

Critical Infrastructure for the Digital Age

The Implementation of an Artificial Intelligence Data Center in the Constanța Metropolitan Area

Favorable EU Context

Why are data centers important?

The backbone of the digital economy

Data centers are the critical infrastructure that hosts, processes, and distributes the vast amounts of data underpinning our modern society, from business processes to public services.

AI is reshaping every industry

Artificial Intelligence is no longer a niche technology. It is transforming every sector, from revolutionizing healthcare diagnostics and clean energy management to reshaping mobility, defense strategies, and public governance.

A rapidly expanding global market

The global demand for data center capacity is projected to grow from 55 GW in 2023 to 219 GW by 2030. This expansion requires an unprecedented investment of **$6.7 trillion**, with **$5.2 trillion dedicated solely to AI centers**. Regions that fail to develop this infrastructure risk falling behind in the AI-centric economy.

The AI revolution needs dedicated infrastructure

The rise of Artificial Intelligence, especially large language models, has caused an exponential increase in data generation and processing needs. This requires a new class of specialized, compute-intensive AI data centers, which are fundamentally different from traditional data centers.

The new EU geopolitical context for AI



Advanced digital infrastructure is now a critical priority to ensure Europe's economic competitiveness and security.

A strategic priority for Europe

In the current geopolitical context, the EU has repositioned its priorities to ensure sovereignty in strategic sectors, including energy, security, and digital technology.

Achieving digital sovereignty

Without its own network of AI data centers, Europe risks dependency on the US and China, which has major implications for data security and innovation capacity.

High-level EU initiatives



The 2024 Draghi Report

The **2024 Draghi Report** on European Competitiveness highlights the urgent need for massive investment in strategic digital infrastructures, including AI. The report draws attention to the major gaps between the EU and its main global competitors.

The InvestAI initiative

The **InvestAI initiative** aims to mobilize **€200 billion** for investment in artificial intelligence, with plans to establish at least 15 "AI Factories" across Europe between 2025 and 2026.

The Black Sea: A Strategic Hub for AI

The Romanian Government has proposed the **"Black Sea AI Gigafactory"** project, to host one of the EU's planned AI factories in the Constanța County area, positioning the region as an ideal location for AI data centres.

Green data centers & alignment with environmental goals

AI data centers are immense energy consumers. It is estimated that by 2030, data centers will consume over 3% of the EU's total energy. Aligning this growth with climate goals is essential. To align with the goal of achieving climate neutrality by 2050 (Net-Zero Scenario), data centers must reduce their greenhouse gas emissions by half by 2030.

ADAPTION
Measures to climate proof data centers against country specific climate hazards.

MITIGATION
Measures to reduce the emissions and environmental impact from data centers.



Source: World Bank, 2023

What makes a data center "green"?

Green data centres are designed for **maximum energy efficiency, low environmental impact, and climate resilience.** It must address six key dimensions: climate resilience, sustainable design, sustainable equipment, sustainable energy, sustainable cooling, and e-waste management.

EU regulatory framework for sustainable data centers



EU Energy Efficiency Directive (recast, 2023)

The Directive nables the establishment of a **common system for assessing the sustainability of data centres**. This system wll allow standardized reporting on key sustainability indicators like Power Usage Effectiveness (PUE), Water Usage Effectiveness (WUE), and Renewable Energy Factor (REF).

It highlights that all district heating and cooling systems will need to be progressively adapted to be able to **use the surplus heat from nearby services and data centers.**

EU Water Resilience Strategy (2025)

The WRS promotes efficient use of water in consumption-intensive economic sectors (such as data centers), encouraging innovative technologies such as dry cooling, and setting **minimum performance standards for water consumption.**

EU Regulation on Artificial Intelligence (AI Act, 2024)

The AI Act aims to ensure environmental protection while stimulating innovation and introduces a series of requirements regarding energy consumption and transparency.

Constanța's commitment to climate neutrality



Source: *Constanța Climate Neutrality Action Plan*

The Municipality of Constanța is part of the **M100 National Hub** and aims to **achieve climate neutrality by 2035**, a goal that aligns perfectly with the development of a sustainable, green AI data center.

Opportunity: to demonstrate the efficiency of green technologies for the sustainability of data centers (100% renewable energy supply and efficient cooling), in a broader framework of achieving climate neutrality.

Repositioning of Constanța in the EU economy

A new digital identity

While other Romanian cities have established themselves as IT hubs, Constanța has identified a unique opportunity to become a European leader in **critical digital infrastructure**, meeting the highest standards of security, sustainability, and digital sovereignty.

From logistics hub to digital powerhouse

Constanța currently has a strong economic profile based on its port, logistics, tourism, and energy sectors. The city is now pursuing a strategic vision of **economic diversification and digital transition.**

A catalyst for a tech ecosystem

An AI data center would be a cornerstone investment, attracting other tech companies, fostering innovation, and strengthening the region's entire **digital ecosystem**. It aligns perfectly with the "Black Sea AI Gigafactory" proposal, creating powerful synergies.

A regional attraction pole

This project will transform Constanța into a **regional pole for advanced technology,** attracting highly qualified talent and strategic investments, and decisively contributing to the economic, energy, and technological repositioning of the region.

The Competitive Advantages of Constanța

Supportive Local Authorities

The Municipality of Constanța is a hands-on partner - preparing infrastructure, fast-tracking permits, and coordinating utilities to take the project from concept to operation, fast.

- **Clear political will and support:** Constanța's local authorities have expressed **clear and proactive interest** in hosting an AI data center and have a proven track record of successfully implementing complex projects in partnership with private investors

- **A reliable and engaged partner:** The Constanța City Hall has officially endorsed the development of an AI data center at the CHP Plant location and **guarantees full facilitation and support** across all stages, from concept to operation

- **Favorable administrative environment :** The authorities are committed to ensuring a favorable administrative and operational environment by:
  - Preparing basic infrastructure.
  - Simplifying and accelerating the administrative and permitting processes (PUZ, PUG).
  - Facilitating dialogue with utility operators

Reliable and clean energy supply

An AI data center in the Constanta area could be powered 100% by green energy, ensuring both reduced operational costs and the application of the highest sustainability standards.

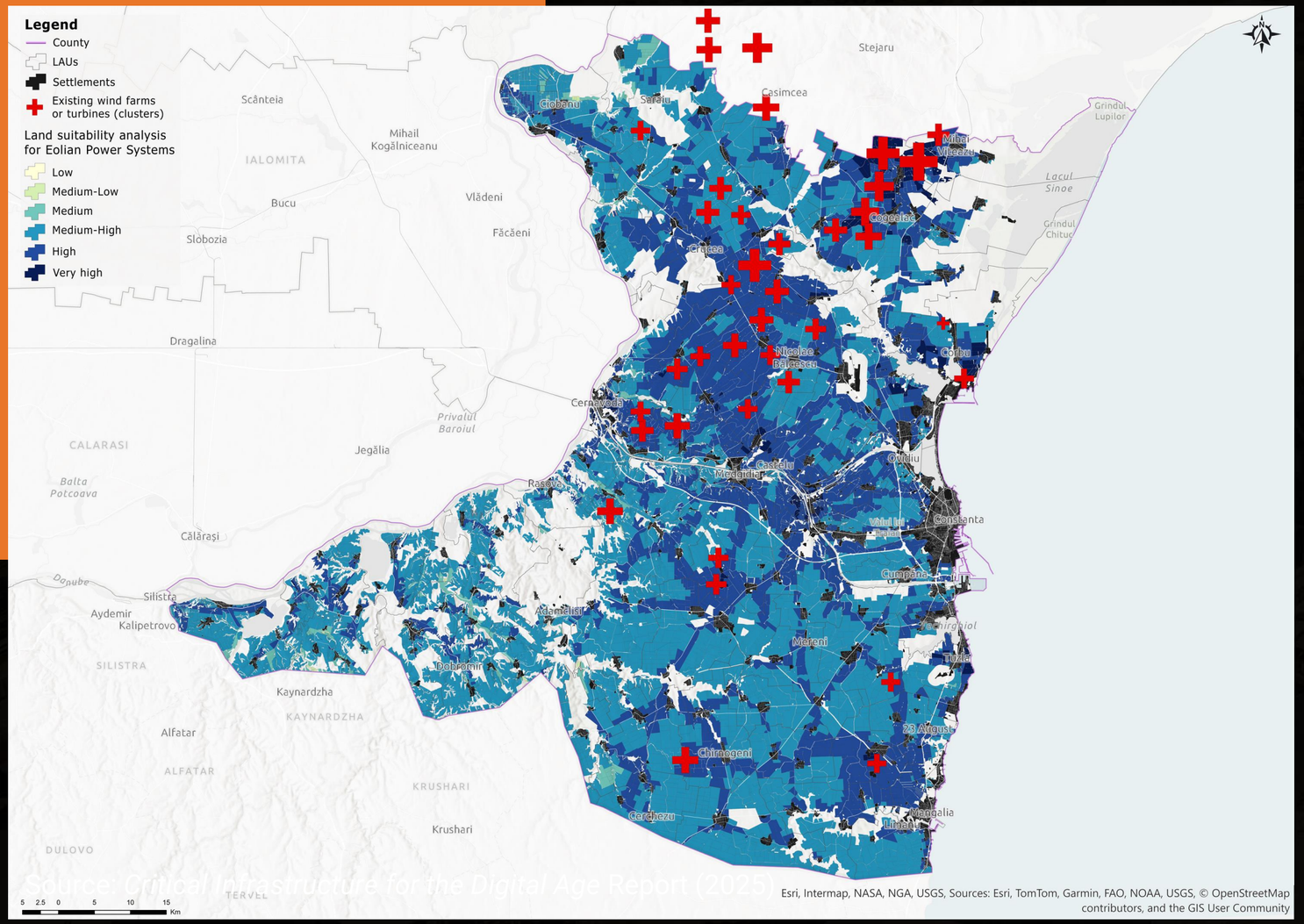
An energy powerhouse: The Constanța region has a massive and diverse energy supply, hosting:

- **The Cernavodă Nuclear Power Plant** (providing ~20% of Romania's electricity).
- The **largest onshore wind farm in Europe** (Fantanele-Cogealac).
- Numerous large-scale photovoltaic parks.

Untapped green potential: The area has significant untapped renewable energy potential, including up to **7 GW of offshore wind power** in the Black Sea and **the largest solar potential in Romania**

Excess renewable energy: Constanța County **produces significantly more energy than it consumes**, creating a surplus. A large-scale data center is the perfect consumer to help balance the regional grid and utilize excess renewable energy locally.

Land suitability map for onshore wind power systems

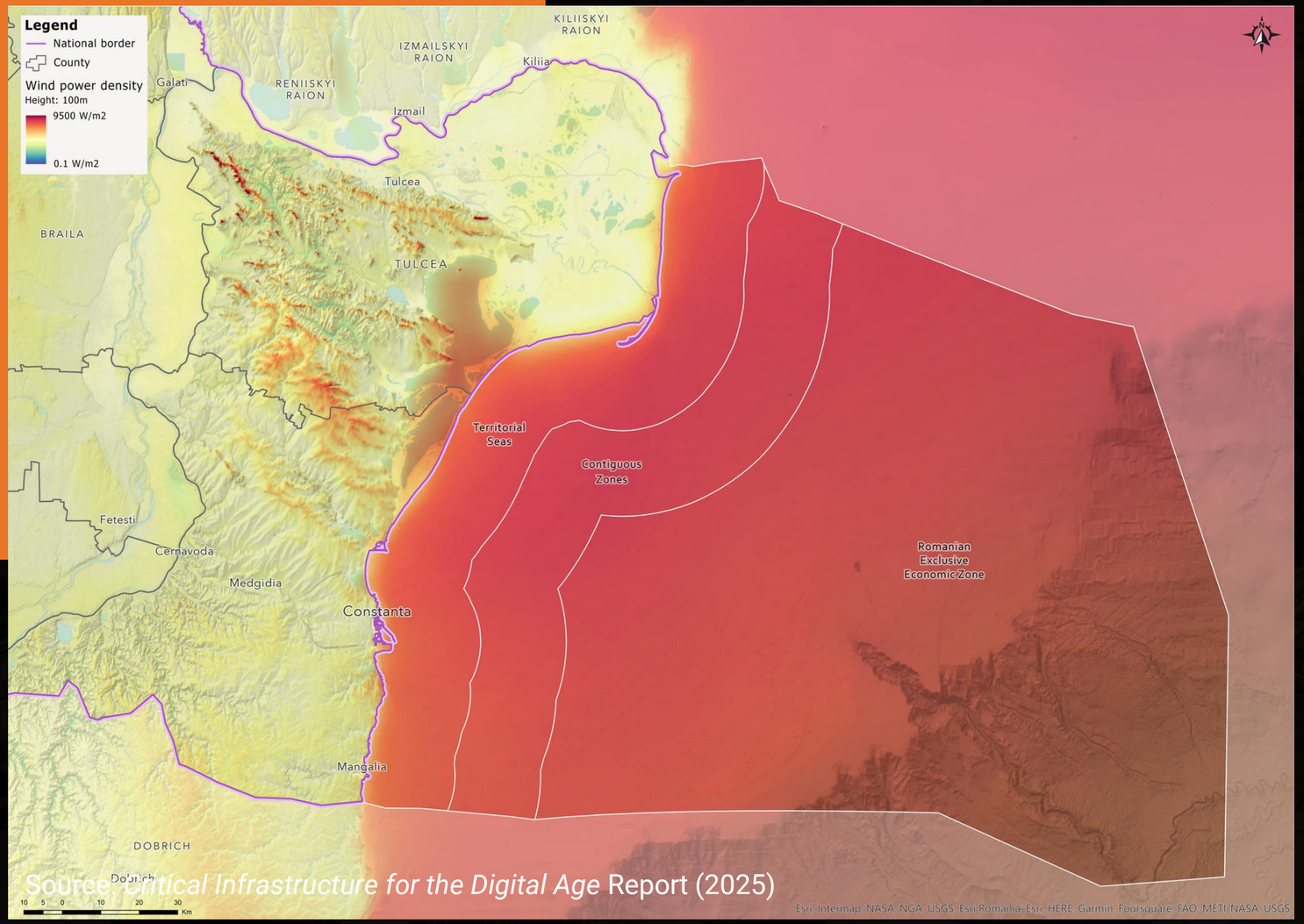


Source: Critical Infrastructure for the Digital Age Report (2025)

Untapped wind power

Constanța County holds some of the best wind resources in Europe, with vast areas highly suitable for onshore wind farms, ensuring a stable and renewable energy supply for large-scale projects such as AI data centers.

Offshore wind power density map

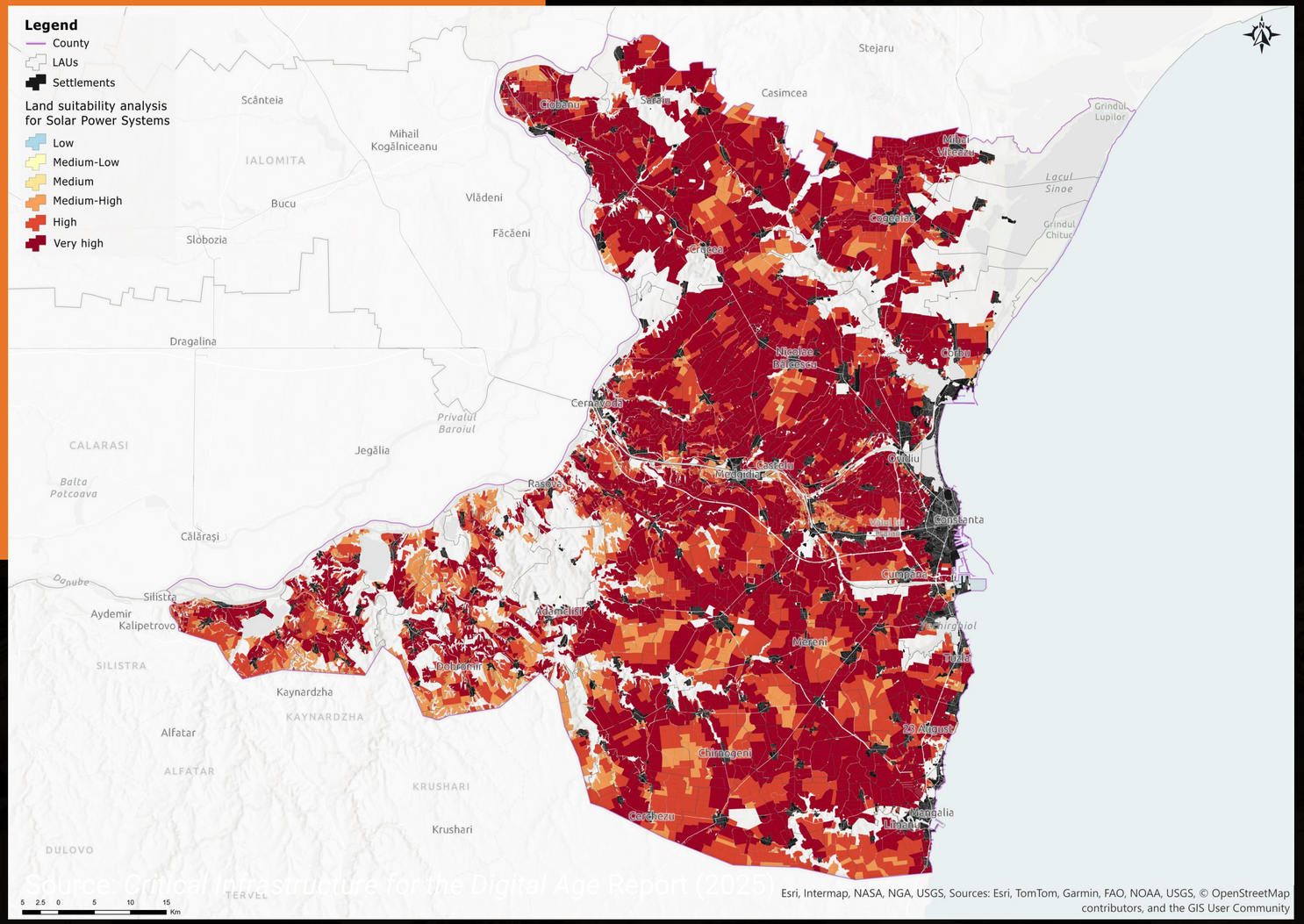


Source: *Critical Infrastructure for the Digital Age* Report (2025)

7 GW of offshore wind power

Constanța's offshore zone in the Black Sea has the capacity to generate up to 7 GW of clean wind power, enough to cover more than a third of Romania's electricity needs by 2035 and secure sustainable energy for advanced digital infrastructure.

Land suitability map for onshore solar power systems



Source: Critical Infrastructure for the Digital Age Report (2025)

Harnessing the sun

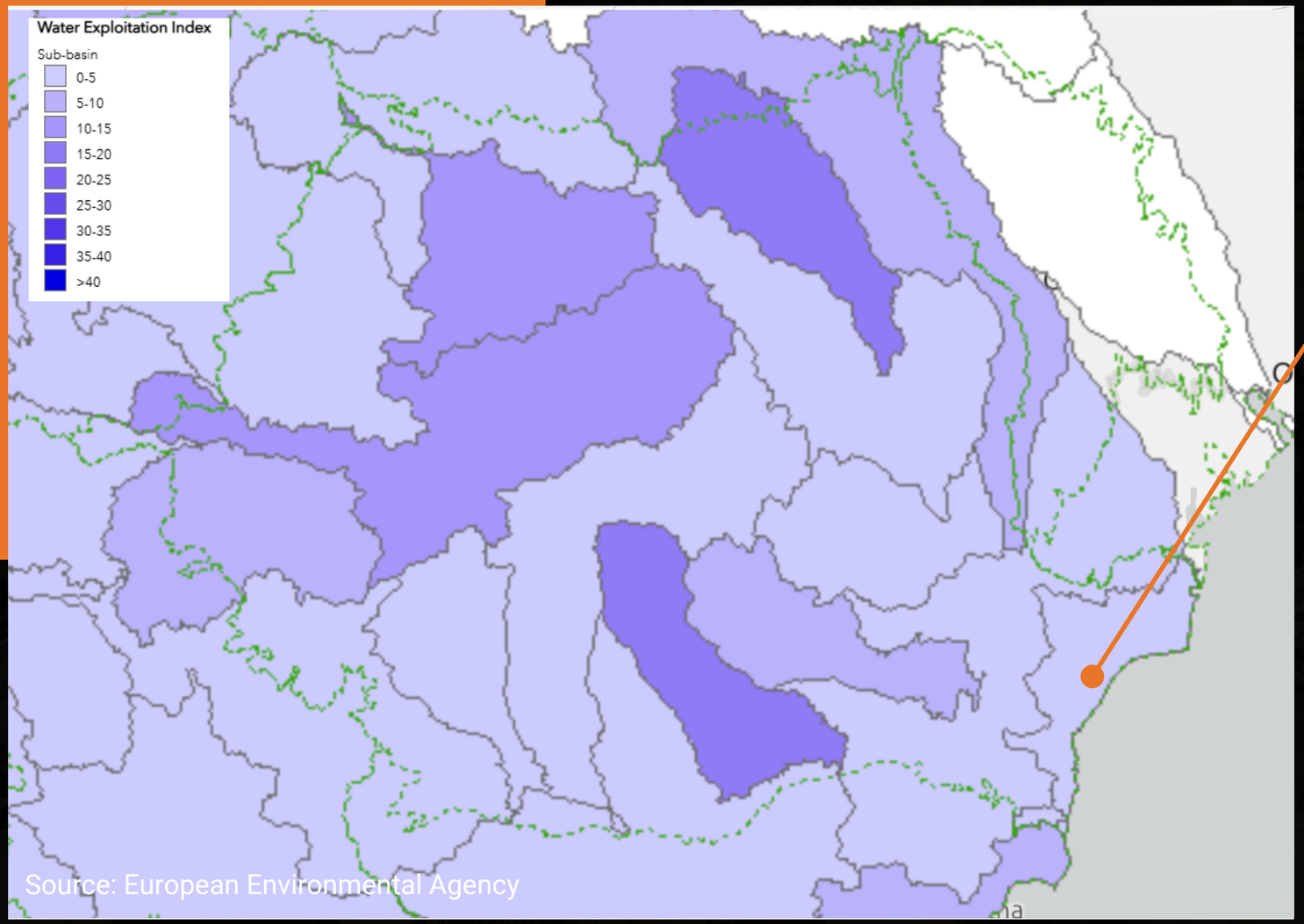
With some of the highest solar irradiation levels in Romania, Constanța County offers vast tracts of land highly suitable for photovoltaic systems, unlocking the potential for large-scale green energy that can power sustainable growth and digital transformation.

Water resources for natural cooling

Constanța's abundant, zero-stress water resources and favourable cooling conditions make it the perfect place to power AI sustainably.

- **Access to abundant water resources:** The region offers secure and constant access to vast water resources for efficient cooling, including the **Black Sea, the Danube River, and the Danube-Black Sea Canal**.
- **Zero Water Stress:** The Dobrogea-Litoral hydrographic area has one of the lowest levels of water stress in the EU. The **Water Exploitation Index (WEI+) is only 1.98%**, far below the 20% threshold, meaning water use for a data center will not compete with other essential needs.
- **Ideal for sustainable cooling technologies:** The Black Sea's average annual water temperature is 12-14°C, **and the temperate climate is optimal for "free cooling" systems** for a large part of the year, drastically reducing energy consumption. This enables the implementation of highly efficient, closed-loop cooling systems modeled after best practices like **Google's data center in Hamina, Finland**, which uses seawater sustainably.

Water exploitation index for river basin districts 2015



Source: European Environmental Agency

The Dobrogea–Litoral hydrographic basin

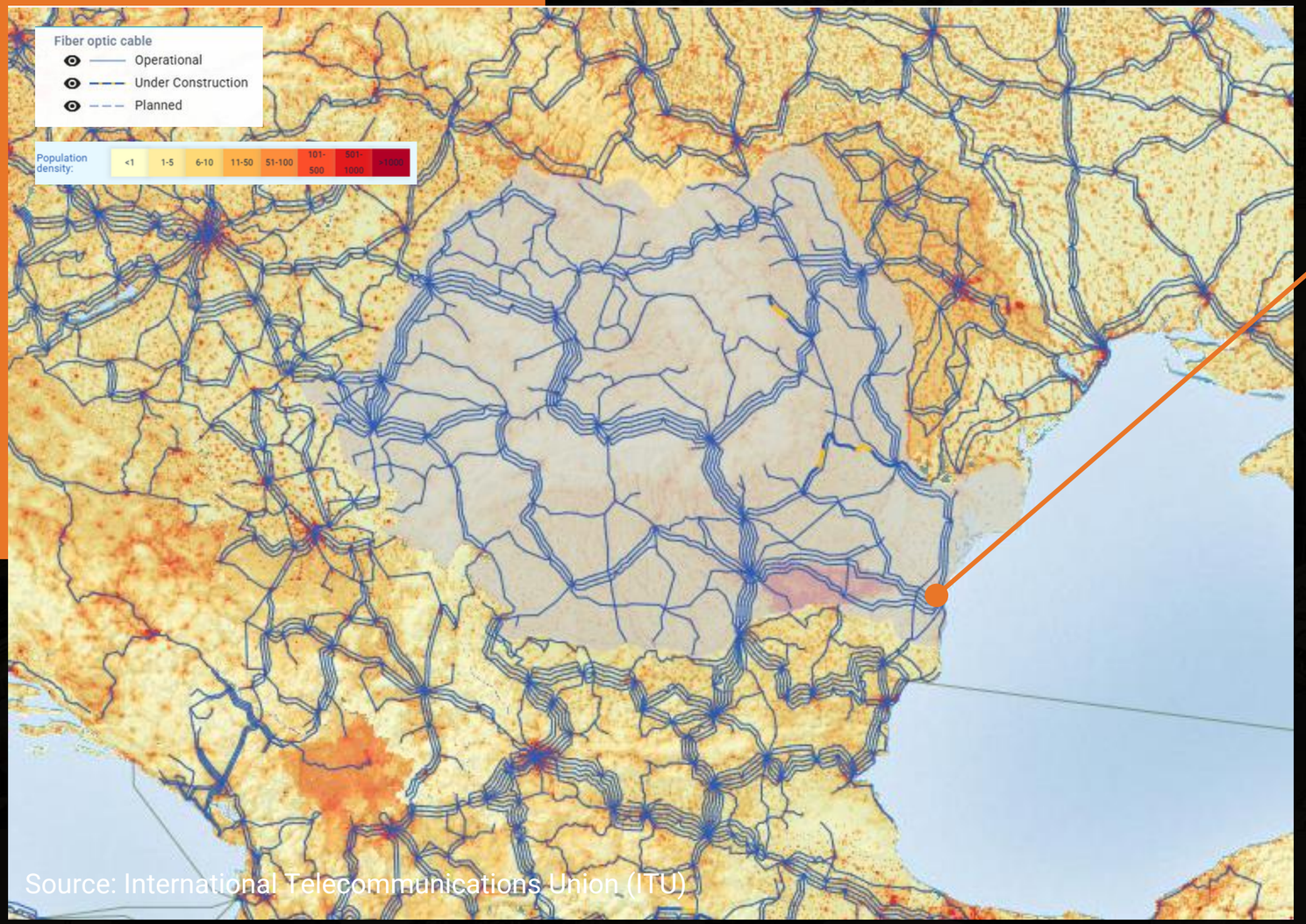
The Dobrogea–Litoral hydrographic basin ranks among the least water-stressed regions in the EU, with a Water Exploitation Index (WEI+) of just 1.98%.

Connectivity to advanced digital infrastructure

Constanța is a powerhouse of connectivity. Ultra-fast fiber, top-tier speeds, and new planned submarine links that put next-gen AI on the express lane.

- **A Premier European digital node:** Constanța is a major digital hub in Eastern Europe, fully integrated into the continental fiber optic network.
- **Top-Tier national infrastructure:** Romania consistently ranks in the **top 3 in the EU for fixed internet speeds**. It boasts the **highest fiber-to-the-home (FTTH/B) penetration in Europe** at ~96.5% coverage.
- **Global submarine cable hub:** The city of Constanța will be the landing point for the upcoming **Georgia-Romania submarine cable**, a strategic project that will provide a secure, high-capacity digital corridor to Central Asia and the Caucasus. The Constanța County is also a node in the KAFOS system.

ITU transmision networks



Source: International Telecommunications Union (ITU)

Constanța

Constanța is an important node in European and national telecommunications infrastructure.

Excellent transport and logistics connectivity

Constanța delivers seamless European integration through port, road, rail, air, and waterway links, offering world-class multimodal connectivity that ensures efficiency, reliability, and cost-effectiveness for every stage of the AI Data Center.

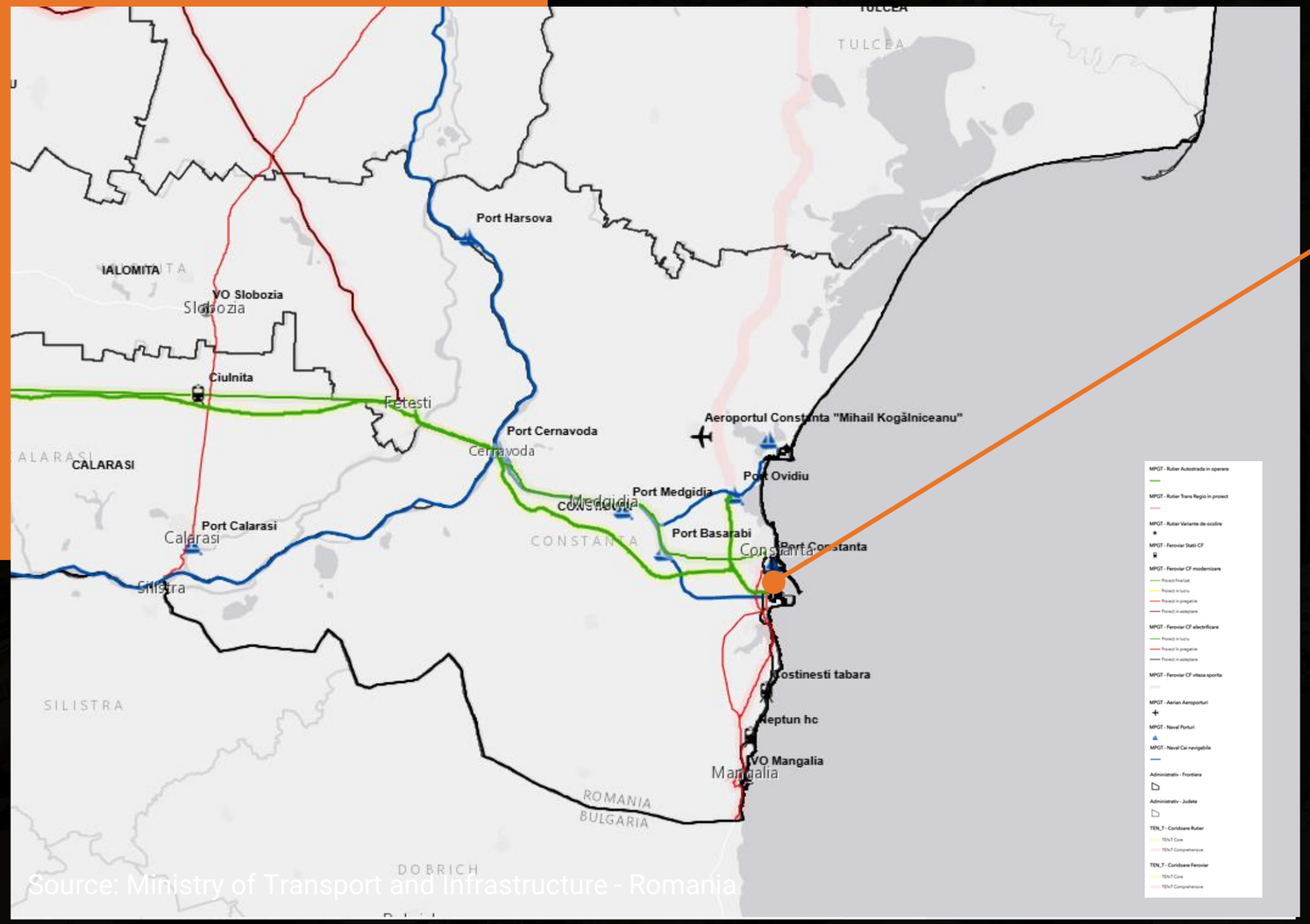
World-class infrastructure assets:

- **Port of Constanța**: The largest and most important maritime hub on the Black Sea.
- **Road & Rail:** A2 motorway and high-speed railway providing direct links to Bucharest and the rest of Europe.
- **Air:** Mihail Kogălniceanu International Airport.
- **Waterway:** The Danube-Black Sea Canal, part of the Rhine-Danube corridor

Seamless European integration: The city is a **core node within the European TEN-T transport network**, ensuring excellent connectivity.

Operational efficiency: This comprehensive multimodal network ensures **efficient, reliable, and cost-effective logistics** for the transport of heavy equipment, materials, and personnel during both construction and operation

Map of mobility coridors in the Constanța Region



Source: Ministry of Transport and Infrastructure - Romania

Constanța

Constanța is **built to move the world.** It is connected by Europe's biggest Black Sea port, the A2 highway and high-speed rail, as well as the Mihail Kogălniceanu International Airport and the Danube–Black Sea Channel connecting directly with the Rhine–Danube corridor.

Access to skilled labor and high quality of life

Constanța combines a steady pipeline of IT and engineering talent, competitive labor costs, and a high quality of life - creating the perfect environment to attract, train, and retain the skilled workforce needed for a world-class AI Data Center.

- **A pipeline of qualified talent:** Constanța is home to "Ovidius" University, **one of Romania's largest universities**, which produces a steady stream of qualified professionals.
- **Relevant specializations:** The university offers specialized degree programs directly relevant to data center operations, including **Computer Science, Engineering, Cybersecurity, and Machine Learning**. There are over 17,000 students in the city's universities.
- **A collaborative academic environment:** The university is **open to developing new, specialized programs** in collaboration with industry partners to meet the specific needs of an AI data center.
- **Competitive advantage**: The region offers **competitive labor costs** compared to major Western European tech hubs, providing superior economic efficiency.
- **High quality of life**: The proposed urban location **facilitates employee access to transportation, services, and leisure**, making Constanța an attractive city for attracting and retaining top talent.

High regional security

Constanța offers unmatched security - anchored by NATO's largest European base, a strategic port, and the EU's Cybersecurity Competence Centre - ensuring a uniquely stable, protected, and resilient environment for critical AI infrastructure.

A secure and stable environment: Constanța County is **one of the safest regions in Romania**, providing a highly protected environment for critical infrastructure.

A NATO stronghold: The area hosts critical security assets, including:

- The **Port of Constanța**, a strategic logistics hub.
- The **Mihail Kogălniceanu NATO military base**, which is undergoing a major expansion to become the largest NATO base in Europe.

Unparalleled physical protection: This consolidated military and security presence ensures **an exceptionally stable and protected environment**, significantly reducing physical investment risks.

Cybersecurity expertise: Romania is home to the **European Cybersecurity Competence Centre (ECCC)**, providing access to top-tier expertise and resources for cyber protection, which is essential for a strategic AI data center.

The ideal location for AI Data Centers

Land Suitability Analysis



A data-driven approach

11 key parameters

The analysis evaluated 11 strategic parameters, divided into six main categories:

ENERGY INFRASTRUCTURE

Proximity to high-capacity power grids (≥110 kV) | Proximity to renewable energy sources (sources and high-potential areas)

CONNECTIVITY

Proximity to regional or national fiber optic networks

COOLING INFRASTRUCTURE

Proximity to sufficient water sources (rivers, lakes, or sea)

LAND CHARACTERISTICS

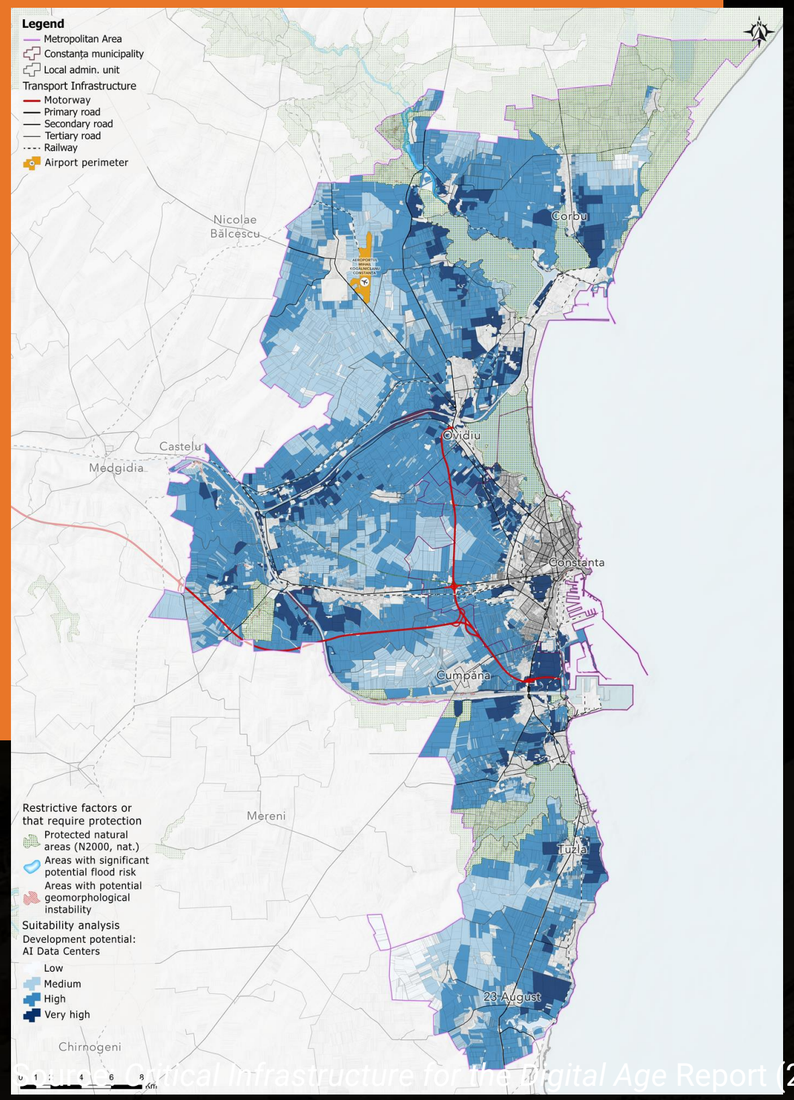
Total plot area | Parcel Shape Index

CLIMATIC CONDITIONS

Multi-annual average air temperature | Land surface temperature (summer maximum)

ACCESSIBILITY TO TECHNICAL INFRASTRUCTURE

Proximity to road and/or rail network | Proximity to existing industrial zones/complexes | Proximity to built-up perimeters (proxy for utility infrastructure)

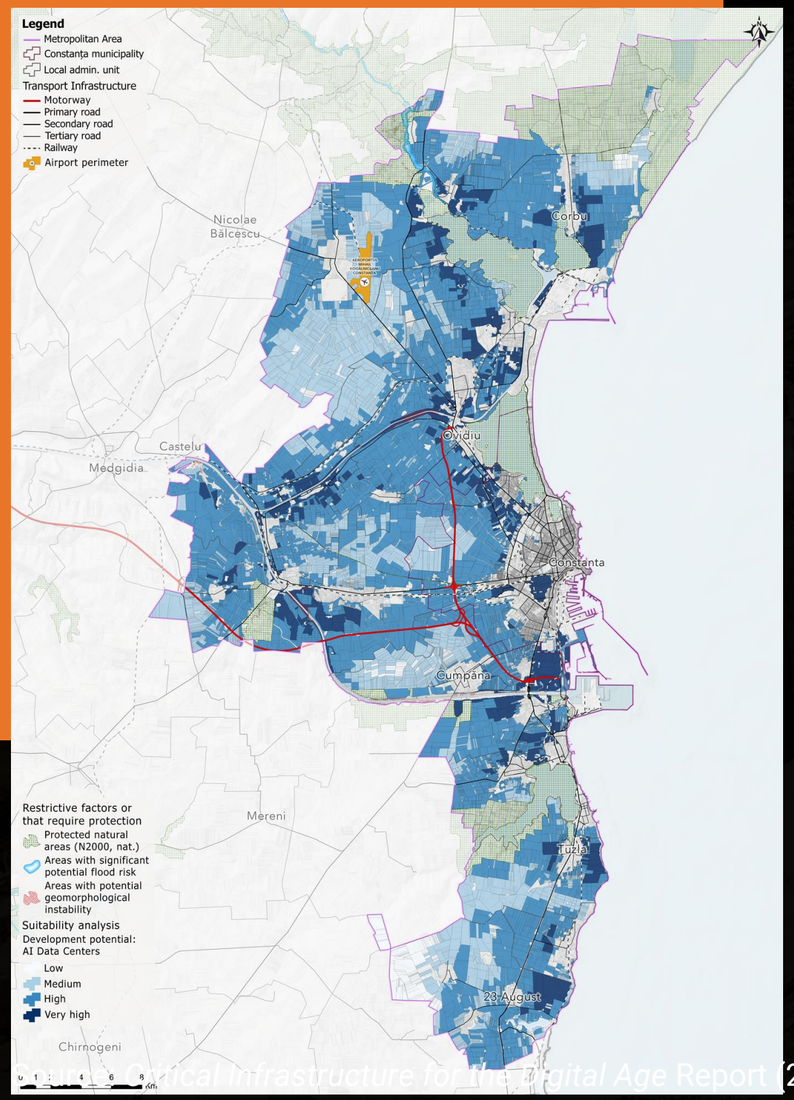


Source: *Critical Infrastructure for the Digital Age* Report (2025)

Land suitability analysis results

The analysis reveals that the Constanța Metropolitan Area has an exceptionally favorable territory for AI data center development.

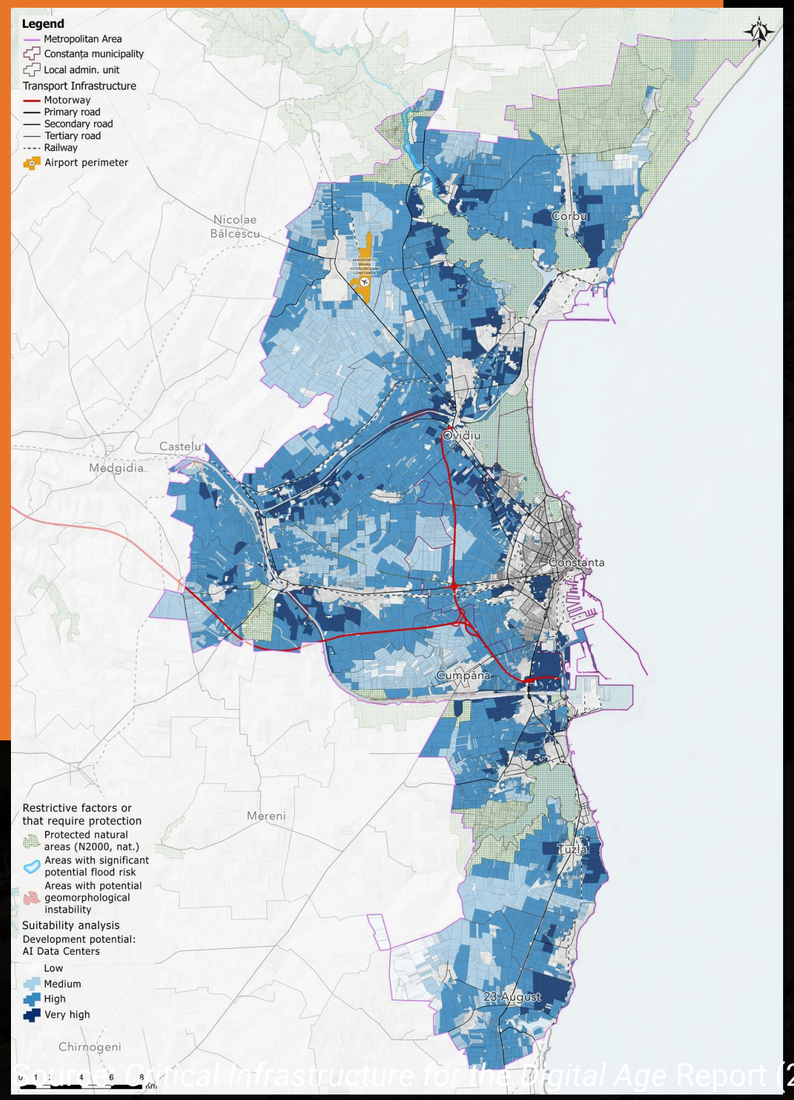
66.34% of the total territory of Constanța Metropolitan Area (71,546 hectares) is suitable for developing AI data centers.



Source: *Critical Infrastructure for the Digital Age* Report (2025)

Land suitability analysis results

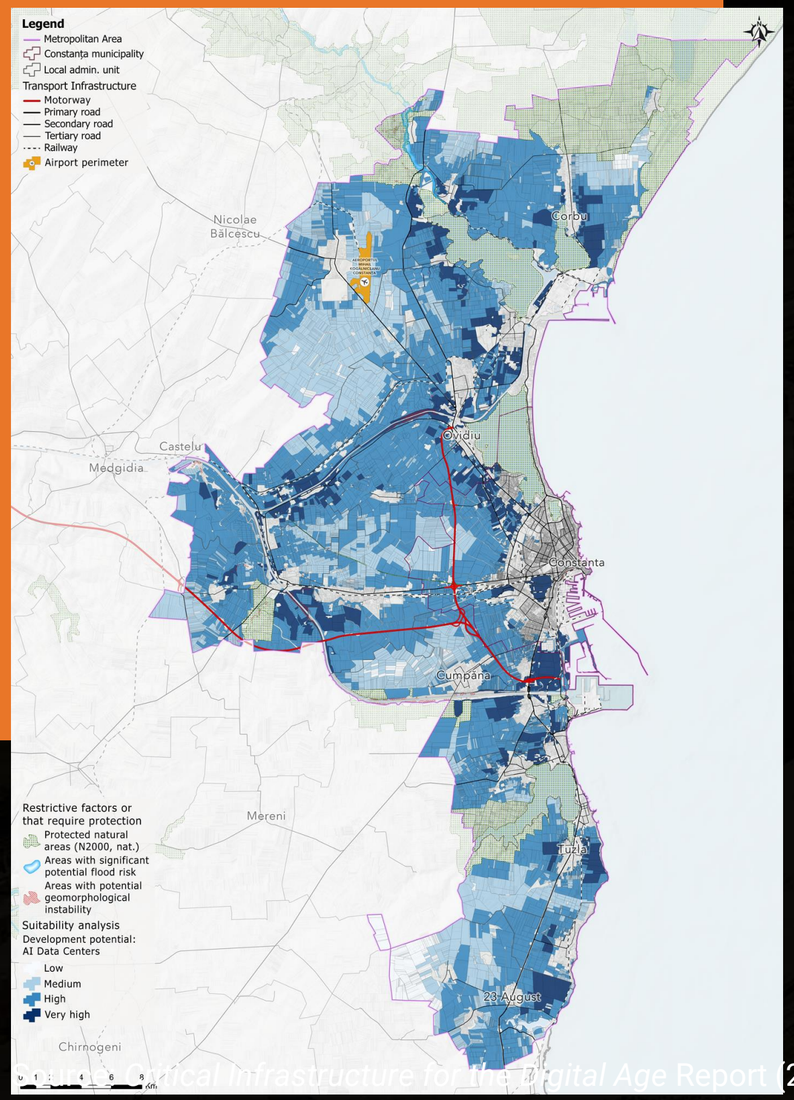
Over 70% of this suitable land (an area of 51,380 hectares) presents a high or very high degree of suitability. This represents over 46% of the entire metropolitan area.



Source: *Critical Infrastructure for the Digital Age* Report (2025)

Land suitability analysis results

The most promising locations are not randomly scattered but are concentrated in distinct strategic corridors that are **already aligned with existing critical infrastructure** (energy, digital, transport).

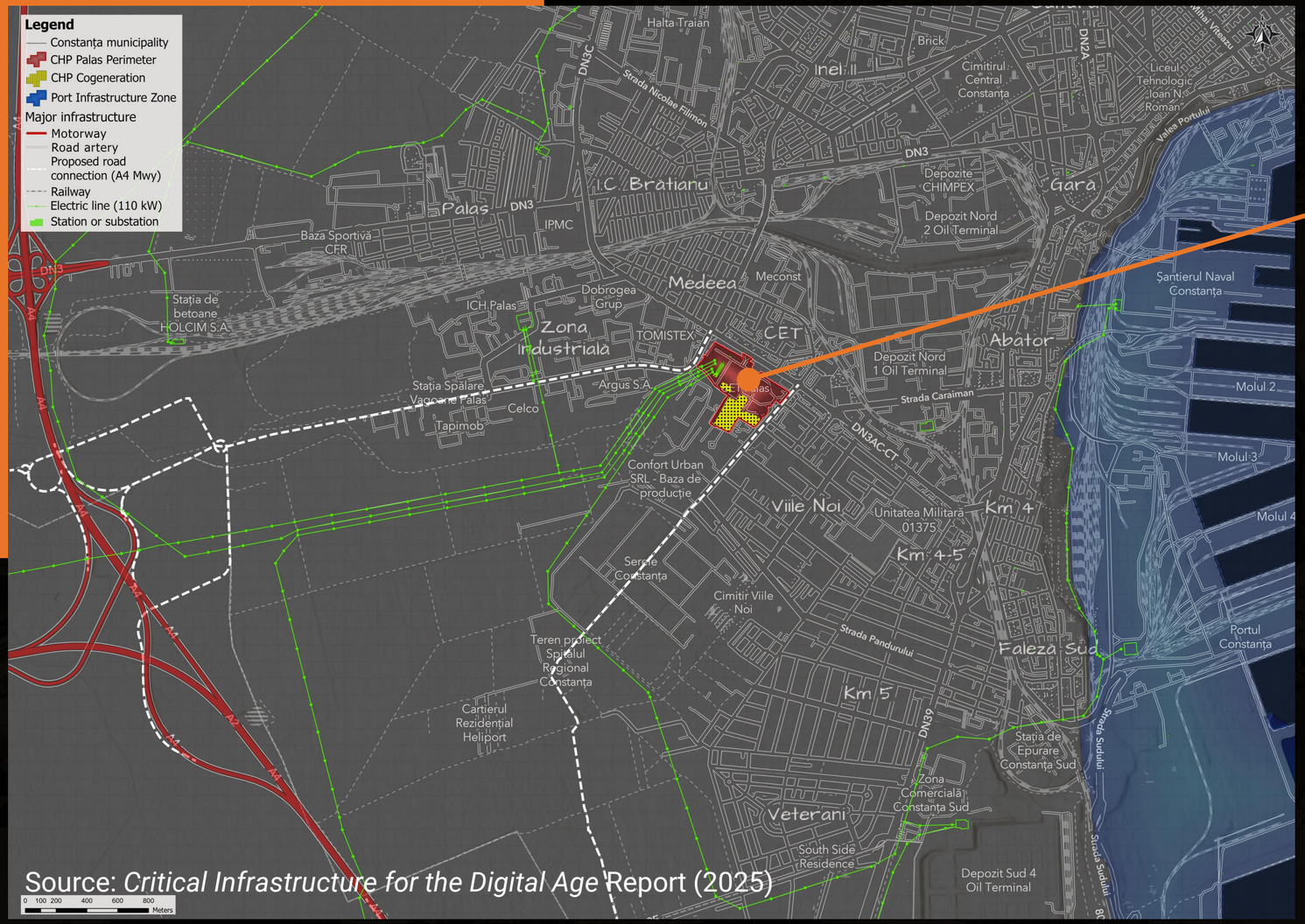


Source: *Critical Infrastructure for the Digital Age* Report (2025)

Land suitability analysis results

The convergence of high-potential land and essential infrastructure creates a **major competitive advantage**, significantly reducing investment risks, accelerating development timelines, and allowing for the creation of synergistic digital clusters.

Zooming in: Ready-to-use location



Source: *Critical Infrastructure for the Digital Age* Report (2025)

Constanța CHP - Ready-to-use location

The Municipality of Constanța has officially designated the **Constanța CHP (Combined Heat and Power) Plant area** as a ready-to-use location for an AI data center.

Zooming in even more: Ready-to-use location

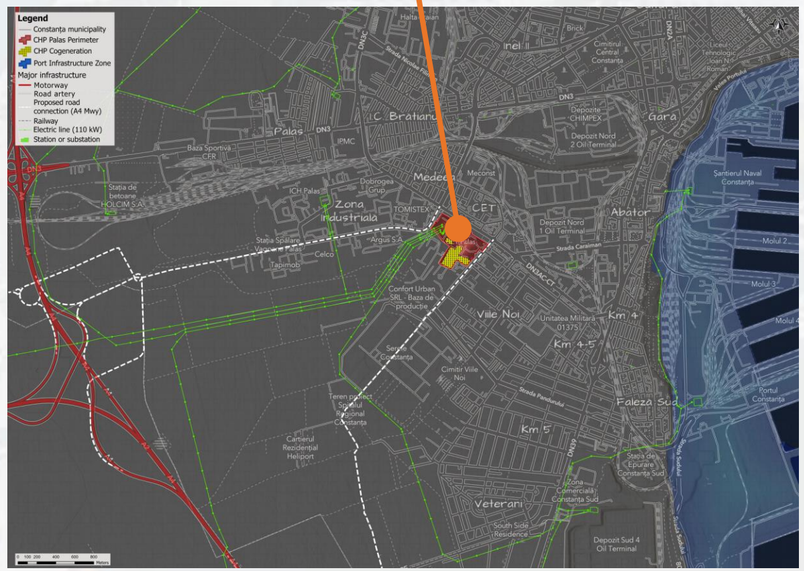


Source: *Critical Infrastructure for the Digital Age* Report (2025)

A prime, immediately available site

The plot has an available surface of ≈10 ha, suitable for the development of an 50-80 MW AI datacenter. The location sits next to a brownfield area that will undergo the largest urban regeneration process in Romania (valued at over €800 mil.), including soil bioremediation planned by 2026.





Key advantages of the CHP location:

- **Urban & ready for investment:** It is a well-established industrial zone within the city with available land, existing utilities, and a framework for **accelerated authorization and fast-tracked implementation.**
- **Direct energy access:** The site offers **direct connection to the high-voltage grid** (110–400 kV) and proximity to Romania's largest concentration of renewable and nuclear energy.
- **Optimal for operations:** The location is **ideal for implementing efficient cooling solutions** and leverages Constanța's advanced digital connectivity.
- **Guaranteed institutional support**: The City Hall has formally endorsed this site and pledges to act as a **reliable partner, providing full institutional support** through every project phase.

Costs and economic impact

Estimated development costs

Capital Investment (CAPEX)

For a 100–200 MW AI data center, the estimated costs are:

€5.6 million to €13 million per MW, depending on the technological tier and redundancy (total estimated CAPEX of €560 million to €2.6 billion)

Nearly 75% of this cost is dedicated to the specialized AI computing equipment (e.g., GPUs).

Operational Costs (OPEX)

Annual OPEX is significant due to high energy consumption and specialized maintenance, potentially **reaching ~40% of the annual capital investment.**

Implementation schedule

A project of this scale has an estimated total duration of **2 to 5 years,** from initial planning to full operation, depending on the complexity and certification level (e.g., Tier III-IV).

Estimated economic impact

Job creation

For a 100–200 MW AI data center, the estimated figures are:

- **Construction Phase:** Creation of 1,000 to 1,300 temporary jobs in construction, installation, and related services.
- **Operational Phase:** Support for 450 to 650 permanent, high-skilled jobs (direct, indirect, and induced) in IT operations, security, and maintenance.

Catalyst for a new tech ecosystem

- The data center will act as an anchor investment, stimulating the growth of related industries in energy, software development, cybersecurity, and specialized hardware, transforming Constanța into a regional tech hub.

Significant fiscal impact

- An estimated €6 million in local tax revenues during the construction phase.
- An estimated €2 million annually in recurring revenues during the operational phase.

Boosting the green energy sector

- A 100-200 MW data center represents a stable, long-term demand for energy, with an annual electricity expense of €50-60 million, directly supporting local renewable energy producers.

Risks and mitigation measures



A proactive approach can turn potential risks into opportunities for innovation and sustainability.

Environmental risks: High energy/water consumption, noise, e-waste.

Mitigation: **Commitment to "Green Data Center" principles.** Use 100% renewable energy via local PPAs, implement closed-loop seawater cooling systems, use acoustic enclosures for equipment, and establish partnerships with licensed operators for e-waste recycling.

Economic risks: Volatility of equipment costs, shortage of skilled labor.

Mitigation: Secure multi-year framework agreements with equipment suppliers to stabilize prices. Develop **strategic partnerships with Ovidius University** to create a pipeline of local, skilled talent through dedicated AI and data engineering programs.

Social Risks: Community exclusion, perception of a "closed" project, digital divide.

Mitigation: **Active community engagement.** Create a Local Innovation Fund, offer free IT training for residents, organize "open days" for the public, and support programs to extend digital infrastructure to surrounding rural areas ("Constanța smart villages").

A community-centered future for AI in Constanța

Community engagement



Source: Google Data Centre Mural project

A project built with the community

The long-term success of the AI data center depends on deep **collaboration and the active involvement of the local community.** Constanța already has a solid foundation of civic cooperation between academia, the private sector, and NGOs to build upon (incl. M100 Climate Neutrality Coalition).

Models for meaningful engagement

An integrated approach inspired by international best practices:

Corporate Social Responsibility (Google Model)

Transforming the data center into a landmark through artistic projects (e.g., Data Center Murals) and investing in the community's future through AI education and training programs.

Participatory financing (Berlin Model)

Allowing citizens to become co-investors in the project's sustainability (e.g. by offering opportunities to crowdfund solar parks, generating both community buy-in and local capital).

Co-ownership & education (Samsø Model)

Exploring models that promote community co-ownership of the renewable energy infrastructure that powers the center; establishing a local "Center of Excellence" to provide education and training on digital and green technologies.



Thank you *for your attention!*

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