

DOCUMENTATION

Municipal Resilience: Safeguarding Critical Infrastructure

REGIONAL LEARNING PROCESS FOR SOUTH-EAST EUROPE/ SOUTH CAUCASUS
KICK-OFF WORKSHOP | 15–18 JUNE 2026 | TIRANA, ALBANIA



30 experts



13 municipalities



9 countries

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Partners of Connective Cities



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Planning for Municipal Resilience: Safeguarding Critical Infrastructure through Risk-Informed Development

Introduction: Why Municipal Resilience Matters

When electricity fails, water pumps stop working. When communication networks are disrupted, emergency response slows down. Critical infrastructure is interconnected—and so are the risks municipalities face.

Across South Eastern Europe and the South Caucasus, municipalities are increasingly confronted with complex and interconnected risks. Climate change, ageing infrastructure, cyber threats and geopolitical instability are placing growing pressure on the systems that provide essential public services. Strengthening the resilience of critical infrastructure has therefore become a key responsibility for local governments.

To support municipalities in addressing these challenges, Connective Cities launched the regional learning process **Planning for Municipal Resilience: Safeguarding Critical Infrastructure through Risk-Informed Development**. The initiative brings together municipalities, municipal associations and technical experts from across the region and Germany to exchange practical experience, learn from one another and jointly develop locally adapted solutions.

Rather than focusing on individual infrastructure sectors, the learning process promotes an integrated understanding of municipal resilience. Through expert inputs, peer exchange and collaborative working sessions, participants identify vulnerabilities, exchange practical approaches and develop concrete priorities for strengthening the resilience of essential services.

THE CONNECTIVE CITIES LEARNING PROCESS

Planning for Municipal Resilience through Peer Learning



LEARNING PROCESS AT A GLANCE



From understanding risks to implementing local solutions:

The Connective Cities learning process combines expert knowledge, peer learning and practical tools to support municipalities in strengthening the resilience of critical infrastructure through locally adapted solutions.

Setting the Scene

UNDERSTANDING URBAN RESILIENCE: A DIGITAL STRESS TEST FOR CITIES

Dr. Aurel von Richthofen (Arup Consult) introduced the concept of urban resilience as the ability of cities not only to withstand shocks, but also to anticipate, adapt and recover from disruption. Using Arup's Digital Stress Test for Cities, he demonstrated how municipalities can systematically assess vulnerabilities across twelve stress scenarios—including climate hazards, cyberattacks, power outages and demographic change—and evaluate their preparedness using a structured framework of indicators and descriptors.

A key message was that critical infrastructure should not be considered in isolation. Because energy, water, transport, communication and public services are closely interconnected, failures in one system can rapidly cascade across others. The stress test therefore promotes integrated planning and continuous resilience monitoring rather than sector-specific risk management.

- **Key takeaway: Resilience starts with understanding interdependencies before investing in infrastructure solutions**



Dr. Aurel von Richthofen (right) presenting the Stress Test, with facilitator Frank Wältring (left).

TERRITORIAL PLANNING AS A FOUNDATION FOR RESILIENCE: NATIONAL ASSOCIATION OF MUNICIPALITIES OF ALBANIA (NAMA)

Drawing on a nationwide survey of around 65 municipal planning professionals, NAMA highlighted the institutional challenges municipalities face in integrating resilience into territorial development. The survey found that only 34% of respondents considered current municipal staffing sufficient, while two-thirds reported shortages in technical and professional capacity - particularly in GIS, engineering, urban planning and architecture.

The presentation identified fragmented urban development, weak coordination between institutions, insufficient local planning instruments and outdated public asset inventories as major barriers to resilient infrastructure development. To address these challenges, NAMA recommended mandatory infrastructure capacity assessments for major developments, stronger coordination between national and local authorities, greater investment in municipal expertise and more flexible planning instruments that integrate resilience into urban development.

- **Key takeaway: Municipal resilience depends as much on institutional capacity and territorial governance as on physical infrastructure.**



Identifying key municipal challenges: shortage of technical expertise.

FROM STRATEGY TO IMPLEMENTATION: CITY OF DNIPRO, UKRAINE

The City of Dnipro illustrated how resilience planning can be translated into concrete municipal action under extreme conditions. Its Dnipro Resilience Plan focuses on five priorities: decentralising the energy system, increasing the autonomy of water supply, expanding solar power generation, introducing cogeneration and strengthening the protection of critical infrastructure. The city estimates investment needs of approximately €120 million and is actively seeking donor support for implementation.

Concrete measures already under implementation include the installation of cogeneration plants providing around 100 MW of decentralised generation capacity, solar panels and battery storage at critical facilities, reconstruction of water mains at 29 priority infrastructure sites, and the construction of a backup boiler house to ensure uninterrupted heating for an entire residential neighbourhood. To reduce vulnerability to repeated attacks, the city is also investing in engineering protection measures and anti-drone systems for critical infrastructure. Beyond infrastructure, Dnipro has established 89 municipal „Points of Resilience“ that provide electricity, heating, internet access, drinking water, first aid and temporary shelter during emergencies, ensuring that essential support remains available to residents even during prolonged disruptions.

- **Key takeaway: Resilience is built through concrete investments in redundancy, decentralisation and continuity of essential services—not only through emergency response.**



Mariia Korytna from the Dnipro Development Agency presenting Dnipro's Resilience Strategy.

Learning from Municipal Practice

Peer learning is a core element of the Connective Cities methodology. Participating municipalities shared practical experiences from their own local contexts, presenting approaches to strengthening critical infrastructure protection and

municipal resilience. Through structured discussions in small peer groups, participants reflected on common challenges, exchanged implementation experiences and identified approaches that could be adapted to their own municipalities.

Exchange Theme	Municipal Contributions
Risk-informed planning & governance	Priboj (Serbia), Kraljevo (Serbia), Noyemberyan (Armenia)
Critical infrastructure & utility resilience	Cologne (Germany), Leipzig (Germany), Drenas (Kosovo)
Disaster risk reduction & community preparedness	İzmit (Türkiye), Gavar (Armenia), Cetinje (Montenegro)
Recovery, adaptation & municipal resilience	Gori (Georgia), Drohobych (Ukraine)

Assessing Municipal Resilience

Before the workshop, participating municipalities completed the Municipal Resilience & Critical Infrastructure Assessment, developed by Connective Cities and Mesopartner. The assessment provides a systems-based framework to identify vulnerabilities, analyse interdependencies between critical infrastructure systems and prioritise action.

It assesses eight critical infrastructure domains against three criteria:

- Local Vulnerability
- Systemic Influence (Cascading Risk)
- Adaptive Governance Capacity

Results are visualised through dashboards and priority matrices, providing a common basis for discussion during the workshop. Together with the good practice exchange, the assessment informed the clustering of shared challenges and the development of municipal action plans.



Identifying vulnerabilities and interdependencies of critical infrastructure systems.

Identifying Shared Challenges

Assessment results and peer discussions revealed common patterns across participating municipalities. The identified vulnerabilities were clustered into four challenge areas:

Technical Issues

Infrastructure • Data • Digital Systems • Emergency Preparedness

- Ageing infrastructure
- Limited monitoring and early warning systems
- Insufficient backup systems
- Cybersecurity and digital vulnerabilities

Human & Network Issues

Capacity • Skills • Cooperation • Leadership

- Shortage of qualified staff
- Limited crisis management capacity
- Brain drain
- Weak stakeholder cooperation

Institutional & Political Issues

Governance • Policies • Planning • Finance

- Fragmented responsibilities
- Weak cross-sector coordination
- Limited strategic planning
- Financial constraints

Socio-Cultural Issues

Awareness • Trust • Participation • Community

- Low risk awareness
- Limited citizen engagement
- Resistance to behavioural change
- Weak community preparedness

From Shared Challenges to Local Action

Based on the identified challenges, each municipality developed a practical action plan addressing a priority resilience issue in its local context. The objective was to define concrete, feasible initiatives that could be implemented within six to nine months using existing local capacities and resources. To ensure comparability, all action plans followed the same structure:

- Main goal
- Initiative
- Implementation steps
- Key stakeholders
- Required resources

Throughout the workshop, municipalities presented their draft action plans, received peer feedback and further refined their initiatives before presenting the final drafts.

MUNICIPAL ACTION PLANS

The workshop resulted in eleven action plans covering different aspects of municipal resilience and critical infrastructure protection. Together, the initiatives address governance, infrastructure, emergency preparedness, climate adaptation and digital resilience, reflecting the diversity of local priorities across participating municipalities.



Construction of new roads for urban infrastructure development.
Photo: Eduard Goricev, shutterstock



Modern water treatment plant.
Photo: Bilanol, shutterstock

Municipality	Initiative	Focus
Gavar & Noyemberyan (Armenia)	GridSync Digital Energy Hub	Digital energy mapping and battery storage for critical infrastructure
Cologne (Germany)	Breaking Bad for StEB Cologne	Emergency procurement and resource-sharing for wastewater services
Dnipro (Ukraine)	Life Energy Buildings & City Budget Lab	Energy resilience for public buildings and participatory reconstruction
Drenas (Kosovo)	Making Peace with Nature	Flood prevention and municipal resilience planning
Drohobych (Ukraine)	Heat Without Interruptions	Backup power for municipal heating infrastructure
Gori (Georgia)	Climate-Resilient Gori	Community preparedness and multilingual early warning
Cetinje (Montenegro)	Backup Bypass	Resilient transport connectivity and evacuation routes
İznik (Türkiye)	Project İznik: Seismic Monitoring & Hydro Protection	Seismic and hydrological monitoring of Lake İznik
Kraljevo (Serbia)	OCTOPUS-KV	GIS-based platform for critical infrastructure and disaster risk reduction
Priboj (Serbia)	Municipal Integrated Resilience Centre (MIRC)	Multi-agency coordination for emergency management
Leipzig (Germany)	Know What Is Important!	Crisis communication for reliable public information during disruptions

Key Takeaways

KEY TAKEAWAYS

Six lessons for strengthening municipal resilience of critical infrastructure

 1. Interdependencies matter Critical infrastructure must be managed as an interconnected system. Failures in one sector can cascade across energy, water, transport, communication and public services.	 2. Assess before investing Risk-informed planning helps municipalities understand vulnerabilities and interdependencies, prioritise investments and integrate resilience into decision-making.	 3. Governance enables resilience Clear responsibilities, cross-sector coordination and institutional capacity are as important as physical infrastructure for effective implementation.
 4. Think local, act practical Local action starts with achievable steps. Practical initiatives, realistic timelines and existing local capacities provide a strong foundation for long-term resilience building.	 5. Learn from peers Exchanging experiences across municipalities helps identify transferable solutions, validate ideas and improve local action plans through constructive feedback.	 6. Resilience is continuous Strengthening critical infrastructure requires ongoing assessment, adaptation and collaboration rather than one-off investments or emergency responses.



Building resilient municipalities is a shared journey.
Together, we create safer, more livable and future-ready communities.

Next Steps

The action plans developed in Tirana provide the foundation for the next phase of the learning process. Through continued peer exchange, follow-up workshops and implementation

support, participating municipalities will further develop their initiatives and translate them into concrete resilience measures.

The participants of the kick-off workshop.



The skyline of Tirana.



IMPRINT

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Connective Cities – International Community of Practice for Sustainable Municipal Development

Since 2013, Connective Cities has been promoting the worldwide exchange of municipal expertise. Within the framework of structured learning processes, the platform disseminates proven-practice solutions for sustainable municipal development and supports peer learning between German and international municipal experts, as well as the joint development of project ideas.

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Further information can be found here:
www.connective-cities.net/en