

Future-proof urban infrastructure planning.

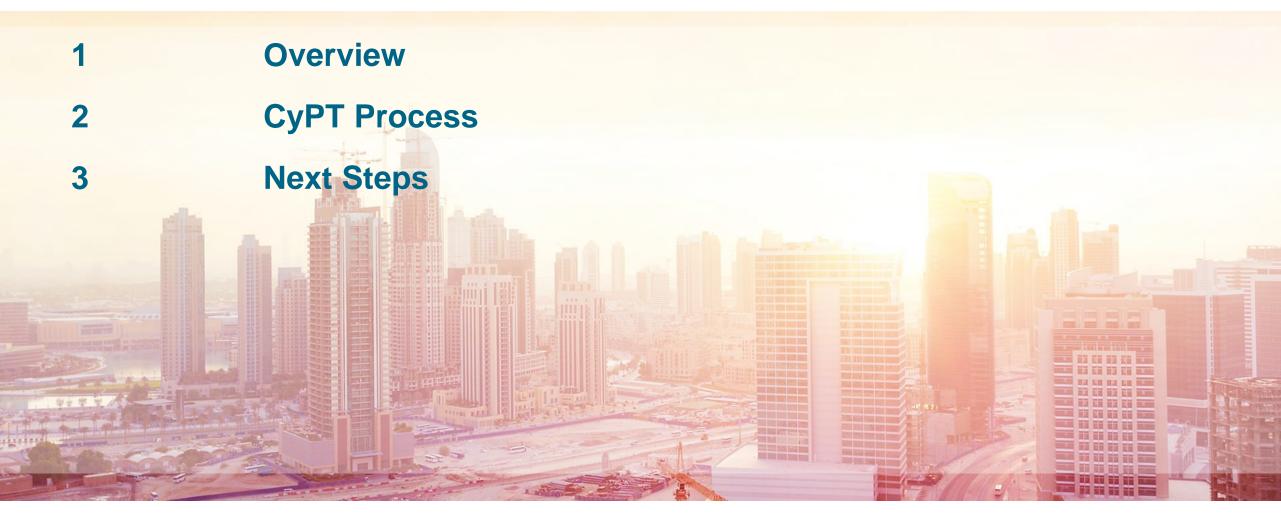
Siemens City Performance Tool (CyPT)

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Agenda







Overview CyPT Process

Next Steps

The Challenge

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Europe GHG emissions reduction targets		Americas GHG emissions reduction targets	
Copenhagen	100% by 2025	Seattle	100% by 2050
Oslo	100% by 2050	Portland	80% by 2050
Stockholm	100% by 2050	Washington DC	80% by 2050
London	60% by 2025	Houston	36% by 2016
Berlin	40% by 2020	Los Angeles	35% by 2030
Amsterdam	40% by 2025	Vancouver	33% by 2020
		Buenos Aires	33% by 2030

Sao Paolo

New York

Boston

San Francisco

Santiago de Chile

30% by 2012

30% by 2030

25% by 2017

25% by 2020

20% by 2020

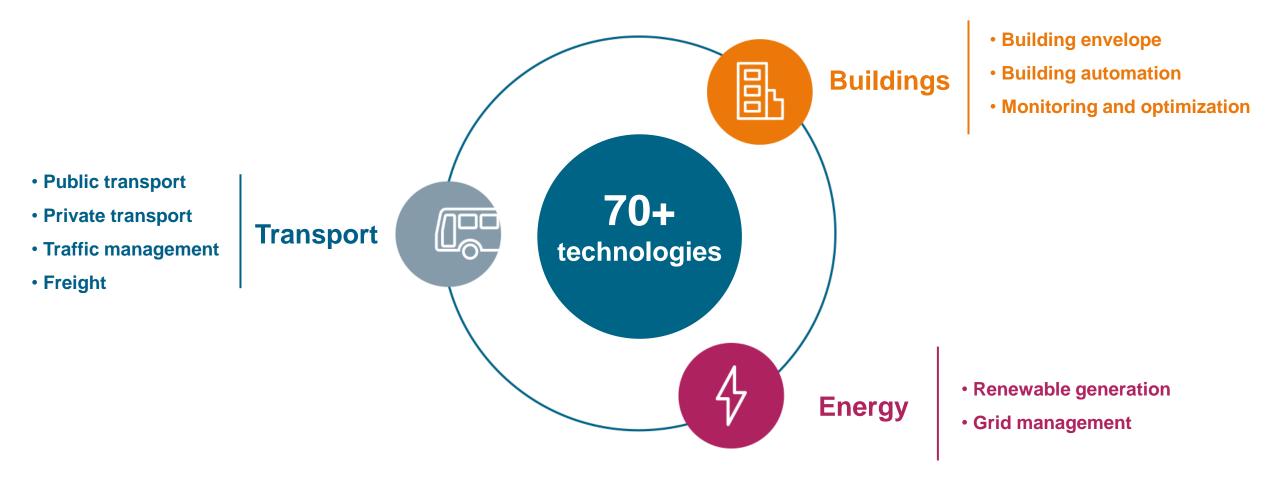
Asia GHG emissions reduction targets

Seoul	40% by 2030
Токуо	25% by 2020
Wuhan	20% by 2015

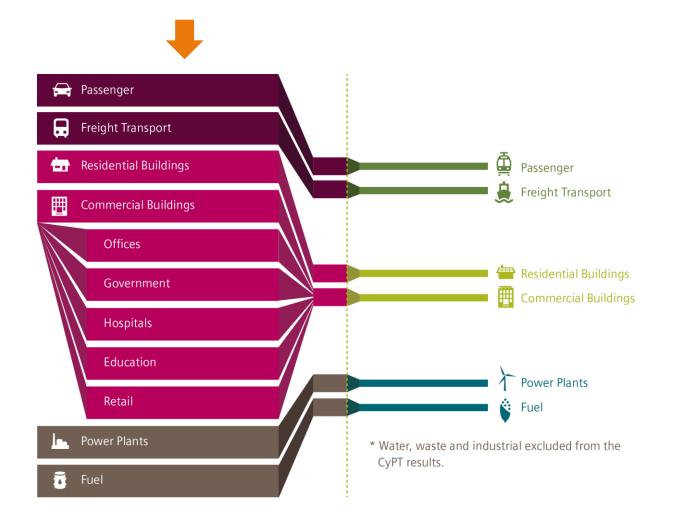
Australia GHG emissions reduction targets

Melbourne	100% by 2020			
Sydney	70% by 2030			
Africa GHG emissions reduction targets				

Siemens Role in Supporting Urban Sustainability



The City Performance Tool (Step 1)

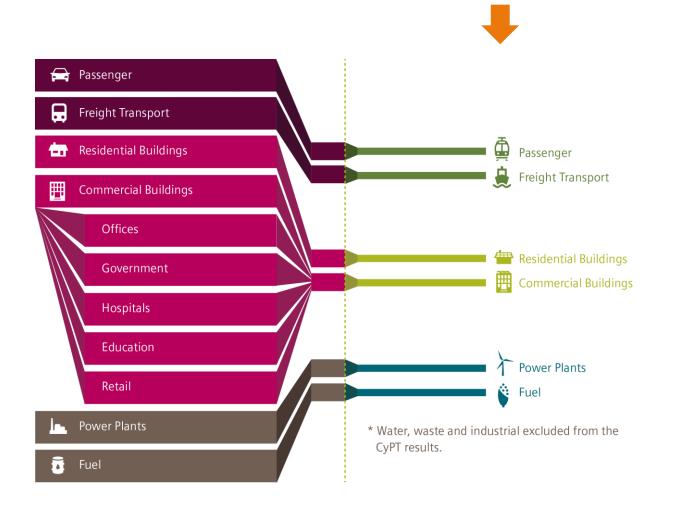


Step 1: Energy Mix Analysis

- 350 data inputs
- Residential and commercial buildings, passenger and freight transport
- Emissions baseline for energy consumption using 2012 GPC Protocol for Community-Wide Emissions

The City Performance Tool (Step 2)

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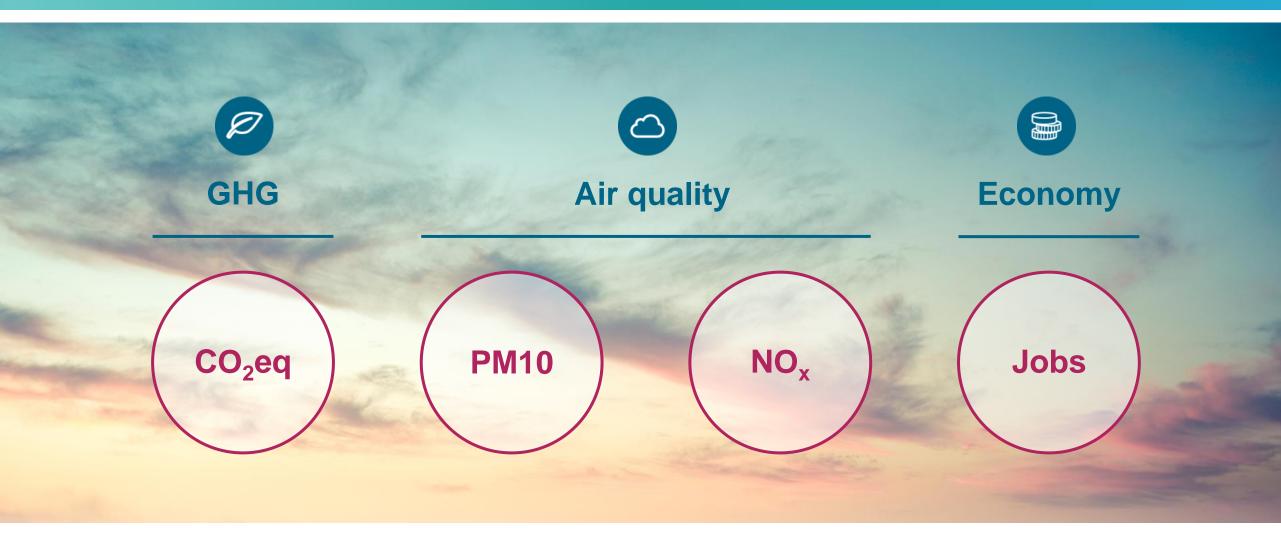


Step 2: CyPT Results

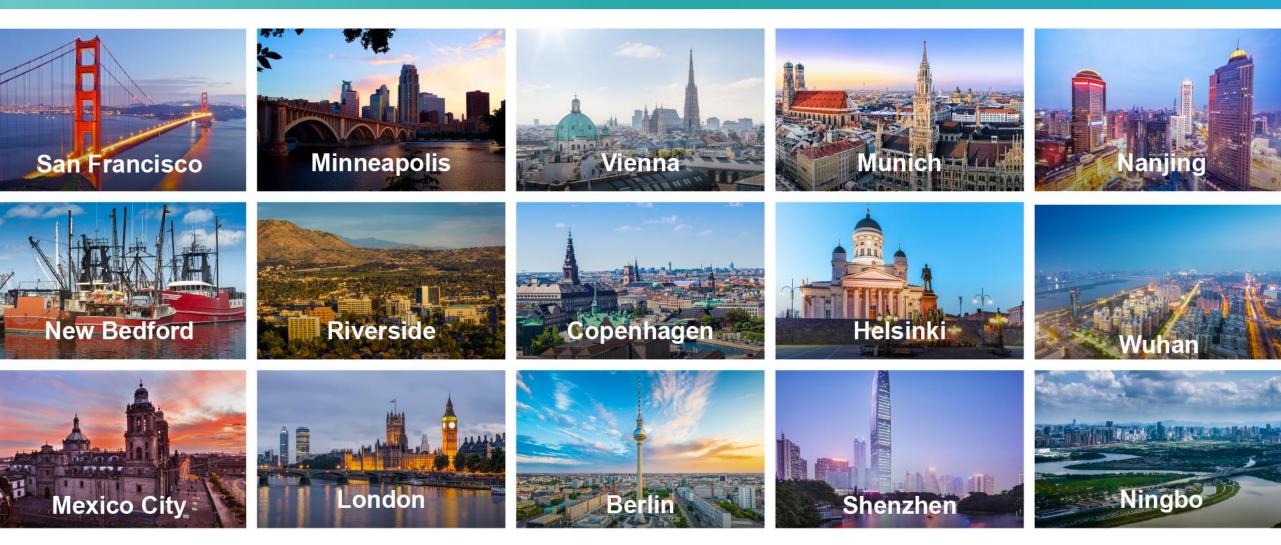
- 73 technologies, each with 3 customizable implementation rates
- Technologies 1) clean underlying energy mix, 2) improve energy efficiency in buildings and transport, and 3) induce modal shift

Outcomes

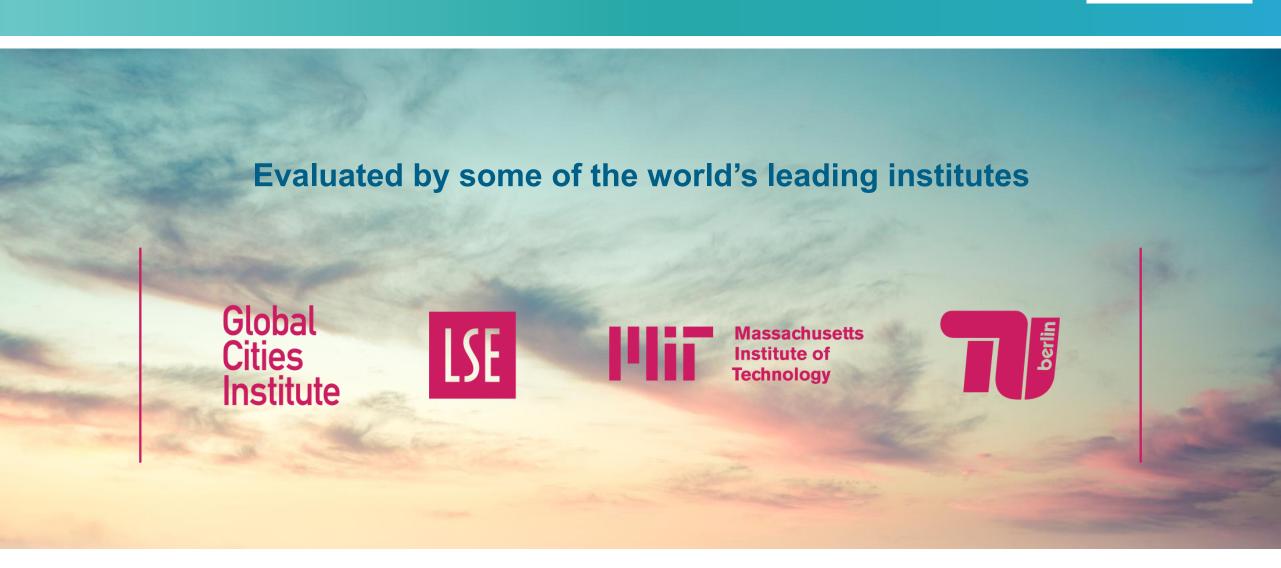




Who We're Supporting

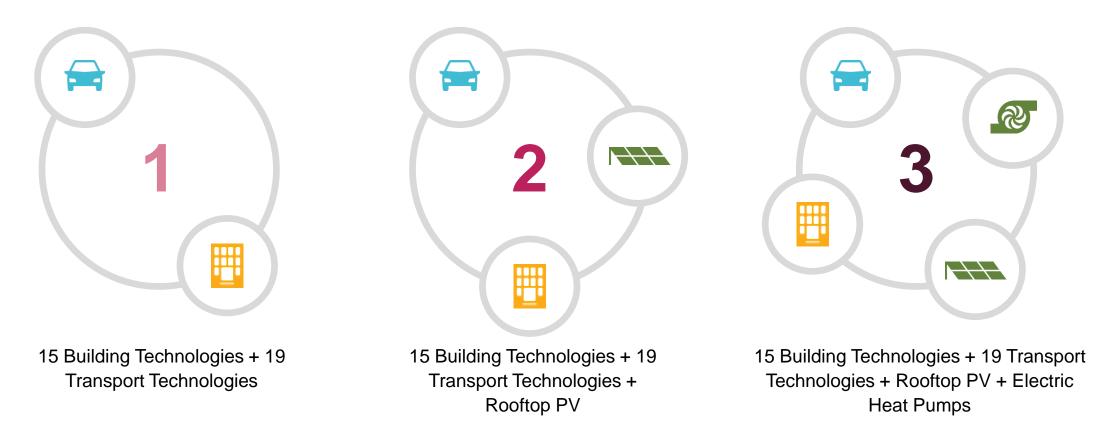


Who Supports Us



Case Study: San Francisco Scenarios

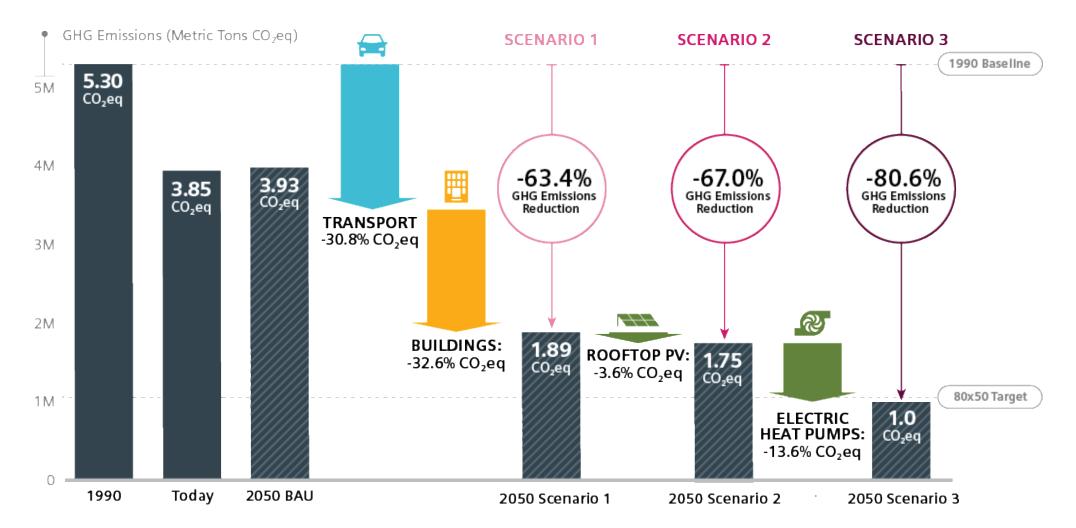
3 Scenarios, 36 Technologies, 3 Objectives



Case Study: San Francisco

Reaching 80x50



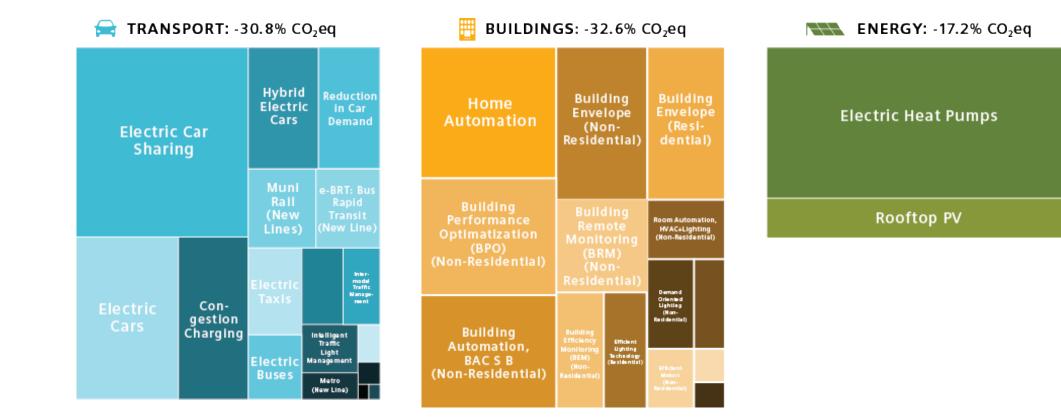


Full report available at http://sfenvironment.org/cas/plans-reports

Case Study: San Francisco

High-Performing Technologies





Case Study: San Francisco

The Big Numbers

Reduction in GHG Emissions from 1990 Baseline (in % CO₂eg) **SCENARIO 3:** 80.6% Emissions 0% 1990 Baseline Reduction by 2050 -25% •••••• BAU: -25.9% CO₂eq COST PER PERSON: \$37,570 Capital & **Operating Expenditures** -50% SCENARIO 1: -63.4% CO2eq SCENARIO 2: -67.0% CO,eq -75% JOBS GENERATED: 80x50 Target 420,000 Full-Time SCENARIO 3: -80.6% CO,eq Equivalents -100% = Today 2050 1990



Overview CyPT Process Next Steps

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Collect data

City provides roughly 20 critical data points, plus its sustainability targets, which are used to customize the model.

Months 1 - 3

Buildings

- **80+ data points including:**
- Floor space
- Electricity usage
- Building envelope



- 5 data points including:
- Population
- Emissions targets



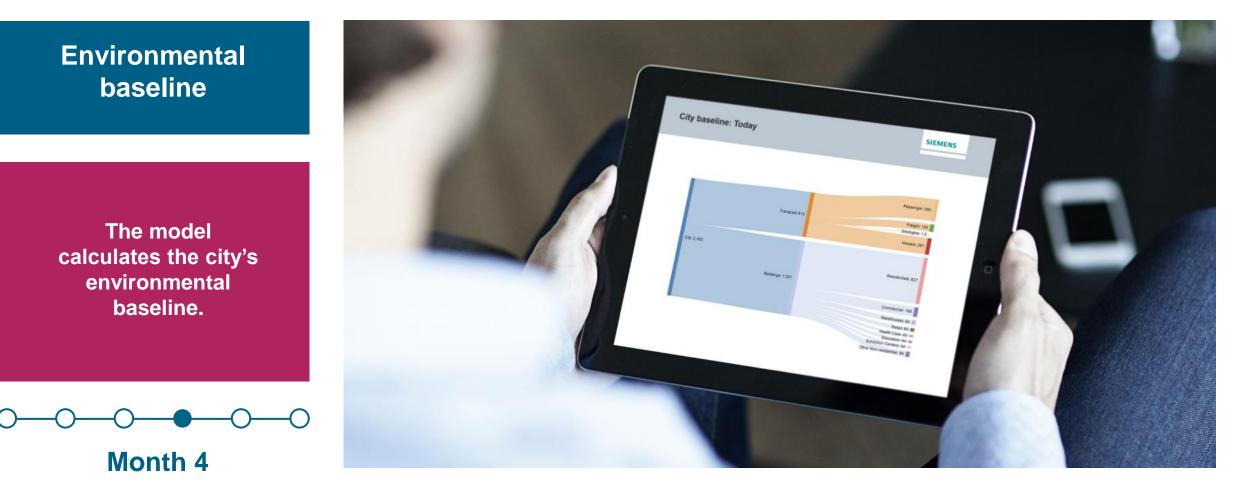
Transport

- **120+ data points including:**
- Passenger & freight demand
- Public transport & infrastructure
- Building envelope

Energy

50+ data points including:

- Consumption
- Source mix
- Grid losses



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Infrastructure technology impacts

Siemens runs a technology workshop with the City to choose scenarios and demonstrate infrastructure impacts.



Month 5



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Infrastructure strategy

Siemens works with city to develop an infrastructure strategy based on future scenarios.

Month 6



Siemens Centre of Competence Cities – Urban Development



Vienna 2025 Siemena Recort - October 2014

Viennie 2025 | Sieneess Report - October 2014

Introduction

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Overview CyPT Process Next Steps **Next Steps**





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Thank you.

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List of Critical Data Points

- Population Growth
- Electricity Mix and Projections
- Building Square Footage by Category
- GHG Inventory, including VMT, Electricity Usage (by Category) and Natural Gas Usage (by Category)
- Transport Data: Separate Call to Discuss Transport Network and Data Sources



CyPT Building Levers

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Commercial buildings

Commercial Wall Insulation

Commercial Double/Triple Glazing

Commercial Efficient Lighting

Demand Oriented Lighting

Building Efficiency Monitoring

Building Performance Optimization

Demand Controlled Ventilation

Heat Recovery

Commercial Building Envelope

Remote Monitoring

Efficient Motors & Drives

Room Automation, HVAC

Room Automation, HVAC & Lighting

Room Automation, HVAC & Lighting + Blinds

Room Automation, BACS C

Room Automation, BACS B

Room Automation, BACS A



Residential buildings

Residential Wall Insulation

Residential Double/Triple Glazing

Residential Building Envelope

Residential Efficient Lighting

Home Energy Monitoring

Home Automation

CyPT Transportation Levers

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Transport 38 levers

Metro: New Vehicles	Freight Tram		Demand Oriented Street Lighting
Metro: New Line	Freight Rail-Electrification		LED Street Lighting
Metro: Reduced Headway	BRT Electrification Switch to new electric vehicles		Smart Street Lighting
Metro: Automated Train Operation	GNG Bus	GNG Car	Intelligent Traffic Light Management
Metro: Regenerative Braking	E-Bus	E-Car	Intermodal Traffic Management
Regional Train: Automated Train Operation	Hybrid Electric Bus	Hydrogen Car	Low Emission Zone (Truck)
Tram: New Line	E-Taxi	Plug-in Hybrid Car	Eco Driving Training
Tram: New Vehicles	E-BRT New Line	Hybrid Car	Urban Bike Sharing
Tram: Automated Train Operation	E-Ticketing	E-Car Sharing	Cycling Highway
Tram: Regenerative Braking E-Highways		Occupancy Dependent Tolling	

City Tolling

CyPT Energy Levers





Photovolatic

Wind Power Generation

Combined Cycle Gas Turbine

Combined Heat and Power

Network Optimization

Smart Grid for Monitoring and Automation

Power System Automation & Optimized Network

Smart Metering

Distributed Generation

On Shore Power Supply in Harbors

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