

BMW
GROUP

SUSTAINABILITY ACROSS
THE ENTIRE VALUE CHAIN.

PREMIUM MEETS RESPONSIBILITY.

MONIKA DERNAI, CORPORATE STRATEGY SUSTAINABILITY AND MOBILITY.



ROLLS-ROYCE
MOTOR CARS LTD



THE BMW GROUP IS CONSIDERING ALL DIMENSIONS OF SUSTAINABILITY IN A HOLISTIC VIEW.



ENVIRONMENTAL



SOCIAL



GOVERNANCE



THE BMW GROUP IS COMMITTED TO ACHIEVING THE 1.5°C TARGET.



SCIENCE
BASED
TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

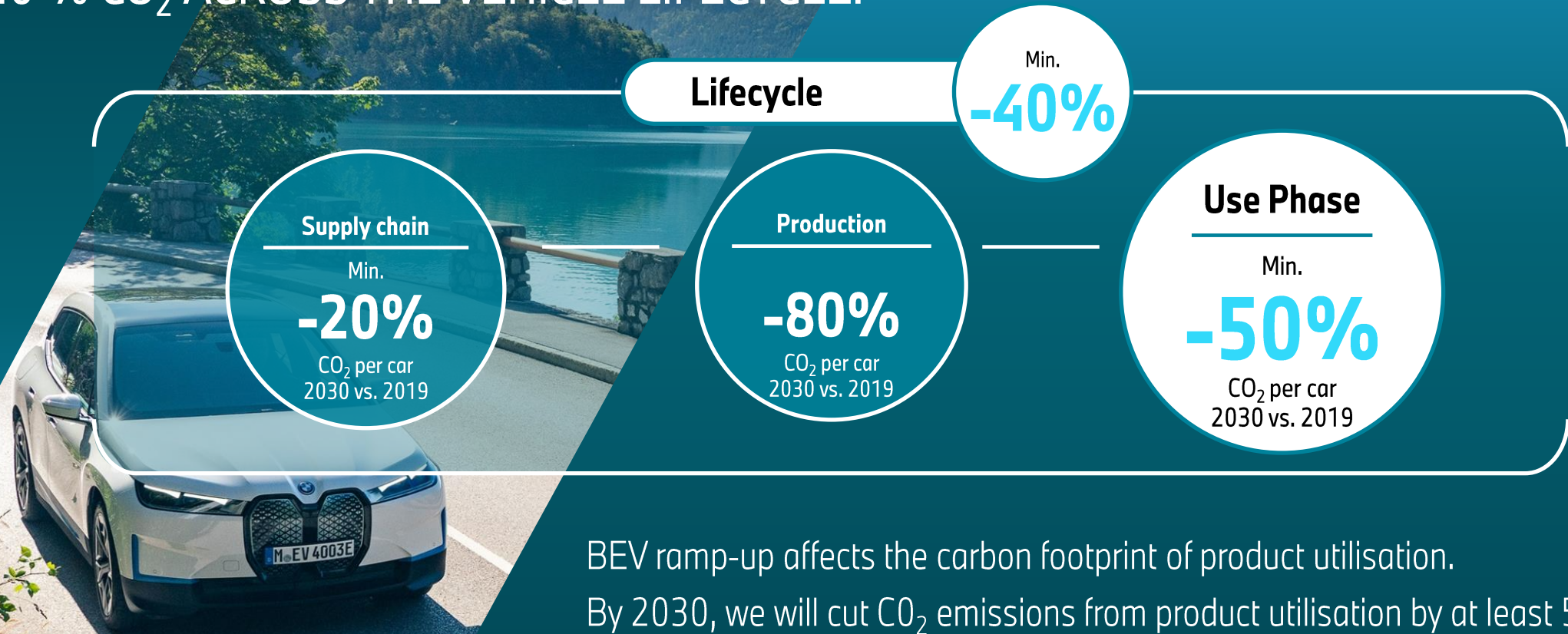
Since TODAY the BMW Group is the first German carmaker to join the **“Business Ambition for 1.5°C”**.

This includes our commitment to achieving climate-neutrality along the value chain by 2050. It also automatically makes us a member of the UN's Race to Zero programme.



1.5°C

-50 % CO₂ FROM PRODUCT UTILISATION BY 2030 –
-40 % CO₂ ACROSS THE VEHICLE LIFECYCLE.



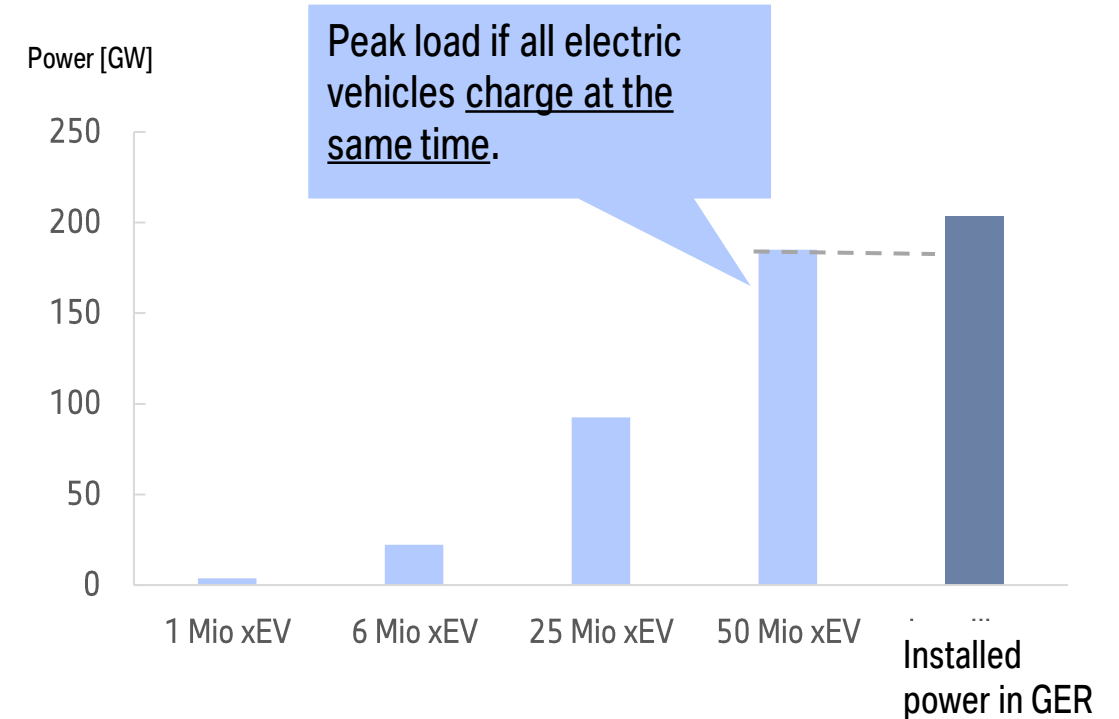
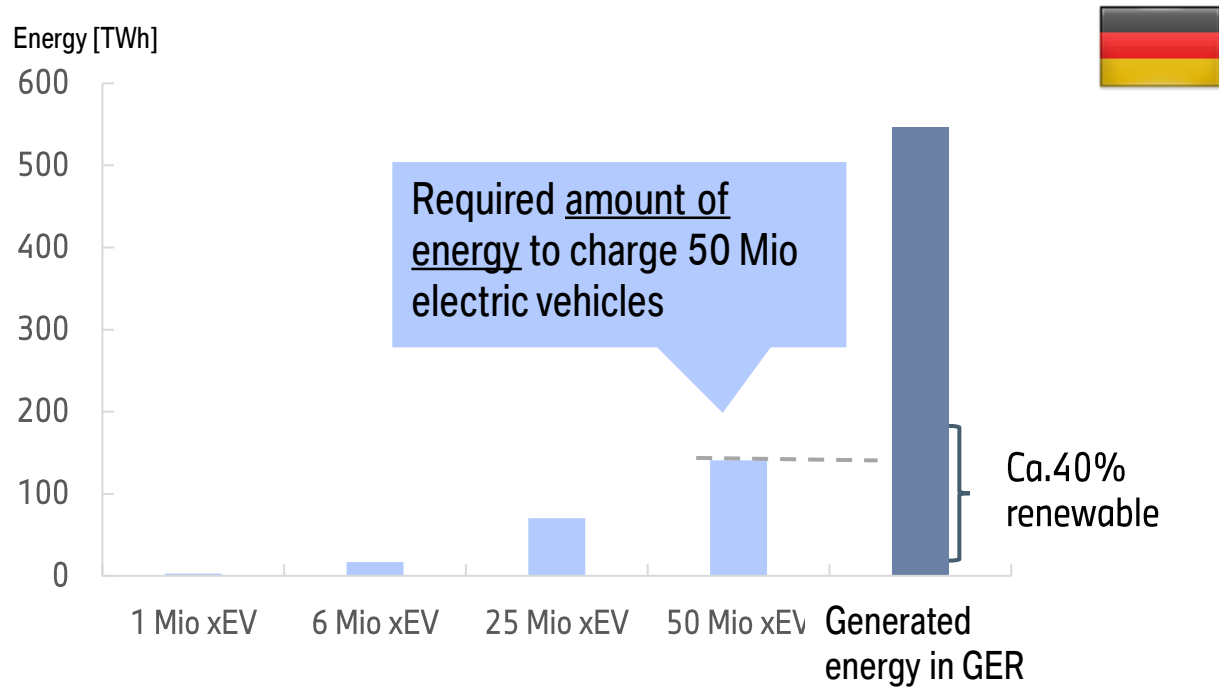
BEV ramp-up affects the carbon footprint of product utilisation.

By 2030, we will cut CO₂ emissions from product utilisation by at least 50%.

Use Phase is the biggest contributor to the BMW Group's global CO₂ footprint, accounting for more than 70%.

So, CO₂ emissions per car across the lifecycle will fall by at least 40% by 2030.

ENERGY FLEXIBILITY IS KEY FOR ENABLING E-MOBILITY & GREEN CHARGING. EXAMPLE: GERMANY.

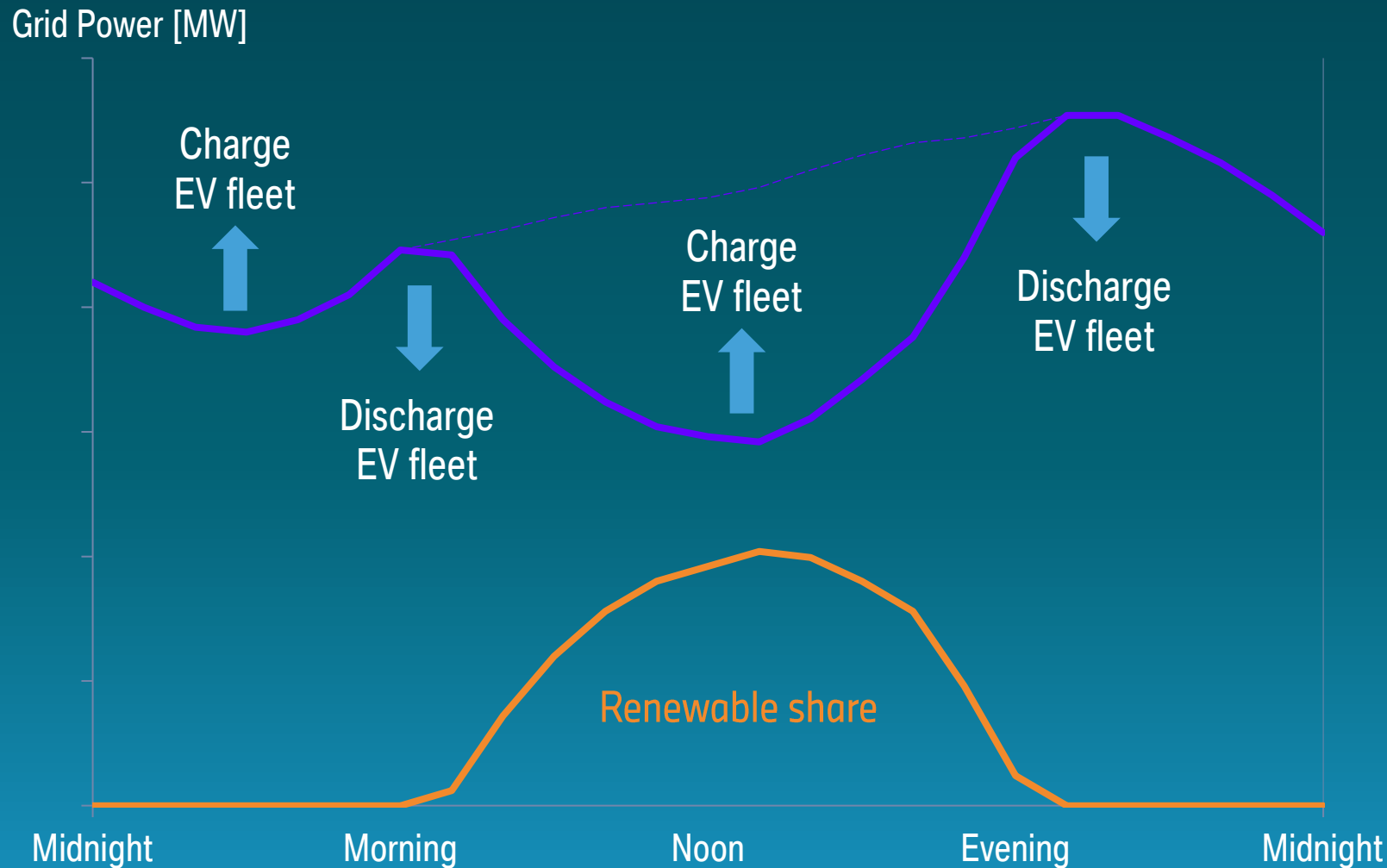


» The required amount of energy for e-mobility could be **covered by renewable sources.**

» Charging electric vehicles will result in peak loads. **Intelligent charging systems are essential.**

Premises: Annual mileage: 15,000 km; E-drive share PHEV: max. 50%; BEV share in inventory: 50%; Consumption: 25kWh/100km; Charging capacity: 3.7kW

VEHICLE TO GRID: EV CHARGING CAN BE A PART OF THE SOLUTION TO STABILIZE THE ENERGY GRID AND INTEGRATE MORE RENEWABLE ENERGY.



STEP 1: LOAD SHIFTING

- Avoid charging EVs in the morning and the evening.
- Encourage charging during mid-day (from storage or through "Time of Use Tariffs").
- Shift charging events of plugged-in vehicles.

STEP 2: VEHICLE TO GRID

- Enable both charging and discharging of EV's
→ use EV fleet as temporary energy storage.

DIGITAL SOLUTION FOR INTELLIGENT CHARGING: "CHARGE FORWARD". 2021-2022: ROLL-OUT IN PARTNERSHIPS WITH UTILITIES ACROSS THE USA.

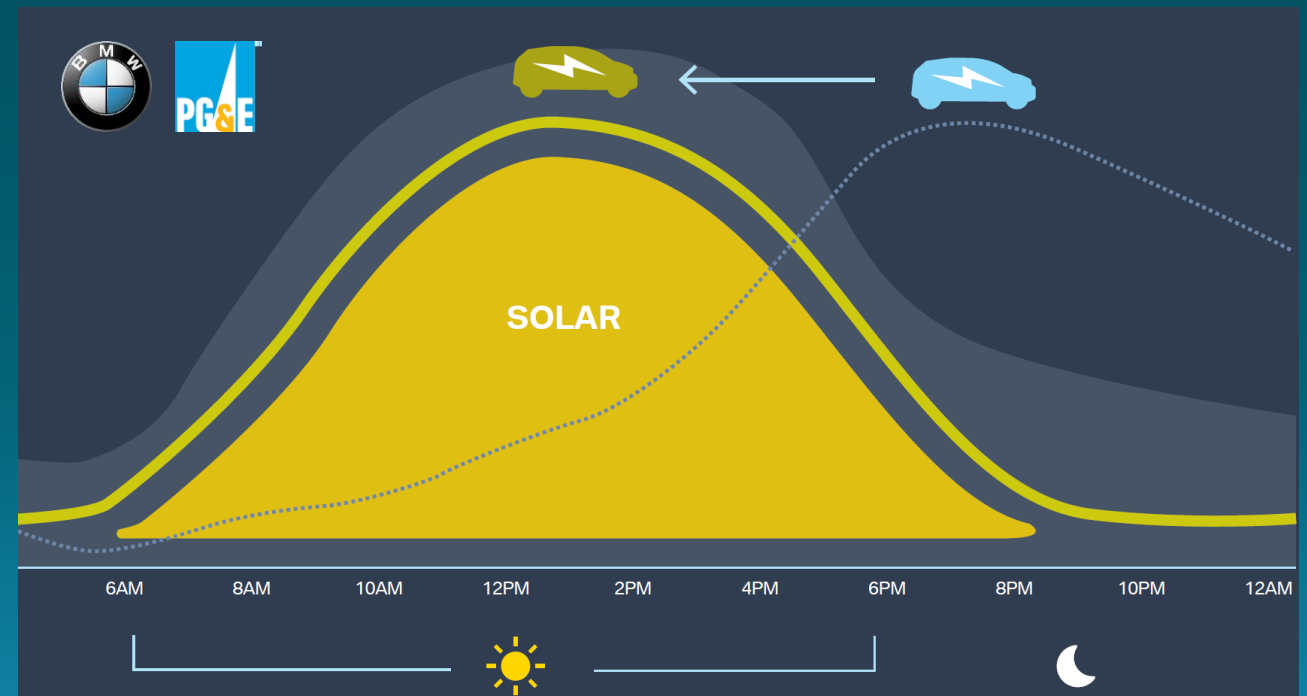
PROJECT WITH PARTNER PG&E

- 2017-2020 Pilot: ~400 BEV+PHEV customers

HOW IT WORKS

- Customer allows BMW to **remotely manage** vehicle charging.
- Charging event is moved to a time window **when solar energy is available**.
- This **reduces CO2 footprint and cost**.

32% CO2 reduction potential in the use phase.



AS OF APRIL 30, 2021 WE HAVE LAUNCHED CHARGEFORWARD 3.0 AND DEMONSTRATED A LEADING POSITION ON SMART CHARGING INNOVATION.



- Smart charging has been shown to reduce GHG emissions of BMW EVs by an additional 32% on average
- Customers can earn valuable incentives for participating (up to \$400 per year) and enjoy off-peak electricity rates
- ChargeForward demonstrates leading position of BMW on digital innovation

HOW DOES IT WORK? CUSTOMER JOURNEY EXAMPLE.

Customer receives
targeted email

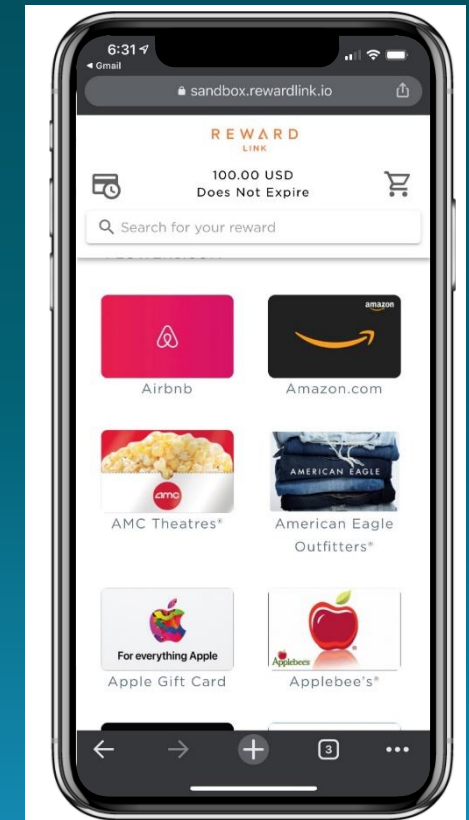
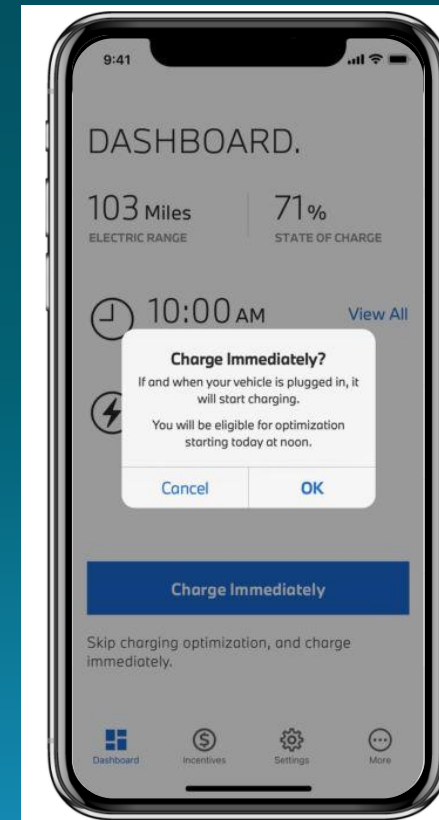
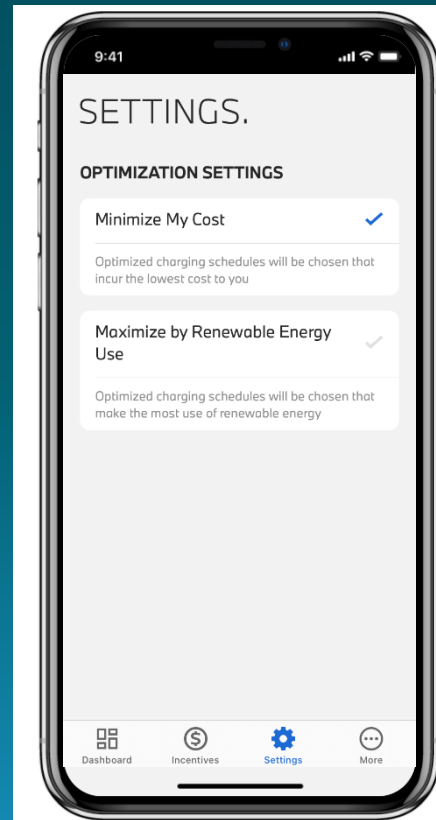
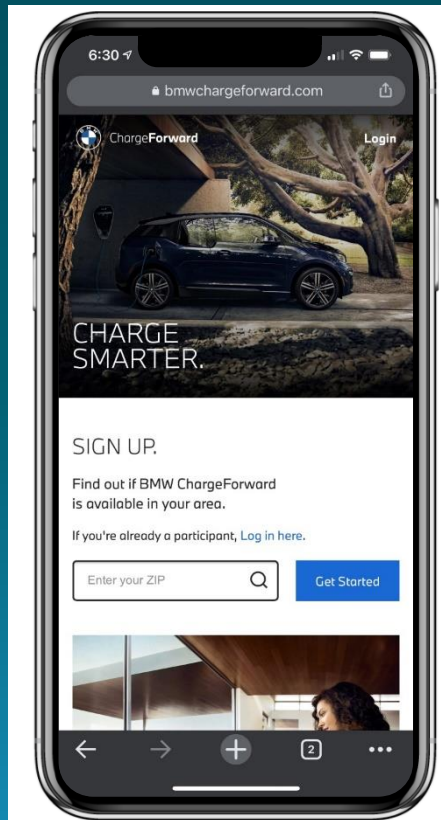
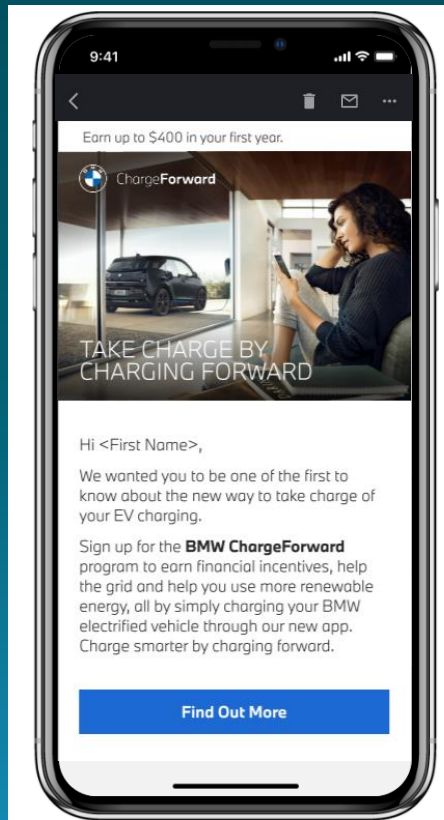
Submits application on
enrollment website

⌚ 2 weeks

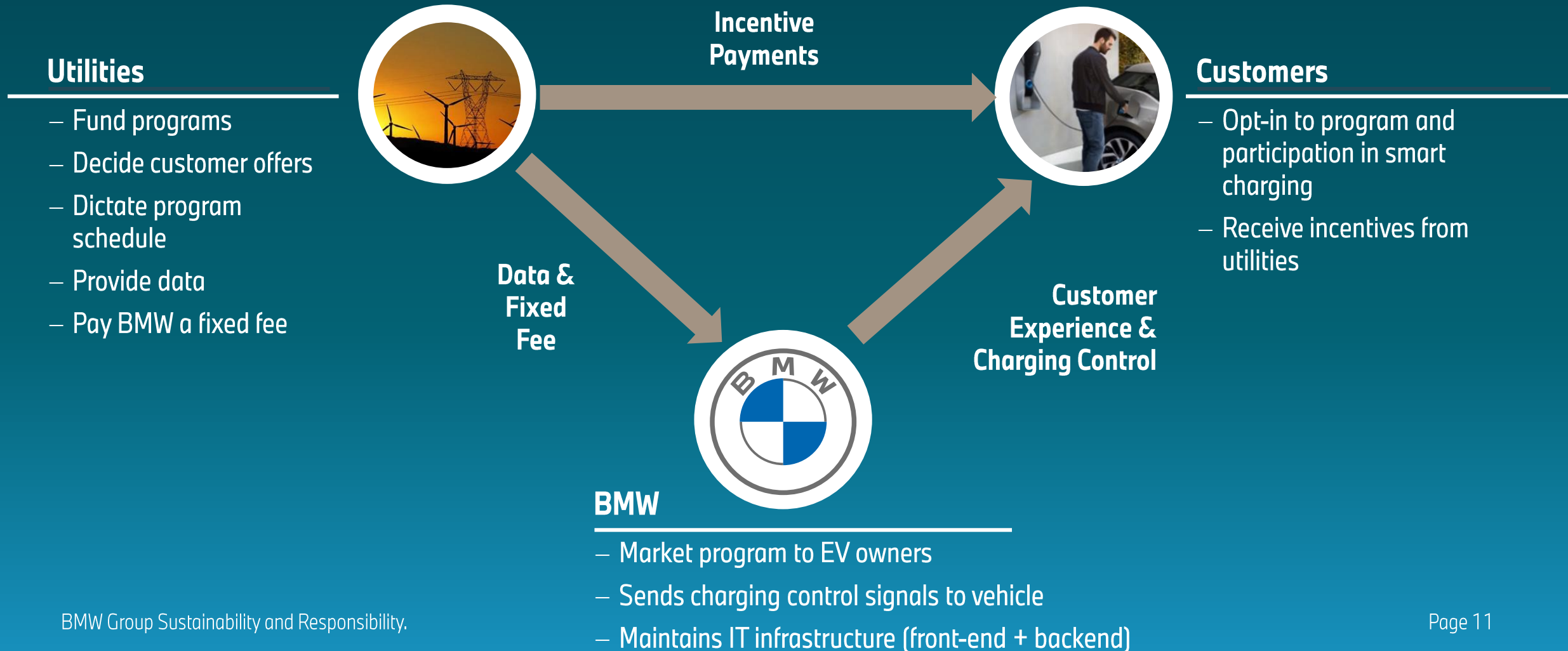
Downloads app and
sets charge preferences
(+\$150 incentive)

Charging schedule
optimized with option
for customer override

Customer receives gift
card incentives up to
\$250 per year



CURRENT BUSINESS MODEL RELIES HEAVILY ON WILLINGNESS OF THE UTILITIES. THIS WILL PLAY A LARGE ROLE IN GROWTH TRAJECTORY.



LONG-TERM OPTIONS FOR ELECTRIC VEHICLE GRID INTEGRATION.

Targets: Make grid ready for large-scale adoption of electric vehicles, reduce customer use phase CO2 footprint

Scale without utilities / network operators

- Each OEM offers intelligent charging to customers
- Reimbursement of customers via OEM
- Grid information from 3rd part
- OEM steers charging

- **Quick to implement**
- **Quick to scale**
- **Not optimal for the grid**
- **Impact on customers can be managed**

Scale with utilities / network operators

- Each OEM joins with specific utilities
- Utilities pay incentives to customer
- Utilities provide grid information
- OEM steers charging

- **Slow to implement**
- **Slow to scale**
- **Not optimal for the grid**
- **Impact on customers can be managed**

Scale with grid integration platform

- Platform integrates OEM data.
- Reimbursement of customers via platform.
- Platform steers charging event to optimize grid performance / renewable share

- **Slow to implement**
- **Quick to scale**
- **Optimal for the grid**
- **Might impact customers negatively**

THANK YOU.

