentura České republiky Technology Agency of the Czech Republic
[32] Národní rozvojová banka - National Development Bank
[33] Národní energetická koncepce - State Energy Policy
[34] Vnitrostátní plán České republiky v oblasti energetiky a klimatu - The National Energy and Climate Plan of the Czech Republic
[35] Národní akční plán pro chytré sítě – National Action Plan for Smart Grid

	documents with clear path to net-zero	towards Net-Zero – coordinate across sectors and cooperate with private companies, reflect strategic priorities Establish the desired level of supply security (both in terms of capacity and energy) considering the necessary costs of the solution and the EU regulations. Furthermore, address specific subtopics: Supporting the construction of low-emission sources (including SMRs) Transformation of district heating systems (40% of households still connected to SCZT[36]) Specific strategies for the development of a hydrogen economy (a compromise between costs and supply security), including concrete steps in legislation and financing Plan for the development of future transport infrastructure (future form of charging network and infrastructure for hydrogen refueling)
9	Modernize and strengthen ERÚ[37] and SÚJB[38] to be able to drive the changes in the energy sector	Introduce changes to the structure and strengthen key regulatory bodies to be able to drive change instead of waiting for requirements from other parties Strengthen capacities to cope with increased agenda due to much higher number of sources (distributed RES) and more than doubling the nuclear capacity (also increasing from 2 powerplants to 20+ including SMRs) Allow to attract (and pay for) to experts and talents – Position both organization s or its parts outside of the Act on civil service Allow to participate during licensing processes in other countries to build expertise
10	Pass legislature to speed up RES and strategic grid deployment	Prepare in depth requirement analysis based on individual and large scale on-grid RES deployment and projected increased electric consumption Define strategic priorities and projects of national interest (include RES into the list) Set deadlines for target network capacity/structure and plan its gradual upgrades Monitor transmission operator and distribution operators for delivery on the plan Enact regulatory changes if needed for speed up the deployment as the strategic enabler for RES and electrification

[36] Systém centrálního zásobování teplem – Central heating system
[37] Energetický regulační úřad – Energy Regulatory Office
[38] Státní úřad pro jadernou bezpečnost – State Office for Nuclear Safety

		Simplify approval process and strengthen the role of state in strategic infrastructure projects Finalize conditions and regulation for community energy, introduce new platform for data sharing between transmission and distribution networks and update affected legislature
11	Prepare new energy act reflecting the RES transformation and new tariff structure	Prepare and present a complex review of energy bill reflecting upcoming transformation of the sector Introduce new tariff structure reflecting the mass development of individual RES – e.g., the payment for connection will need to be fairly distributed as fixed item (payment for always available source)
12	Mandate ČEZ to deploy first SMR by 2032 and provide regulatory support	Mandate ČEZ (state as the majority shareholder) to take a lead in SMR deployment - prepare first tender for specific SMR Add SMRs to the list of key strategic project in the national interest to smoothen the approval process Instruct and strengthen SÚJB to provide support in order to approve first project by end of 2024 so the deployment can fit to the schedule (operational by 2032) Consult any other update of regulation that will be required Mandate supplier to build local capabilities Define and prepare additional sites for new SMRs (at least 20 SMRs will be needed for CZ)
13	Prepare new financing programs for off and on-grid RES	Continue to support small and medium scale RES (mainly solar and wind) Review and renew subsidy programs to match current technology and progress towards strategic targets
14	Implement GO-TO zones for large scale RES into Czech law and define 30 sites	Identify multiple (at least 30) of RES zones with simplified approvals and subsidies for large scale RES installments according to EU definition of Go-To zones (approval process will not take more than 1 year) Identify and remove process constrains for deployment (approval processes, investments, incentives…)
15	Prepare action plan for winding down Coal and restructuring regional industry for green tech	Start to prepare for winding down all coal/lignite operations Present a plan for affected locations including industrial restart (subsidies for new industries, gradual preparation of workforce…)
16	Prepare and present national CCUS plan and	Identify key producers and define overall requirements for carbon capture

	coordinate with neighbor countries	Coordinate potential approach to storage on the regional level (neighbor countries) Propose cost allocation and investment sourcing
17	Define industry decarbonization goals and schedule and prepare additional subsidy programs for technology and services	Provide coordinated support (R&D and investment funding) for first movers in scaling emerging technologies and capabilities – e.g., around process machinery electrification, sustainable process heat, smart lifecycle solutions, and energy optimization Accelerate domestic demand for decarbonization technology and services through regulation and subsidies, enabling companies to pilot locally Incentivize transition to biobased products and packaging for small and medium companies (e.g., one-off subsidies for changing production) Support biomaterial development research (extra research grants) and transfer
18	Identify companies endangered by end of ICE vehicle production and prepare targeted support for the transition	Identify list of endangered companies based on their production focus Prepare targeted programs to support the transition from BEV to ICE aimed at the companies at risk Adapt the appropriate capacities in the education system to match the output to the change of profiles that will be needed (e.g., less manual assembly due to simpler engine, more electronic engineers, and SW developers) Attract investments to BEV specific parts production in CZ (engines, batteries, electronics…)
19	Prepare infrastructure and attract 2-3 giga factories (combined capacity over 140GWh)	Identify multiple areas across CZ for battery research and production facilities (giga factories) – Actively prepare areas upfront and do not wait for external interest to start with listing potential locations (falling behind competition from other countries) Aim to attract 2 larger (~70GWh) or 3 medium (30-50GWh) sized giga factories with total capacity of at least 140GWh per year Ensure providing sufficient “green” energy capacity (needs to be available upfront – currently insufficient) and strengthen grid connection Provide subsidies as the battery development and production will affect the future of Czech automotive industry (as one of the main pillars of the economy)

20	Boost EV and H_2 adoption through building 100k public chargers by 2035	Boost building of EV charging and hydrogen refueling network Establish central coordination center for EV infrastructure Provide targeted incentives for less economically feasible locations to strengthen the network Impose regulation to include gradually more and more chargers at every new/reconstructed parking lot
21	Boost EV adoption through purchase incentives for mass market and regulation aimed at large companies	Aim for faster adoption of EV cars in lower segment Provide larger subsidies for low-medium income individuals Gradually increase fuel taxes (set up automatic scheme) Regulate possibility to purchase ICE fleet cars (e.g., for companies above certain size) Adjust regulation to enable mass purchase of fleet cars (e.g., requirements for chargers) Introduce powertrain-oriented truck tolls
22	Remove <EURO5 cars from the roads through taxation and incentives to replace most polluting cars	Gradually impose and increase road tax for older ICE vehicles Introduce emission free zones (city centers) Provide incentives for active old cars replacement to speed up the transition
23	Implement "Green public procurement" – mandatory carbon related criteria for public tenders	Every public tender will have to include sustainability/carbon intensity as selection criteria (at least 10% of overall weight) otherwise non-applicability must be substantiated by the procuring party Bidders can be advantaged/dis-advantaged by audited company carbon footprint or audited solution/product footprint
24	State and municipal running on own 100% RES by 2030	Mandate (and support) government, organizations, and municipalities to build local RES capacities to cover >100% of their energy consumption (offices, municipalities, related organizations) Affected subjects will be provided with subsidies for investment but central financial transfers will be decreased by respective typical energy costs as of defined year Support PPAs (Power Purchase Agreement) from the public institutions and municipalities
25	Enforce fossil-free heat in almost all reinvestment – exclude fossil fuels from any subsidies as of 2025	Set up efficient combination of investments and regulation (along with ETS2) to prevent any reinvestment of fossil fuel heating (applicable for industries, commercial buildings and housing)

		Incentivize the transition to electricity and heat pumps application for both public and industries Introduce increased taxes on local carbon heavy heating (gradually also for gas)
26	Tie housing support with Net-positive living - subsidized housing construction with sustainable materials and technologies	Combine much needed affordable housing support with decarbonization through aggressive subsidies for wooden building components with net zero solutions. Aim to make such house at least 15% cheaper than similar "standard" house (differentiated by region) Potentially targeted at structurally challenged regions with large decline of inhabitants
27	Introduce mandatory renovation schedule for inefficient buildings	Enact regulation requiring achieving certain level of building energy efficiency Support with subsidies for renovation and energy transition

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