Flood Risk Management in Šilutė District: An Overview

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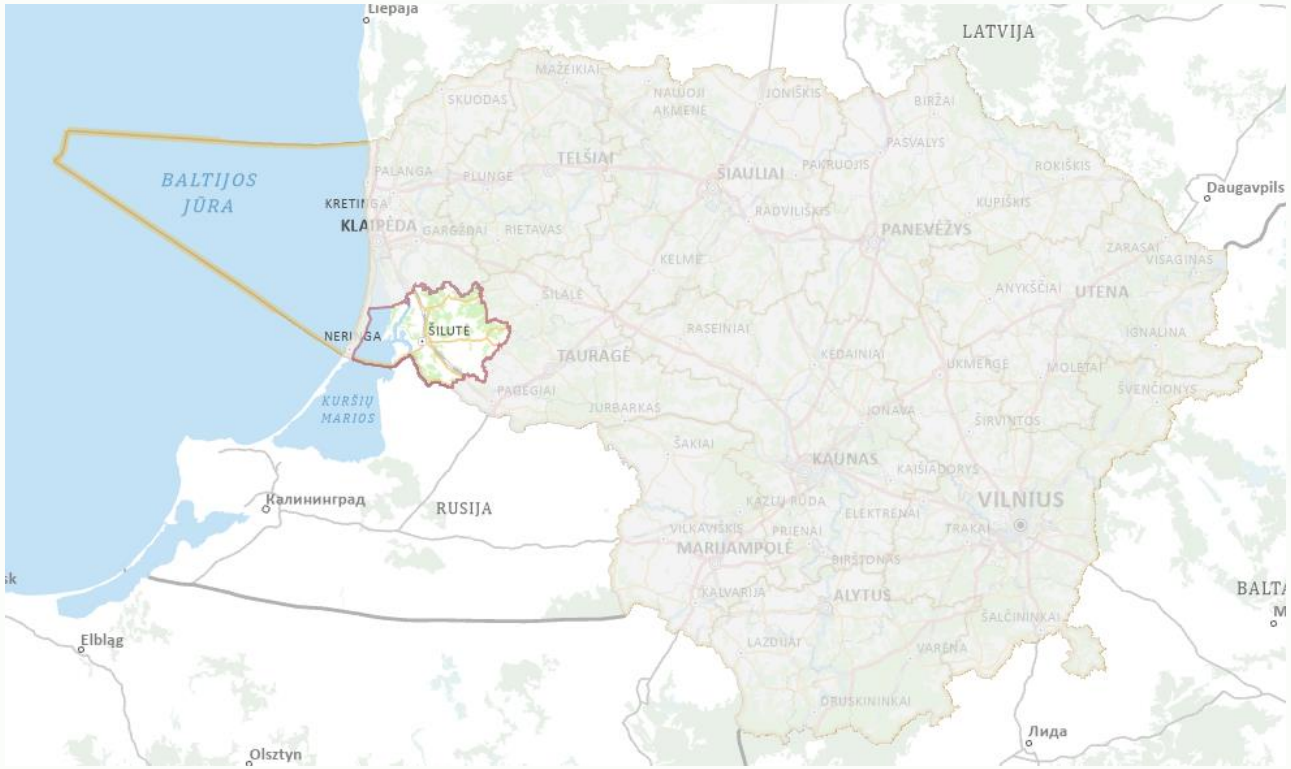
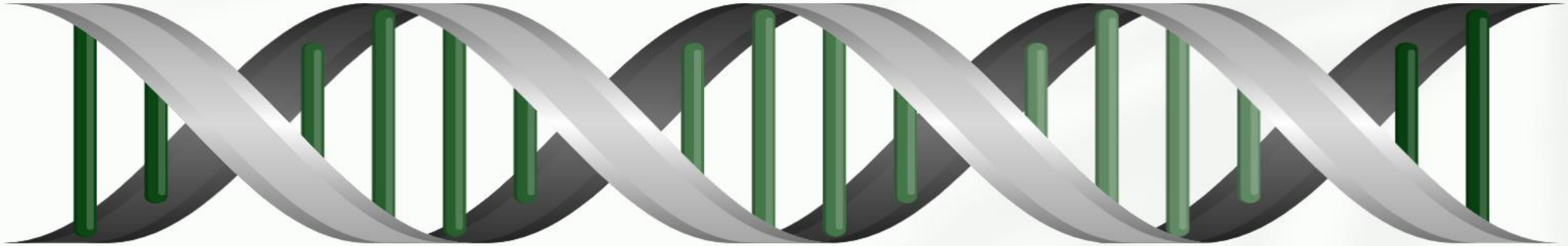
Location of Šilutė District



Flood Characteristics in Šilutė District

Key features and impacts of flooding in the Nemunas Delta region



01

Location in Nemunas Delta

Area experiences regular flooding events due to its deltaic geography

02

Large-scale annual inundation

Tens of thousands of hectares flooded each year in the district

03

Prolonged flood duration

Floodwaters remain for weeks because of slow natural drainage

04

Flood protection infrastructure

Includes 12 winter and 13 summer polders covering 24,000 ha plus over 200 km of embankments

05

Impacts on agriculture, infrastructure, ecosystems

Floods affect farming areas, built environment, and natural habitats in the district

Flood Management Challenges in Šilutė District

Explore key facts about Šilutė's geography, population, and flood risk history

Šilutė district located in Nemunas Delta

Situated in Western Lithuania, Šilutė district covers a unique location within the Nemunas Delta, making its environment distinct and ecologically important.

Area 1,700 km²

The district covers a sizable 1,700 square kilometers and supports a population of approximately 38,000 residents, highlighting the community scale and land coverage.

Among Lithuania's most flood-affected areas

Šilutė is recognized as one of the most flood-prone regions in Lithuania, facing frequent water-related challenges impacting residents and infrastructure.

Long-standing priority on flood management

Flood control and mitigation have been critical priorities for decades, reflecting ongoing efforts to protect the district's population and environment.

Understanding Polders: Protecting Land from Flooding

Explore how polders in Šilutė District safeguard land and maintain soil moisture effectively

Polders are artificially drained lands

Polders are land areas artificially drained and protected by embankments, designed to prevent flooding and regulate soil moisture for productive use.

Purpose: flood protection and moisture control

The primary goal of polders is to shield land from floodwaters while maintaining optimal moisture levels to support agriculture and habitation.

Šilutė District polder statistics

In Šilutė District, the total polder area covers 27,000 hectares, with 25,000 hectares actively managed and 221.7 km of embankments protecting the land.

Winter polders offer year-round protection

Winter polders safeguard the town of Šilutė and 36 surrounding villages throughout the year, ensuring continuous flood defense.

Summer polders protect growing meadows

Summer polders focus on protecting meadows during the growing season, preserving agricultural productivity and ecosystem health.

Understanding Polders: Protecting Land from Flooding

Pumping Stations and Automation in Flood Control

Overview and benefits of automated pumping stations in Šilutė District

01 Operate 35 out of 43 pumping stations

A total of 43 pumping stations were built, with 35 currently operational to manage floodwaters effectively.

02 Automate 27 stations with advanced technology

27 stations feature automation including water level sensors, remote digital control via systems or mobile apps, energy-efficient operations, and emergency modes for heavy rainfall or flooding.

03 Maintain stable soil moisture for agriculture

Automated pumping helps keep soil moisture stable, which supports agricultural productivity and crop health.

04 Reduce crop loss risk after storms

Effective flood control and emergency modes reduce the risk of crop losses following storms or flooding events.

05 Enable efficient resource planning with real-time data

Real-time data from automated systems allows for better planning and allocation of resources during flood events.

Pumping Stations and Automation in Flood Control

Problem Definition: Climate Change and Flood Risks

Understanding the key factors driving flood risks in Šilutė Municipality

Increase flood frequency and severity due to climate change

Flood events are becoming more frequent and intense as a direct result of climate change impacts.

Rising sea levels worsen flood risks in the region

Elevated sea levels contribute to higher flood risks, particularly affecting coastal and low-lying areas in Šilutė Municipality.

Floods significantly impact agriculture, roads, and settlements

Critical infrastructure and livelihoods including farms, transportation routes, and communities suffer serious damage from floods.

Flood risk is Šilutė Municipality's top safety and economic concern

Managing flood risks is paramount for protecting the municipality's safety and economic stability.

Historical Flood Statistics and Trends

Key flood events and their impacts in Šilutė District over decades

2004

Severe Flood Year

Flooded land area often exceeded 40,000 ha during extreme events like this one, stressing regional preparedness.

2010

Peak Water Levels Recorded

Floods reached record water levels in multiple rivers, underlining the critical nature of hydrological monitoring.

2013

Significant Flood Recurrence

Further demonstrated the almost annual frequency of major floods impacting Šilutė.

2018

Noteworthy Flood Year

Continued pattern of severe flooding reinforcing the importance of flood risk management.

2022

Rusnė Island Isolation

Floods isolated Rusnė Island for several weeks with about 20,000 ha flooded, highlighting vulnerability of key areas.

2024

Recent Severe Flood

Latest major flood event continuing the trend of frequent severe floods impacting the district's landscape and infrastructure.

Severe Flood Impacts Across Key Rivers in Nemunas delta (2022–2024)

Analyze critical flood levels and their effects on villages and infrastructure from recent events

February 2024 Floods Submerge Up to 17,000 ha

Flooding affected approximately 15 villages and around 70 homesteads, causing widespread disruption and damage to homes and farmland.

Leitė River Surpasses Critical Flood Level

Water levels reached 355 cm against a critical threshold of 245 cm, indicating severe overflow and risk for nearby communities.

Atmata River Exceeds Safe Water Mark

Recorded at 369 cm, significantly above the critical 288 cm level, intensifying flood hazards in the region.

Gėgė River Hits Extreme Flood Height

Measured 517 cm compared to critical 425 cm, marking one of the highest flood peaks with extensive impact.

Flood Consequences Include Isolation and Outages

Flooding caused transport disruptions, isolated villages, and led to power outages, severely affecting daily life and emergency response.

Implemented Flood Risk Management Measures

Key infrastructure and actions protecting Šilutė District from floods

Ensure year-round access to Rusnė Island

The 460 m Rusnė Overpass maintains continuous connectivity, crucial during flood seasons.

Protect farmland and settlements with polder system

The polder system safeguards approximately 24,000 hectares of agricultural land and residential areas from flooding.

Modernize pumping stations for efficiency

Upgraded pumping stations feature automation and energy-saving improvements to enhance floodwater management.

Maintain canals and embankments regularly

Ongoing maintenance programs ensure optimal functioning of canals and embankments to prevent flood breaches.

Develop information systems and flood risk maps

Residents benefit from advanced flood risk maps and information systems for better preparedness and awareness.

Allocate €1,8 million for flood prevention in 2025

Significant funding from EU and national sources supports flood risk management initiatives in Šilutė District.

Funding Sources and Investment Overview

Financial Overview and Key Funding Programs for Flood Risk Management

Funding Source / Program	Time Period	Details	Total Value (€)	EU Support (€)	Municipality Contribution (€)
Rural Development Programme for Lithuania	2007–2027	27 reconstruction projects completed	15,500,000	12,250,000	3,250,000
State Budget Allocations	1999–2025	Consistent funding	-	-	1,110,000 per year
State Budget Capital Investments	2018–2025	Capital investments for polder operation, maintenance, reconstruction	11,060,000	-	-

2014–2020 EU funding period

Completed major flood infrastructure

Reconstruction of Traksėdžiai Winter Polder with €4.5M investment including pumping stations and embankments, enhancing flood

2014–2020 EU funding period

Reconstruction of retaining walls, embankments, ditches, quay walls, and concrete slope protection with €4.3M funding, strengthening urban flood defenses.

Šilutė town & Rusnė polder rebuilt

2022–2030

Future flood resilience projects planned

Under Ministry of Environment program, 3 projects totaling €14 million are being prepared to increase resilience against extreme hydrometeorological events.

Projects will be funded with 85% EU co-financing and 15% municipality share, ensuring strong financial support for flood resilience improvements.

EU co-financing secured

2022–2030

Achieved Results from Flood Management Efforts

Outcomes of Implemented Measures in Šilutė District

Reduce flood damage to residents and farmers

Implemented measures have significantly lowered flood damage impacting local residents and agricultural activities.

Protect transport routes and infrastructure

Flood management efforts improved the safety and functionality of key transport routes and infrastructure in the district.

Increase community resilience and preparedness

Local communities have become more resilient and better prepared against flood risks through targeted programs and initiatives.

Enhance civil protection coordination

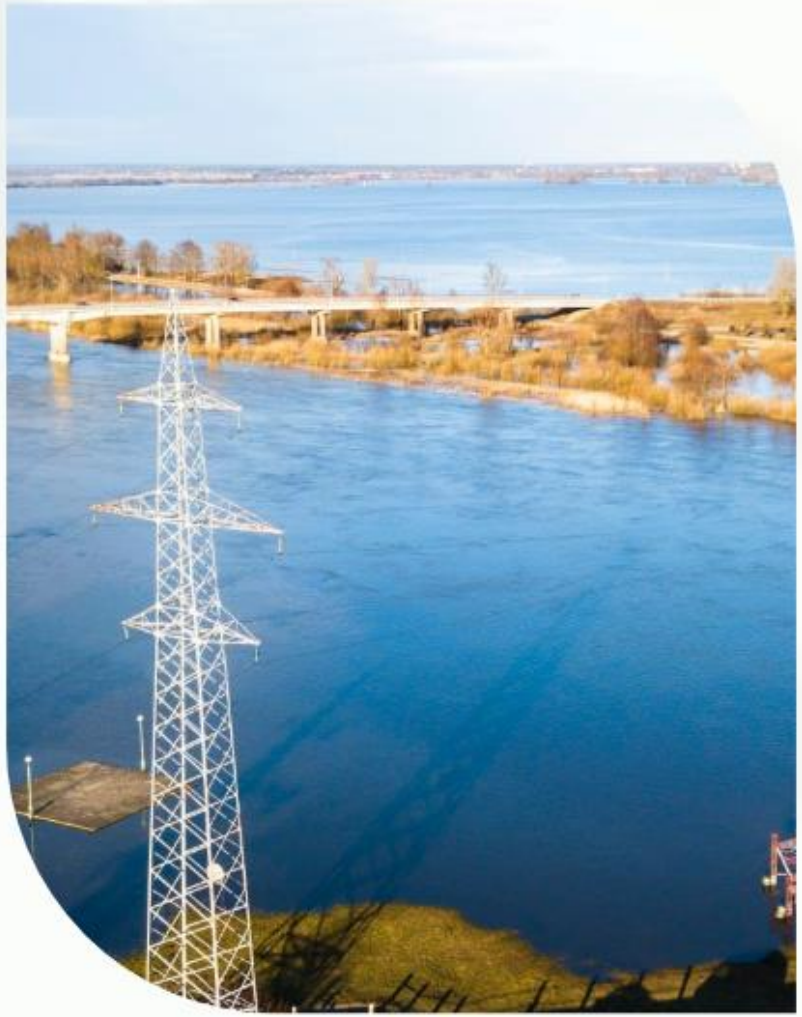
Coordination among civil protection services has been strengthened, improving emergency response effectiveness.

Strengthen collaboration with government and EU programs

Partnerships with the national government and EU programs have been reinforced, supporting sustainable flood management.

Environmental Benefits of Flood Management Systems

Key ecological advantages of effective flood risk management



Reduce energy use by minimizing human intervention

Flood management systems lower energy consumption and reduce transport needs by automating key processes and interventions.

Prevent ecological damage with rapid response

Quick action during extreme weather events helps avoid harm to ecosystems and limits environmental degradation.

Support long-term environmental monitoring

Continuous data collection from flood systems enables informed decisions for sustainable environmental management.

Maintain ecological balance by protecting habitats

Flood management protects natural habitats, reduces soil erosion, and preserves biodiversity.

Maximize Crop Success with Stable Soil Moisture

Discover how precise moisture monitoring reduces risks and enhances resource use for farming

Stable soil moisture ensures ideal growth

Maintaining consistent soil moisture creates optimal growing conditions, supporting healthier crops and higher yields.

Minimize crop loss risk after storms

Accurate moisture data helps farmers respond swiftly after floods or storms, significantly reducing potential crop damage.

Optimize resource use with real-time data

Real-time soil moisture tracking enables precise farm planning, improving water and fertilizer efficiency to boost productivity.

Civil protection training “Atmata2025” (2025-09-18)

Future Plans for Flood Risk Adaptation

Planned initiatives for 2025–2030 to enhance flood resilience in Šilutė District

Modernize polder and pumping systems

Upgrade existing flood control infrastructure to improve water management efficiency and resilience.

Integrate renewable energy into pumping stations

Incorporate solar and wind energy sources to power pumping stations sustainably.

Deploy digital tools for real-time water management

Use GIS and IoT sensors to monitor and control water levels dynamically and accurately.

Launch new EU-supported climate adaptation projects

Implement initiatives funded by the EU to address climate change impacts on flood risks.

Strengthen cooperation with Baltic municipalities

Collaborate with neighboring municipalities to exchange best practices and improve regional flood management.

Recommendations for Strengthening Flood Resilience

Strategic actions to enhance flood protection and community preparedness

Regularly strengthen and maintain levels and embankments

Ensure structural integrity and reduce flood risk by conducting frequent inspections and timely repairs of levees and embankments in the Šilutė District.

Improve drainage systems and increase riverbed capacity

Upgrade and expand drainage infrastructure to handle higher water volumes, preventing overflow and reducing flood impact in vulnerable areas.

Implement smarter land-use planning to avoid flood-prone zones

Adopt zoning regulations and development controls that restrict construction in high-risk flood areas, minimizing potential damages.

Conduct public awareness campaigns and develop evacuation plans

Educate residents on flood risks and safety measures, while preparing clear evacuation procedures to enhance community readiness.

Adopt and adapt best practices from other European flood-prone regions

Learn from successful flood resilience strategies implemented in Europe to improve local approaches and policies effectively.

Restoration of Water Bodies through Cross-Border Cooperation

Project No. LL-00049

Interreg

Co-funded by the European Union

Latvia – Lithuania

Project objectives

Restoring Urban Ponds for Sustainable Ecosystems and Community Well-being

Address pollution threats in Šilutė and Kuldīga ponds

Urban ponds in Šilutė and Kuldīga suffer from toxic substances, oil products, and heavy metals, endangering local biodiversity and ecosystem health.

Restore healthy, sustainable urban water bodies

Aim to rejuvenate water bodies to foster vibrant, sustainable environments that benefit local communities and wildlife alike.

Implement multi-faceted ecological restoration approach

Clean ponds in H. Scheu Park and Māra Pond, introduce selected plant and fish species, establish cross-border monitoring, share best practices, and promote public environmental education.

Achieve cleaner ponds and enhanced biodiversity

Expect transformative change including improved water quality, richer biodiversity, and strengthened cooperation between municipalities for sustainable regional growth.

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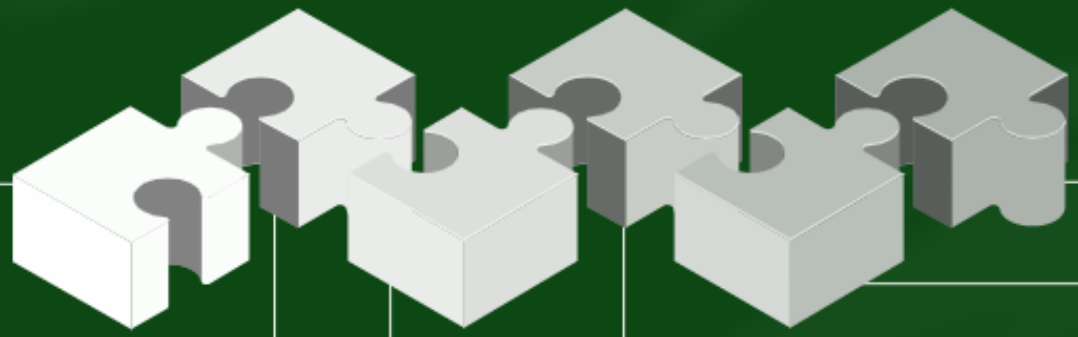
Territorial Challenges in Šilutė & Kuldīga

Addressing pollution and social exclusion through pond restoration and ecological improvement



01

Abandoned polluted urban ponds

Šilutė and Kuldīga have historic ponds abandoned and polluted, limiting recreation and social inclusion.

02

Cross-border pollution impact

Pollution affects connected rivers and lakes, risking contaminant spread across borders.

03

Cultural and economic importance

Ponds support fishing, tourism, and irrigation, vital for local heritage and economy.

04

Restoration benefits

Improves ecological quality, boosts investment and tourism, and reduces social exclusion.

05

H. Scheu park ponds contamination

Ponds contaminated with oil and zinc; no fish survive due to pollution.

06

Kuldīga Māra pond issues

Suffers from silting, excessive vegetation, and pollution harming water quality and ecosystem.

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Driving Šilutė District's Renewable Energy Progress

Key sustainable energy steps and future green initiatives shaping Šilutė's clean energy future

Commitment to renewable energy since 2014

Šilutė District has invested consistently in renewable energy sources, achieving 90.5% energy from renewables by 2025, targeting 95% by 2030.

Modernized district heating system

Upgraded with biomass boilers, new pipelines, and efficient pumps, modern district heating improves energy efficiency and reduces emissions.

Smart heat metering delivers 9.5% energy savings

Implementation of smart heat meters helps monitor and reduce heat consumption, contributing to significant energy savings across the district.

Solar power plants in public and religious sites

Since 2019, solar installations totaling 740 kW have been set up in schools, churches, and community buildings, boosting local clean energy production.

Robust wind energy capacity

The district operates 56 wind turbines with a combined capacity of 142.73 MW, playing a major role in meeting energy demands sustainably.

EV charging infrastructure planned

Approved in 2022, the plan includes 98 EV charging stations by 2030, supporting the transition to electric mobility in Šilutė.

Municipal electric vehicle adoption

Plans to acquire electric vehicles for municipal use and contracts for three electric school buses in 2025 demonstrate leadership in green transport.

Solar power in water treatment facilities

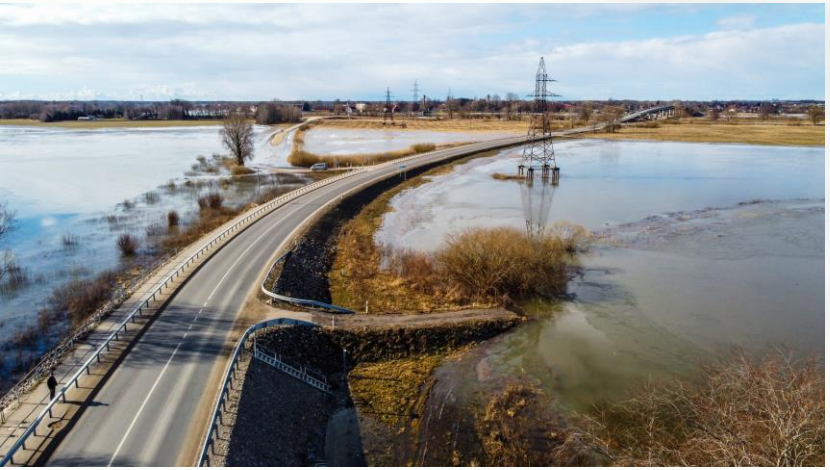
"Šilutės vandenys" installed solar plants totaling 600 kW at water supply and wastewater sites, reducing operational carbon footprint.

Energy storage for schools

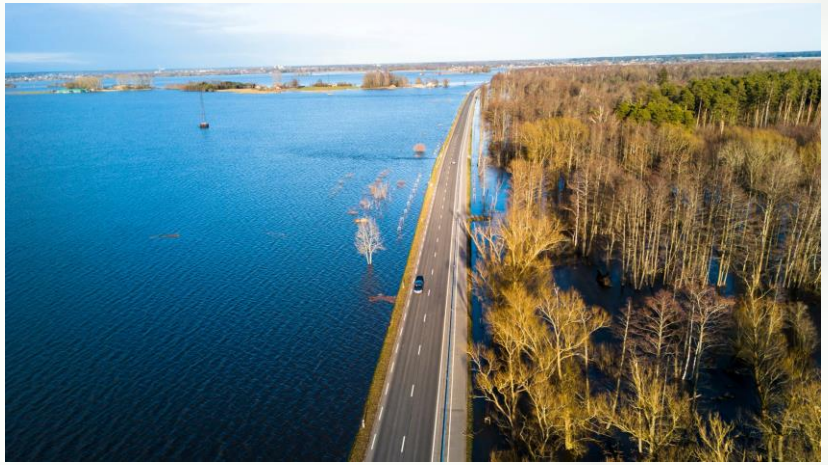
Pamarys Progymnasium applied for energy storage systems in 2025 to store energy from its 50 kW solar plant, enhancing energy resilience.

Growth in household energy prosumers

An increasing number of households generating their own energy is expected, fostering community engagement in sustainable energy practices.









Flood risk management is not only about infrastructure – it is about resilience, cooperation, and a sustainable future

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