Pre-Conference Short Course, 9th African Rift Geothermal Conference
Djibouti Palace Kempinski, 1st November – 2nd November 2022

Direct use project set up and Business models

Jack Kiruja/ 1 November 2022

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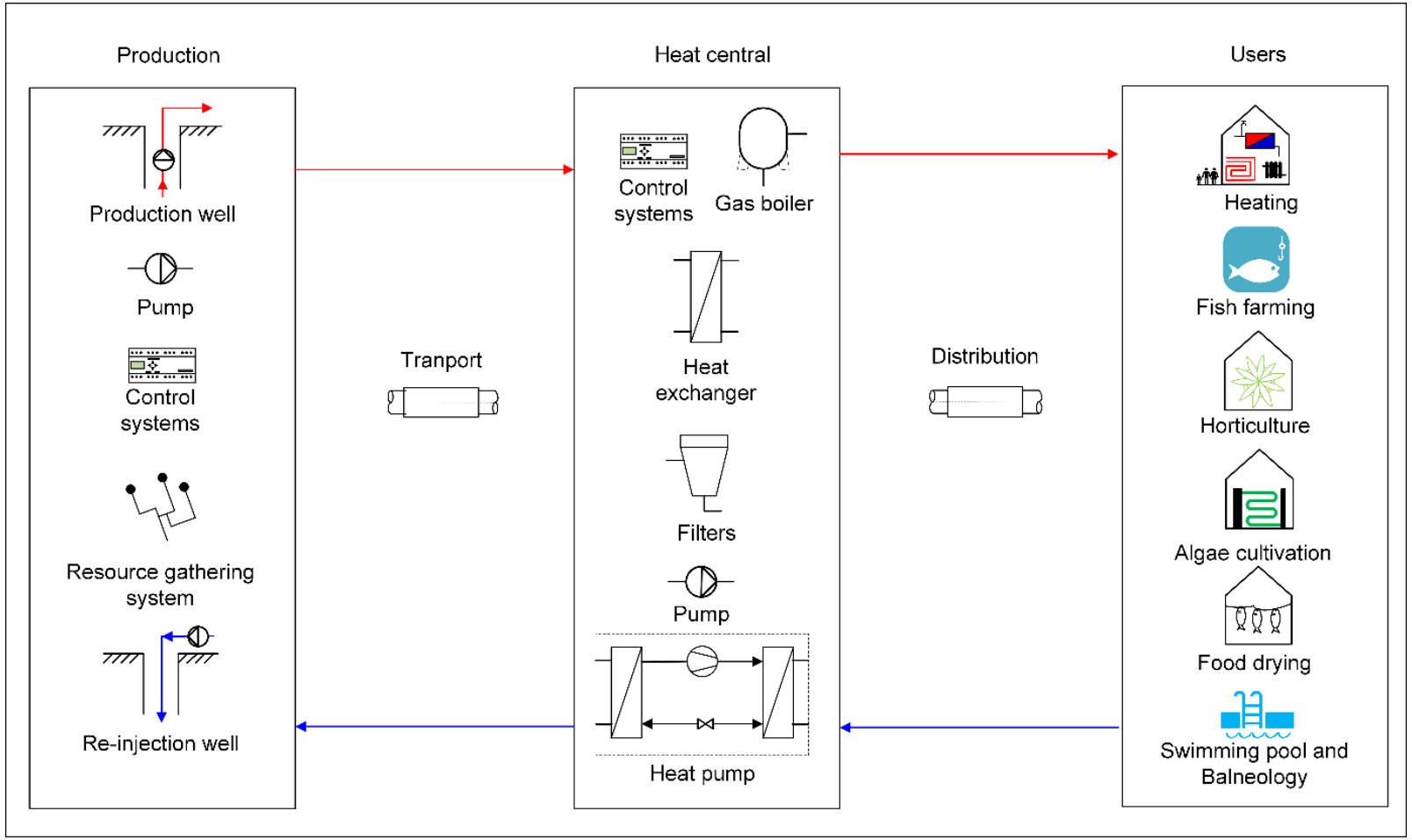
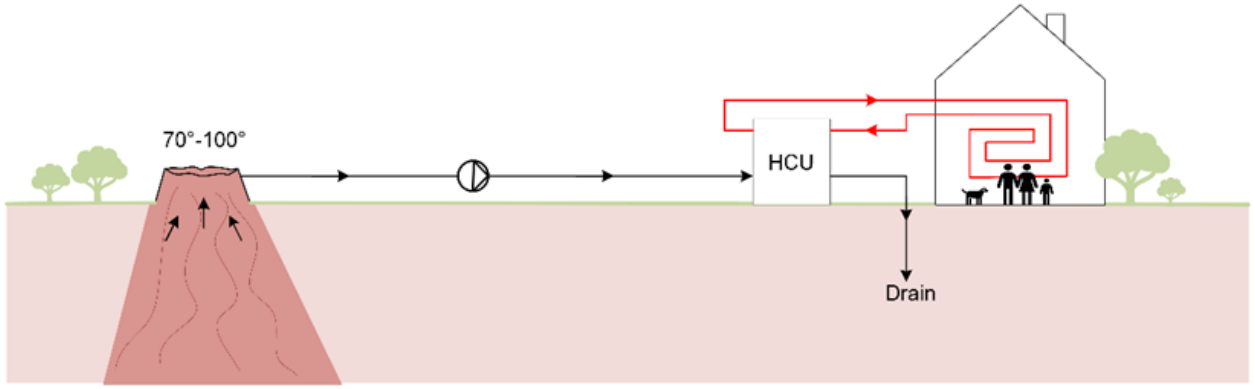
System configuration



Production of Energy for Direct Use

- Low temperature
  - Natural outflow from geothermal reservoirs
    - Hot springs, fumaroles
  - Boreholes with elevated temperatures
  - Energy from shallow ground/ground water, in combination with heat pumps
  - Hot water co-produced with oil and gas or from repurposed oil and gas wells
- High temperature
  - Excess steam not used for electricity generation
  - Separated geothermal brine from electricity generation
  - Wells located at uneconomical distance from power plant
  - Geothermal fluid from sub-commercial wells (low temperature/pressure wells)



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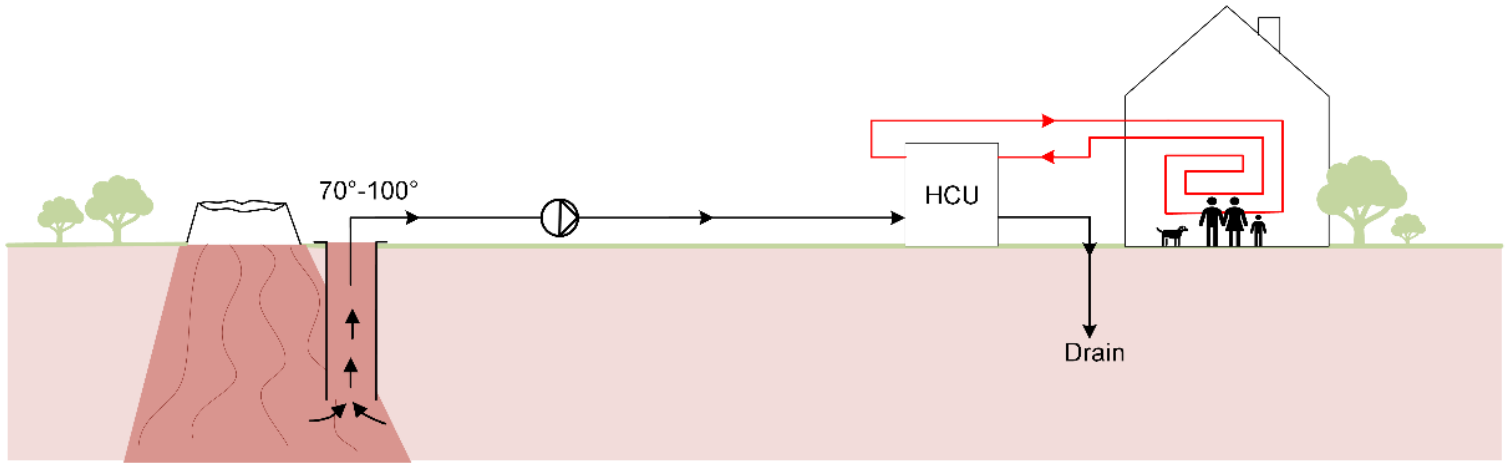

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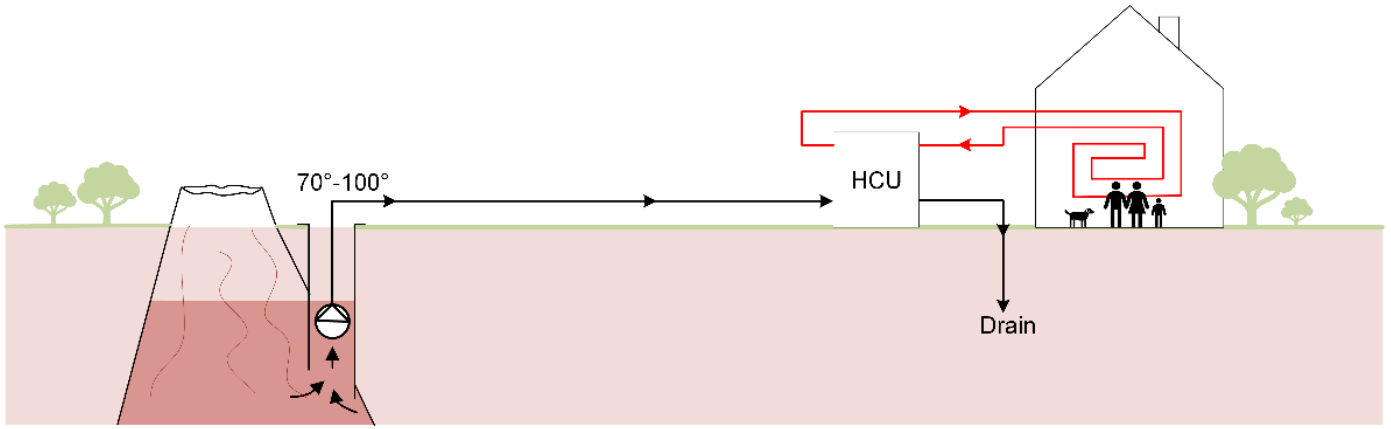

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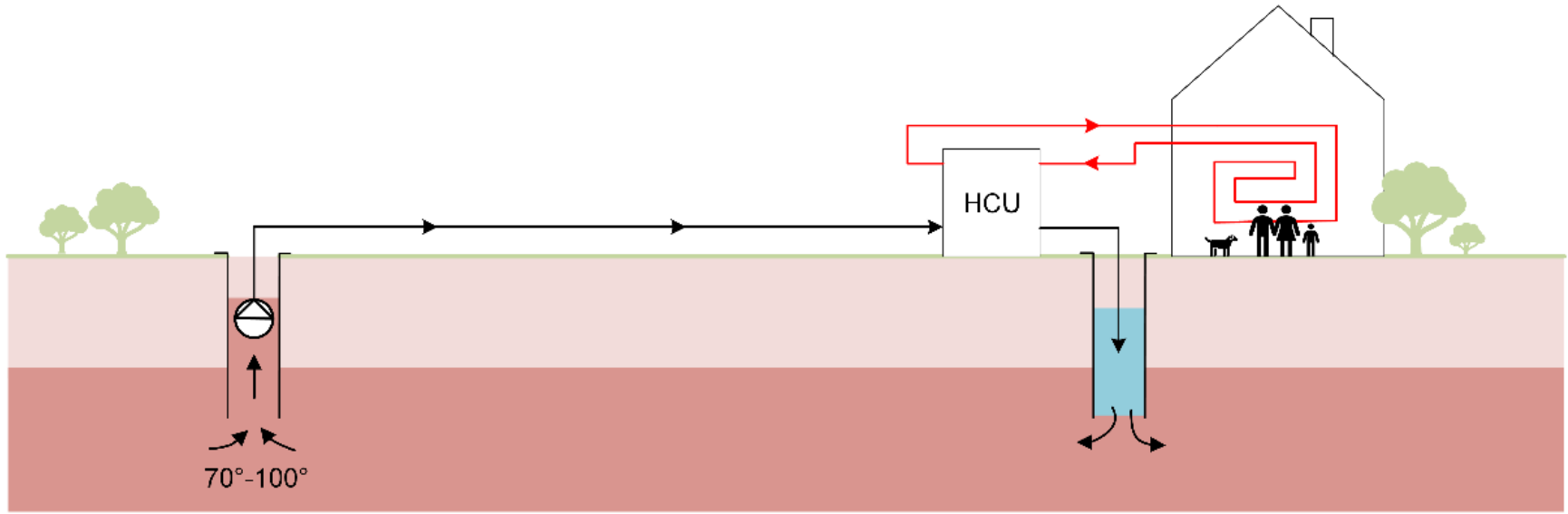
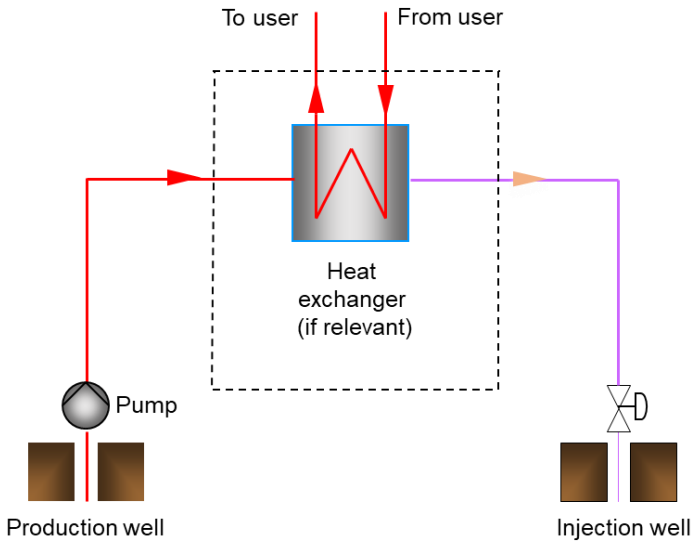


All sources in combination with re-injection

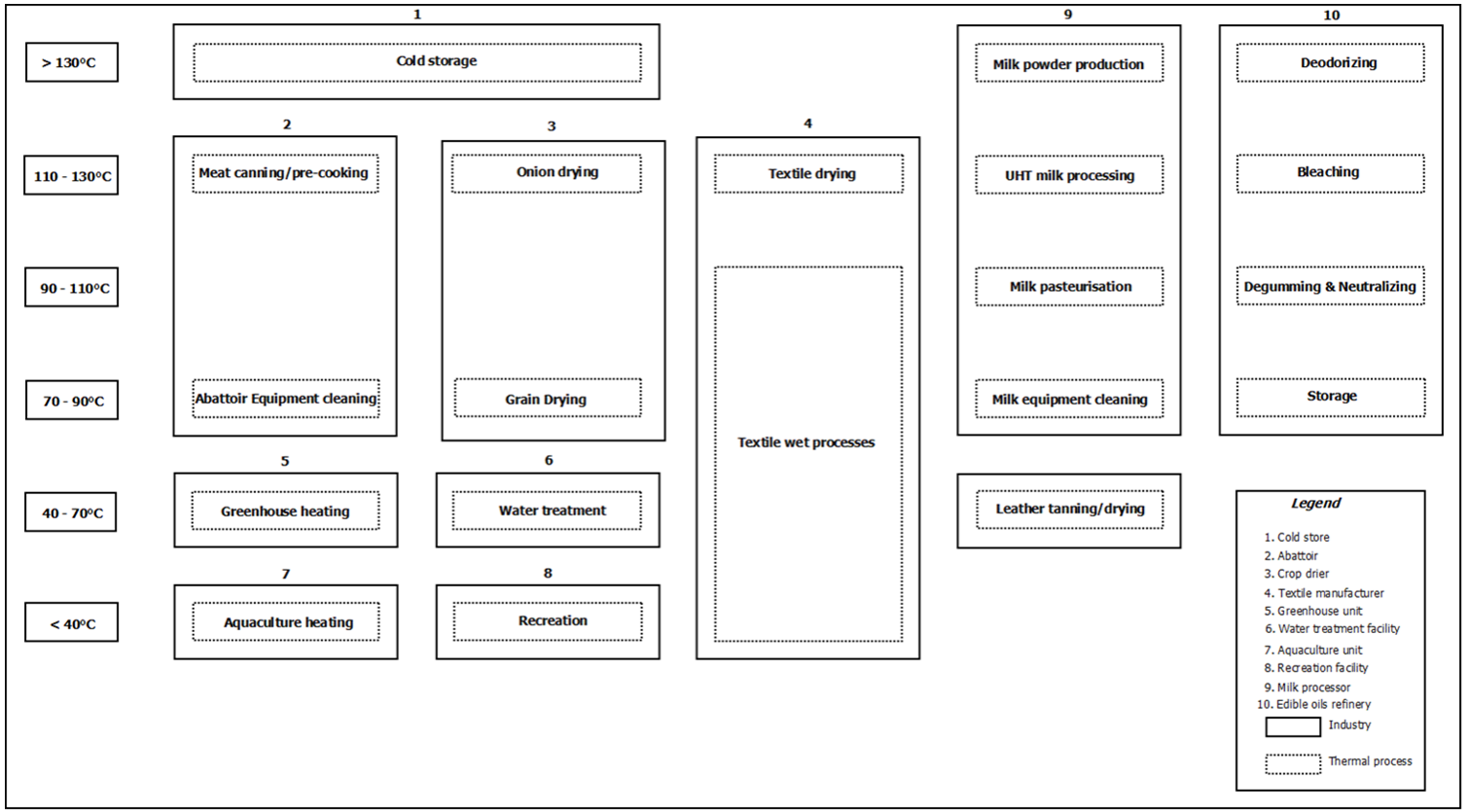
System setup – Standalone



Stand-alone systems

- Individual projects
- Naturally occurring/shallow well/existing well
- Lower cost/risks/time

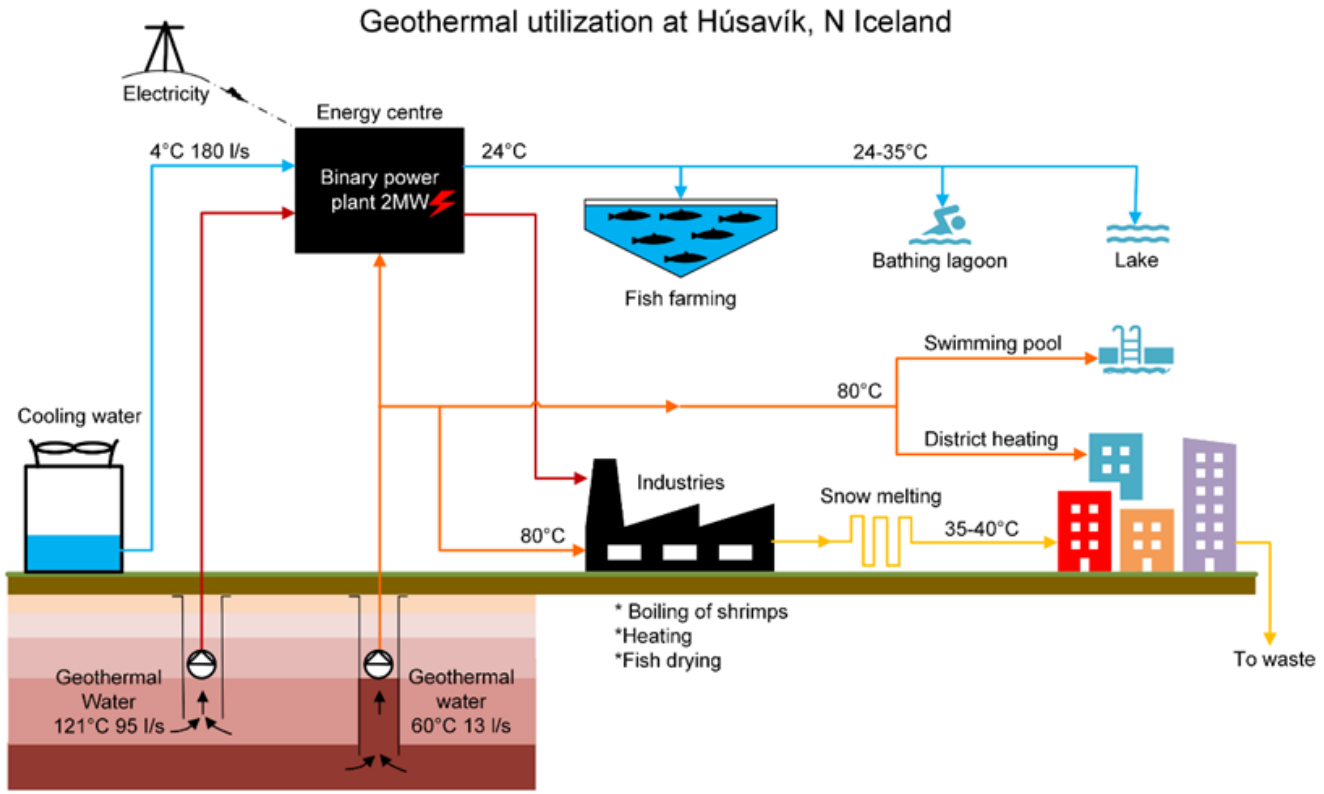
System setup – Cascade



Cascaded systems

- 2 or more projects utilizing same stream
- Medium to high temperature
- Usually drilling required
- Shared costs
- Potential lower tariffs
- Efficiency in utilisation
- Socio-economic impact
- Potentially higher costs
- Complex agreements

System setup – Integrated with electricity generation



Integrated with electricity

- Stand-alone or cascaded alongside power generation
- medium to high temp
- Resource risks and costs avoided
- Captive power with lower tariff
- Circular economy
- More revenue streams
- Complex agreements

Project Selection

Indicator	Weighted scoring (%)
Geothermal resource potential to support direct-use applications	20%
Process energy requirement of the direct-use applications	15%
Market demand of the commodity to be produced	15%
Investment potential	15%
Employment potential	15%
Socio-cultural fit for beneficiary community	10%
Environmental impacts	5%
Replicability potential	5%
Total weighted score	**100%**

Ownership models

Ownership models

- Full ownership
- Heat purchase agreement
- Partnership

Thank you

Jack Kiruja/ Country Engagement and partnerships / Global Geothermal Alliance / jkiruja@irena.org/ +971 56 5452560..

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