Interreg Danube Region

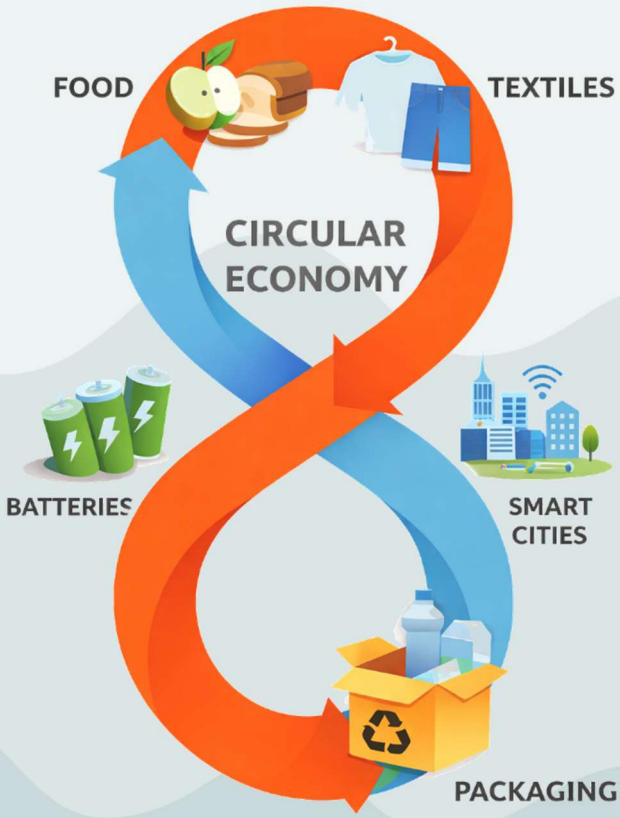
Co-funded by the European Union

DECIDE

DANUBE REGION strategy

FLAGSHIP

EU Strategy for the Danube Region



Selected Circular Business Models

from the Danube Region

Interreg Project DECIDE

Digital Services for Circular Economy – a Toolbox for Regional Developers & SMEs

Contents

DECIDE Digital Services for Circular Economy – a Toolbox for Regional Developers & SMEs

In response to global challenges, **the EU promotes sustainability** through initiatives such as the Sustainable Development Goals, Fit for 55, and the Circular Economy Action Plan. The focus lies on making sustainable products the norm, reducing waste, and advancing circular solutions in key sectors like food, textiles, packaging, batteries, and smart cities.

Circular Economy Business Models (CEBM) play a key role in achieving these goals. However, their implementation in the Danube Region faces challenges such as regulatory barriers, limited infrastructure, and a lack of practical business models.

The **DECIDE project** addresses these gaps by **providing tools and methods** to develop, test, and scale circular business models. Through pilot actions, data-driven analysis, and cross-border cooperation, DECIDE supports Small and Medium-sized Enterprises (SMEs) and regional actors in applying circular solutions in practice.

Main Objectives

1. **DECIDE Toolbox**: Develop and validate a toolbox to enable systematic analysis and transferability of CEBMs.

2. **CE Business Models**: Conduct pilot projects to test practical application and ensure implementation and impact.

3. **Capacity Building**: Strengthen collaboration and knowledge exchange to enable innovation and scaling of CEBMs.

For more information on the project visit our project website:

https://interreg-danube.eu/projects/decide

Partner Overview

Lead Partner: Centre for Digitalisation Böblingen District - ZD.BB GmbH, Böblingen, Germany (DE)

- Regional agency for the development of small and medium size enterprises Alma Mons Ltd. Novi Sad, Serbia (RS)
- ANTEJA ECG D.O.O., Ljubljana, Slovenia (SI)
- Alumni Association of Petru Maior University, Targu Mures, Romania (RO)
- Reutlingen University, Reutlingen, Germany (DE)
- Social cooperative Humana Nova, Čakovec, Croatia(HR)
- Pulp and Paper Institute, Ljubljana, Slovenia (SI)
- Innovation Salzburg GmbH, Salzburg, Austria (AT)
- DBH Group, Debrecen, Hungary (HU)
- Sarajevo Economic Region Development Agency, Sarajevo, Bosnia and Herzegovina (BA)
- Sofia University, Science and Research Department, Sofia, Bulgaria (BG)
- Technology Innovation Centre Međimurje Ltd., Čakovec, Croatia (HR)
- University of Maribor, Maribor, Slovenia (SI)
- University of Medicine, Pharmacy, Science and Technology G.E.Palade of Targu Mures, Targu Mures, Romania (RO)
- University of Zagreb, Faculty of Organization and Informatics, Varaždin, Croatia (HR)
- Alecu Russo Balti State University, Balti, Moldova (MD)

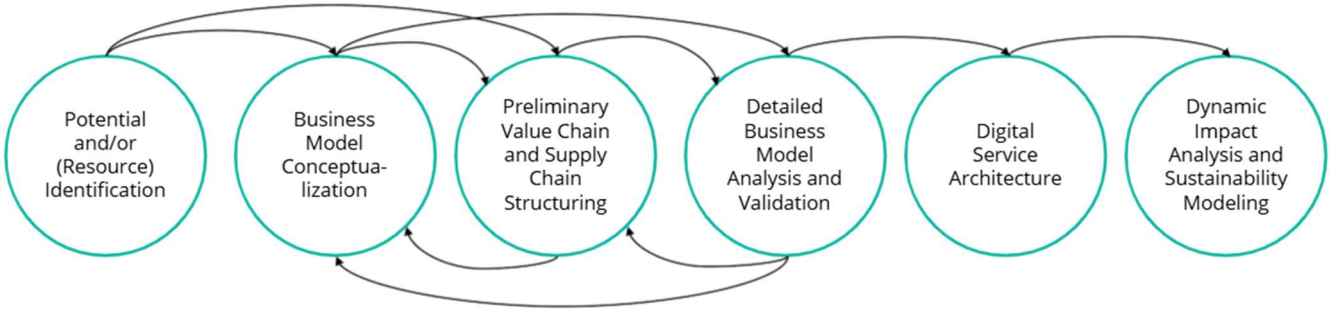
DECIDE Toolbox and Methodology

Integrated tools of the **DECIDE Toolbox** enable data-driven decision-making across the entire business model lifecycle.

This toolbox helps you explore and apply the Circular Economy in real-world business contexts. It includes tools for identifying circular potential and for developing and validating business models. Everyone's journey is different, so we give you the flexibility to explore and find what works for you.

Check out the DECIDE Toolbox in our Service Catalogue:

https://danube-services.eu/decide-toolbox/#develop-and-validate



The **DECIDE Methodology** provides a structured, end-to-end framework for developing, analysing, and validating circular business models.

Key Aspects

- Use AI to identify regional business opportunities
- Access validated circular economy models
- Develop and analyse value creation, capture and delivery
- Evaluate the business model
- Evaluate KPIs (costs, revenues, profits, CO2)
- Leverage advanced business modeling & simulation tools

Value Chain Generator (AI-driven): Identifies new circular business opportunities from waste streams & by-products.

Circular Economy Business Model Catalog: A structured repository of circular business models.

System Dynamics: Simulate long-term business impacts, CO_2 footprint & financial viability.

Digital Service Implementation Recommender: Structural and operational insights into your business and IT landscape. Map IT and business services to operational processes & infrastructure needs.

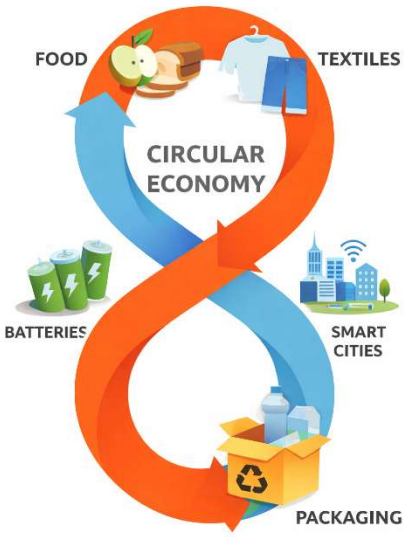
Business Model Canvas (BMC): Industry-standard framework to define, refine & communicate your business model.

e3Value: Visualize actors, value exchanges, costs and revenue streams within your Network Business Model and simulate break-even scenarios.

Business Process Model: Identify inefficiencies and cost drivers through detailed process modeling.

Process Time & Cost Analysis: Reduce bottlenecks and improve workflow efficiency.

8 selected Circular Business Models from the Danube Region



The transition to a circular economy is no longer a vision – it is a necessity. Across the Danube Region, regions, companies, and organisations are working to turn circular ideas into viable business models that deliver economic, environmental, and social value.

The Interreg Danube Region flagship project **DECIDE Digital Services for Circular Economy – a Toolbox for Regional Developers & SMEs** has contributed to this transition by developing practical tools, testing innovative approaches, and fostering transnational cooperation. At its core, DECIDE supports SMEs and regional developers in applying circular solutions in key sectors such as food, textiles, packaging, batteries, and smart cities.

This brochure presents the DECIDE pilot cases: 8 real-world examples from across the Danube Region. They demonstrate how circular concepts can be implemented under diverse conditions, from local initiatives to cross-sector collaborations. The pilot actions highlight not only technical solutions, but also new partnerships, business opportunities, and pathways for scaling.

Together, they show one clear message: Circular ideas can become successful business models – when supported by the right tools, collaboration, and regional ecosystems.

Circular economy is not a concept – it is a business opportunity with economic, environmental, and social impact.

Check out our Service Catalogue for more information on the 8 pilot cases and discover even more best practice cases:

https://danube-services.eu/circular-economy-services/

How Pilot Cases Turn Ideas into Practice

More than 20 real-world best practice examples formed the starting point. Building on this, a structured transnational **DECIDE Tandem approach** was applied, in which partners combined complementary expertise to jointly develop, validate, and refine circular business models. This collaborative process enabled knowledge exchange across regions and disciplines and accelerated the transfer of best practices into real pilot applications.

Co-Creation & Capacity Building
Partners from different countries worked together on real-world examples
Skills were developed through trainings and cross-country knowledge sharing

Selection & Implementation
Promising business cases were identified and selected
Pilots followed a shared approach to ensure comparable results

Analysis & Modelling
Business models were analysed and modelled using the DECIDE Toolbox
Focus on economic, environmental and social impact

Transfer & Sustainability
Results can be reused in other regions
Integrated into the DECIDE Service Catalogue for long-term use and impact

As a result, 8 pilot cases were implemented across multiple sectors and validated under real conditions using the DECIDE Methodology Framework and DECIDE Toolbox.

Smart Cities: Sourcing Energy from Biomass

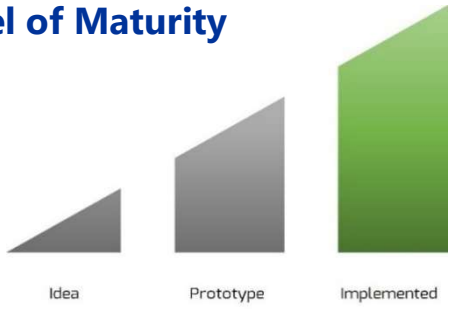
#smart-city #biomass #electricity #heating #pyrolysis

Converting local agricultural residues and renewable crops into energy through pyrolysis, producing syngas and pyrolysis oil for electricity, heat, and fuel.

Sector: Smart Cities

Circular Strategies: Reduce, Reuse, Recycle, Remanufacture

Level of Maturity



Pilot Case Description

A rural town in Baden-Württemberg, Germany, develops a renewable energy system by converting agricultural by-products such as corn straw, Miscanthus, and beetle wood into syngas through pyrolysis. The syngas is used in CHP plants to produce electricity and heat, which is distributed via district heating networks. The system is complemented by solar and wind energy, maximizing and supporting the local economy.

Circular Economy Impact

Recycle

- biochar for soil and materials
- ash for soil or cement
- waste heat for district heating

Reduce

- less fossil fuel use
- no open burning
- no extra land needed
- improved soil quality

Reuse

- agricultural residues for energy
- reuse of waste heat
- pyrolysis oil for industry

Remanufacture

- long-term use of energy infrastructure
- materials reused in new products

Sustainability (SDGs)

Environmental Impact: lower emissions; less biomass waste; renewable energy use

Economic Impact: income for farmers; stable energy costs; local value creation

Social Impact: local jobs; community involvement

Business Model Expert:

Reutlingen University, Alteburgstrasse 150, 72762 Reutlingen, Germany

Hochschule Reutlingen
Reutlingen University

Batteries: Household-Level Battery Recycling

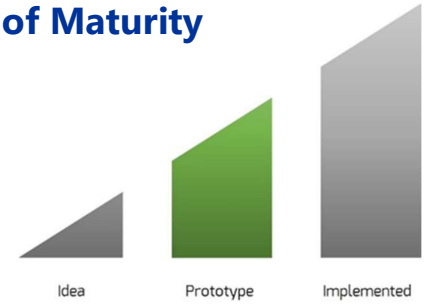
#batteries #extraction #raw-material

Renergy is a Moldovan company specializing in the collection and recycling of used batteries. They process batteries to extract valuable metals and materials, which can be reused in manufacturing new batteries. In addition, they offer solutions for energy storage systems using recycled components.

Sector: Batteries

Circular Strategies: Reuse

Level of Maturity



Pilot Case Description

Renergy collects and recycles used batteries. The company extracts valuable metals and materials such as lithium, nickel, and cobalt from spent batteries. These recovered resources can be reused in the production of new batteries or in other industrial applications, significantly reducing the need for virgin raw materials and minimizing the environmental impact of electronic waste.

Circular Economy Impact

Reuse

- recovered metals for new batteries
- recycled components for energy storage

"The toolbox provided a clear framework for mapping collection points and optimizing the frequency of pick-ups, which is crucial for maintaining cost-efficiency in small-scale household battery collection."

Company review and evaluation

Sustainability (SDGs)

Environmental Impact: Less pollution from toxic substances; safer waste handling

Economic Impact: Lower raw material costs; added value from recovered metals

Social Impact: Awareness for proper disposal

"We found that the toolbox's collaborative frameworks were particularly effective in aligning local authorities and private collection points, creating a more unified recycling ecosystem."

Company review and evaluation

Business Model Expert:

Alecu Russo Balti State University, Puskin 30, 3100 Balti, Moldova

Packaging: Products Made of Recycled or Biodegradable Materials

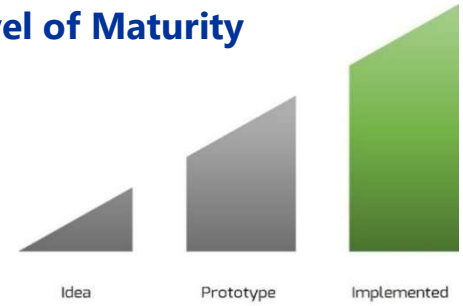
#biodegradable #packaging #plastic

Weltplast developed its own brand ECOWELT, products made of recycled or biodegradable materials. All products from this line can have one of two labels developed, EcoWelt and EcoWelt Bio, 100% recyclability, and 100% biodegradability.

Sector: Packaging

Circular Strategies: Reduce, Reuse, Recycle, Remanufacture

Level of Maturity



Pilot Case Description

Weltplast developed the ECOWELT brand using recycled and biodegradable materials. EcoWelt products are fully recyclable, EcoWelt Bio fully biodegradable. Since 1989, the company has achieved near zero-waste production by reusing all plastic residues. With over 12,000 t/year capacity, it operates in 18 EU markets and produces safe, durable products compliant with food-contact regulations.

Circular Economy Impact

Reduce

- less virgin plastic through improved material formulas

Reuse

- reusable bag made of more than 85% recycled material

Recycle

- efficient processes and closed material loops

Remanufacture

- In-house recycling of plastic waste into new materials

Sustainability (SDGs)

Environmental Impact: 8,000 tons of plastic recycled per year; 100% renewable electricity

Economic Impact: 25–30 million EUR annual revenue

Social Impact: 133 employees; stable job growth

Business Model Expert:

Sarajevo Economic Region Development Agency, Kolodvorska 6, 71000 Sarajevo, Bosnia and Herzegovina

Sarajevska regionalna razvojna agencija
SERDA
Sarajevo Economic Region Development Agency

Packaging: PLA filaments to replace traditional materials

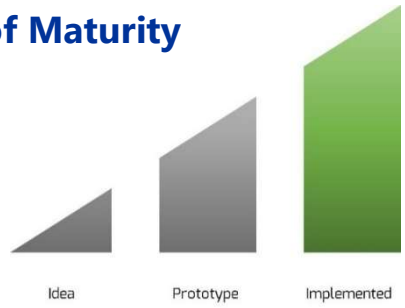
#3D-printing #biopolymer #cornstarch #filament #packaging

Filaticum Ltd. produces sustainable, specialized PLA-based filaments for 3D printing, enabling the manufacturing of custom logistic trays for various industries.

Sector: Packaging

Circular Strategies: Reduce, Repair, Recycle

Level of Maturity



Pilot Case Description

Filaticum produces sustainable PLA-based 3D printing filaments for customized logistic trays used in automotive, food, and healthcare sectors, replacing materials like aluminum and plastics. The company develops tailored filaments with properties such as conductivity, antibacterial effects, or chemical and impact resistance. PLA is derived from corn starch and is compostable or recyclable after use. 3D printing minimizes waste, shortens supply chains, improves precision, and enables on-demand production and repair of machine parts.

Circular Economy Impact

Reduce

- The PLA filaments replaces aluminum, plastics, and glass

Repair

- 3D-priting enables on-demand production of spare parts

Recycle

- PLA can be recycled or composted

"The Toolbox provided us with a much clearer picture on the recyclability rate of the failed printed items."

Company review and evaluation

Sustainability (SDGs)

Environmental Impact: bio-based material from corn; lower energy use

Economic Impact: cost-efficient and flexible production; shorter supply chains

Social Impact: reduced dependence on critical raw materials

Business Model Expert:

DBH Group, Arany J. u. 55, 4025 Debrecen, Magyarország, Hungary

Packaging: From Tomato Stems to Paper Bags

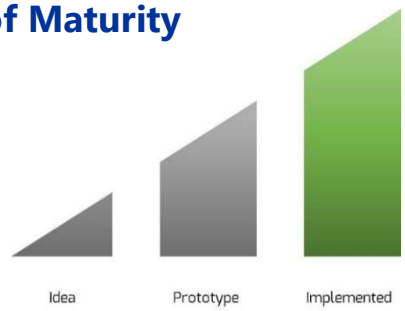
#biomass #cellulose #packaging #paper

Agro-residues are typically treated with a liner business model, where they are seen as waste and are not integrated into the supply chain. The circular business model, however, aims to close the loop by rethinking resource use, reducing waste, and creating value chains from by-products.

Sector: Packaging

Circular Strategies: Reduce, Recycle

Level of Maturity



Pilot Case Description

A tomato producer in Slovenia uses tomato stems as raw material for paper and packaging production. The process converts agro-residues into cellulose fibers, which are blended with wood pulp to create paper products. This approach reduces waste, lowers the need for wood, and decreases environmental impact, especially transport-related emissions. Pilot results confirm feasibility, while challenges such as impurities and fiber quality can be solved with improved equipment.

Circular Economy Impact

Reduce

- less agricultural waste
- lower need for wood
- reduced transport impact

Recycle

- paper products can be recycled through standard systems

Sustainability (SDGs)

Environmental Impact: less waste; lower emissions; efficient resource use

Economic Impact: new value chains; income in rural areas

Social Impact: job creation; support for farmers

"The Toolbox enabled a quick assessment of the solution's environmental impacts."

Company review and evaluation

Business Model Expert:

Reutlingen University, Alteburgstrasse 150, 72762 Reutlingen, Germany

Hochschule Reutlingen
Reutlingen University

Textiles: Making Flags from Old Textiles

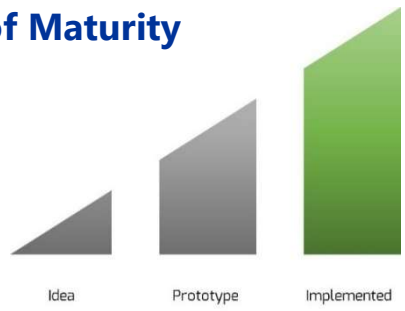
#textiles

Fahnen-Gärtner in Salzburg applies circular economy principles by using recycled polyester from PET bottles, reducing reliance on virgin resources and minimizing waste. The company emphasizes recycling and upcycling to promote environmental sustainability.

Sector: Textiles

Circular Strategies: Reduce, Reuse, Recycle, Remanufacture

Level of Maturity



Pilot Case Description

Fahnen Gärtner applies circular economy principles in textile production by using recyclable materials and designing durable products. The company reduces waste and resource use through optimized processes and a full lifecycle approach, ensuring environmentally and economically sustainable solutions.

Circular Economy Impact

Reuse

- long-lasting textiles used multiple times

Reduce

- lower material and energy use; use of recycled inputs

Recycle

- textile recovery and reintegration into production

Sustainability (SDGs)

Environmental Impact:

less waste; lower emissions

Economic Impact: new markets for sustainable products

Social Impact**:** awareness for sustainable consumption

Business Model Expert:

Innovation Salzburg GmbH, Maxglaner Hauptstraße 72, 5020 Salzburg, Austria

INNO VATION SALZ BURG

Textiles: Work Integration Through Textile Waste

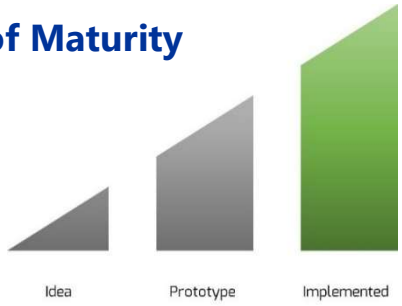
#clothes #textiles

Humana Nova's circular business model emphasizes sustainability, inclusion, and waste reduction. It transforms discarded textiles into upcycled products, second-hand clothing, and industrial rags. By employing marginalized groups, it addresses both environmental and social challenges.

Sector: Textiles

Circular Strategies: Reduce, Reuse, Repurpose, Recycle

Level of Maturity



Pilot Case Description

Humana Nova is a social enterprise with a circular model that reduces textile waste and creates social impact. It collects and processes discarded textiles into upcycled products, second-hand clothing, and industrial rags, extending textile life and reducing landfill waste. More than 50% of employees are people with disabilities or from marginalized groups, supporting inclusive job creation. The process includes collection, sorting, reuse, recycling, sewing, and sales, contributing to environmental protection and local development.

Circular Economy Impact

Reuse

- second-hand clothing sales

Reduce

- lower demand for new textiles

Repurpose

- textiles turned into bags, coats, and other products

Recycle

- non-wearable textiles processed into rags or recycled

Sustainability (SDGs)

Environmental Impact: less textile waste; lower emissions

Economic Impact: new income sources

Social Impact: over 50% employees from vulnerable groups

Business Model Expert:

Social cooperative Humana Nova, Ulica žrtava fašizma 3, 40000 Čakovec, Croatia

HumanaNova

Food: Making Dehydrated Fruits and Veggies from Leftovers

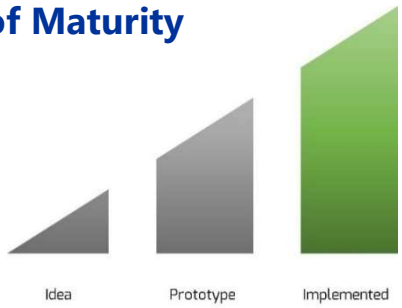
#biomass #food #fruit #vegetables

Tastesylvania produces snacks and seasonings based on dehydrated fruits and vegetables, striving to adapt and adopt CE behavior in order to reduce food waste and to improve the valorization of the agricultural raw materials and sustainable production.

Sector: Food

Circular Strategies: Reduce, Reuse, Recycle, Remanufacture

Level of Maturity



Pilot Case Description

The business collects and dehydrates fresh fruits and vegetables, including those that may not meet the visual standards of supermarkets but are still nutritionally viable. By transforming produce that might otherwise be wasted, the company creates value from surplus goods. Revenue comes primarily from long-term wholesale contracts and collaborations with retailers targeting health-conscious consumers.

Circular Economy Impact

Reuse

- organic residues are used as compost or feedstock

Reduce

- less food waste
- less packaging
- lower transport weight

Recycle

- recyclable packaging

Remanufacture

- nutrients preserved through processing

Sustainability (SDGs)

Environmental Impact: lower emissions; less food waste

Economic Impact: new services and local value chains

Social Impact: New jobs and cooperation with local farmers

"The System Dynamics model helped to simulate key indicators, including environmental impact based on the quantity of products and raw material used." **Company review and evaluation**

Business Model Expert:

Alumni Association of Petru Maior University,
Nicolae Iorga 1, 540088 Targu Mures, Romania

ALUMNI "Petru Maior" University Tîrgu Mureș

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