

### Table of contents

1	Attributes and stock of values in the tables of regulation elements .....	2
2	Levels of regulations in the Country.....	2
3	Tables of regulation elements.....	3
3.1	Implementation of NSGE application .....	3
3.2	Installation of NSGE in special geological conditions .....	4
3.3	Installation of NSGE on protected areas or natural risk zones .....	5
3.4	Public services for NSGE applications.....	5
3.5	Permitting and charging procedures for NSGE applications .....	6
4	Tables of good practices for regulation elements.....	8
4.1	Good practices for implementation of NSGE application .....	8
4.2	Good practices for installation of NSGE in special geological conditions .....	9
4.3	Good practices for installation of NSGE on protected areas or natural risk zones.....	10
4.4	Good practices for public services for NSGE applications.....	10
4.5	Good practices for permitting and charging procedures for NSGE applications .....	11



# Templates<sup>1</sup>

## 1 Attributes and stock of values in the tables of regulation elements

Attribute	Stock of values
Legal regulation	Not allowed / Allowed / Obligatory / Not required / Recommended / Not regulated
Legal instrument	Act / Decree / Rule / Standard / Voluntary standard / Technical guidance / Ordinance / Decision / Approval / Guidelines
Regulation level	EU / National / Regional / Provincial / Local

[Practical instructions: 1) the width of tables and columns is fixed, the height of rows is adapting to the content; 2) for detailed explanation or citations the footnotes shall be used; 3) regulation elements in the first column are automatically numbered, so you may insert the additional regulation element and pay attention to the numbering; 4) Pay attention for automatic numbering of footnotes and cross-references.]

## 2 Levels of regulations in the Country

Following table including Dictionary is not mandatory to fill in. Anyway, it is recommendable to facilitate stakeholders the comprehension of administrative and regulation levels in different countries that are very different in partners' countries. The aim is not to explain in the detail the structure but only to get basic reference for the information given in the questionnaire, if it is needed. Above all to reveal the position of region, state, province, department, municipality... Table can be expanded in vertical or horizontal direction to add or reduce levels.

Regulation level	1	2	3	4
<b>NATIONAL</b>				
Legal instrument				
<b>REGIONAL</b>				
Legal instrument				
<b>LOCAL</b>				
Legal instrument				

### Dictionary of Legal instruments: English - National

English term	National term	Remark
1.		

<sup>1</sup> This chapter will be included in the final deliverable as separate Annex.

English term	National term	Remark
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

### 3 Tables of regulation elements

#### 3.1 Implementation of NSGE application

Regulation element	Legal regulation	Legislative conditions	Legal instrument	Regulation level
1. Drilling /excavating below groundwater table				
2. Reinjection for NSGE-W				
3. Minimum distance to installations a. next building, b. drinking water well, c. other uses wells d. other public installations				
4. Minimum distance between neighboring NSGE installations a. heat exchanger or b. groundwater well				
5. Minimum distance to neighboring plot (property line)				
6. Minimum distance between pumping and reinjection site				
7. Temperature difference of the reinjected water (W)				

Regulation element	Legal regulation	Legislative conditions	Legal instrument	Regulation level
8. Temperature drop (H, V) a. absolute allowed $T_{min}$ , b. absolute allowed $T_{max}$ , c. relative value describing the accepted $\Delta T$ between disturbed and ambient undisturbed temperature.				
9. Heat carrier fluid type				
10. Refrigerant type				
11. Tightness – ground loop and refrigerant tubing				
12. Backfilling of BHE				
13. Liquidation procedure after abandonment of NSGE installation a. heat pump b. heat exchanger				
14. Monitoring				

### 3.2 Installation of NSGE in special geological conditions

Regulation element	Legal regulation	Legislative conditions	Legal instrument	Level
15. Artesian aquifers				
16. Very shallow water table where reinjection can be problematic				
17. Perched groundwater layers				
18. Two or multiple aquifer layers				
19. Mineral water resources				
20. Thermal water resources				
21. Gas occurrences				

22. Unstable ground a. compressible soil b. landslide c. evaporate (with the risk of swelling / dissolution)				
23. Contaminated soil				
24. Karst area				

### 3.3 Installation of NSGE on protected areas or natural risk zones

Regulation element	Legal regulation	Legislative conditions	Legal instrument	Level
25. Water protection area (WPA)				
26. Natura 2000 area				
27. Nature protected ecosystem area				
28. Flood and erosion areas				
29. Landslide area				
30. Riparian / coastal zone				
31. Other areas a. ... b. ...				

### 3.4 Public services for NSGE applications<sup>2</sup>

<sup>2</sup> Information asked in the table "**Fehler! Verweisquelle konnte nicht gefunden werden.**" is to describe how planning tools in the framework of public services are regulated. This could be:

1. Planning: via setting the objectives (for example, in National renewable resources energy plans) regulating subsidies and insurance system for investments
2. Providing evidences (of natural resources, energy use,...) to support planning in the general interest as well as stimulate the effectiveness of investment by providing good data of natural resources to designers, installers, and investors

Regulation element	Legal regulation	Legislative conditions	Legal instrument	Level
32. NSGE (GSHP) objectives a. national (NREAP) b. regional c. local (LEC...)				
33. Subsidies				
34. Insurance system				
35. Certification a. professionals b. organization				
36. Borehole drilling report				
37. Pumping test report				
38. Thermal response test report				
39. Reception of borehole by the investor				
40. Water pumping data periodic report				
41. Heat energy production data periodic report from NSGE				
42. Register of heat pumps				
43. Register of heat exchanger				
44. Register of NSGE production				
45. Register of drilling data				
46. Register of geothermal data				
47. Register of groundwater abstraction				

### 3.5 Permitting and charging procedures for NSGE applications

Regulation element	Legal regulation	Legislative conditions	Legal instrument	Level

3. Reducing bad practices by providing availability of information on natural resources and by providing education/certification schemes...

It is all about regulation of financial and mainly non-financial incentives concerning NSGE.

Regulation element	Legal regulation	Legislative conditions	Legal instrument	Level
48. Research/drilling permit				
49. Declaration / Recorded special use of water				
50. Water consent				
51. Water permit				
52. Water fee				
53. Concession				
54. Royalty / concession fee				
55. Energy fee				

#### Dictionary of permitting and charging terms: English – National language

English term	National term	Remark
Declaration		
Recorded special use of water		
Water consent		
Water right a. Recorded special use b. Water permit c. Concession		
Water fee / Water charge		
Royalty		
Concession fee		

National term / abbreviation	Explanation

## 4 Tables of good practices for regulation elements

### 4.1 Good practices for implementation of NSGE application

Regulation element	Good practice example	Scientifically base	Explanation	Source
1. Drilling /excavating below groundwater table				
2. Reinjection for NSGE-W				
3. Minimum distance to installations a. next building, b. drinking water well, c. other uses wells d. other public installations				
4. Minimum distance between neighboring NSGE installations a. heat exchanger or b. groundwater well				
5. Minimum distance to neighboring plot (property line)				
6. Minimum distance between pumping and reinjection site				
7. Temperature difference of the reinjected water (W)				
8. Temperature drop (H, V) a. absolute allowed $T_{min}$ , b. absolute allowed $T_{max}$ , c. relative value describing the accepted $\Delta T$ between disturbed and ambient undisturbed temperature.				
9. Heat carrier fluid type				
10. Refrigerant type				
11. Tightness – ground loop and refrigerant tubing				
12. Backfilling of BHE				



Regulation element	Good practice example	Scientifically base	Explanation	Source
13. Liquidation procedure after abandonment of NSGE installation a. heat pump b. heat exchanger				
14. Monitoring				

#### 4.2 Good practices for installation of NSGE in special geological conditions

Regulation element	Good practice example	Scientifically base	Explanation	Source
15. Artesian aquifers				
16. Very shallow water table where reinjection can be problematic				
17. Perched groundwater layers				
18. Two or multiple aquifer layers				
19. Mineral water resources				
20. Thermal water resources				
21. Gas occurrences				
22. Unstable ground a. compressible soil b. landslide c. evaporate (with the risk of swelling / dissolution)				
23. Contaminated soil				
24. Karst area				

### 4.3 Good practices for installation of NSGE on protected areas or natural risk zones

Regulation element	Good practice example	Scientifically base	Explanation	Source
25. Water protection area (WPA)				
26. Natura 2000 area				
27. Nature protected ecosystem area				
28. Flood and erosion areas				
29. Landslide area				
30. Riparian / coastal zone				
31. Other areas a. ... b. ...				

### 4.4 Good practices for public services for NSGE applications<sup>3</sup>

Regulation element	Good practice example	Scientifically base	Explanation	Source
32. NSGE (GSHP) objectives a. national (NREAP) b. regional c. local (LEC...)				

<sup>3</sup> Information asked in the table "**Fehler! Verweisquelle konnte nicht gefunden werden.**" is to describe how planning tools in the framework of public services are regulated. This could be: 1. Planning: via setting the objectives (for example, in National renewable resources energy plans) regulating subsidies and insurance system for investments 2. Providing evidences (of natural resources, energy use,...) to support planning in the general interest as well as stimulate the effectiveness of investment by providing good data of natural resources to designers, installers, and investors 3. Reducing bad practices by providing availability of information on natural resources and by providing education/certification schemes... 4. It is all about regulation of financial and mainly non-financial incentives concerning NSGE.

Regulation element	Good practice example	Scientifically base	Explanation	Source
33. Subsidies				
34. Insurance system				
35. Certification a. professionals b. organization				
36. Borehole drilling report				
37. Pumping test report				
38. Thermal response test report				
39. Reception of borehole by the investor				
40. Water pumping data periodic report				
41. Heat energy production data periodic report from NSGE				
42. Register of heat pumps				
43. Register of heat exchanger				
44. Register of NSGE production				
45. Register of drilling data				
46. Register of geothermal data				
47. Register of groundwater abstraction				

#### 4.5 Good practices for permitting and charging procedures for NSGE applications

Regulation element	Good practice example	Scientifically base	Explanation	Source
48. Research/drilling permit				
49. Declaration / Recorded special use of water				
50. Water consent				
51. Water permit				
52. Water fee				
53. Concession				
54. Royalty / concession fee				

Regulation element	Good practice example	Scientifically base	Explanation	Source
55. Energy fee				