Table 1: Simplified Geoexchange® - Geothermal Schematic. Entries highlighted in red, indicate specific aspects requiring regulatory control.

CLASS	GEOEXCHANGE®	GEOEXCHANGE®	GEOTHERMAL	GEOTHERMAL	GEOTHERMAL	GEOTHERMAL	
Type	**(A) Geoexchange® (Ground Source Heat Pumps)**	**(B) Shallow Subsurface**	**(C-1) Conventional Low T**	**(C-2) Conventional Geothermal**	**(C-3) Conventional Geothermal**	**(D) Closed Loop* (e.g., Borehole Heat Exchanger^)**	**(E) Retrofit Downhole Heat Exchanger^**
1. Depth (typical)	<300 m; within the Groundwater table	within the Groundwater table	600 m to ~5 km	>1.5 km to ~5 km	>1.5km to ~5 km	>300 m to ~1.5 km	any
2. Temperature	Up to 30°C	Up to 30°C	30°C to 70°C	70°C – 170°C (sed basin); higher in other geological environments	170°C and above (including super critical systems)	>30°C	100°C to unspecified
3. Exploration Risk	Nil; not applicable in areas with ground ice	Nil; not applicable in areas with ground ice	Low (dependent on existing geoscience data)	Moderate -High (dependent existing geoscience data)	Moderate -High (dependent existing geoscience data)	Moderate -High (dependent existing geoscience data)	n/a
4. Capital cost (CAPEX)	Low	Low – moderate	Moderate	Moderate – high	High	Moderate – High	Low (installed in pre-existing wellbores)
5. Well bore size	Tiny	Small	Moderate to Large	Large	Large	Small – Moderate	Well bore dependent
6. Drilling rig capacity	Very small	Small or not required if surface or mine source	Large	Large	Large	Moderate – Large	n/1
7. Well control	Artesian flow	Artesian flow	Yes	Yes	Yes	Yes	n/a
8. Engineered well design for drilling below groundwater	Compliant with water well regulations.	Compliant with water well regulations or not required for surface or mine source	Yes	Yes	Yes	Yes	n/a
9. Power Generation	no	no	No (with current technology)	Yes; limited in 70°C – 110°C range	Yes	Project dependent	Yes
10. Multi commodity	No	No	Yes	Yes	Yes	No	No
11. Carbon Sequestration	No	No	Yes	Yes	Yes	No	No
12. Open loop+	No	Yes - Groundwater or surface water	Yes – open to formation	Yes – open to formation	Yes – open to formation	No	n/a
13. Closed loop	Yes	Yes	Possible; convert to Type D or E	Possible; convert to Type D or E	Possible; convert to Type D or E	Yes (closed to formation)	n/a
14. Heat pumps	Yes	Yes	No	No	No	No	No
15. Heat exchanger^	No	No	Yes	Yes (cascade off of ORC) as secondary heat recovery; heat exchanger for direct use	Yes (cascade off of Flash) ORC and heat exchanger for direct use	Yes	Yes

CLASS	GEOEXCHANGE®	GEOEXCHANGE®	GEOTHERMAL	GEOTHERMAL	GEOTHERMAL	GEOTHERMAL	
16. Enhanced permeability	No	No	Possible	Possible	Possible	Possible	n/a
17. Down hole pumps	No	No	Yes	Yes (line shaft/ESP)	No (free flow)	No (thermosyphon)	Project dependent
18. Resource degradation	No; heat/cooling balanced by external inputs	No; heat/cooling balanced by external inputs	Yes; ameliorated by good reservoir management	Yes; ameliorated by good reservoir management	Yes; ameliorated by good reservoir management	Yes; resource management required	Yes; resource management required
19. Operating costs (OPEX)	Low	Low	Low	Mod	Low	Low	Low
20. Corrosion	No	No	Possible	Possible	Possible	Possible#	Possible#
21. Scaling	No	No	Possible	Possible	Possible	Possible#	Possible#
22. Working fluid	Propylene Glycol or Ethanol or proprietary	Formation/groundwater or Propylene Glycol or Ethanol or proprietary	Formation fluid	Formation fluid	Formation fluid/steam	Proprietary fluid	Formation fluid and proprietary fluid
23. Longevity	20-30 years	20 years	More than 40 years	More than 40 years	More than 40 years	20 years?	20 years?
24. Environmental footprint	Very small	Very small	Small	Small	Small	Small	n/a
25. Surface Spatial Requirements	Very small&	Very small	Small	Small	Small	Small	n/a
26. Induced seismicity	No	No	Possible (due to injection and rock mass cooling)	Possible (due to injection and rock mass cooling)	Possible (due to injection and rock mass cooling)	Possible (due to rock mass cooling)	Possible (due to rock mass cooling)
27. EGS (engineer/enhanced)%	No	No	Yes (deep low temperature systems in crystalline rock require EGS)	Yes	Yes	Yes (deep low temperature systems in crystalline rock require EGS)	n/a

* Closed loop (Type D and E): Purpose drilled wellbores lined and using a high heat capacity fluid for heat recovery (e.g., Eavor˜) or a downhole heat exchanger (e.g., CeraPhi˜)

^ Downhole heat exchangers can be installed in wells that do not have sufficient flow to be commercial, they are recovery systems (e.g., CeraPhi˜; Green Fire˜) or are used in cases where thermal energy is being utilized at shallower depths and lower temperatures (but higher than possible with geoexchange® systems).

+ “Open loop” are systems that are open to the formation. Well completions can be “barefoot” or use perforated casing or slotted liner.

Possible corrosion and/or scaling on the exterior of the pipe/ well bore and/or heat exchanger if applicable.

& Horizontal closed loop systems can have a large footprint

% EGS = Enhanced (or Engineered) Geothermal Systems – A Geothermal reservoir that has had permeability and porosity enhanced via completions methods (fracking, acid, etc.)

˜ Companies named are used as examples of specific proprietary technologies they provide and have marketed; there is no implied endorsement of these technologies or the companies.