

Using seasonal forecast for energy production: SHYMAT climate service, a Small HYdropower Management and Assessment Tool

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Small Hydropower Plants:

- Run-of-River
- Mountaneous areas
- No dam or water storage
- Cost-effective and environmentally friendly energy technology

However...

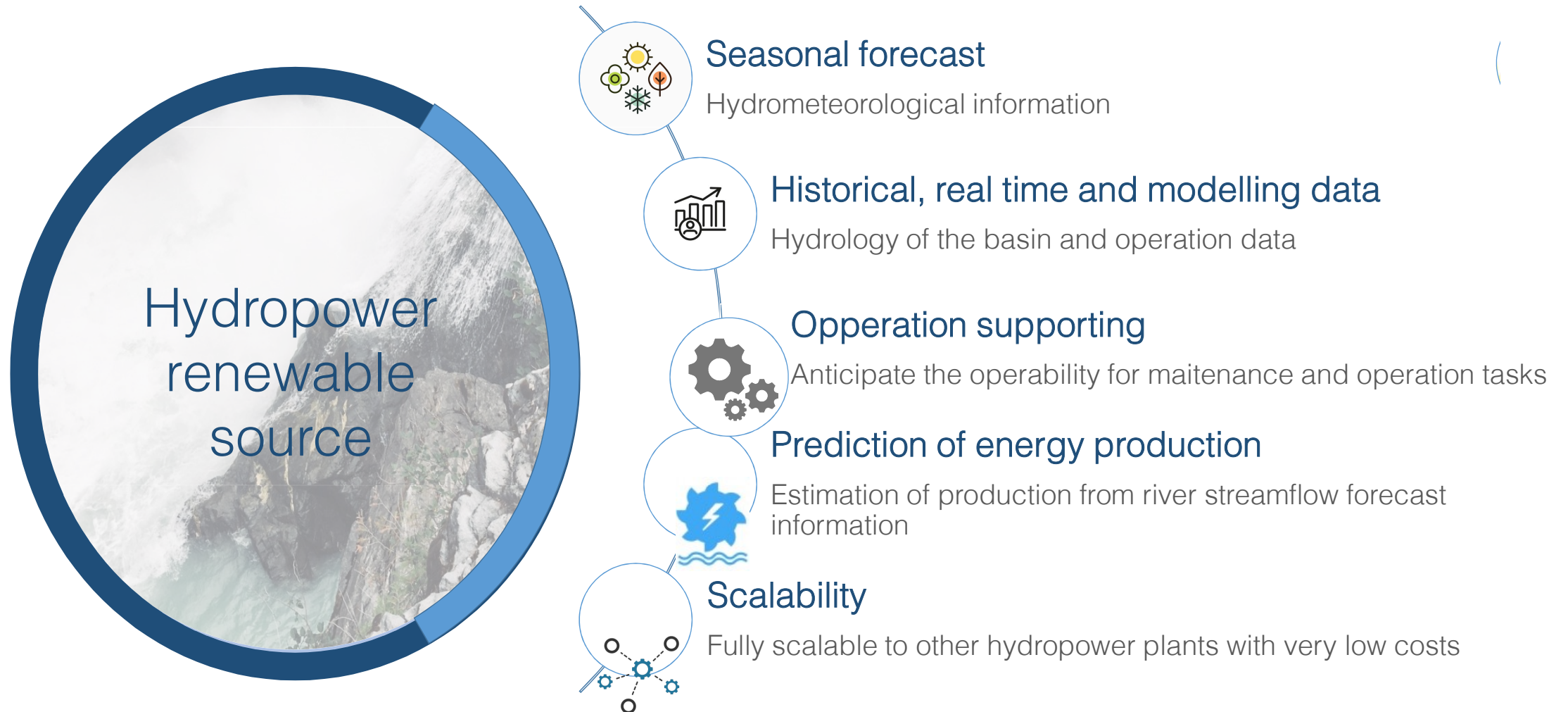
- ✓ Production subjected to the run-of-river flow
- ✓ Minimum technical inflow of the turbines ➡ enough water to remain operational
- ✓ Extremely high inflows ➡ water will have to be “spilled” (a lost opportunity for generation)



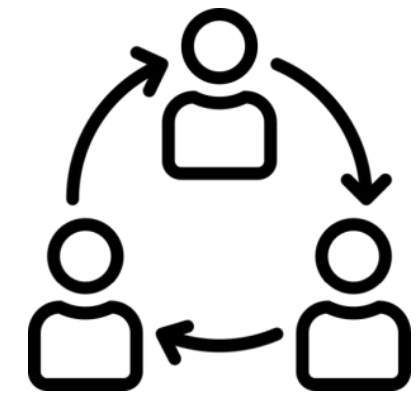
Great advances in the climate forecast framework, but....



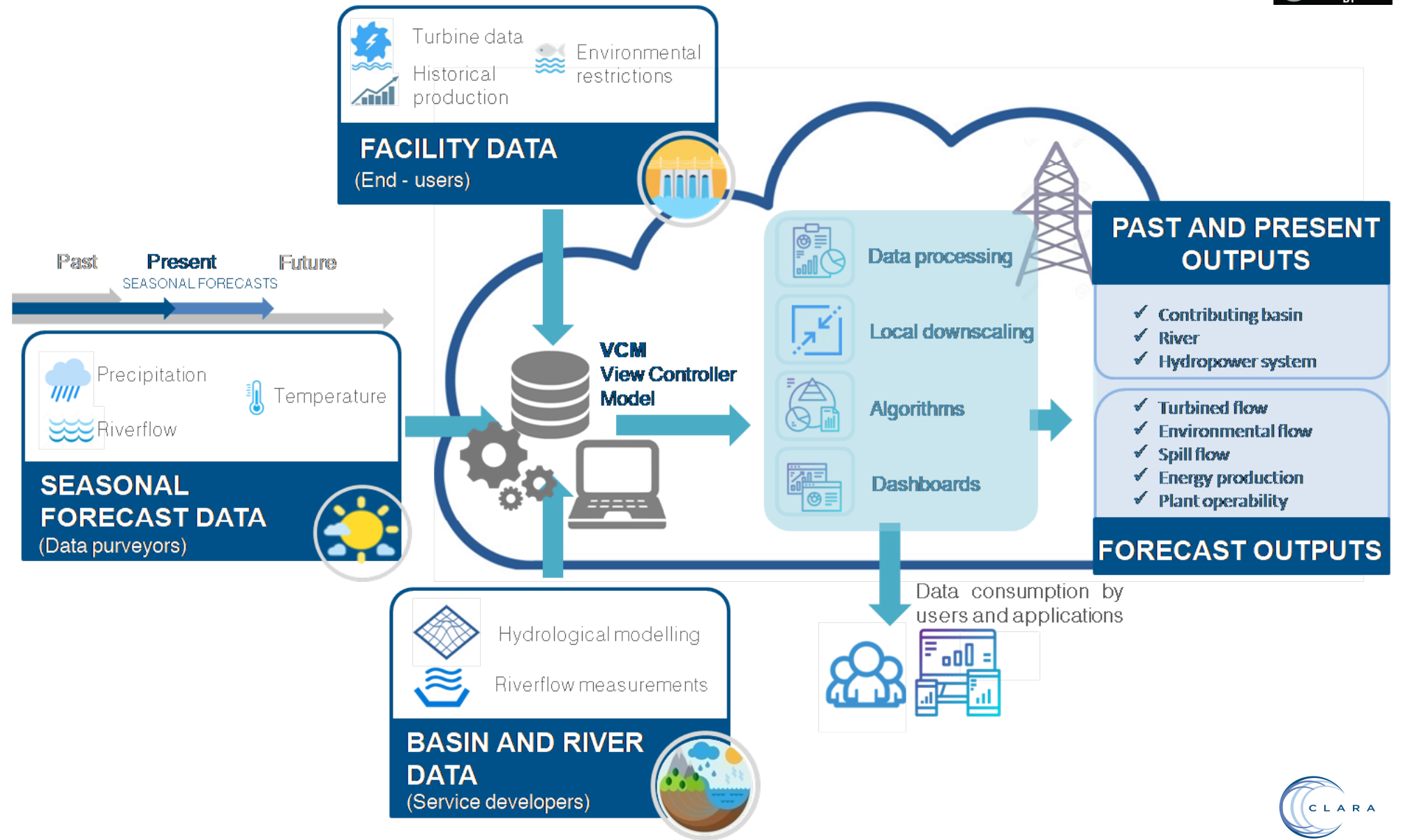
Existing gap to link the results of the forecast with the decision support process



Climate service approach



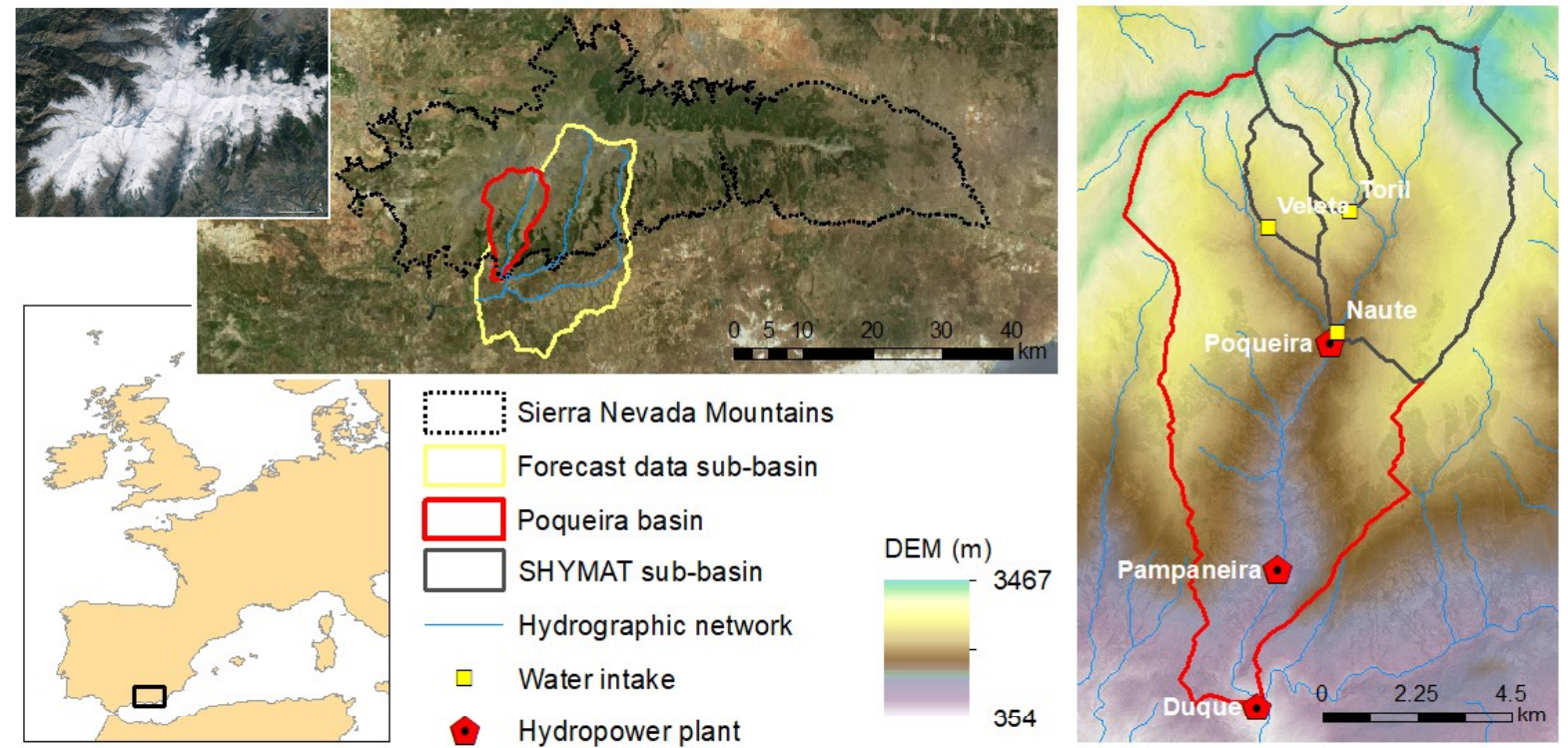
Co-development
process



Pilot application



- ✓ Three small hydropower plants system located in Poqueira River (Southern Spain), with a generating capacity 10 - 12 MW.
- ✓ Managers normally take decisions based on historical information of the inflows.




- ✓ Water availability very heterogeneous over the years:

Annual precipitation regime highly variable: 200 to 1000 mm. (Pérez-Palazón et al., 2015)

Mean annual fractional snow cover area for the period 2000-2013: 0.9 to 0.16 $\text{m}^2 \cdot \text{m}^{-2}$. (Pimentel et al., 2017)



Pilot application



SHYMAT

Small Hydropower Management Assessment

Tower: Torre 1

Information of ...

Hydropower plant of

Variable

Energy production


Select year ...

2019-2020

Graph

Box

View graph



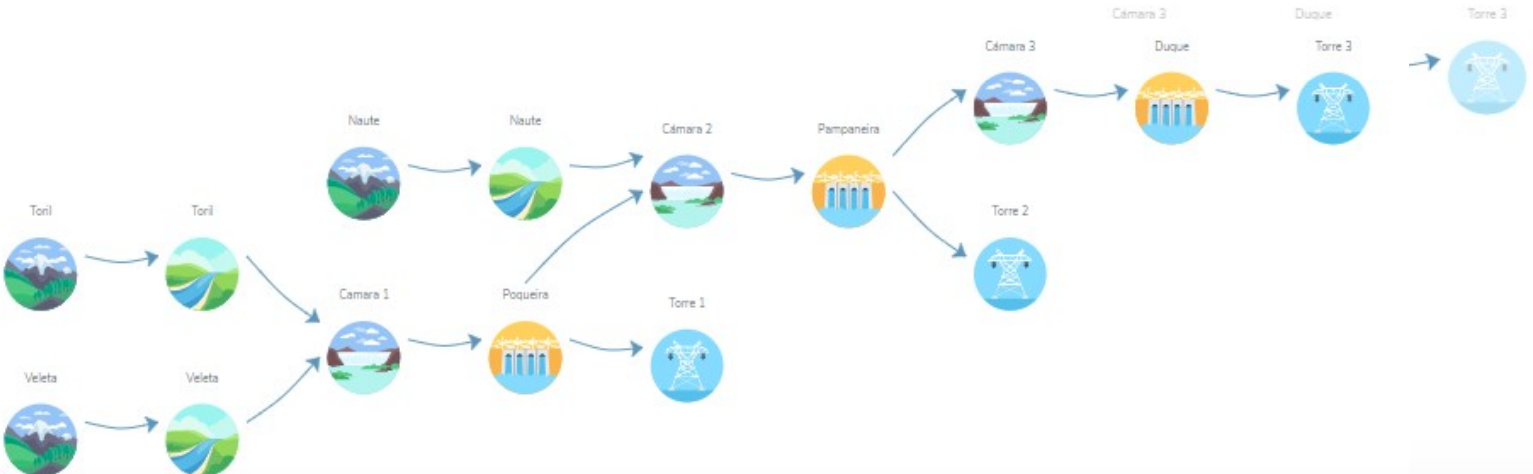
Co-funded by the European Union

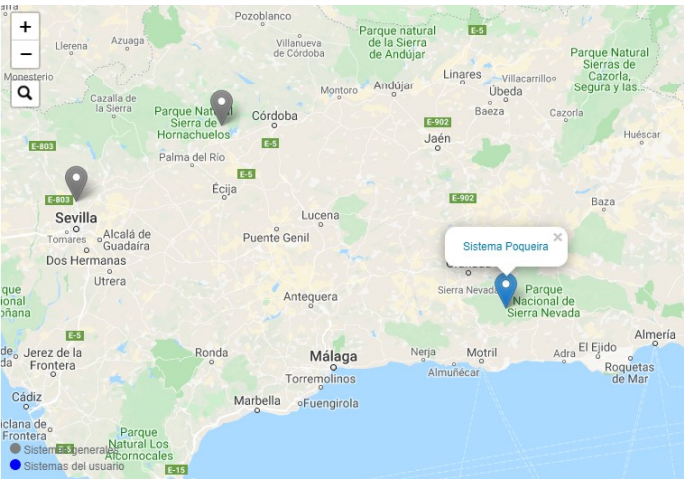
Forecast Mode

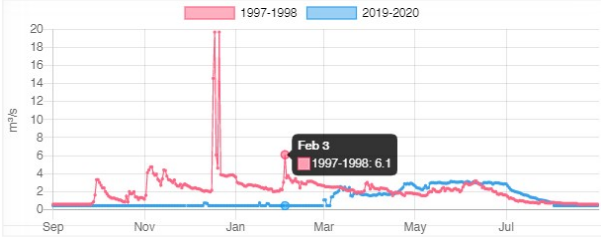
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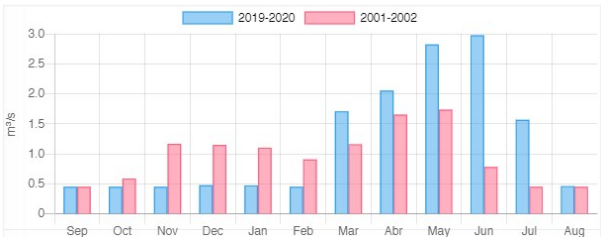
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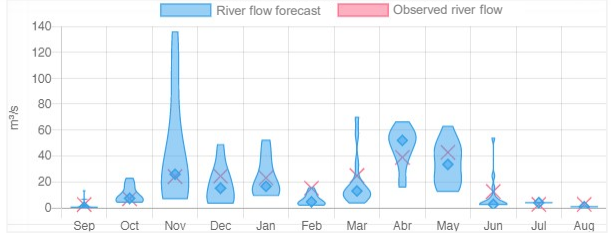
Home > Poqueira

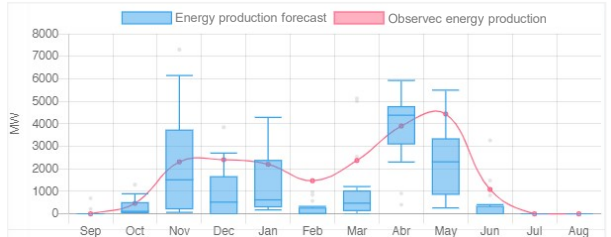






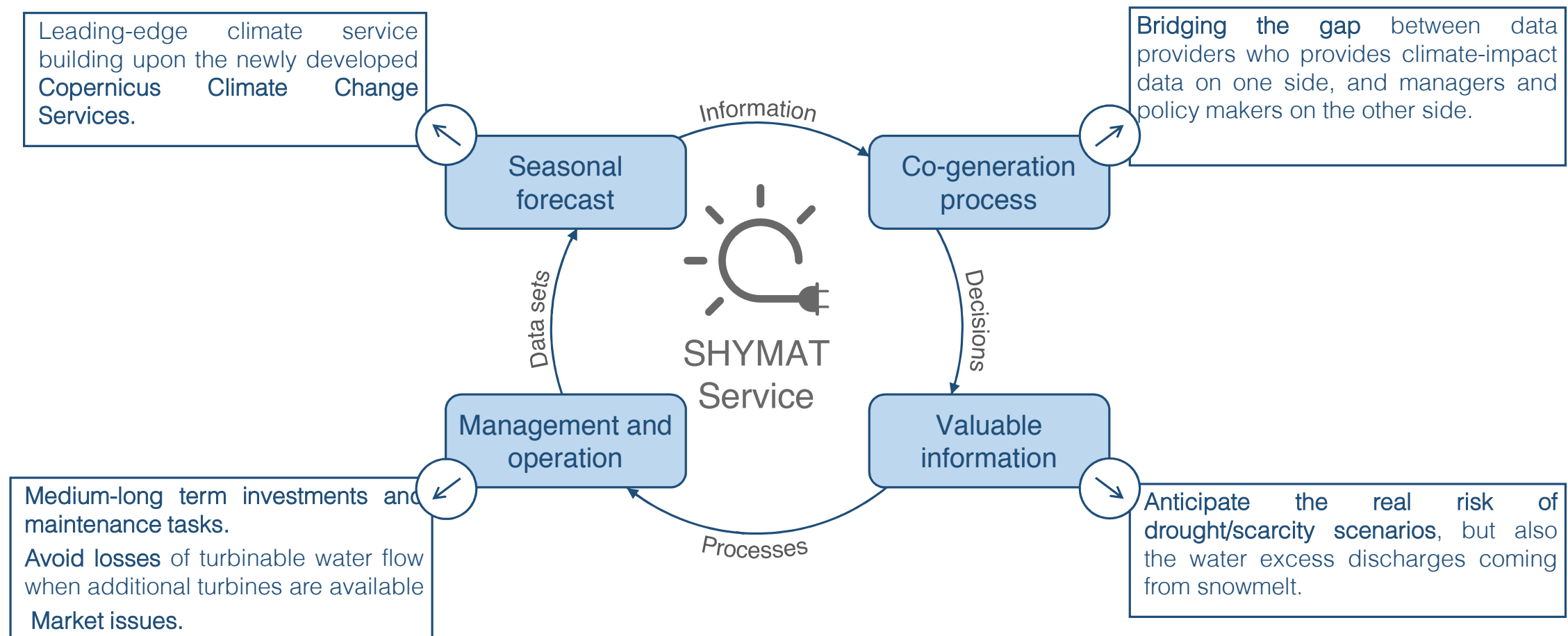






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- ✓ The cogeneration process is a powerful tool to develop climate services perfectly suiting users needs.
- ✓ Users can take advantage of forecasting climate data in order to anticipate:
 - High production periods and shutdown periods, for maintenance and repair tasks planning;
 - Possibility of compliance with environmental river flow restrictions;
 - The spilling of water, giving managers the opportunity to quickly tune up additional turbines;
 - Energy production, clearly valuable information for market issues.
- ✓ The scalable software architecture used will allow apply SHYMAT in other small hydropower plants with very low cost.



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Small Hydropower Management Tool (SHYMAT)



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