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Department of Infrastructure and Energy

**GEOHERMAL RISK MITIGATION FACILITY
FOR EASTERN AFRICA (GRMF)**



**Anticipated Well Cost Guidelines
(Fifth Edition)**

Project funded by:



European Union Africa
Infrastructure Trust Fund

BMZ



Bundesministerium für
wirtschaftliche Zusammenarbeit
und Entwicklung

KFW





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1 BACKGROUND

Applicants shall estimate costs for their proposed drilling programme in line with these Anticipated Well Cost (AWC) Guidelines. The AWC Guidelines specify the allowable cost structure for standard drilling cost items, such as casing, cementing, rig hire, necessary services or consumables (so-called AWC items) for drilling projects applying for funding by the Geothermal Risk Mitigation Facility (GRMF).

For each individual AWC item, the maximum allowable percentage of total AWC items cost that can be allocated to this item is stated. Different maximum percentages are given for wells of different types, diameters and depth intervals.

The AWC Guidelines also outline the maximum allowable total drilling metre costs taking into account the total cost of AWC items “A-X”. It is however to be noted that rig mobilisation and rig demobilisation are not accounted for in the metre price calculation, as may be seen in the AWC Guideline tables below. Maximum allowable metre prices are stated for different types of well, diameters and depths intervals.

Only costs directly associated with the drilling are eligible.

The AWC Guideline tables exclude a number of eligible, either mandatory or optional goods and services (so-called non-AWC items), since as a percentage, the non-AWC items will vary significantly depending on how many wells are in the programme and on the specific drilling programme. All costs for these non-AWC items must still be clearly justified in the technical Application and stated as separate cost items in the cost estimate. They will be assessed separately.

Where an Applicant plans to use its own resources for drilling (for example if it owns the rig), non-AWC items are eligible but will be rigorously verified to make sure they are reasonable and in line with market prices.

Any exceedance over the indicated maximum percentage or maximum drilling metre cost need to be substantially justified in order to allow for a case to case assessment and an evaluation of their exceptional acceptability.

At the same time, Applicants need to justify that the equipment is appropriate for the envisaged drilling plan, diameter, depth, draw capability etc. This shall be done in the technical Application.

The following tables are broken down by well diameter (slim hole / standard size / wide diameter), for several depth ranges and for whether they are vertical or directional. For deviated wells, the numbers are given based on a Kickoff Point (KOP) of 450 m and a deviation of 30°.

2 SLIM HOLE WELLS

Slim hole wells are defined as wells with < 5" diameter of the last casing or liner. A typical slim hole sizes are shown in Table 1. The following two pages give the AWC Guideline values for slim hole vertical and deviated wells.

Table 1: Slim Hole Well Sizes.

Hole Diameter, OD*	Casing Diameter / Casing weight	Drilled depth, TD*	Cased Depth, TD
17-1/2"	13-3/8" / 68 ppf*	0-100 (150) m	0-100 (150) m
12-1/4"	9-5/8" / 47 ppf	100 (150)-400 (600) m	0-400 (600) m
8-1/2"	7" / 23 ppf	400 (600)-700 (1000) m	0-700 (1000) m
6"	4-1/2" slotted liner	700 (1000)-2500 m	700 (1000)-2500 m

*OD: outer diameter; ppf: pounds per foot; TD: total depth

		SLIM Hole - VERTICAL					
		Bottom of conductor pipe to 450 m		450 m to 1500 m		1500 m to beyond	
Item	Description	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled
	Rig move in	Maximum 10%					
A	Site Preparation including Conductor Pipe	8%	\$650,00	NA	\$900,00	NA	\$1.100,00
B	Consultancy / Management	3%		3%		3%	
C	Cementing	10%		9%		10%	
D	Directional Drilling	NA		NA		NA	
E	Drilling Fluids, Compressors	4%		5%		6%	
F	Drilling Tools Rental	4%		4%		4%	
G	Bits	6%		6%		6%	
H	BOP and Rotating Head	2%		2%		2%	
I	Well Logging	5%		5%		5%	
J	Casing	14%		14%		14%	
K	Casing Accessories and Liner Adapter	1%		1%		1%	
L	Surface Logging - Mud Logging	4%		4%		4%	
M	Fuels and Oils	8%		8%		8%	
N	Water Supply Pumps Rental and Water	5%		5%		5%	
O	Wellhead and Valves	2%		2%		2%	
P	Rig Operating Day Rate	30%		30%		30%	
Q	Camp Day Rate including Telecommunication	4%		4%		4%	
R	Welding and X-Ray Services	1%		1%		1%	
S	Pipe Inspection and Hardbanding Services	1%		1%		1%	
T	Support Services, Wellsite Security, Transport of Personnel	4%		4%		4%	
U	Documentation and reports	1%	1%	1%			
V	Contingency on long lead items	5%	5%	5%			
W	Contingency on services	5%	5%	5%			
X	Other contingencies	5%	5%	5%			
	Rig move out	maximum 10%					

		SLIM Hole - DEVIATED: KOP=450 m					
		Bottom of conductor pipe to 450 m		450 m to 1500 m		1500 m to beyond	
Item	Description	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled
	Rig move in	Maximum 10%					
A	Site Preparation including Conductor Pipe	8%	\$750,00	NA	\$1.050,00	NA	\$1.200,00
B	Consultancy / Management	3%		3%		3%	
C	Cementing	10%		9%		10%	
D	Directional Drilling	4%		4%		4%	
E	Drilling Fluids, Compressors	4%		5%		6%	
F	Drilling Tools Rental	4%		4%		4%	
G	Bits	6%		6%		6%	
H	BOP and Rotating Head	2%		2%		2%	
I	Well Logging	5%		5%		5%	
J	Casing	14%		14%		14%	
K	Casing Accessories and Liner Adapter	1%		1%		1%	
L	Surface Logging - Mud Logging	4%		4%		4%	
M	Fuels and Oils	8%		8%		8%	
N	Water Supply Pumps Rental and Water	5%		5%		5%	
O	Wellhead and Valves	2%		2%		2%	
P	Rig Operating Day Rate	30%		30%		30%	
Q	Camp Day Rate including Telecommunication	4%		4%		4%	
R	Welding and X-Ray Services	1%		1%		1%	
S	Pipe Inspection and Hardbanding Services	1%		1%		1%	
T	Support Services, Wellsite Security, Transport of Personnel	4%		4%		4%	
U	Documentation and reports	1%	1%	1%			
V	Contingency on long lead items	5%	5%	5%			
W	Contingency on services	5%	5%	5%			
X	Other contingencies	5%	5%	5%			
	Rig move out	Maximum 10%					

3 STANDARD SIZE WELLS

Standard size wells are defined as wells with ≥ 5 " but $< 9\text{-}5/8$ " diameter of the last casing or liner. Typical standard sized well sizes are shown in Table 2. The following two pages give the AWC Guideline values for standard size vertical and deviated wells.

Table 2: Standard Size Well Sizes.

Hole Diameter, OD*	Casing Diameter / Casing weight	Drilled depth, TD*	Cased Depth, TD
26"	20" / 94 ppf*	0-100 (150) m	0-100 (150) m
17-1/2"	13-3/8" / 68 ppf	100 (150)-400 (600) m	0- 400 (600) m
12-1/4"	9-5/8" / 47 ppf	400 (600)-700 (1000) m	0-700 (1000) m
8-1/2"	7" / 23 ppf slotted liner	700 (1000)-2500 m	700 (1000) m – 2500 m

*OD: outer diameter; ppf: pounds per foot; TD: total depth

		Standard Size - VERTICAL					
		Bottom of conductor pipe to 450 m		450 m to 1500 m		1500 m to beyond	
Item	Description	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled
	Rig move in	Maximum 11%					
A	Site Preparation including Conductor Pipe	10%	\$1.250,00	NA	\$1.400,00	NA	\$1.700,00
B	Consultancy / Management	3%		3%			
C	Cementing	10%		9%			
D	Directional Drilling	NA		NA			
E	Drilling Fluids, Compressors	4%		5%			
F	Drilling Tools Rental	4%		4%			
G	Bits	6%		6%			
H	BOP and Rotating Head	2%		2%			
I	Well Logging	5%		5%			
J	Casing	14%		14%			
K	Casing Accessories and Liner Adapter	1%		1%			
L	Surface Logging - Mud Logging	4%		4%			
M	Fuels and Oils	8%		8%			
N	Water Supply Pumps Rental and Water	5%		5%			
O	Wellhead and Valves	2%		2%			
P	Rig Operating Day Rate	32%		32%			
Q	Camp Day Rate including Telecommunication	4%		4%			
R	Welding and X-Ray Services	1%		1%			
S	Pipe Inspection and Hardbanding Services	1%		1%			
T	Support Services, Wellsite Security, Transport of Personnel	4%	4%				
U	Documentation and reports	1%	1%				
V	Contingency on long lead items	5%	5%				
W	Contingency on services	5%	5%				
X	Other contingencies	5%	5%				
	Rig move out	Maximum 11%					

		Standard Size - DEVIATED: KOP=450 m					
		Bottom of conductor pipe to 450 m		450 m to 1500 m		1500 m to beyond	
Item	Description	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled
	Rig move in	Maximum 11%					
A	Site Preparation including Conductor Pipe	10%	\$1.250,00	NA	\$1.800,00	NA	\$2.100,00
B	Consultancy / Management	3%		3%		3%	
C	Cementing	10%		9%		10%	
D	Directional Drilling	4%		4%		4%	
E	Drilling Fluids, Compressors	4%		5%		6%	
F	Drilling Tools Rental	4%		4%		4%	
G	Bits	6%		6%		6%	
H	BOP and Rotating Head	2%		2%		2%	
I	Well Logging	5%		5%		5%	
J	Casing	14%		14%		14%	
K	Casing Accessories and Liner Adapter	1%		1%		1%	
L	Surface Logging - Mud Logging	4%		4%		4%	
M	Fuels and Oils	8%		8%		8%	
N	Water Supply Pumps Rental and Water	5%		5%		5%	
O	Wellhead and Valves	2%		2%		2%	
P	Rig Operating Day Rate	32%		32%		32%	
Q	Camp Day Rate including Telecommunication	4%		4%		4%	
R	Welding and X-Ray Services	1%		1%		1%	
S	Pipe Inspection and Hardbanding Services	1%		1%		1%	
T	Support Services, Wellsite Security, Transport of Personnel	4%		4%		4%	
U	Documentation and reports	1%	1%	1%			
V	Contingency on long lead items	5%	5%	5%			
W	Contingency on services	5%	5%	5%			
X	Other contingencies	5%	5%	5%			
	Rig move out	Maximum 11%					

4 WIDE DIAMETER WELLS

Wide diameter wells are defined as wells with $\geq 9\text{-}5/8\text{'}$ diameter of the last casing or liner. Typical large diameter well sizes are shown in Table 3. The following two pages give the AWC Guideline values for wide diameter vertical and deviated wells.

Table 3: Wide Diameter Well Sizes.

Hole Diameter, OD*	Casing Diameter / Casing weight	Drilled depth, TD*	Cased Depth, TD
32"	26-1/2" WT*	100 m	0-100 m
24"	18-5/8" / 87.5 ppf*	100-350 m	0-350 m
17-1/2"	13-3/8" / 68 ppf	350-1000 m	0-1000 m
12-1/4"	9-5/8" / 47 ppf slot- ted liner	1000-2500 m	1000-2500 m

*OD: outer diameter; WT: welded tube; ppf: pounds per foot; TD: total depth

		LARGE Diameter - VERTICAL					
		Bottom of conductor pipe to 450 m		450 m to 1500 m		1500 m to beyond	
Item	Description	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled
	Rig move in	Maximum 11%					
A	Site Preparation including Conductor Pipe	10%	\$1,500,00	NA	\$1,800,00	NA	\$2,200,00
B	Consultancy / Management	3%		3%		3%	
C	Cementing	10%		9%		10%	
D	Directional Drilling	NA		NA		NA	
E	Drilling Fluids, Compressors	4%		5%		6%	
F	Drilling Tools Rental	4%		4%		4%	
G	Bits	6%		6%		6%	
H	BOP and Rotating Head	2%		2%		2%	
I	Well Logging	5%		5%		5%	
J	Casing	14%		14%		14%	
K	Casing Accessories and Liner Adapter	1%		1%		1%	
L	Surface Logging - Mud Logging	4%		4%		4%	
M	Fuels and Oils	8%		8%		8%	
N	Water Supply Pumps Rental and Water	5%		5%		5%	
O	Wellhead and Valves	2%		2%		2%	
P	Rig Operating Day Rate	32%		32%		32%	
Q	Camp Day Rate including Telecommunication	4%		4%		4%	
R	Welding and X-Ray Services	1%		1%		1%	
S	Pipe Inspection and Hardbanding Services	1%		1%		1%	
T	Support Services, Wellsite Security, Transport of Personnel	4%		4%		4%	
U	Documentation and reports	1%	1%	1%			
V	Contingency on long lead items	5%	5%	5%			
W	Contingency on services	5%	5%	5%			
X	Other contingencies	5%	5%	5%			
	Rig move out	Maximum 11%					

		LARGE Diameter - DEVIATED: KOP=450 m					
		Bottom of conductor pipe to 450 m		450 m to 1500 m		1500 m to beyond	
Item	Description	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled	Maximum allowable percentage to total AWC cost	Maximum allowable total AWC cost per metre drilled
	Rig move in	Maximum 11%					
A	Site Preparation including Conductor Pipe	10%	\$1.500,00	NA	\$2.200,00	NA	\$2.500,00
B	Consultancy / Management	3%		3%		3%	
C	Cementing	10%		9%		10%	
D	Directional Drilling	4%		4%		4%	
E	Drilling Fluids, Compressors	4%		5%		6%	
F	Drilling Tools Rental	4%		4%		4%	
G	Bits	6%		6%		6%	
H	BOP and Rotating Head	2%		2%		2%	
I	Well Logging	5%		5%		5%	
J	Casing	14%		14%		14%	
K	Casing Accessories and Liner Adapter	1%		1%		1%	
L	Surface Logging - Mud Logging	4%		4%		4%	
M	Fuels and Oils	8%		8%		8%	
N	Water Supply Pumps Rental and Water	5%		5%		5%	
O	Wellhead and Valves	2%		2%		2%	
P	Rig Operating Day Rate	32%		32%		32%	
Q	Camp Day Rate including Telecommunication	4%		4%		4%	
R	Welding and X-Ray Services	1%		1%		1%	
S	Pipe Inspection and Hardbanding Services	1%		1%		1%	
T	Support Services, Wellsite Security, Transport of Personnel	4%		4%		4%	
U	Documentation and reports	1%	1%	1%			
V	Contingency on long lead items	5%	5%	5%			
W	Contingency on services	5%	5%	5%			
X	Other contingencies	5%	5%	5%			
	Rig move out	Maximum 11%					