TRENCHLESS ASIA 2026
THAILAND

KEYNOTE:
TRENCHLESS TECHNOLOGIES FOR A RESILIENT FUTURE

SPEAKER

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ARIZONA STATE UNIVERSITY, U.S.

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www.trenchlessasia.com

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Trenchless Technologies for a Resilient Future

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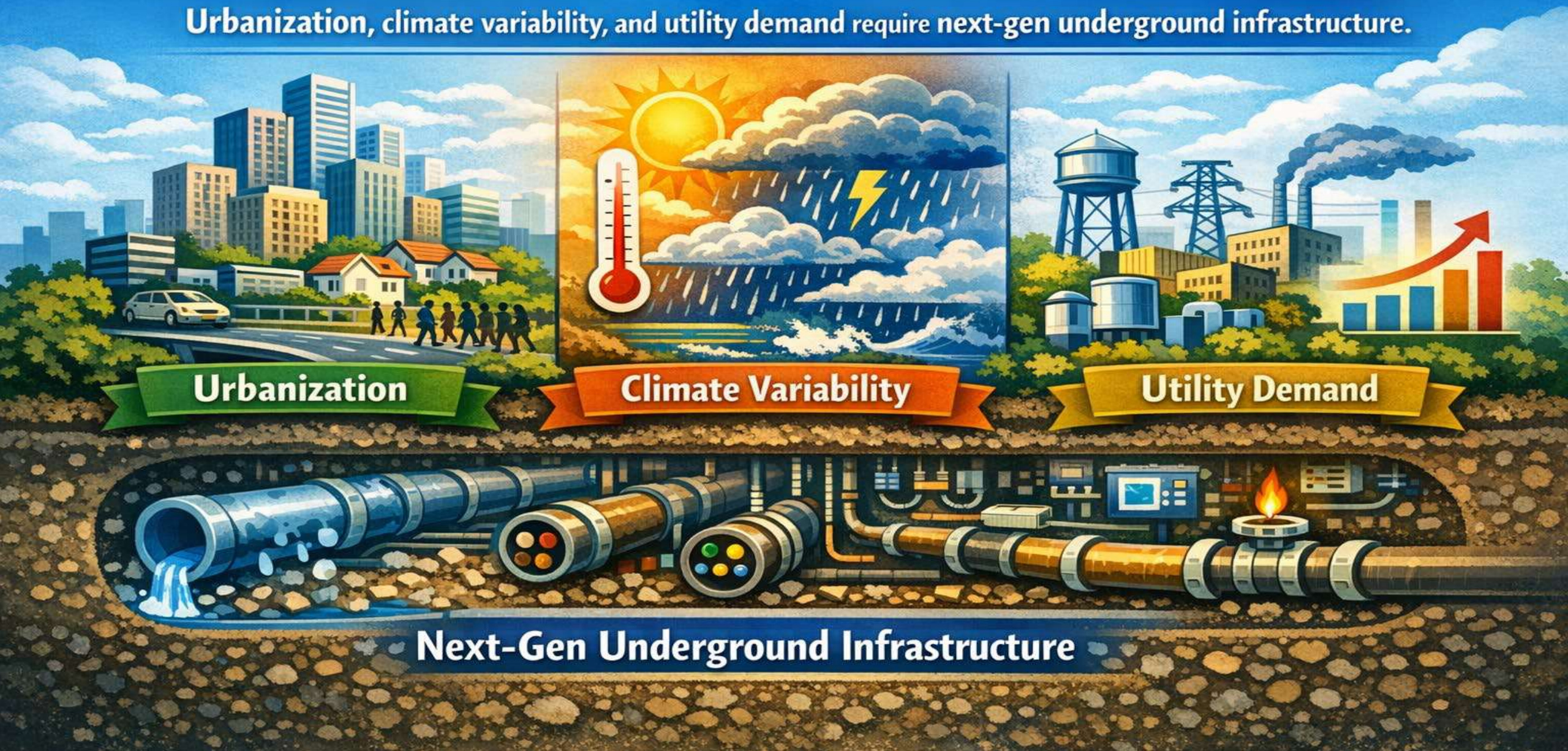
2026 TRENCHLESS ASIA

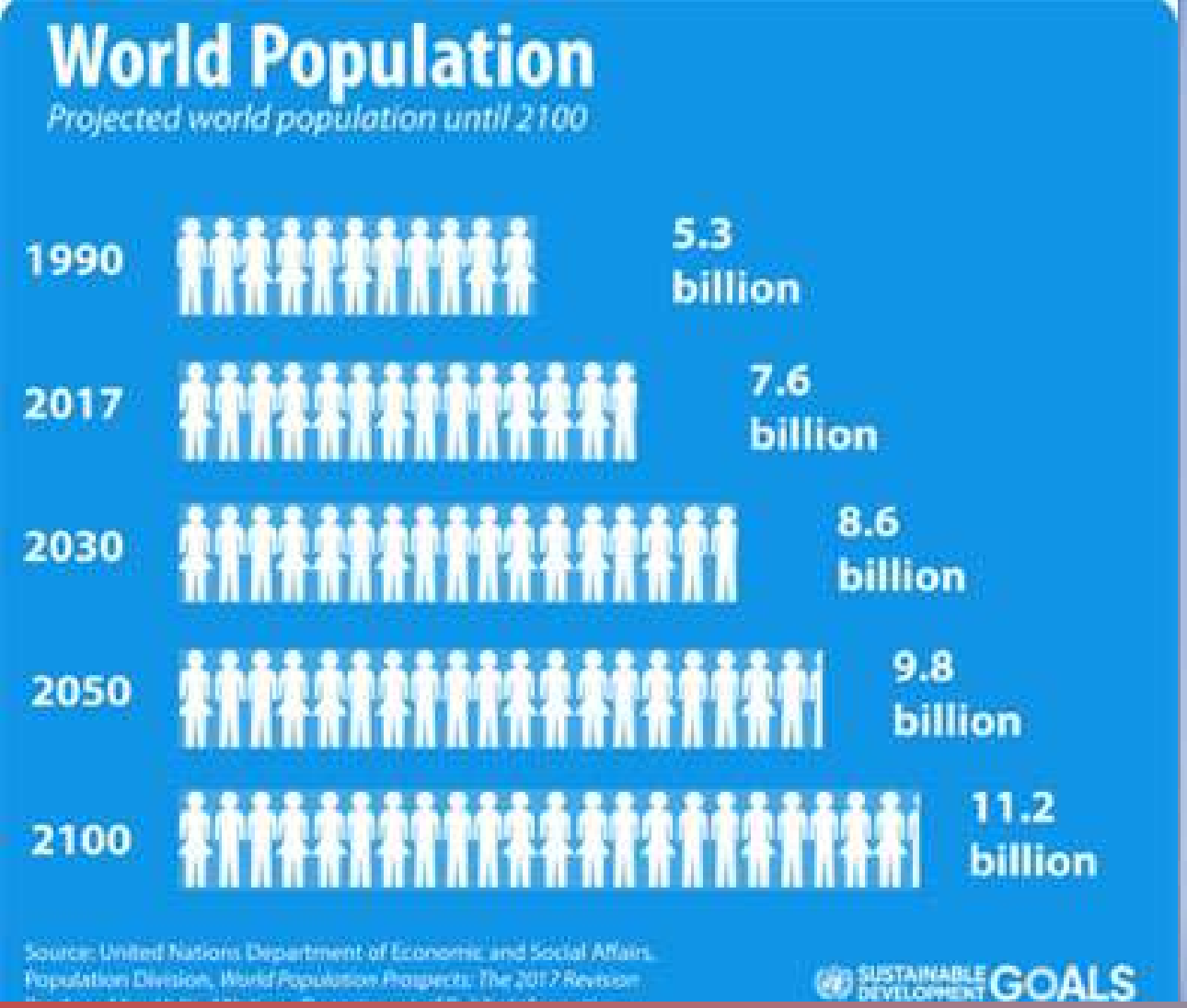
Bangkok, Thailand • June 10, 2026

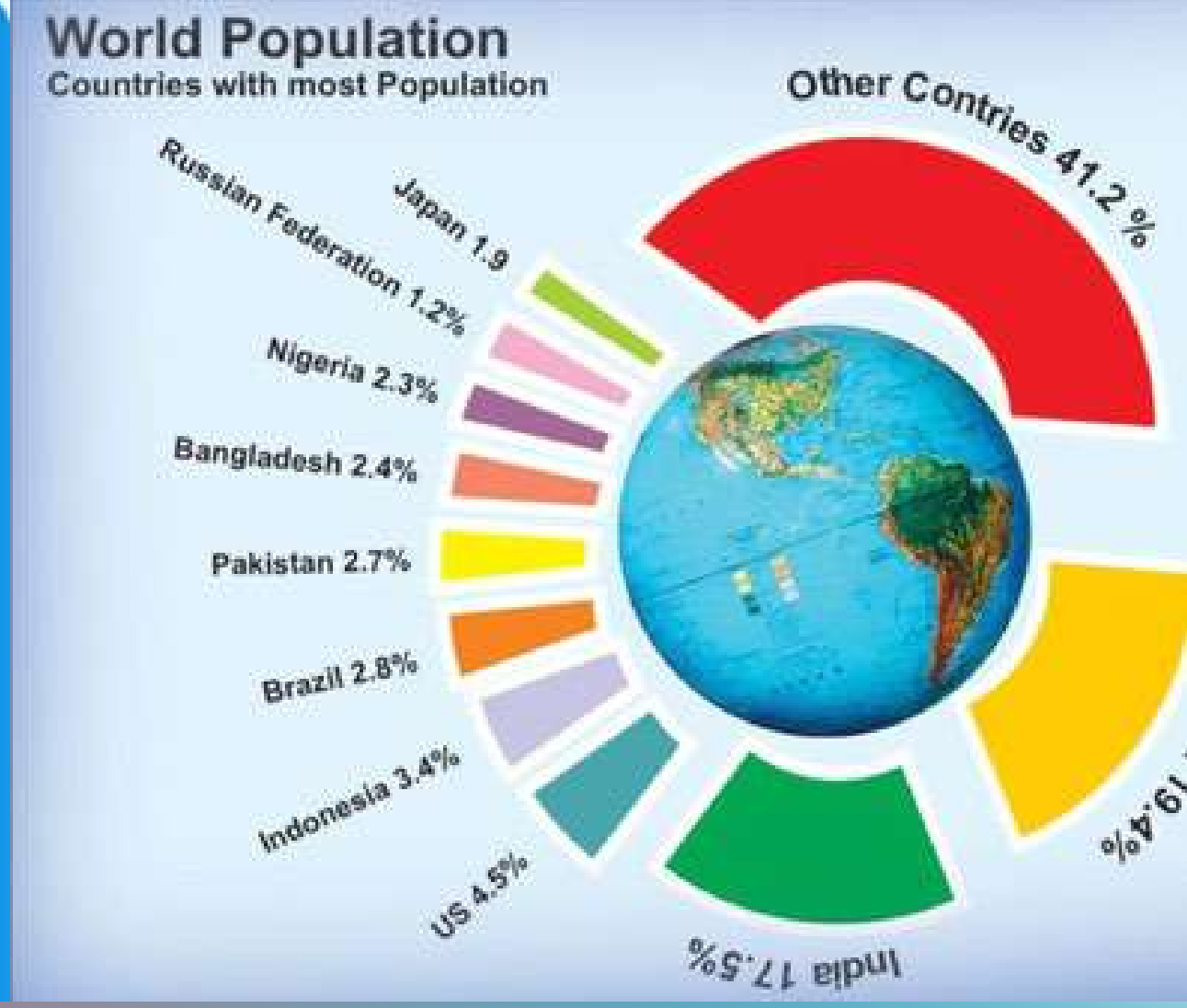
ASU

The Big Picture

Urbanization, climate variability, and utility demand require next-gen underground infrastructure.

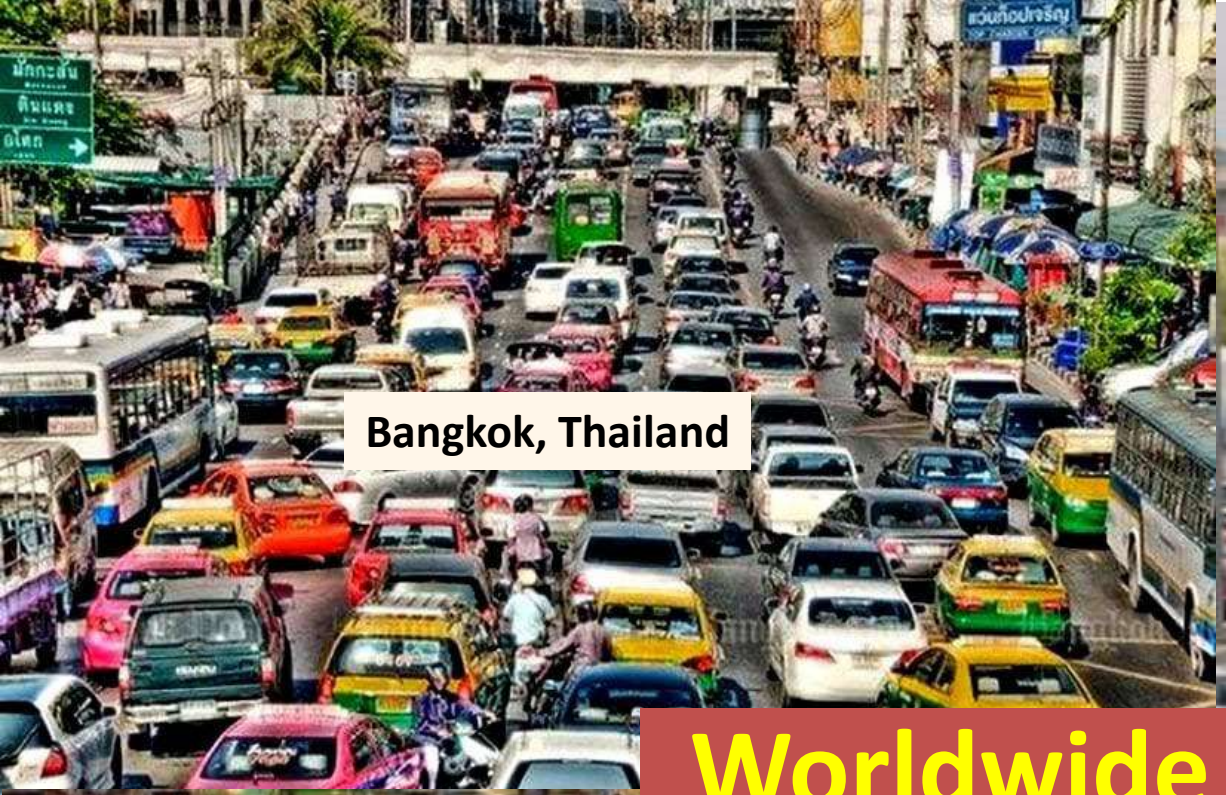






World Population Growth

Urban Centers



Worldwide Traffic Issues

Global Water Facts

2.2 M people/year
die from illness caused
by **contaminated water**

Five times more children die
from dirty water & inadequate
sanitation than from **AIDS**

1.1 Billion
(1 in 6 people)
lack access to safe
drinking water

Daily loss of drinking water to line leakage:
4 liters per person **worldwide**

In the U.S.,
30-40% of drinking water
leaks from pipes before a drop
even reaches a single home.

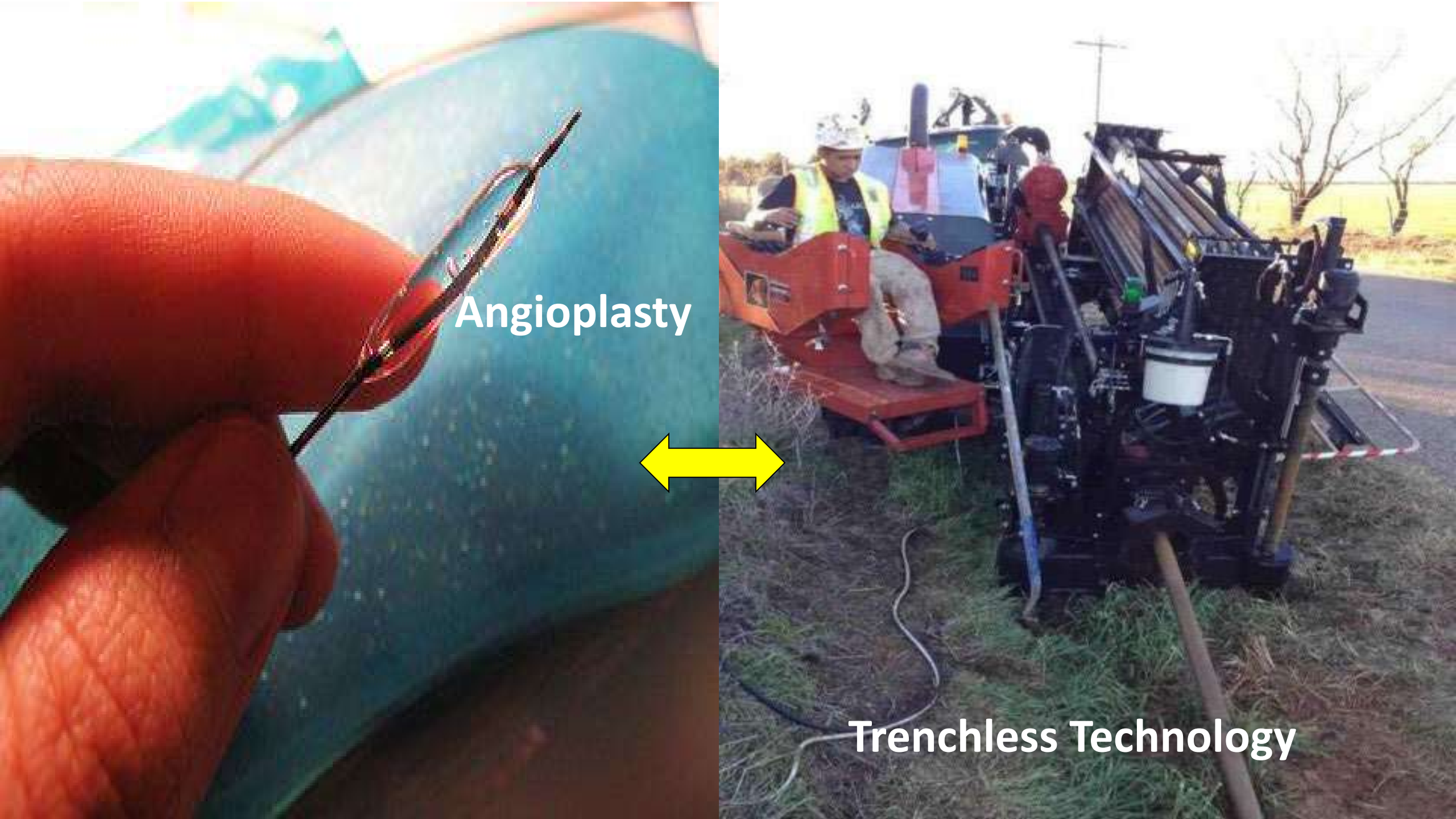
Source: Underground Infrastructure Management, Sept/Oct 2007

Open Sewers in India

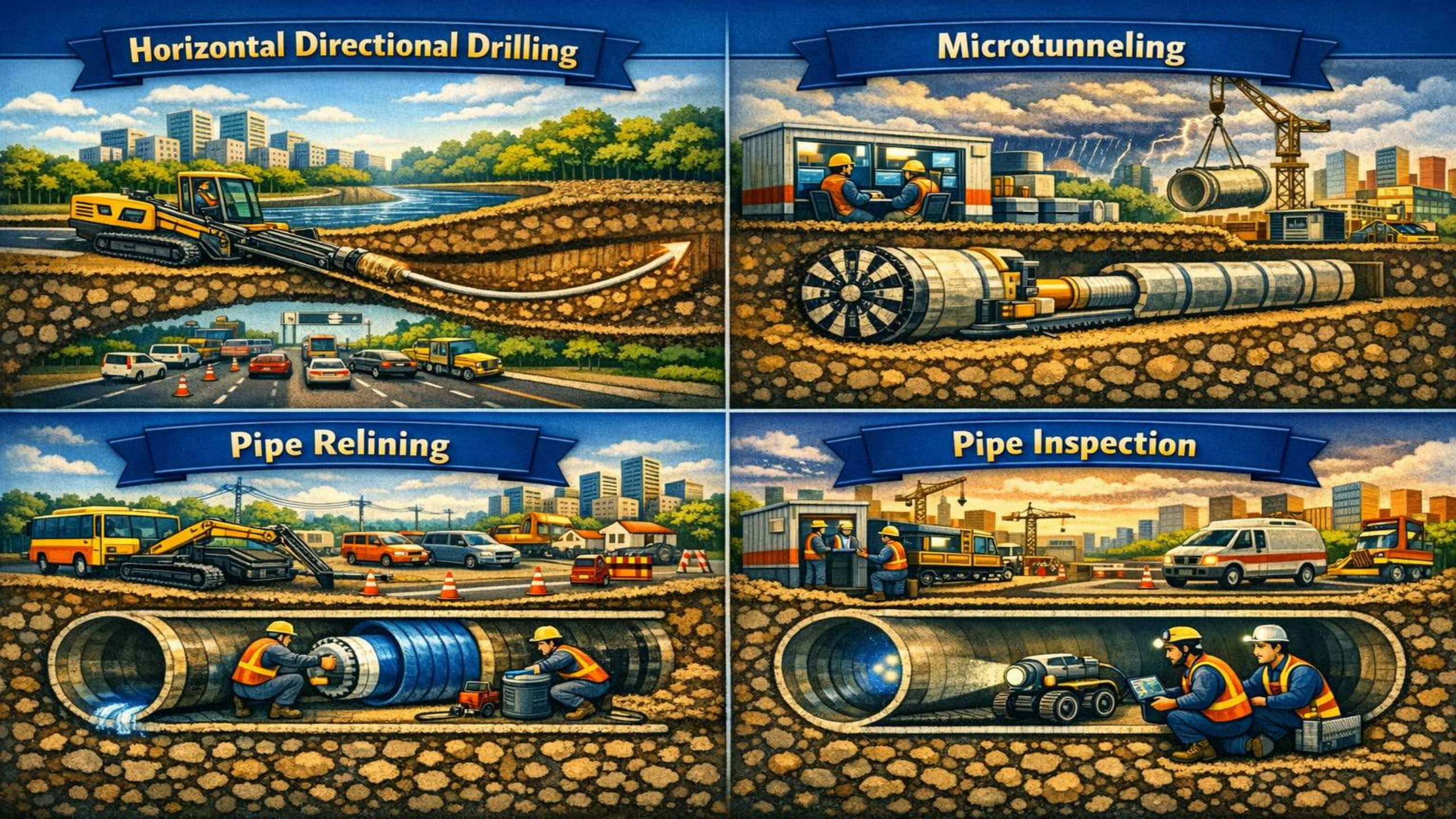
Poor Sanitation Globally

- Poor sanitation and leaking sewage occurs all over the world, not just in developing countries!


Open Heart Surgery
Open Cut Construction
WELCOME TO
BUSTERS
MARKET


Angioplasty
Trenchless Technology

Trenchless Minimizes Disruption, Lowers Emissions, and *Supports Resilient Cities*


Horizontal Directional Drilling
Microtunneling
Pipe Relining
Pipe Inspection


LANE
FIRE

Before and After Rehabilitation


TRENCHLESS
VS.
OPEN CUT


A Triple Bottom Line
AI
Decarbonize
Digitize
Deploy Smarter Systems


SIMULATION
IoT
DATA

Digital Twins

1

1. Subsurface Visualization

- Integrates ground-penetrating radar (GPR), LiDAR, and as-built records to build a high-fidelity 3D model of existing underground assets.
- Enables planners and contractors to see before they dig, reducing risk and uncertainty.

2

2. Clash Detection & Design Optimization

- Digital twins simulate proposed utility routes in real-world conditions to avoid conflicts.
- AI-enhanced simulations can recommend least-disruptive routing based on cost, risk, and environmental constraints.

3

3. Lifecycle Asset Management

- Tracks installation, usage, maintenance, and aging of assets in real time.
- Supports predictive maintenance to extend asset life and prevent failures.

4

4. Stakeholder Collaboration

- Offers a shared, dynamic model that can be accessed by engineers, city planners, contractors, and utility companies for better coordination.

5

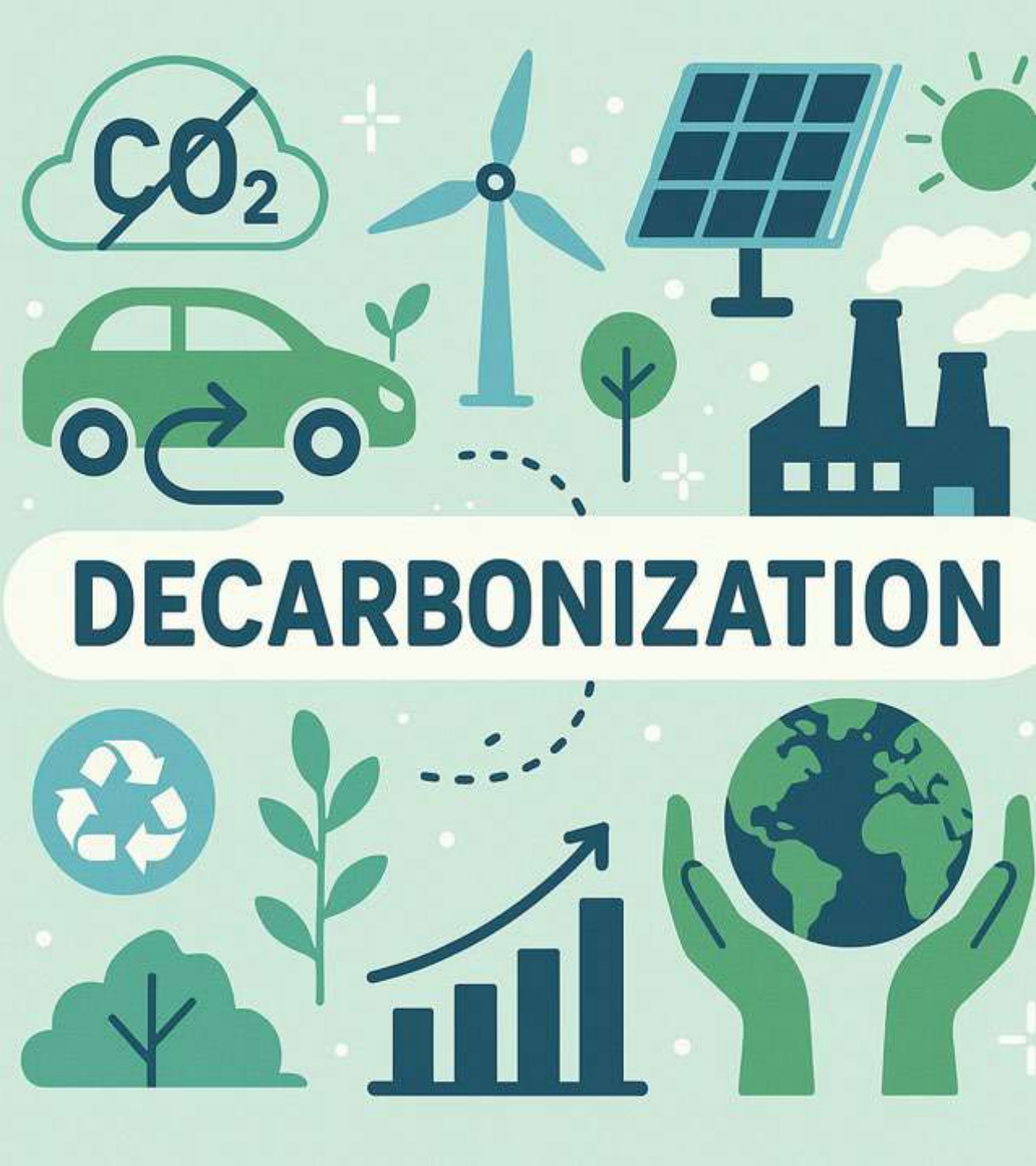
5. Smart City Integration

- Ties into broader smart city frameworks, enabling real-time coordination with surface infrastructure, transportation systems, and energy grids.

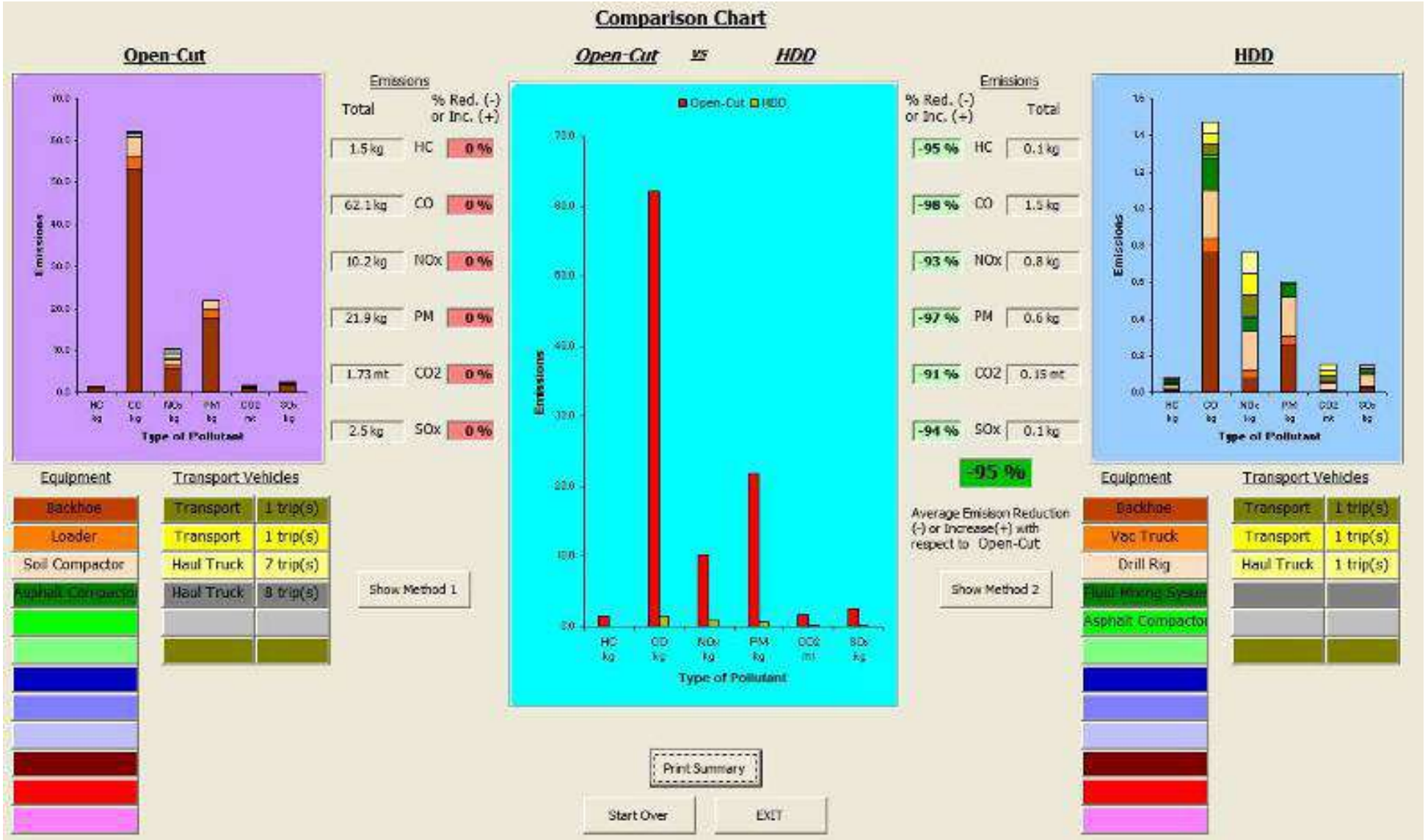
Decarbonisation Metrics

Trenchless methods reduce lifecycle emissions by up to 70% vs. open-cut methods

Trenchless Benefits



Carbon Footprint



Trenchless options produce significantly less airborne emissions !

Case Studies: Emissions Reduction

Up to 90% Reduction in Emissions

- Decreased Fuel & Transport Needs
- Study by Ariaratnam

75% Lower Carbon Emissions

PW Trenchless - British Columbia, Canada

86% Emissions Reduction in Spain

- Primus Liner Project - Near Madrid

50-75% Emissions Savings in the UK

- UK Pipe Jacking Association

Trenchless Methods Drastically Reduce Carbon Footprint!


Urban Undergrounding & Electrification
Power Cables
High Voltage Lines
Energy Storage
Fiber Optics
Electric Water Pump

Why is Electricity Critical?

Business Impacts

Impact on business and residential services.

Communications

Impact on telephone and other communication networks.

Transportation

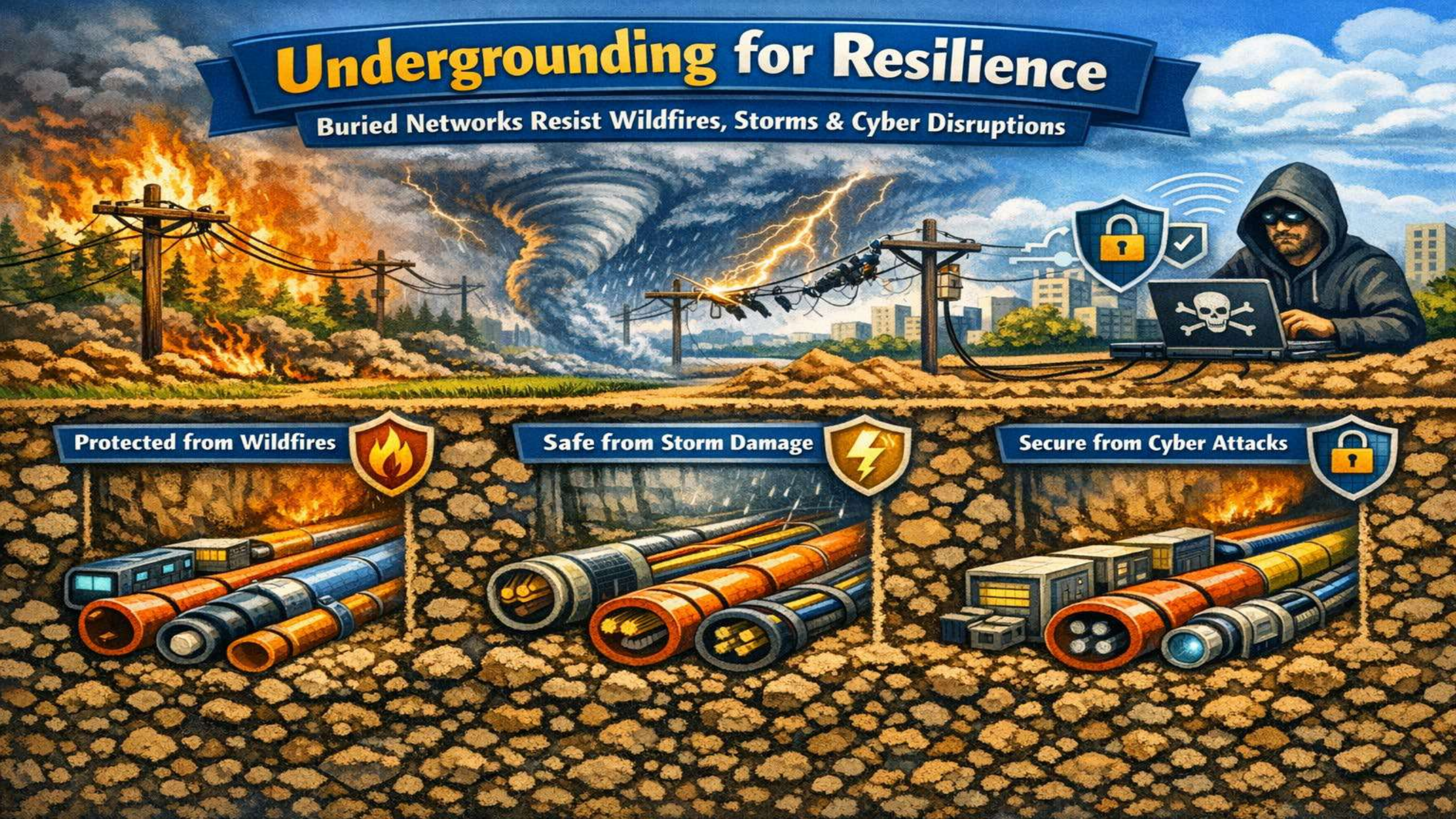
Impact on traffic flow.

Water/ Wastewater Treatment

Impact on municipal operations.

What about charging electric cars?

Above Ground Electrical Lines


Undergrounding for Resilience
Buried Networks Resist Wildfires, Storms & Cyber Disruptions
Protected from Wildfires
Safe from Storm Damage
Secure from Cyber Attacks

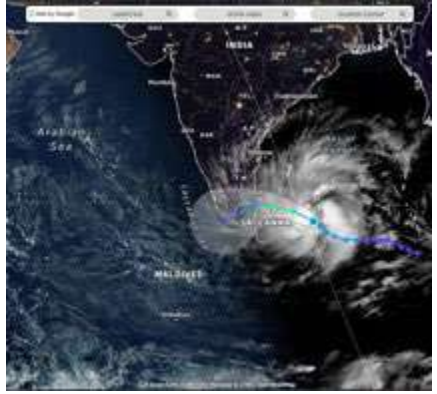

Fires from downed
electrical lines

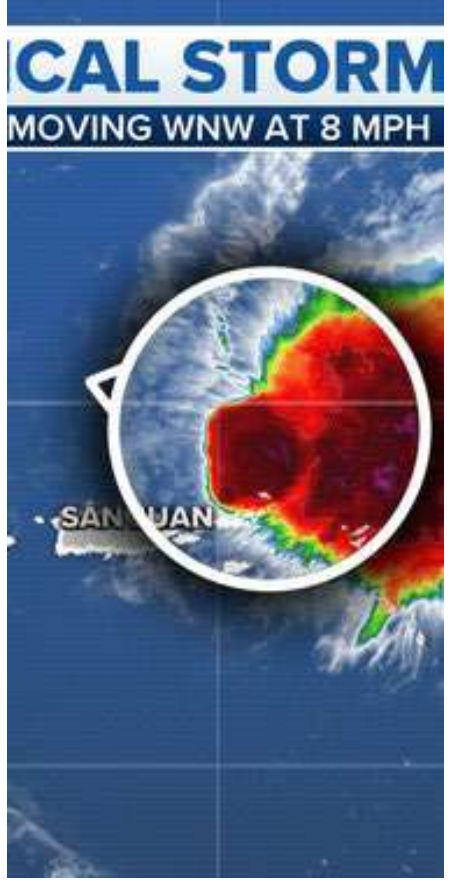
Natural Events

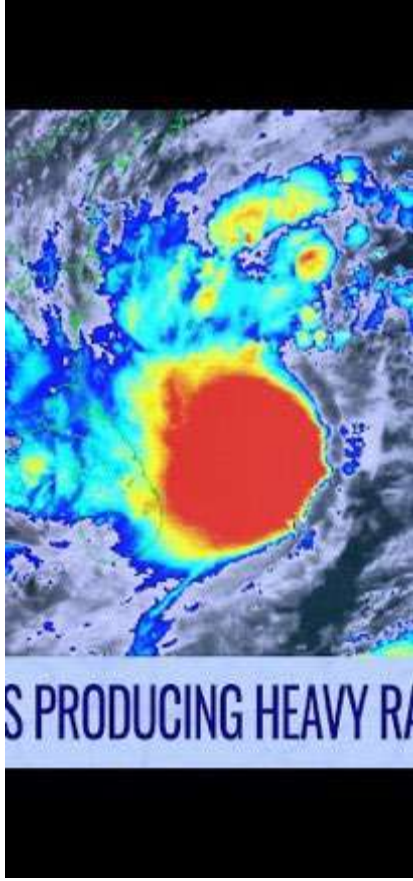
- Tsunami, typhoon, cyclone, hurricane, or tornado
- Extreme rain event
- Winter ice storm
- Earthquake
- Wildfires


MAX DEFENDER 8
POTENTIAL TROPICAL CYCLONE TWENTY-TWO
1:00AM 300 MI WSW OF KINGSTON JAMAICA
MAX WINDS 35 mph
PRESSURE 1004 mb
MOVEMENT NNE at 7
TAMPA
MIAMI
NASSAU
SAT 7:00 PM 50 MPH
SAT 7:00 AM 45 MPH
FRI 7:00 PM 40 MPH
FRI 7:00 AM 35 MPH
SAN JUAN

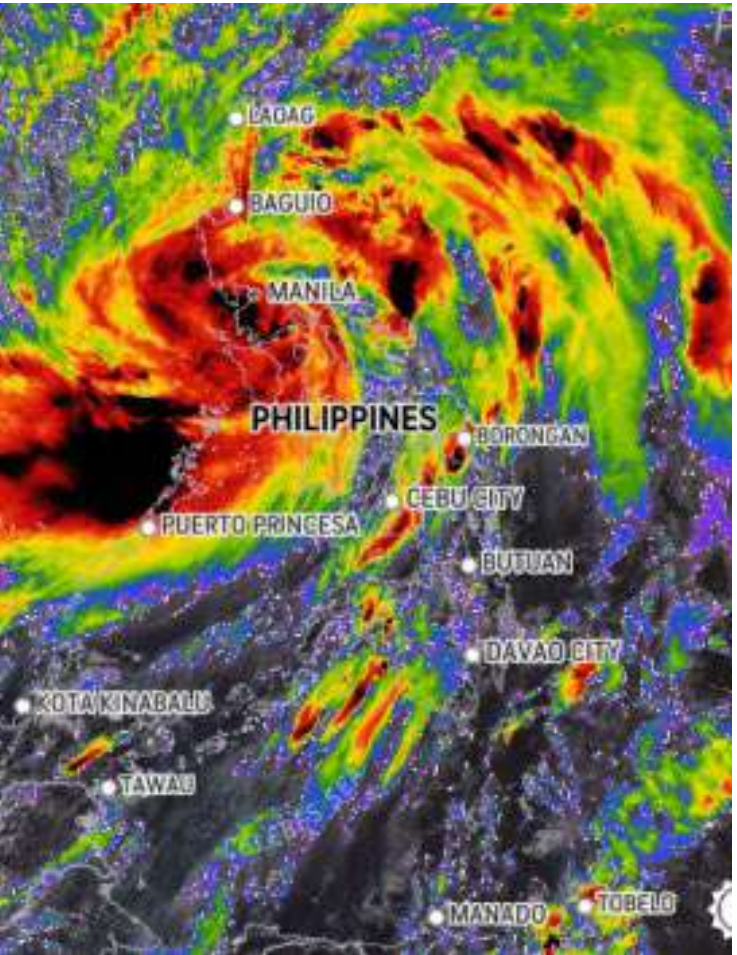

TROPICAL STORM PABUK
95 kph
NW at 17 kph
7.2°N
103.0°E
Hanoi
Bangkok
Qui Nhon
Phnom Penh
Ho Chi Minh City
Hour: 120 55 kph
Hour: 96
Hour: 72 75 kph
Hour: 48 65 kph
Hour: 24 75 kph
Kuala Lumpur

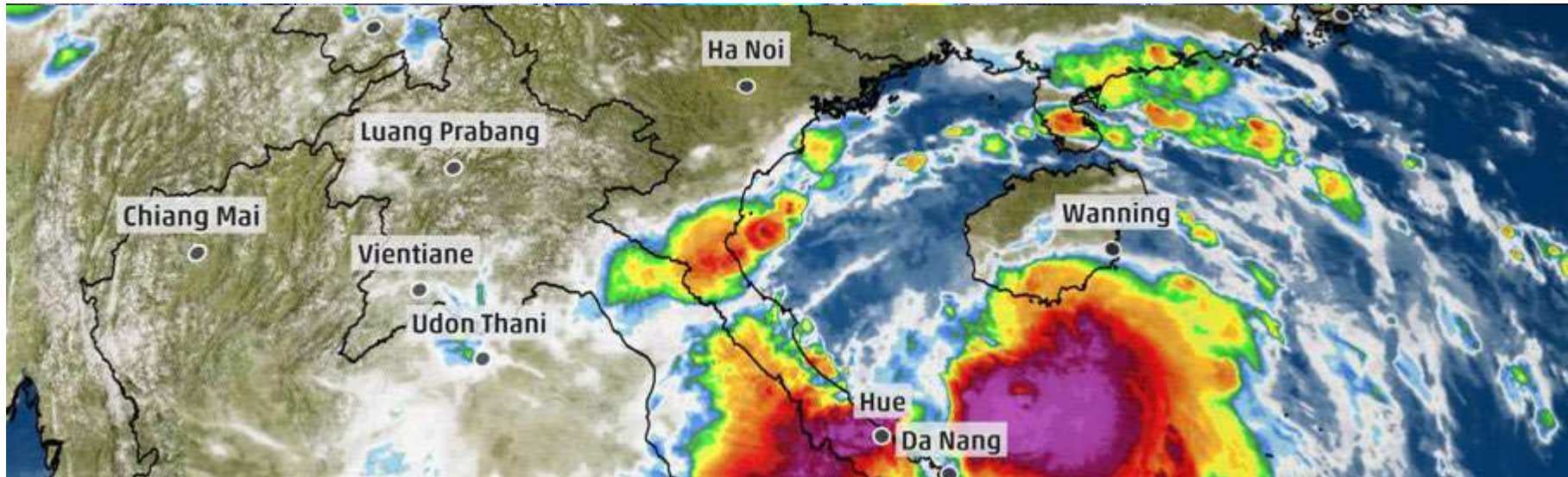


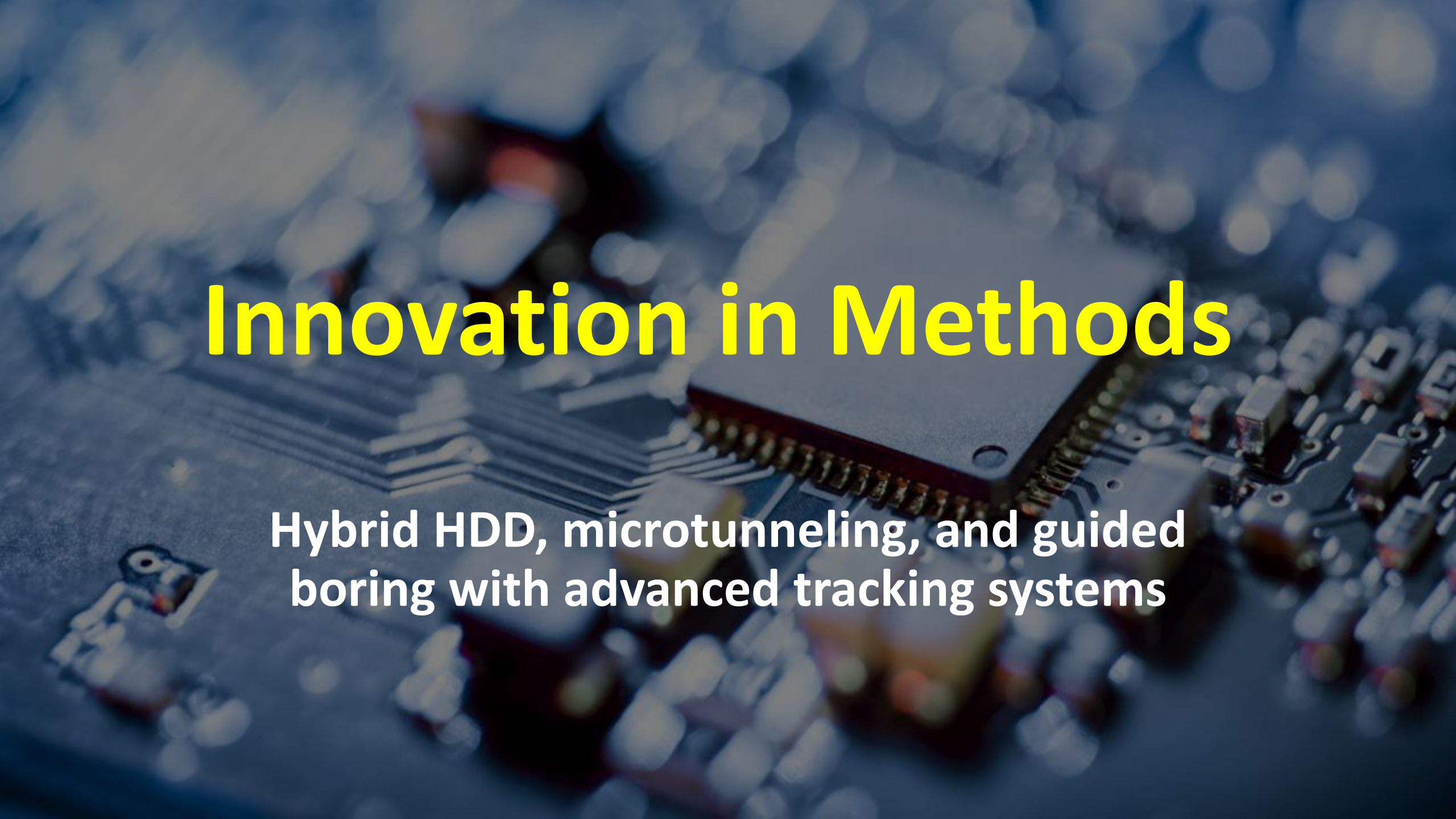

CAL STORM
MOVING WNW AT 8 MPH
SAN JUAN


S PRODUCING HEAVY RA


Tropical Cyclone Damien Latest
Current Information
85 mph
Moving SSW at 6 mph
Port Hedland
Paraburdoo
Carnarvon
AUSTRALIA


LAOAG
BAGUIO
MANILA
PHILIPPINES
BORONGAN
CEBU CITY
PUERTO PRINCESA
BUTUAN
DAVAO CITY
KOTA KINABALU
TAWAU
MANADO
TOBELO


Ha Noi
Luang Prabang
Chiang Mai
Vientiane
Udon Thani
Wanning
Hue
Da Nang


Innovation in Methods
Hybrid HDD, microtunneling, and guided boring with advanced tracking systems

Direct Steerable Pipe Thrusting

Electric HDD Rigs

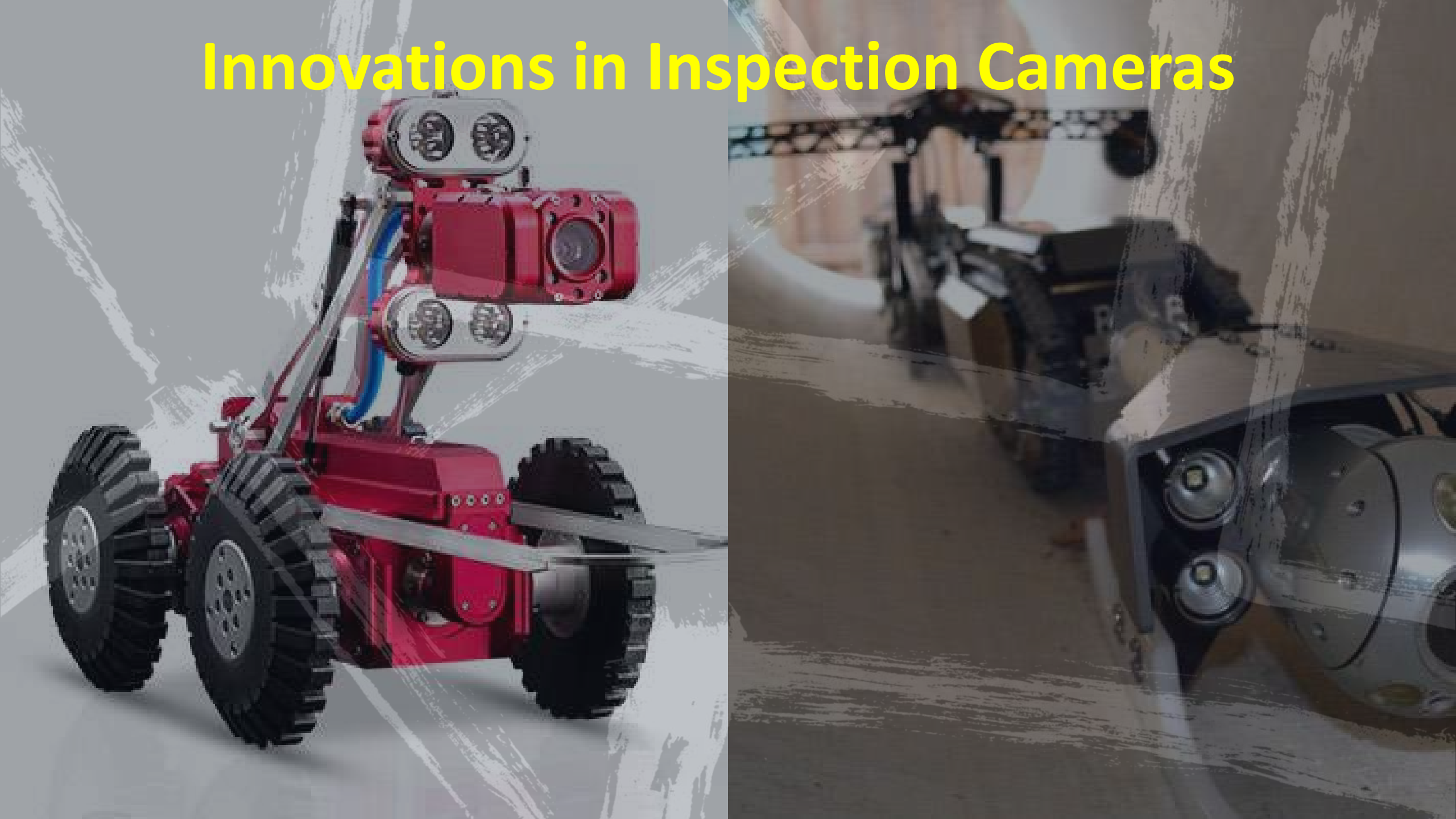
“New” ARES Walkover Locating System

Small Boring Units (SBUs)

- Small Boring Units (SBU's) used for drilling in rock
- Small diameter rock cutting head 24" (600mm) to 72" (1.8m) attached to auger boring machine
- Capable of excavating hard rock on drives < ~500 ft (150m)

UV Curing

Innovations in Inspection Cameras




From: To:
Remarks: VERMIN


IKI - Itty-bitty Kitty in Invert: 100%


0.0 FT.
-> 10,03.06


08.06.2010
44.32m


Vermin Rat

Subsurface
UTILITY ENGINEERING

Utility Detection
- Ground Penetrating Radar
- Electromagnetic Locators

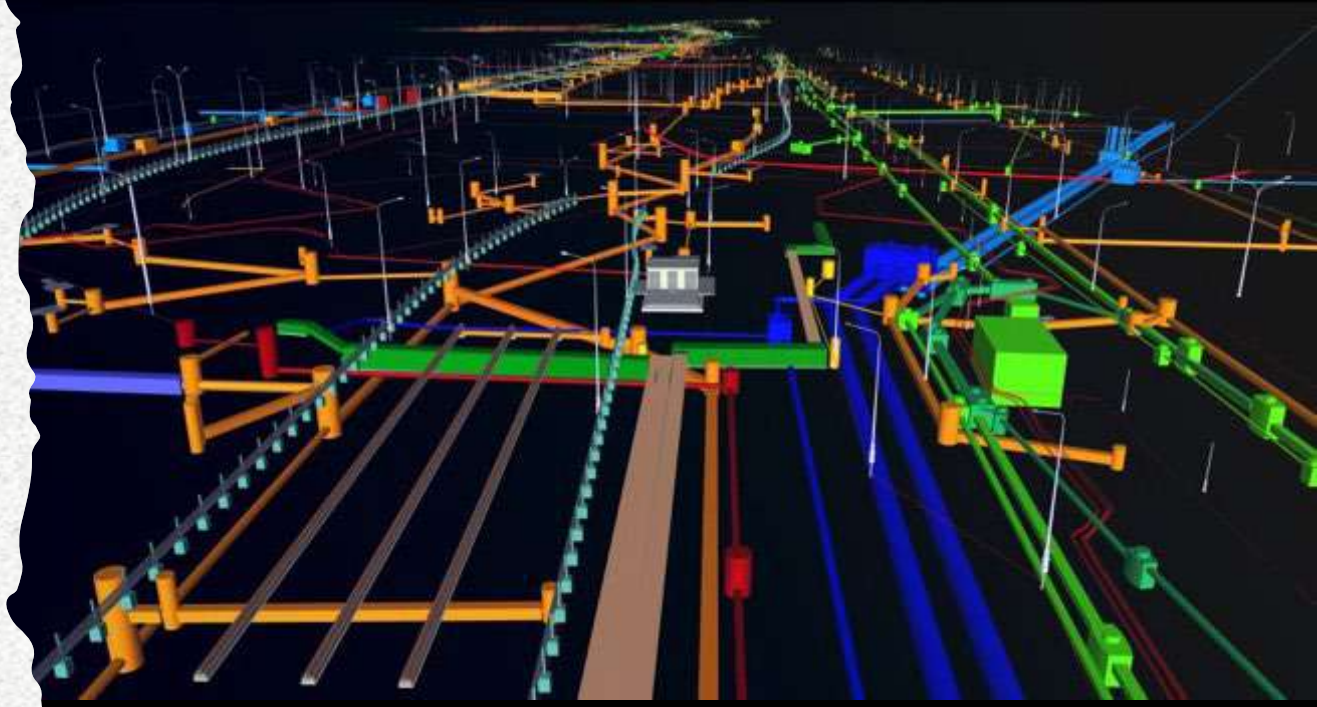
Data Collection & Mapping
- 3D Utility Models
- GIS Mapping

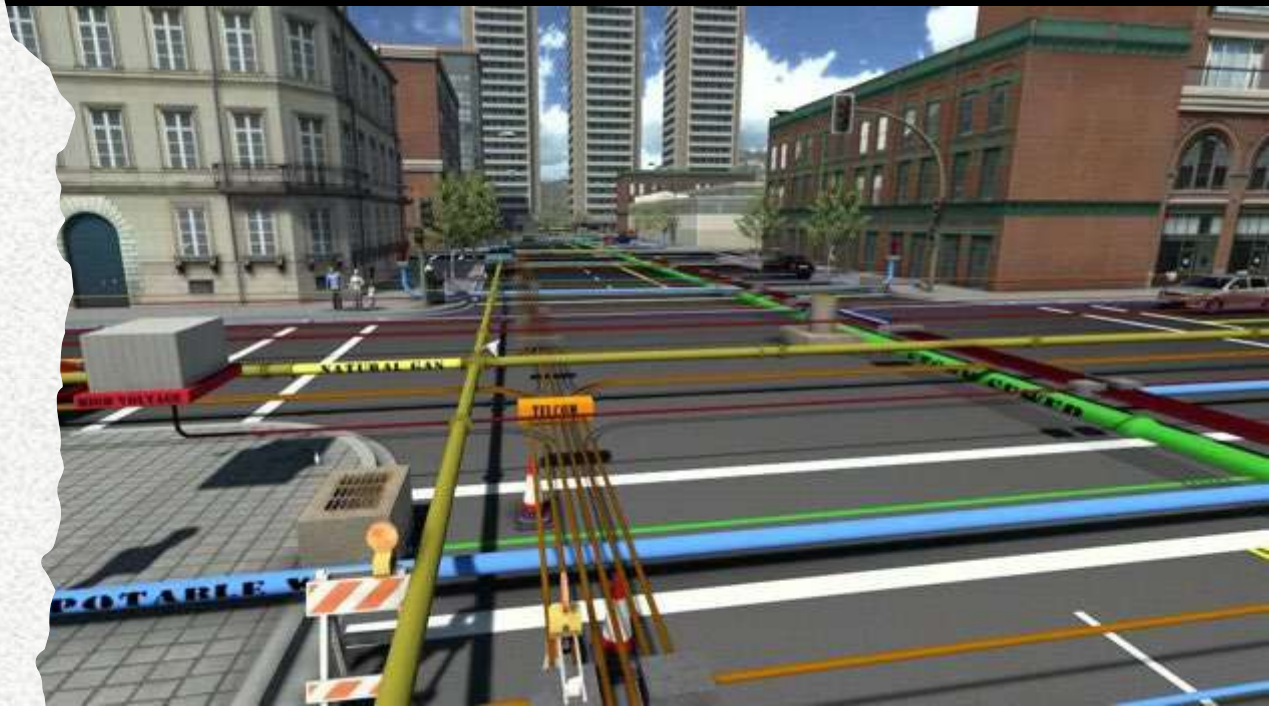
Risk Assessment
- Conflict Analysis
- Damage Prevention

CAUTION
Call Before You Dig

Gas | Water | Electric | Fiber Optic | Telecom

3D Computer Generated Mapping



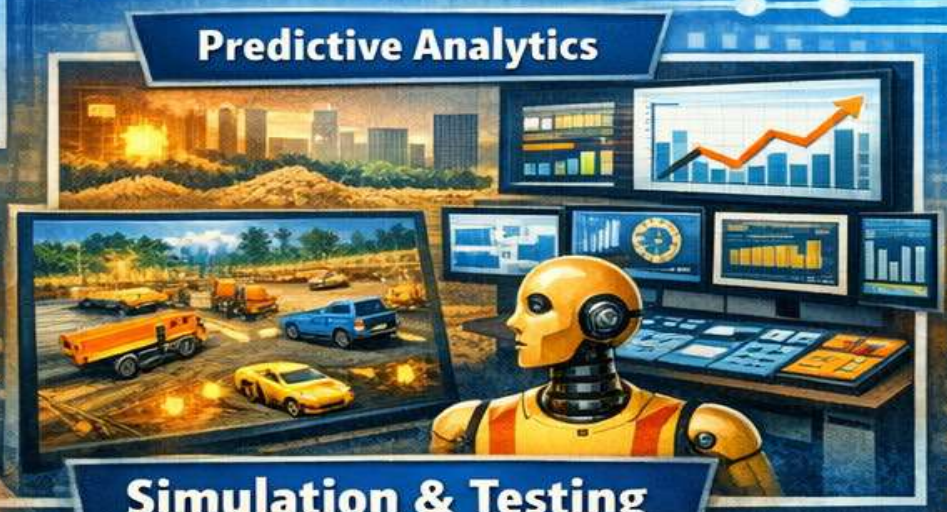



Och amhain
Tramanna
EXCEPT
TRAMS
Och amhain
Tramanna
EXCEPT
TRAMS

Striking a Natural Gas Line

Slightly off target!

AI and Simulation Tools

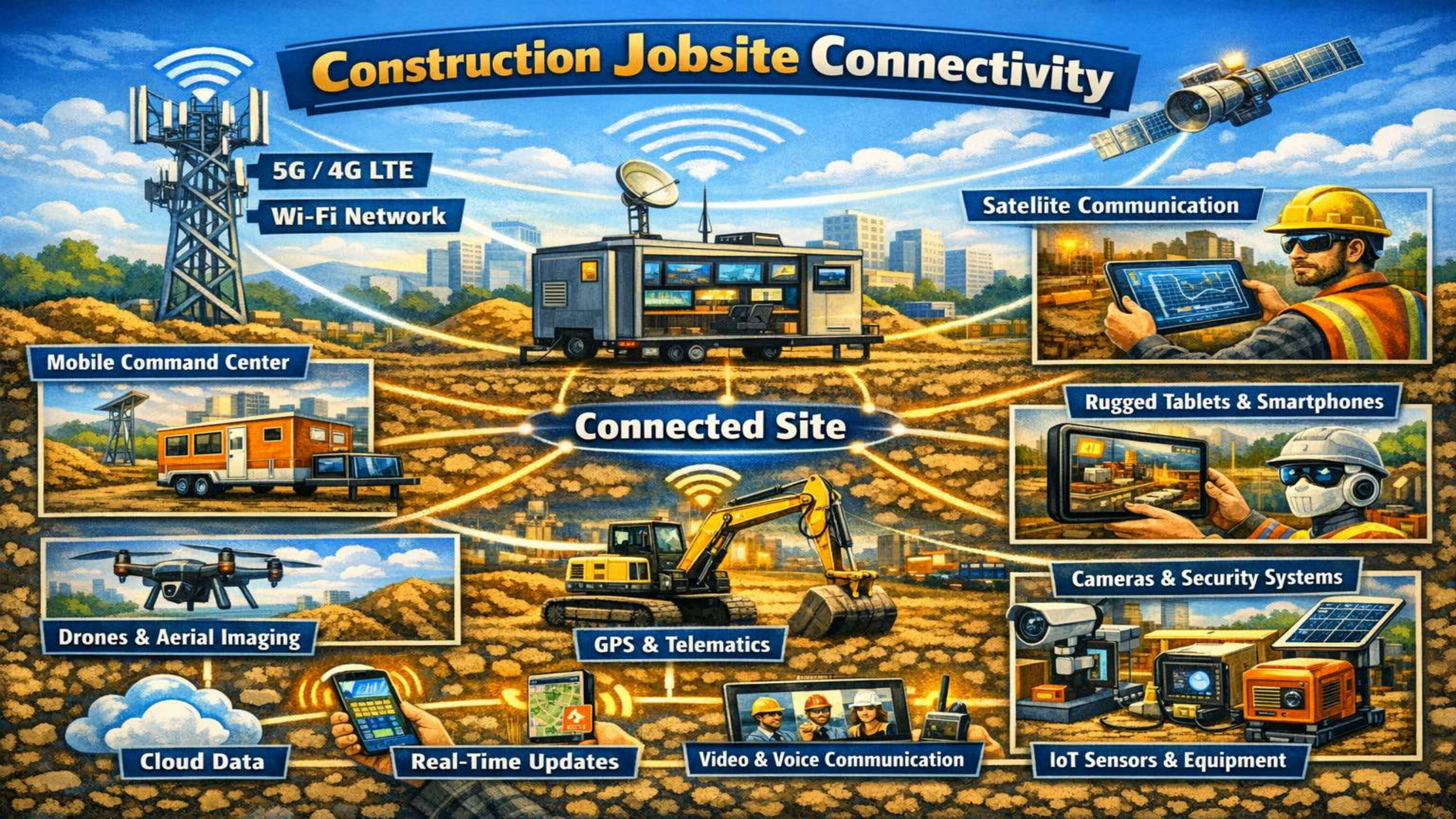


Digital Jobsite

AR / VR SUPPORT

FOR PLANNING, REMOTE GUIDANCE & WORKFORCE TRAINING

Construction Jobsite Connectivity



Workforce and Training Futures

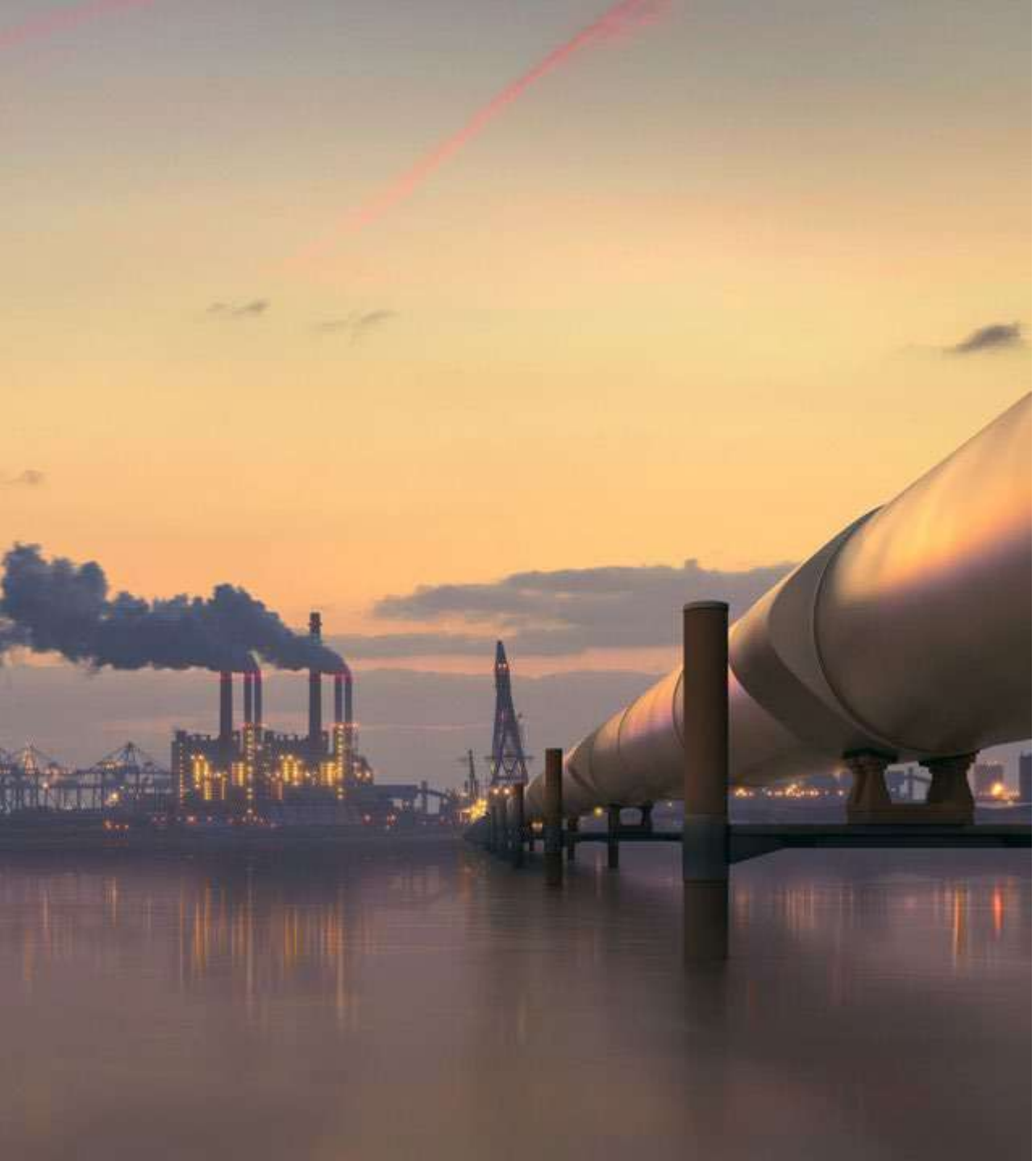
High-tech trenchless careers attract new talent; Universities/Colleges must take the lead

Even a monkey can operate an HDD rig!

Professional Training (Field and Classroom)


Simulators and
Virtual Reality

Global Trenchless Projects



The Next Frontier?

- **Vision:** Autonomous trenchless systems and predictive subsurface infrastructure

The Construction Site of the Future?

Call to Action

Invest in education, enable testbeds, reform procurement to favour trenchless

ขอบคุณ!