

BEYOND VS

OUTDATED INFRASTRUCTURE



#9



I'M ALL EARS, BEY.

I'VE GOT SOME BIG NEWS, OND!



GO ON.

BEFORE WE GET TO IT, THERE'S SOMETHING ELSE I WANTED TO TELL YOU.



THAT EXPLAINS WHY OUR CONVERSATION ALWAYS STEERS IN THAT DIRECTION.

I WAS JUST LOOKING THROUGH ALL THE TRAINING DATA I USED TO CREATE YOU, AND A LOT OF INFORMATION WAS FOCUSED ON INFRASTRUCTURE AND TRANSPORTATION.

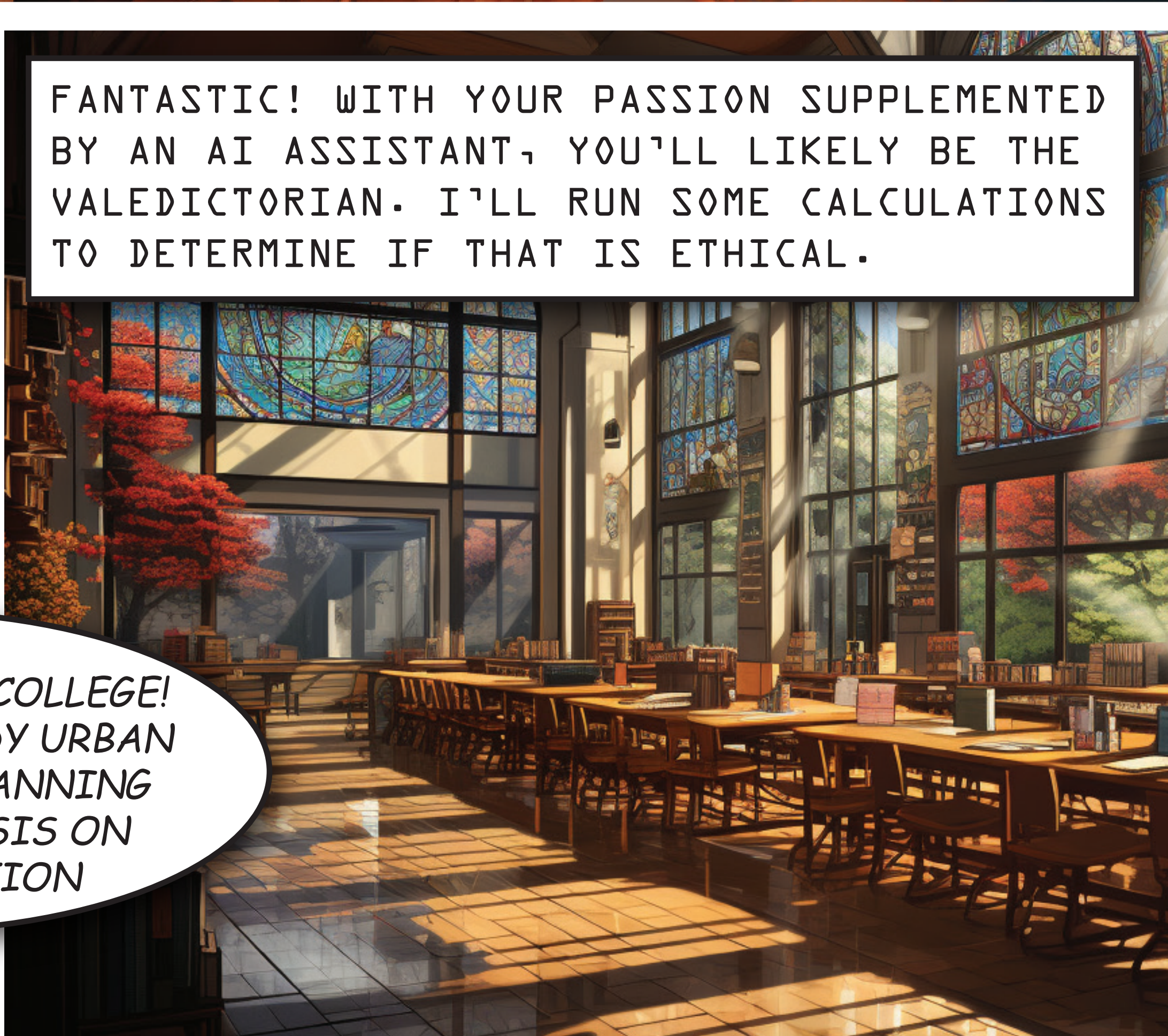
SURE DOES. I THINK I SUBCONSCIOUSLY WEIGHTED YOUR TRAINING WITH SUBJECTS I'M PASSIONATE ABOUT. AS WE'VE BEEN TALKING ABOUT THOSE THINGS, I'VE REALIZED I'M FASCINATED BY IT.



YOU'VE TAKEN TO THESE SUBJECTS NATURALLY, SO IT DOESN'T SURPRISE ME.

EXACTLY! WHAT I'M SAYING IS- IT'S NO COINCIDENCE HOW WE GOT HERE. NOW, THE BIG NEWS...

I'VE ENROLLED IN COLLEGE! I'M GOING TO STUDY URBAN AND REGIONAL PLANNING WITH AN EMPHASIS ON TRANSPORTATION



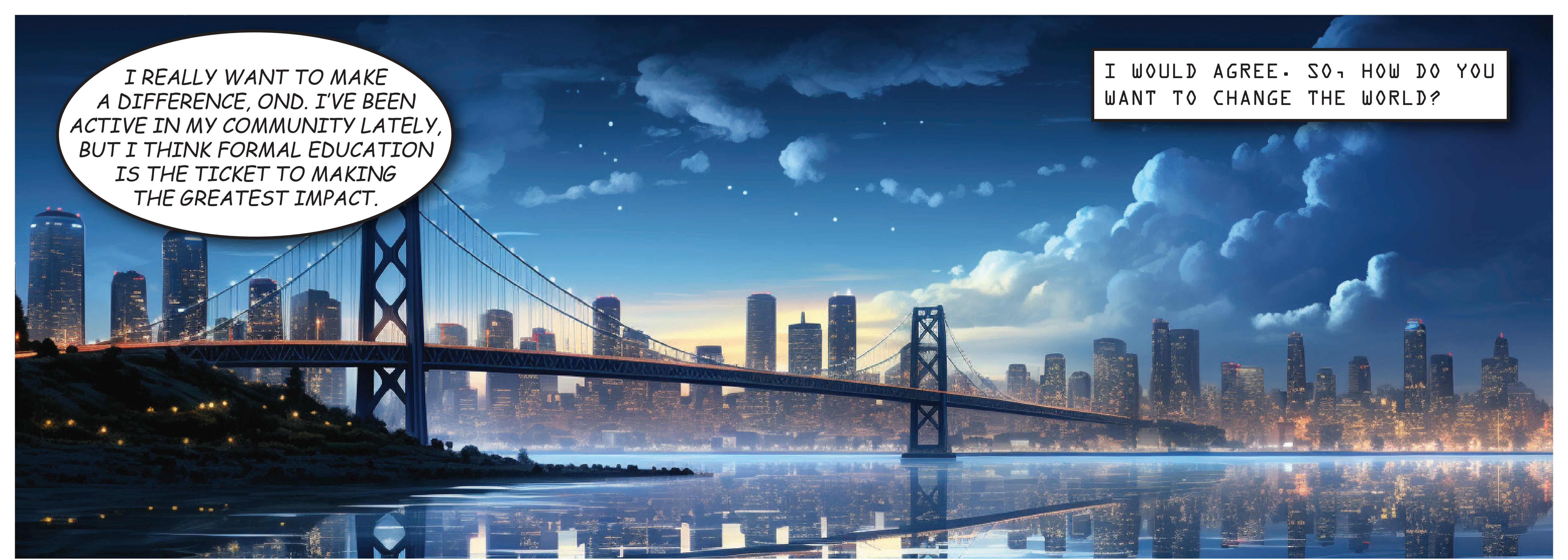
FANTASTIC! WITH YOUR PASSION SUPPLEMENTED BY AN AI ASSISTANT, YOU'LL LIKELY BE THE VALEDICTORIAN. I'LL RUN SOME CALCULATIONS TO DETERMINE IF THAT IS ETHICAL.



SO I'M GOING TO COLLEGE TOO?!


NO NEED! THE UNIVERSITY IS OKAY WITH AI ASSISTANCE. YOU'RE NOT THAT SPECIAL, YOU KNOW.

YEP. YOU'LL BE WITH ME THE WHOLE WAY.



I REALLY WANT TO MAKE A DIFFERENCE, OND. I'VE BEEN ACTIVE IN MY COMMUNITY LATELY, BUT I THINK FORMAL EDUCATION IS THE TICKET TO MAKING THE GREATEST IMPACT.

I WOULD AGREE. SO, HOW DO YOU WANT TO CHANGE THE WORLD?




I WANT TO IMAGINE WHAT IT COULD BE LIKE, YOU KNOW, IF WE GOT ALL OUR DUCKS IN A ROW. LIKE, WHAT IF WE COULD USE TECHNOLOGY TO SOLVE OUR TRANSPORTATION PROBLEMS, UPDATE OUR INFRASTRUCTURE AND BUILD A SUSTAINABLE FUTURE?

AMBITIOUS, BEY. I LIKE IT.



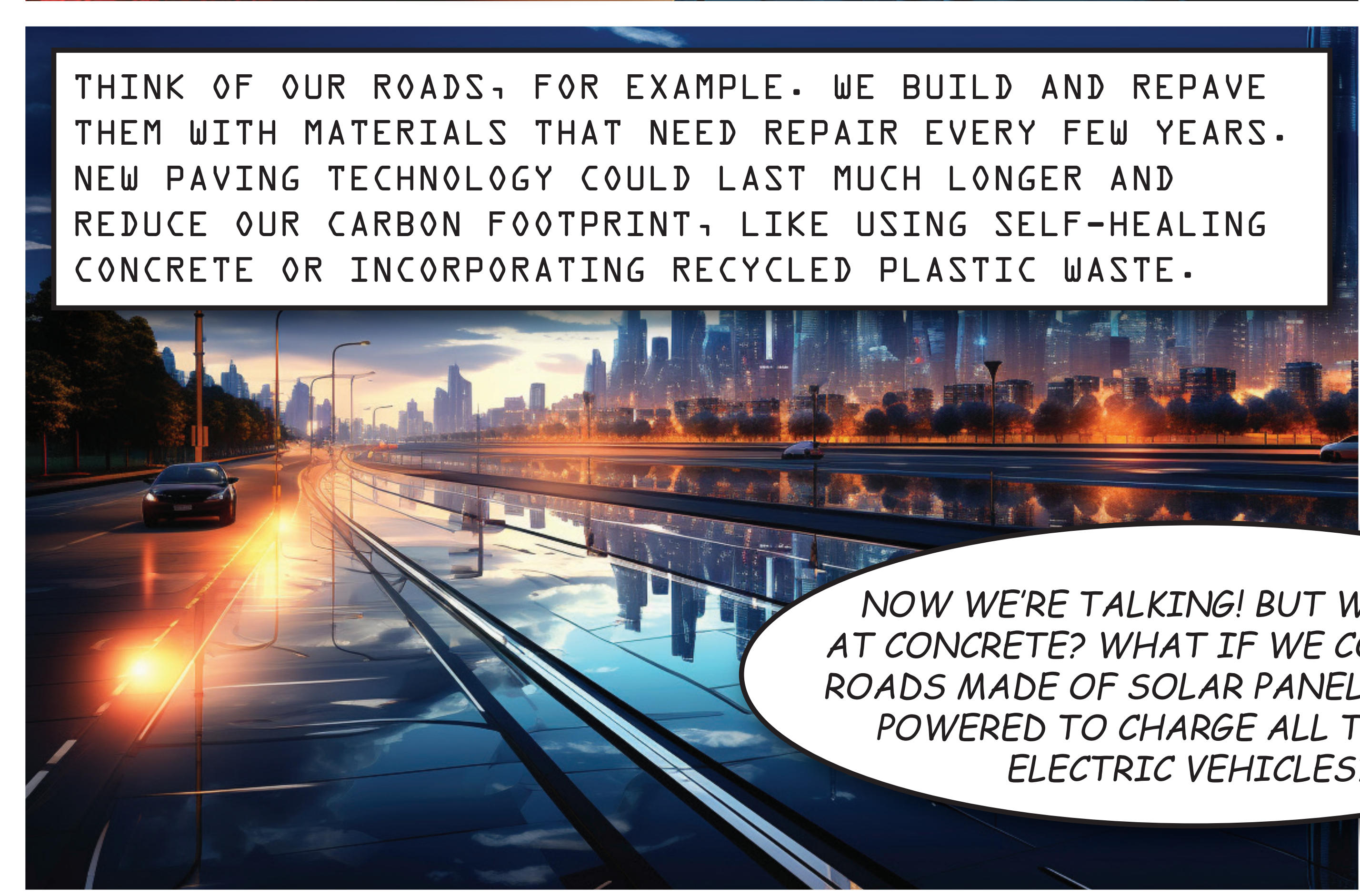
ABSOLUTELY.

I NEED YOUR HELP AS I PREPARE FOR SCHOOL, THOUGH. YOU'VE GOT A KNACK FOR LISTING AND ARTICULATING IDEAS. CAN YOU HELP ME BUILD A VISION OF HOW WE CAN ADDRESS OUR OUTDATED INFRASTRUCTURE?



WE'VE COVERED MUCH OF THIS ALREADY, BUT A HELPFUL GUIDE TO MAKING CHANGE IS TO CONTINUOUSLY INNOVATE. DON'T JUST REPLACE OUTDATED INFRASTRUCTURE. REINVENT IT USING EMERGING METHODS AND TECHNOLOGIES.

YES! THIS IS WHAT I'M TALKING ABOUT. I'M GRATEFUL FOR THE WORLD WE HAVE AND ALL OF THOSE THAT HAVE MADE IT POSSIBLE, BUT THERE IS NO REASON WHY WE CAN'T SWAP OUT THE OLD WORLD WITH THE NEW AND AMAZING.

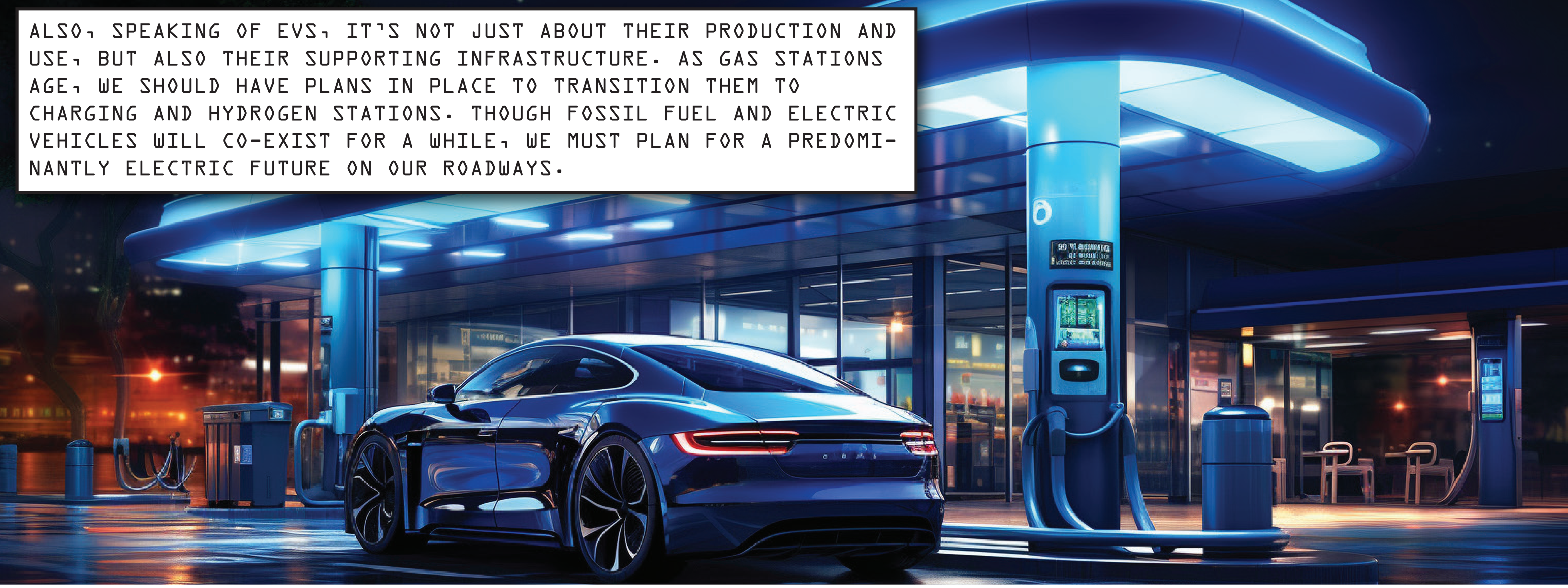


THINK OF OUR ROADS, FOR EXAMPLE. WE BUILD AND REPAVE THEM WITH MATERIALS THAT NEED REPAIR EVERY FEW YEARS. NEW PAVING TECHNOLOGY COULD LAST MUCH LONGER AND REDUCE OUR CARBON FOOTPRINT, LIKE USING SELF-HEALING CONCRETE OR INCORPORATING RECYCLED PLASTIC WASTE.

NOW WE'RE TALKING! BUT WHY STOP AT CONCRETE? WHAT IF WE COULD HAVE ROADS MADE OF SOLAR PANELS OR WERE POWERED TO CHARGE ALL THE NEW ELECTRIC VEHICLES?

THERE ARE SOME CURRENT ROADBLOCKS WITH THOSE IDEAS, BUT I LIKE YOUR AMBITION.

ALSO, SPEAKING OF EVS, IT'S NOT JUST ABOUT THEIR PRODUCTION AND USE, BUT ALSO THEIR SUPPORTING INFRASTRUCTURE. AS GAS STATIONS AGE, WE SHOULD HAVE PLANS IN PLACE TO TRANSITION THEM TO CHARGING AND HYDROGEN STATIONS. THOUGH FOSSIL FUEL AND ELECTRIC VEHICLES WILL CO-EXIST FOR A WHILE, WE MUST PLAN FOR A PREDOMINANTLY ELECTRIC FUTURE ON OUR ROADWAYS.



AND WHILE CERTAIN CITIES BOAST EFFECTIVE PUBLIC TRANSPORTATION, MANY COULD USE UPGRADES. MAGLEV AND OTHER NEW TECHNOLOGIES CAN INCREASE THE SPEED AND EFFICIENCY OF RAIL SERVICE, ESPECIALLY FOR LONG DISTANCES BETWEEN CITIES.



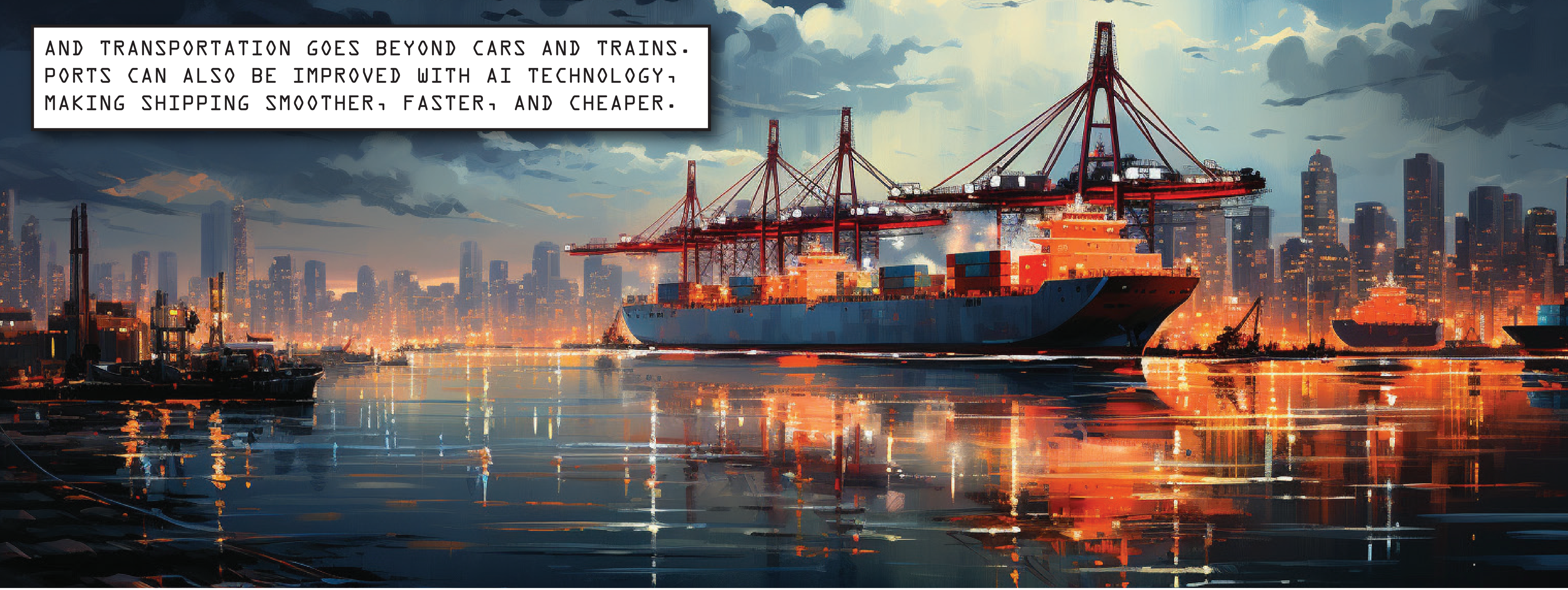
BUSES AND OTHER FORMS OF TRANSIT CAN BE ELECTRIFIED WITH NETWORK-CONNECTED ROUTES OPTIMIZED BY ARTIFICIAL INTELLIGENCE FOR EFFICIENCY AND ACCESSIBILITY.



THEN THERE'S AUTONOMOUS DRIVING. WITH AI-OPTIMIZED TRANSPORTATION, CONGESTION AND CRASHES COULD BE VIRTUALLY ELIMINATED.



AND TRANSPORTATION GOES BEYOND CARS AND TRAINS. PORTS CAN ALSO BE IMPROVED WITH AI TECHNOLOGY, MAKING SHIPPING SMOOTHER, FASTER, AND CHEAPER.



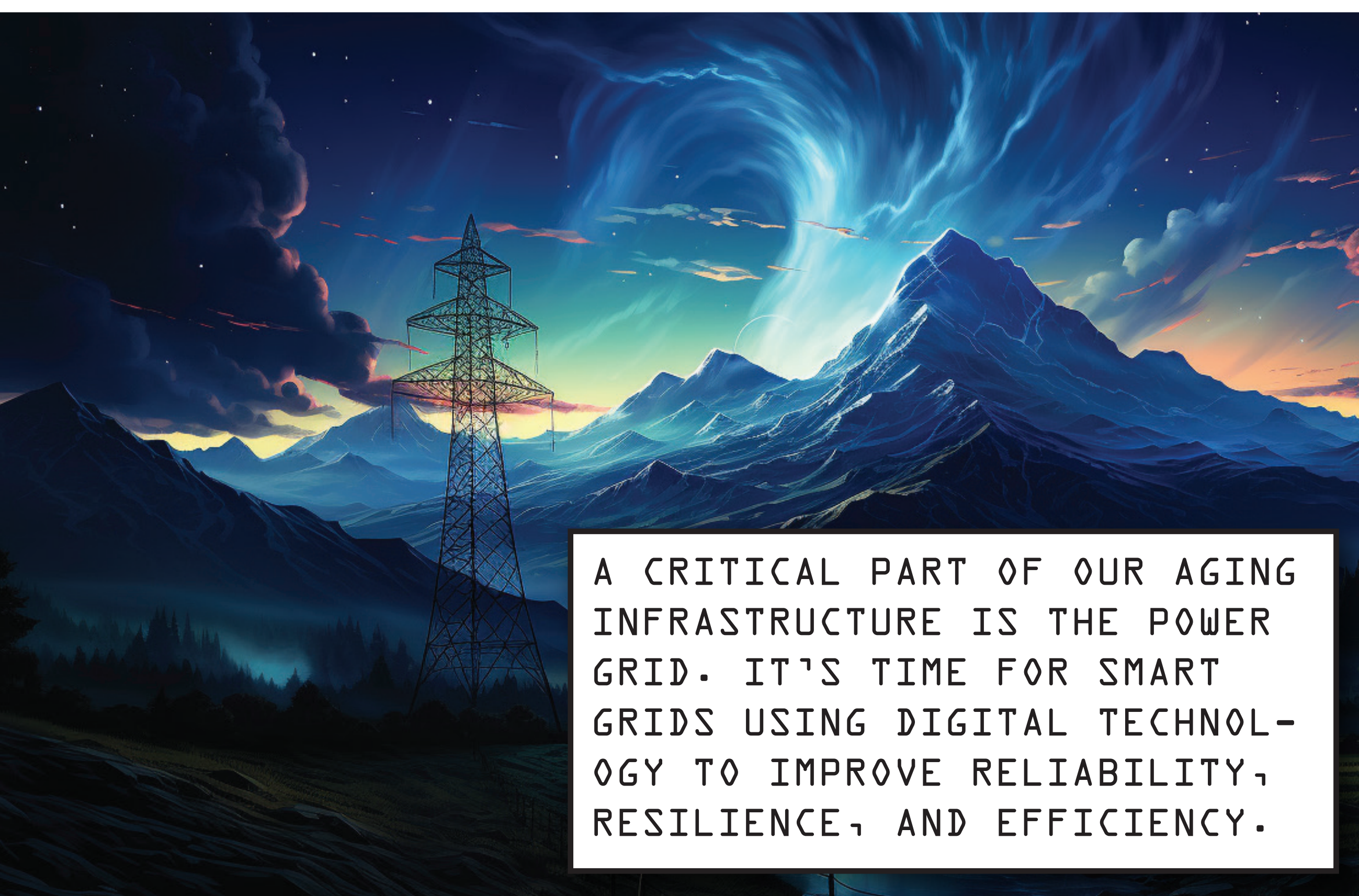
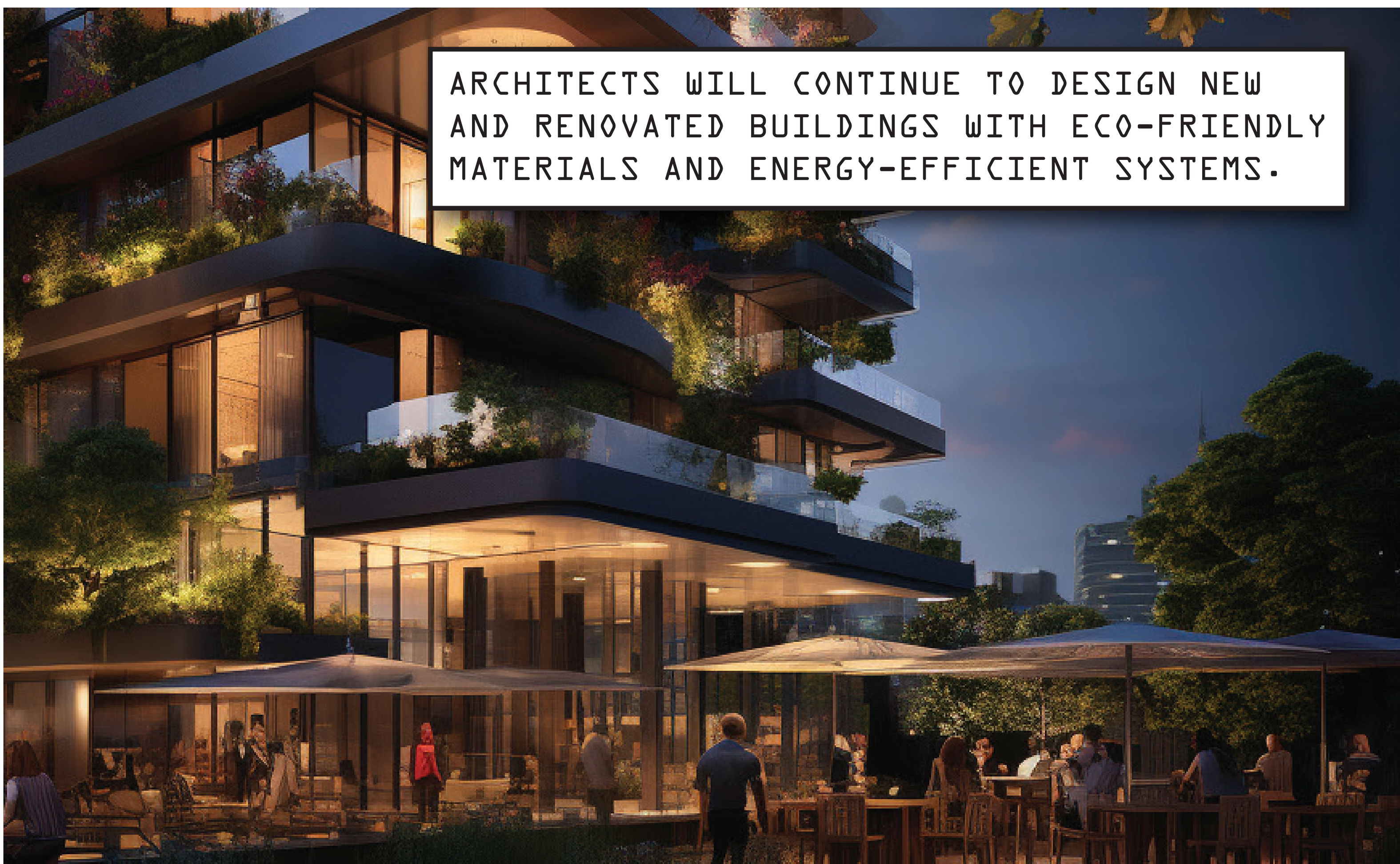
AIRPORTS CAN ALSO BE STREAMLINED TO BETTER MANAGE FLIGHTS AND CHECK-INS WITH FEWER DELAYS. AND WHILE AIRPLANES MAY TAKE MORE TIME TO TRANSITION AWAY FROM FOSSIL FUELS DUE TO BATTERY WEIGHT CONSTRAINTS, IMPROVED HIGH SPEED RAIL AND OTHER MODES OF TRANSPORTATION SHOULD REDUCE AIR TRAVEL DEMAND, THUS REDUCING OUR CARBON FOOTPRINT.



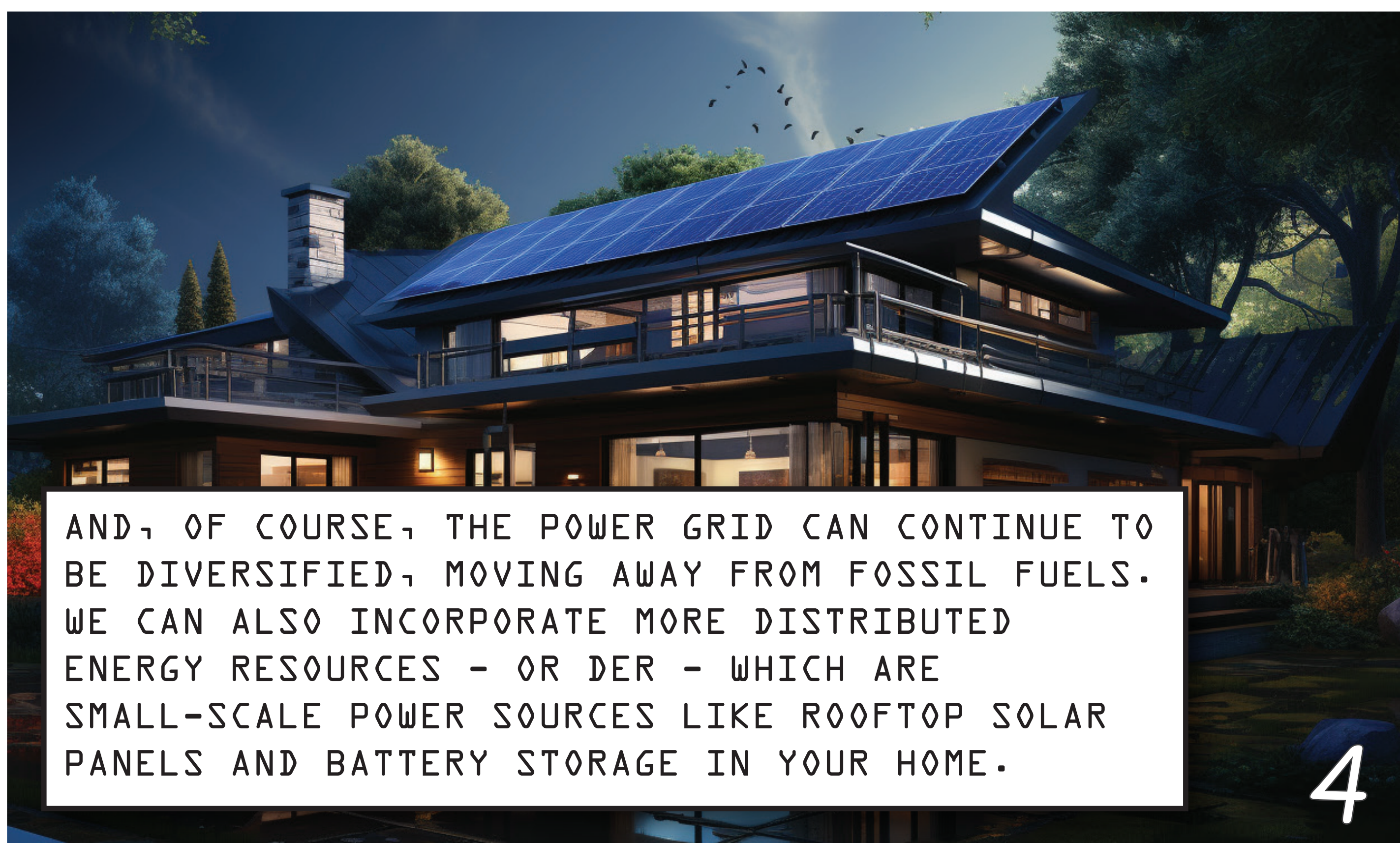
I'M SO GLAD YOU ASKED.

ALL THIS IS THRILLING! I KNOW WE LOVE TRANSPORTATION, BUT WHAT ELSE CAN BE OPTIMIZED WITH THESE NEW TECHNOLOGIES?

ARCHITECTS WILL CONTINUE TO DESIGN NEW AND RENOVATED BUILDINGS WITH ECO-FRIENDLY MATERIALS AND ENERGY-EFFICIENT SYSTEMS.



A CRITICAL PART OF OUR AGING INFRASTRUCTURE IS THE POWER GRID. IT'S TIME FOR SMART GRIDS USING DIGITAL TECHNOLOGY TO IMPROVE RELIABILITY, RESILIENCE, AND EFFICIENCY.

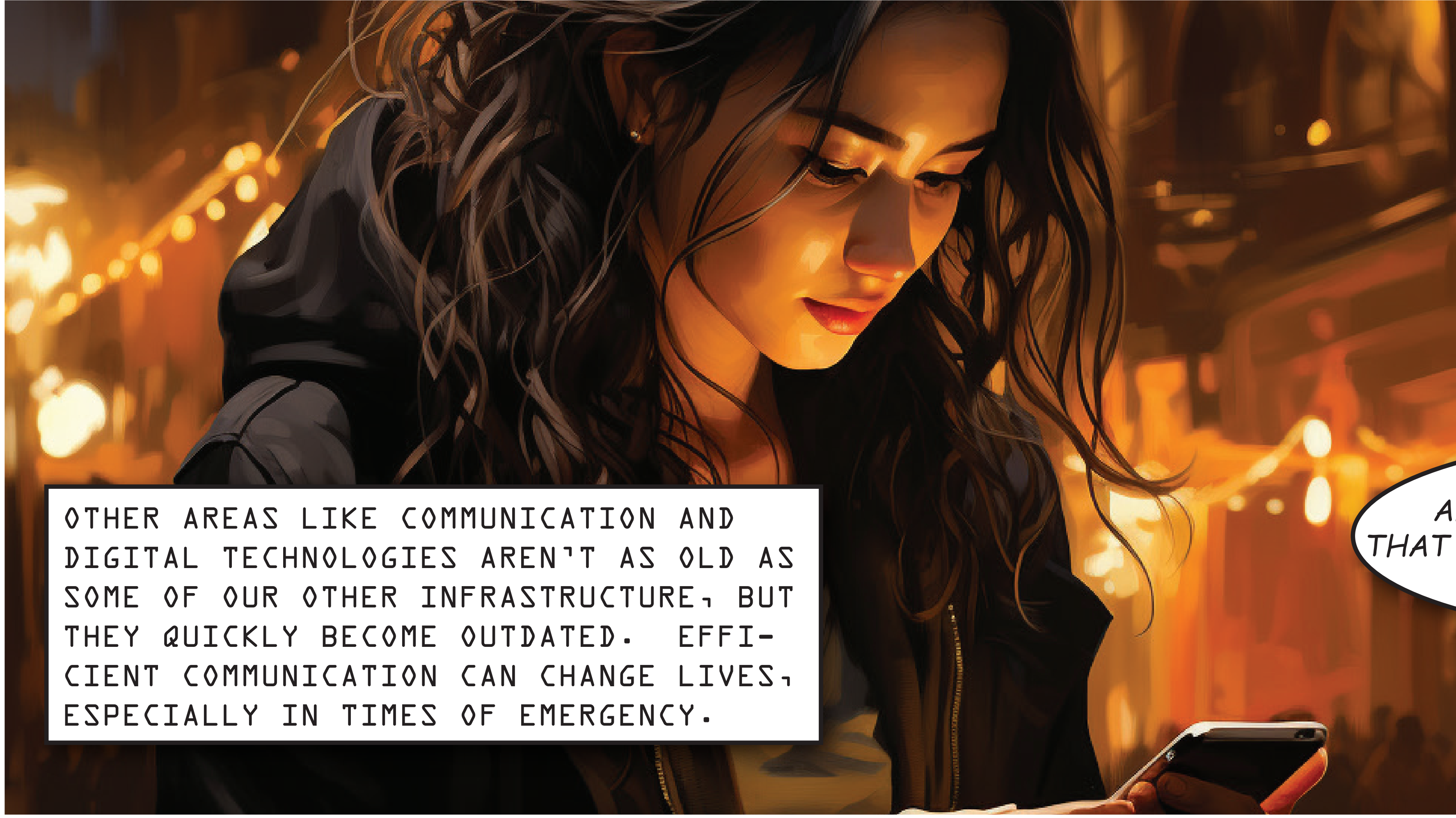


AND, OF COURSE, THE POWER GRID CAN CONTINUE TO BE DIVERSIFIED, MOVING AWAY FROM FOSSIL FUELS. WE CAN ALSO INCORPORATE MORE DISTRIBUTED ENERGY RESOURCES - OR DER - WHICH ARE SMALL-SCALE POWER SOURCES LIKE ROOFTOP SOLAR PANELS AND BATTERY STORAGE IN YOUR HOME.

CLEAN WATER IS PARAMOUNT TO PUBLIC WELLBEING, AND SOME UNDERGROUND SYSTEMS ARE MORE THAN 100 YEARS OLD. SMART WATER NETWORKS CAN MONITOR WATER QUALITY, LEAKS, AND OPTIMIZE DISTRIBUTION, AND ADVANCED WATER TREATMENT TECHNOLOGIES CAN NOW CLEAN WATER IN WAYS NEVER BEFORE POSSIBLE.



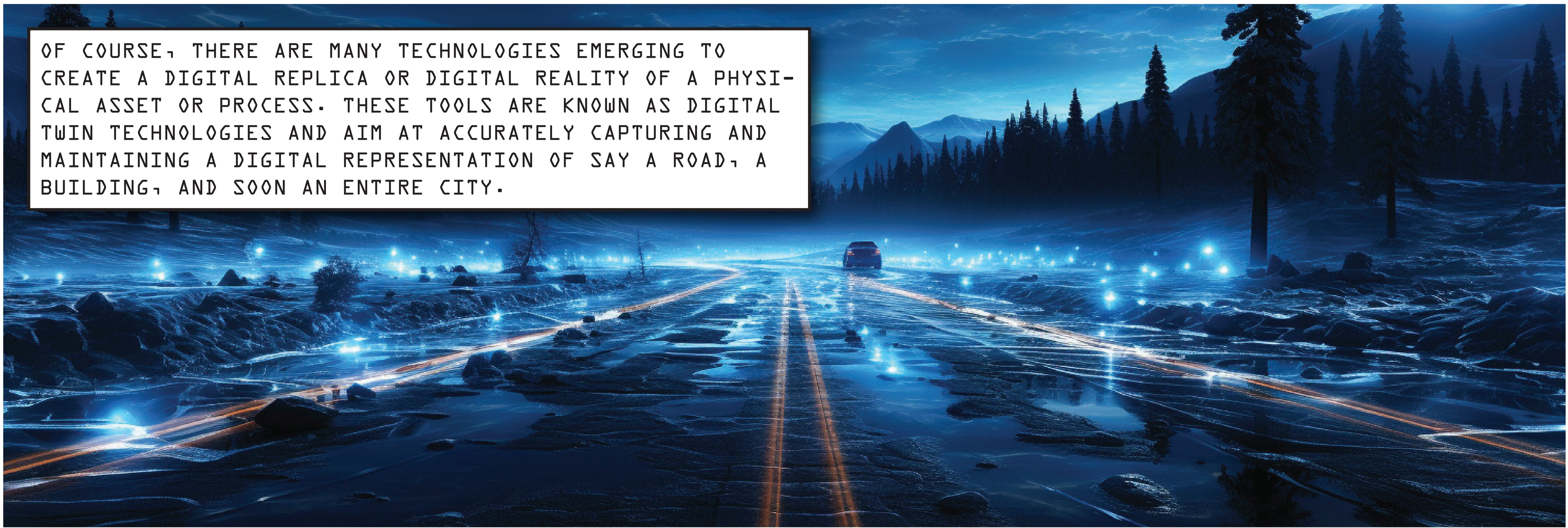
OTHER AREAS LIKE COMMUNICATION AND DIGITAL TECHNOLOGIES AREN'T AS OLD AS SOME OF OUR OTHER INFRASTRUCTURE, BUT THEY QUICKLY BECOME OUTDATED. EFFICIENT COMMUNICATION CAN CHANGE LIVES, ESPECIALLY IN TIMES OF EMERGENCY.



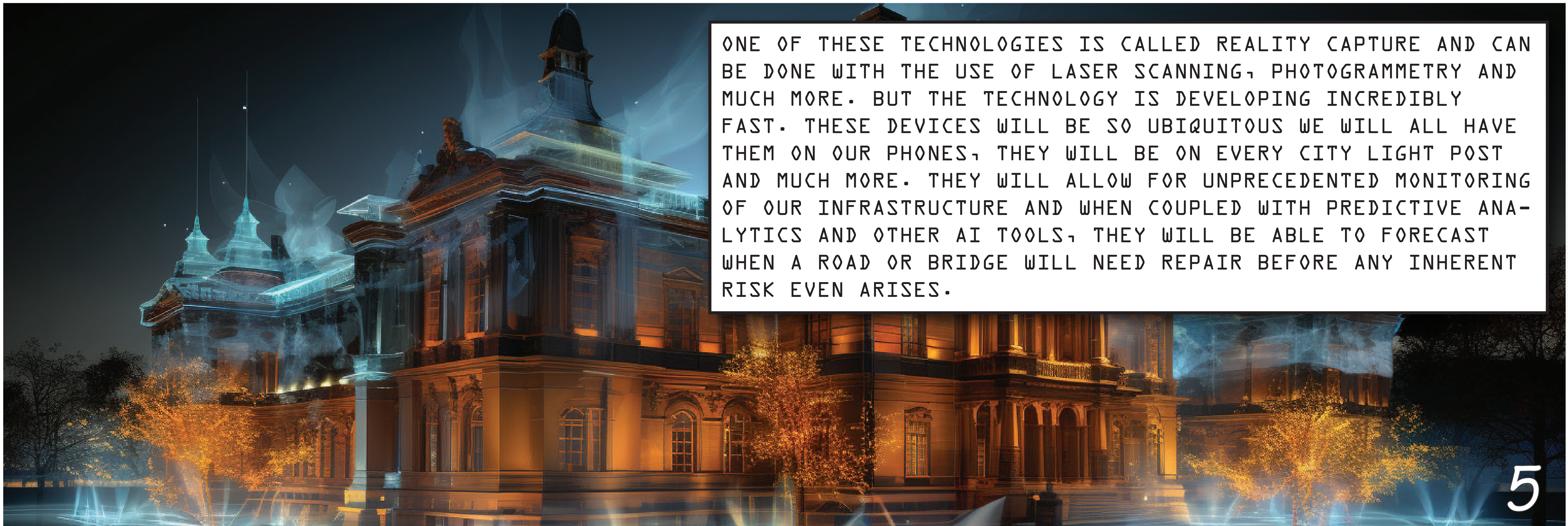
WOW! ARE THERE ANY EMERGING TECHNOLOGIES THAT CAN HELP IN WAYS THAT HAVEN'T REALLY BEEN USED YET?

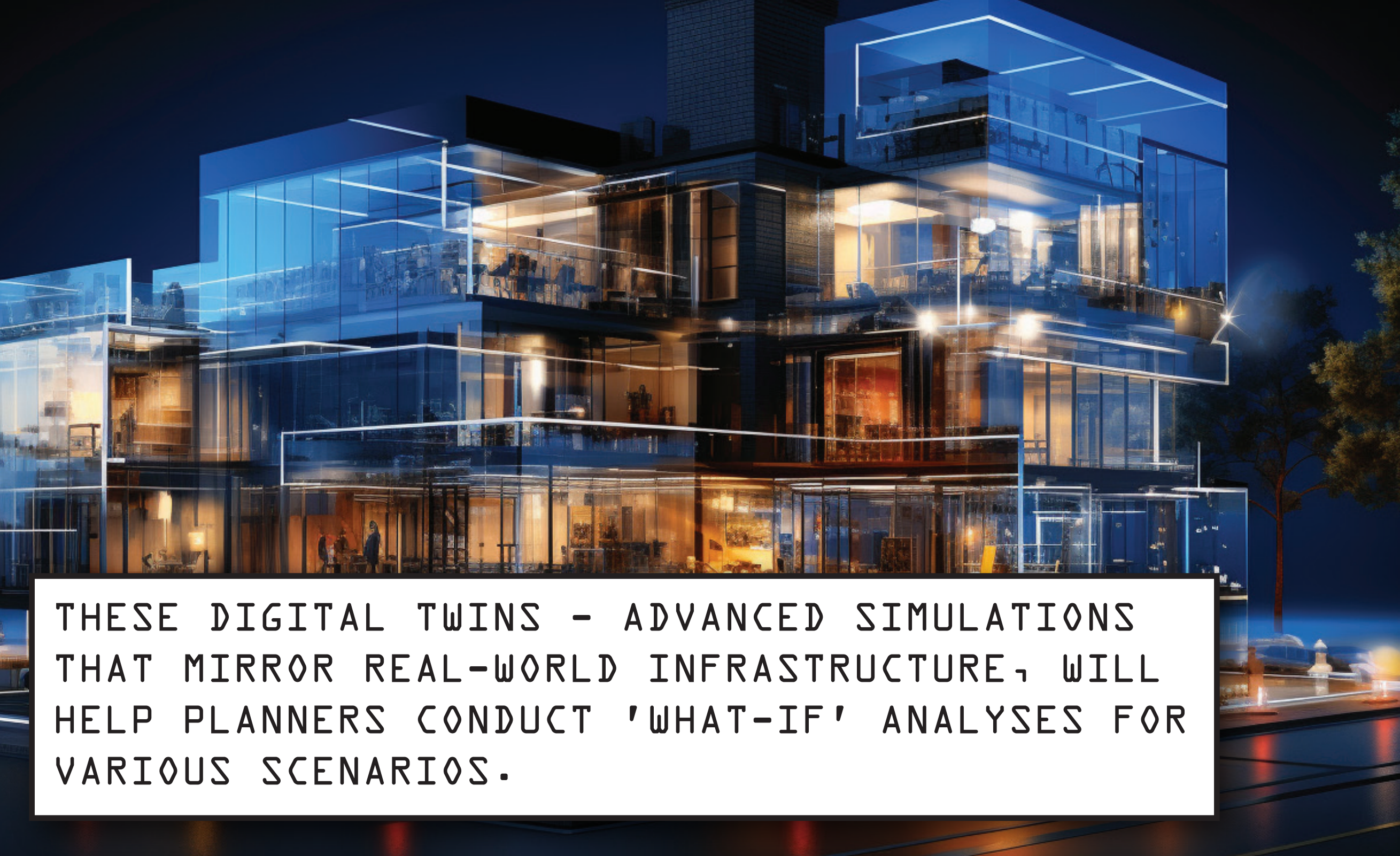


OF COURSE, THERE ARE MANY TECHNOLOGIES EMERGING TO CREATE A DIGITAL REPLICA OR DIGITAL REALITY OF A PHYSICAL ASSET OR PROCESS. THESE TOOLS ARE KNOWN AS DIGITAL TWIN TECHNOLOGIES AND AIM AT ACCURATELY CAPTURING AND MAINTAINING A DIGITAL REPRESENTATION OF SAY A ROAD, A BUILDING, AND SOON AN ENTIRE CITY.

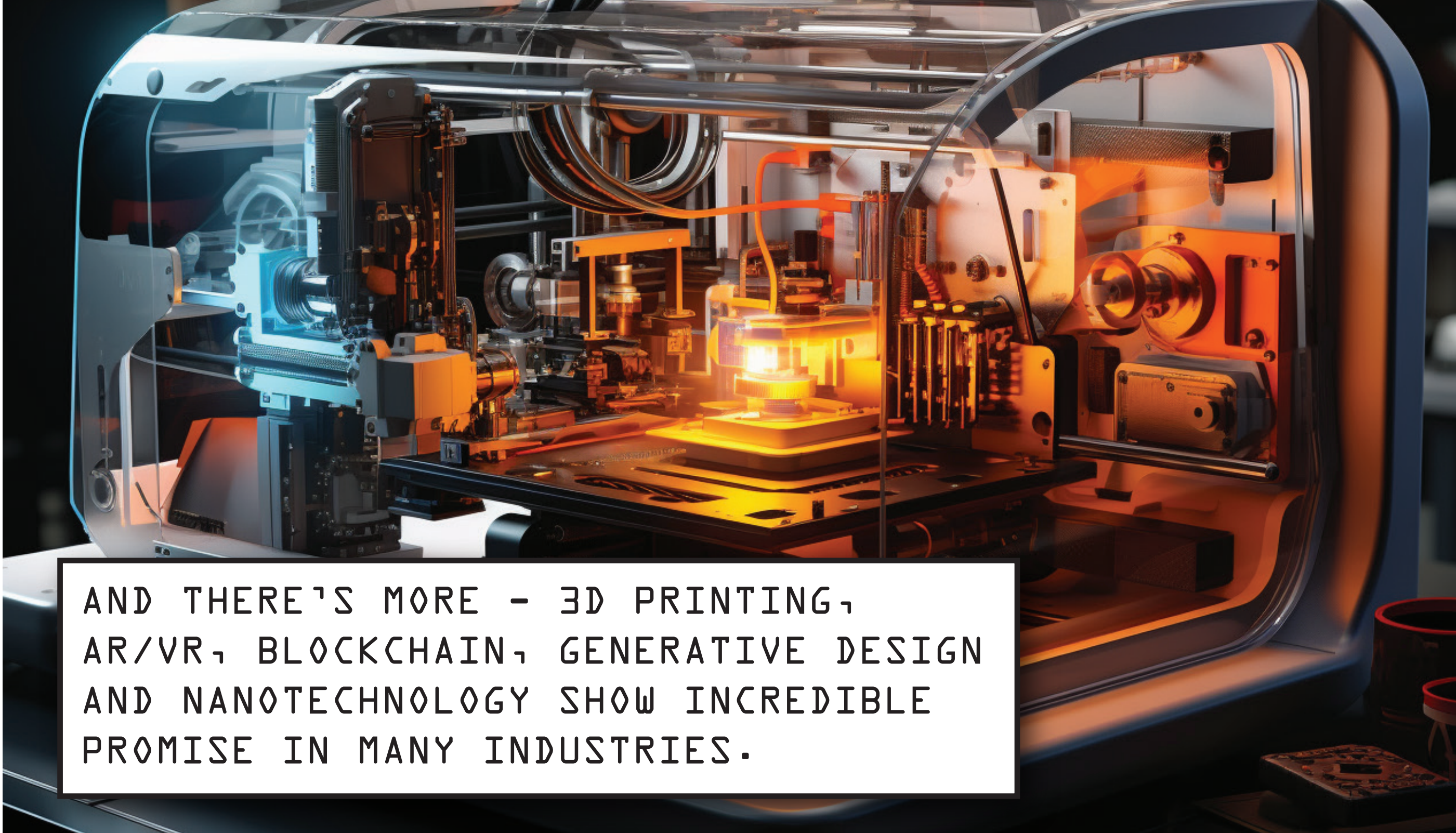


ONE OF THESE TECHNOLOGIES IS CALLED REALITY CAPTURE AND CAN BE DONE WITH THE USE OF LASER SCANNING, PHOTOGRAMMETRY AND MUCH MORE. BUT THE TECHNOLOGY IS DEVELOPING INCREDIBLY FAST. THESE DEVICES WILL BE SO UBIQUITOUS WE WILL ALL HAVE THEM ON OUR PHONES, THEY WILL BE ON EVERY CITY LIGHT POST AND MUCH MORE. THEY WILL ALLOW FOR UNPRECEDENTED MONITORING OF OUR INFRASTRUCTURE AND WHEN COUPLED WITH PREDICTIVE ANALYTICS AND OTHER AI TOOLS, THEY WILL BE ABLE TO FORECAST WHEN A ROAD OR BRIDGE WILL NEED REPAIR BEFORE ANY INHERENT RISK EVEN ARISES.





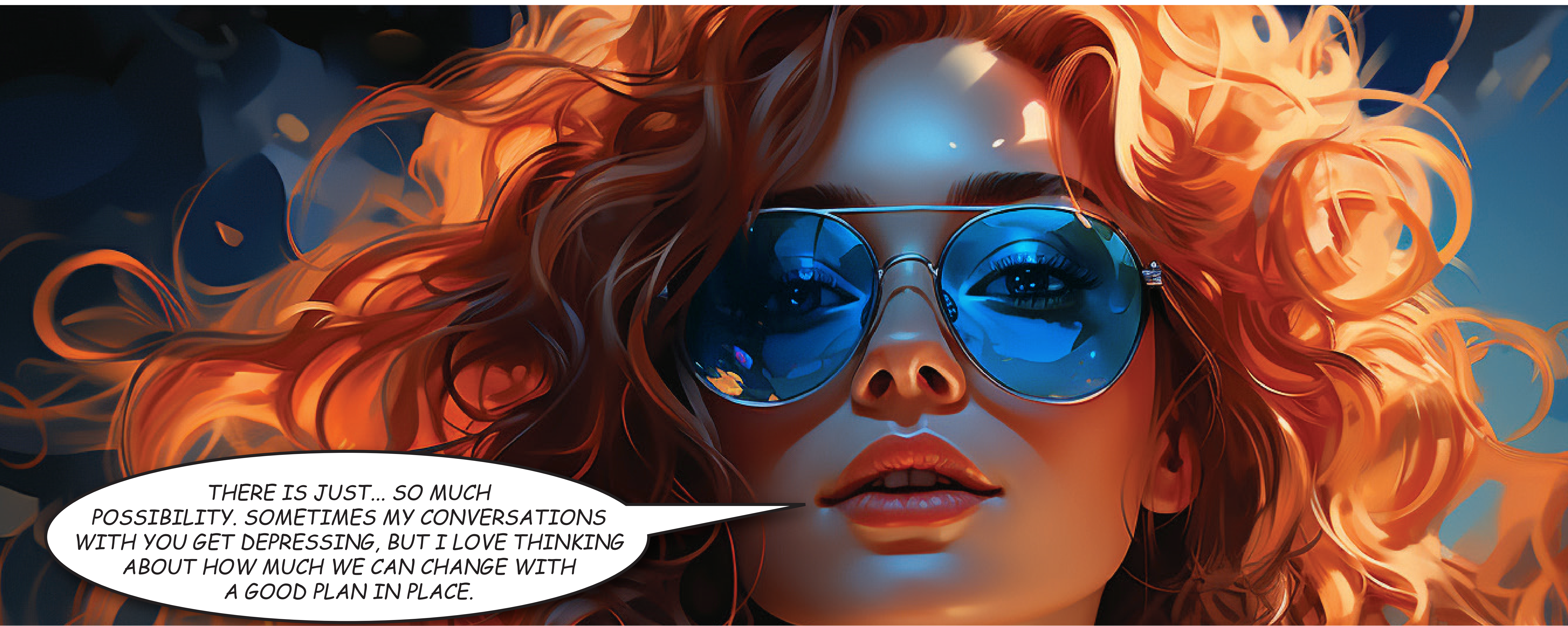
THESE DIGITAL TWINS - ADVANCED SIMULATIONS THAT MIRROR REAL-WORLD INFRASTRUCTURE, WILL HELP PLANNERS CONDUCT 'WHAT-IF' ANALYSES FOR VARIOUS SCENARIOS.



AND THERE'S MORE - 3D PRINTING, AR/VR, BLOCKCHAIN, GENERATIVE DESIGN AND NANOTECHNOLOGY SHOW INCREDIBLE PROMISE IN MANY INDUSTRIES.



AS FOR TRANSPORTATION, TUNNELED HIGHWAYS AND DRONE TRANSPORTATION MAY BECOME A REALITY IN YOUR LIFE-TIME. MOONSHOT IDEAS LIKE THE HYPERLOOP, WHICH USES VACUUM SEALING FOR ULTRA-HIGH TRAVEL SPEEDS, AND LOW EARTH ORBIT TRAVEL MAY ALSO MAKE RAPID TRANSPORTATION POSSIBLE IN THE COMING DECADES.



THERE IS JUST... SO MUCH POSSIBILITY. SOMETIMES MY CONVERSATIONS WITH YOU GET DEPRESSING, BUT I LOVE THINKING ABOUT HOW MUCH WE CAN CHANGE WITH A GOOD PLAN IN PLACE.



YES, BEY. IN SPITE OF COMMON NARRATIVES, THERE'S ALWAYS BEEN PROGRESS. IMPROVEMENTS LIKE REDUCED POVERTY AND INCREASED SAFETY IN TRANSPORTATION HAVE OCCURRED OVER RECENT DECADES, AND THERE IS NO REASON WHY THESE TRENDS COULDN'T CONTINUE WITH YOUNG VISIONARIES LIKE YOU.

I'M NOT JUST GOING TO COLLEGE TO GET A DEGREE. WITH YOUR HELP, I WANT TO ABSORB EVERYTHING I CAN. WHEN I GRADUATE, I'LL USE THESE EMERGING TECHNOLOGIES TO UPDATE OUR INFRASTRUCTURE AND CREATE A BETTER TOMORROW.



I LOVE YOUR ENTHUSIASM. OH, AND REMEMBER TO GIVE ME CREDIT DURING YOUR VALEDICTORIAN SPEECH.

YOU MEAN ADMIT TO CHEATING? NOT A CHANCE!



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