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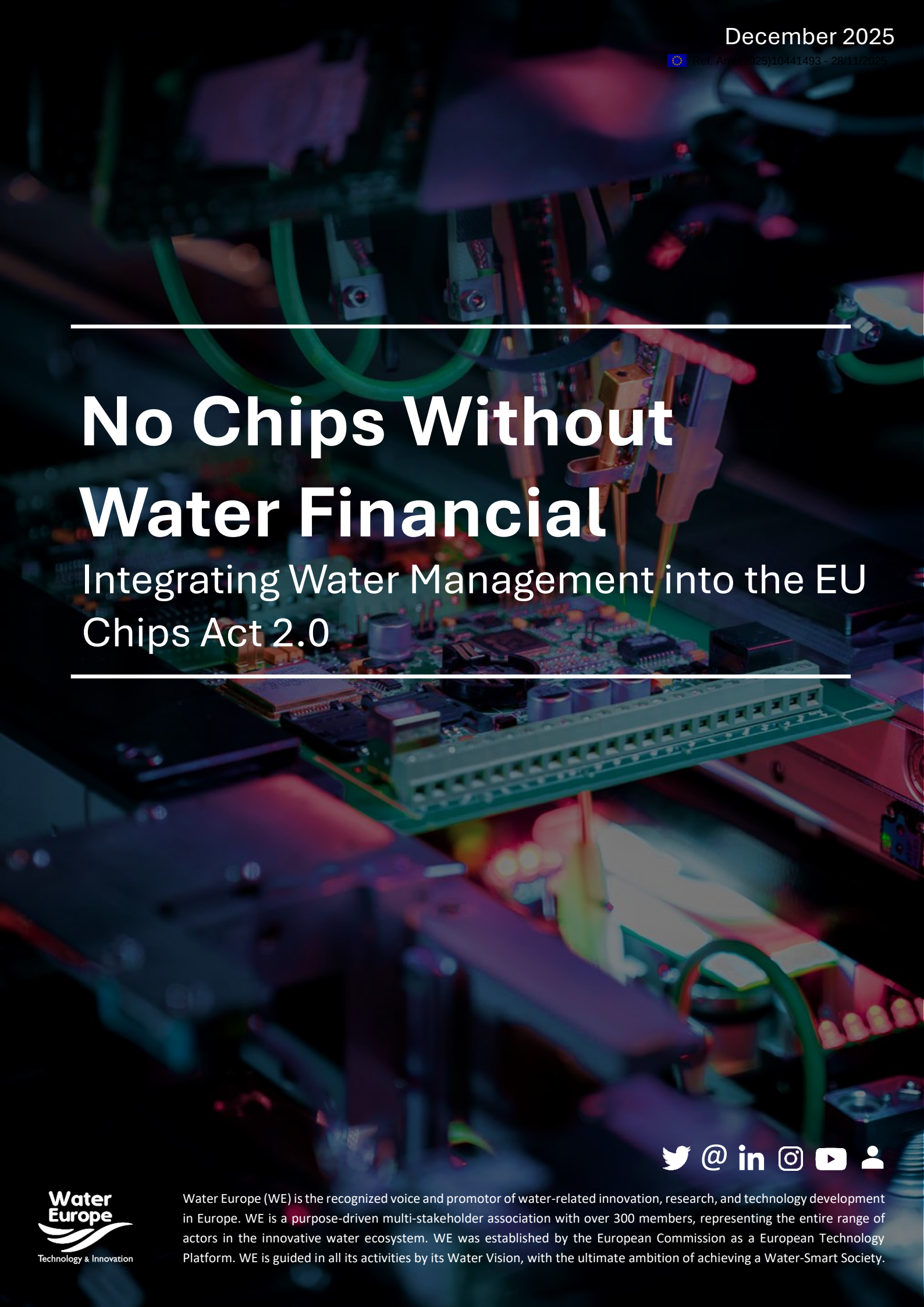


No Chips Without Water Financial

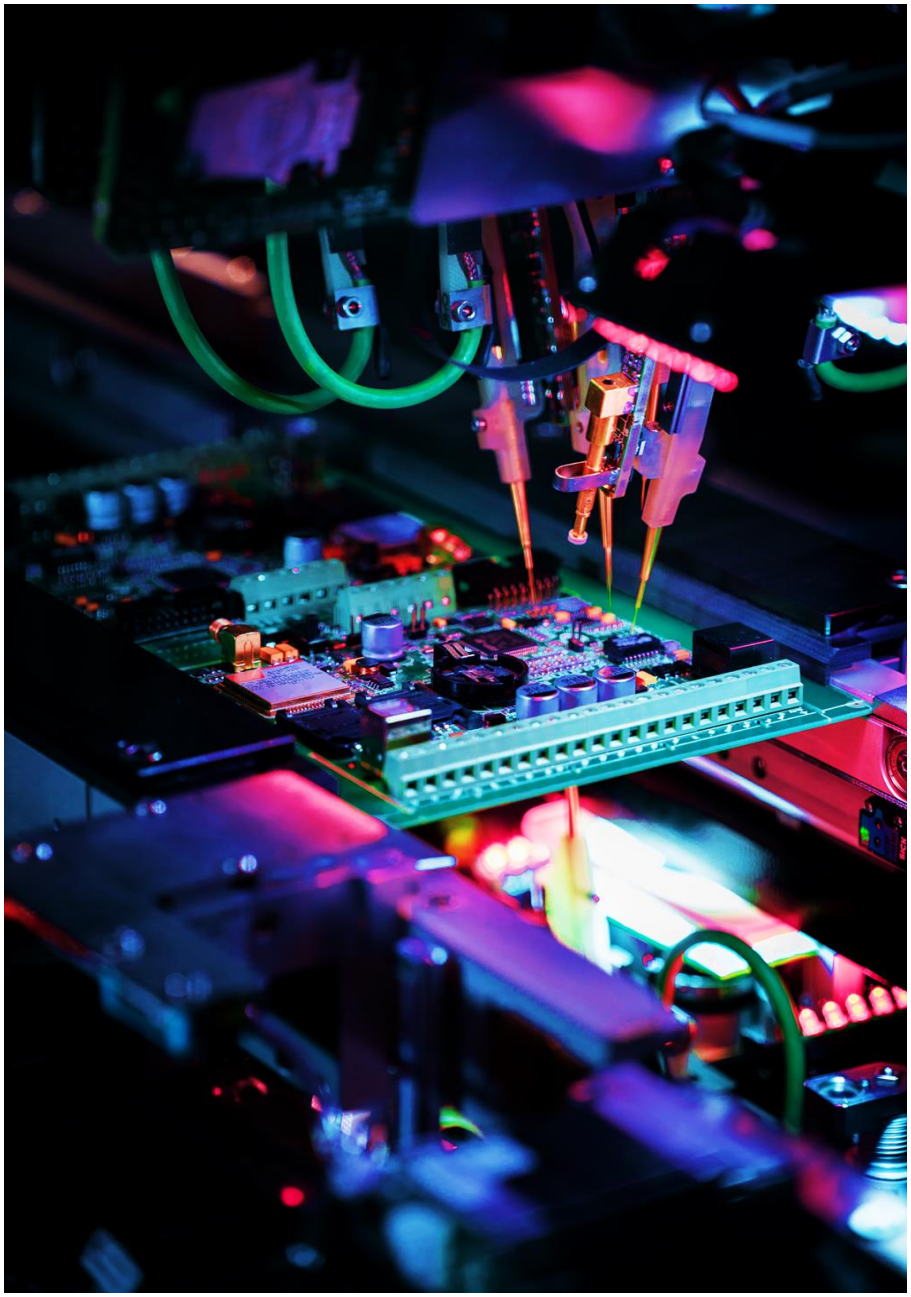
Integrating Water Management into the EU Chips Act 2.0

Water Europe
Technology & Innovation

Water Europe (WE) is the recognized voice and promotor of water-related innovation, research, and technology development in Europe. WE is a purpose-driven multi-stakeholder association with over 300 members, representing the entire range of actors in the innovative water ecosystem. WE was established by the European Commission as a European Technology Platform. WE is guided in all its activities by its Water Vision, with the ultimate ambition of achieving a Water-Smart Society.

Water Europe

POLICY RELATED PAPER



Table

No Chips Without Water

INTEGRATING WATER MANAGEMENT INTO THE UE CHIPS ACT 2.0

Water Europe supports the European Commission's initiative to evaluate the EU Chips Act, given the strategic importance of semiconductors for Europe's digital and green transitions. Semiconductors are essential components in technologies ranging from electric vehicles and renewable energy systems to artificial intelligence, data centres, and advanced manufacturing, making them indispensable for the EU's economic competitiveness.

This evaluation provides a crucial opportunity to ensure the legislation remains fit for purpose and addresses all critical enablers of semiconductor manufacturing in line with the objectives of the Water Resilience Strategy to build a Water-Smart Economy.

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Introduction

The legislation and call for evidence rightly acknowledge the importance of improving energy efficiency and enabling greater circularity in semiconductor production to support environmentally sustainable manufacturing. However, Water Europe regrets the notable absence of water considerations among the priorities for evaluation, and potential revision, announced by the European Commission, considering the new Water Resilience Strategy and its objective to strengthen the competitiveness and the security of the European economic activities by building a Water-Smart Economy.

As documented in our detailed study "Socio-economic study on the value of the EU investing in water", water management and water technologies are critical for semiconductor manufacturing and should be prioritised alongside energy and as part of circularity considerations. The study's research reveals the following:

1. **High water footprint**
   Semiconductor manufacturing is extremely water-intensive. The EU's current production of 3 million wafers per month consumes 45 million m^3 of fresh water monthly (15 m^3 per 12-inch wafer). For advanced memory chips, water consumption can reach 21 litres per cm^2 of wafer. Achieving the EU's goal of doubling production to 6 million wafers per month by 2030 will require between 72 and 108 million m^3 of water monthly, a 60-140% increase from current levels.

2. **Ultra-pure water quality requirement**
   Chip fabrication demands water of very high purity, with each wafer being rinsed approximately 100 times during production. It takes 1.5 litres of fresh water to produce 1 litre of ultra-pure water, and the more advanced the chip process, the purer the water must be. Even trace impurities can damage delicate semiconductor circuits and reduce production yields.

3. **Water scarcity risks**
   Water shortages or supply disruptions can force semiconductor plants to halt operations. The 2021 Taiwan drought demonstrated this vulnerability, doubling global semiconductor lead times from 10 to 21 weeks, with estimated EU losses of approximately €27.5 million per month in economic profit.

4. **Environmental compliance**
   Proper wastewater treatment is essential for semiconductor facilities to meet environmental regulations. The manufacturing process generates highly contaminated wastewater containing chemicals and heavy metals, with EU production projected to discharge between 14 and 50 million m^3 annually by 2030, depending on recycling rates.

5. **Competitive advantage**
   Advanced water management technologies can significantly reduce operational costs and improve sustainability. EU semiconductor manufacturers currently recycle on average 45% of water compared to 86% achieved by global leaders. Improving recycling rates and adopting advanced purification technologies could save over €1 billion annually in operational costs while reducing freshwater consumption by 216 million m^3 per year.

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INTEGRATING WATER RESOURCES AND TECHNOLOGIES INTO THE EU CHIPS ACT'S STRATEGIC OBJECTIVES

Consequently, the strategic importance of water management and water technologies for semiconductor production should be explicitly acknowledged in the EU Chips Act, as they are fundamental to achieving each of the three goals outlined for the evaluation and potential future revision:

- **Securing manufacturing of leading-edge chips (sub-10nm):** Advanced semiconductor nodes below 10nm require higher water purity and greater water consumption. Developing the EU's manufacturing capacity for these strategic chips will require advanced water infrastructure.
- **Achieving a competitive edge in semiconductors:** Water recycling and advanced water technologies can reduce environmental impact and operational costs simultaneously to position Europe as a leader in sustainable semiconductor production.
- **Ensuring supply chain resilience:** Water availability represents a critical but overlooked vulnerability in semiconductor supply chains. Comprehensive resilience assessments must include water resource availability and treatment capacity.

RECOMMENDATIONS

Considering the evaluation and potential revision, Water Europe recommends the following priorities for the EU Chips Act regarding water management and technology:

1

Recognise water infrastructure and technologies as essential enablers, and water companies as partners in EU policy-making, for achieving EU semiconductor production goals and strategic autonomy.

2

Enable access to Chips Act funding for water purification, recycling, and wastewater treatment infrastructure specifically tailored to semiconductor manufacturing requirements.

3

Promote adoption of advanced water management technologies, best practices, guidelines and common water footprint indicators to improve competitiveness, circularity and water efficiency in semiconductor production.

4

Integrate considerations on water resources in supply chain resilience assessments and permit requirements for semiconductor production.

5

Support partnerships and knowledge exchange platforms between semiconductor manufacturers, water technology providers, and regional water authorities to address water challenges.