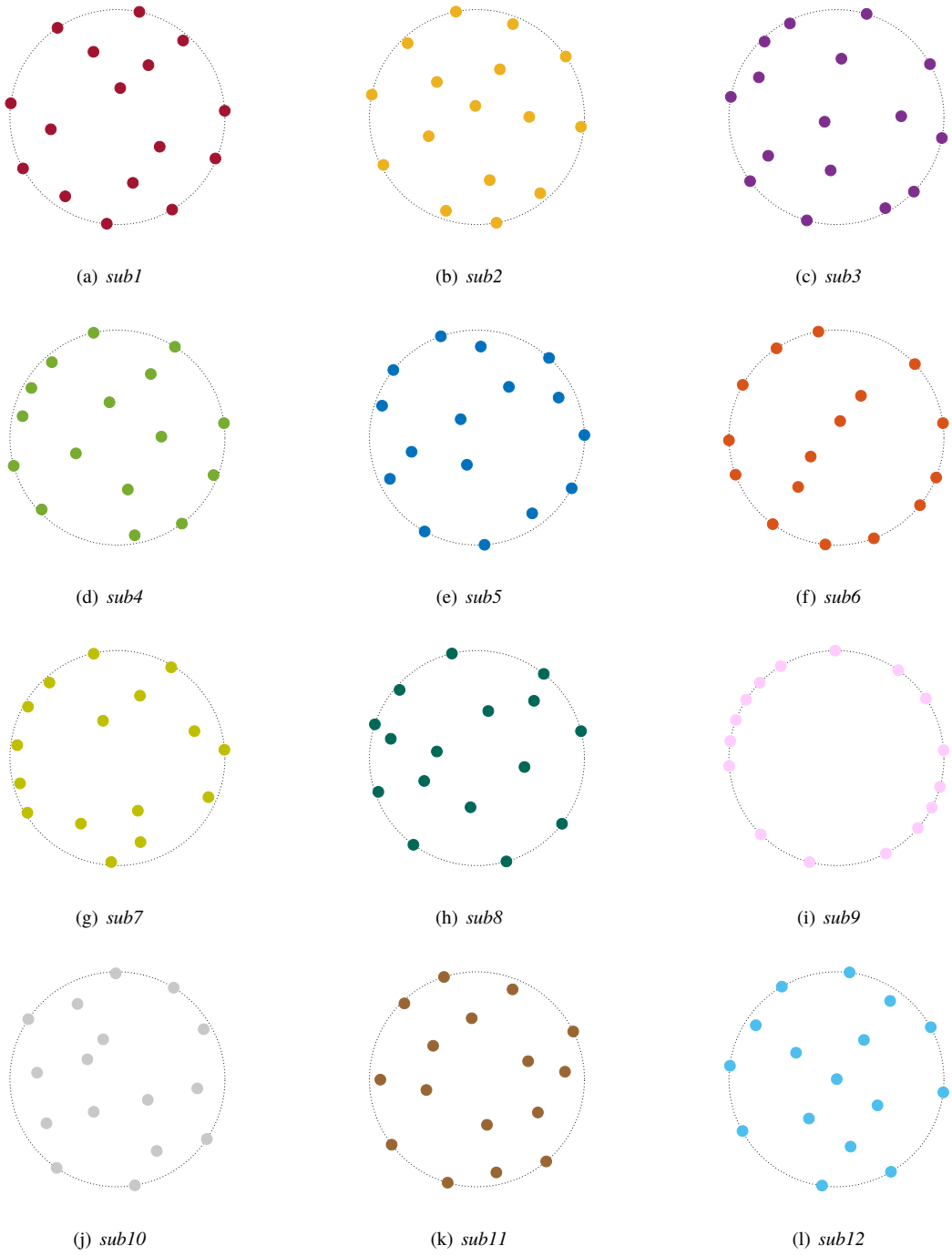
Appendix

This appendix contains plots of the optimized wind farm layouts submitted by all participants for case study 1. The optimized layouts for case study 1 are shown in Figs. 1 to 3 for the 16, 36, and 64 turbine wind farms, respectively.



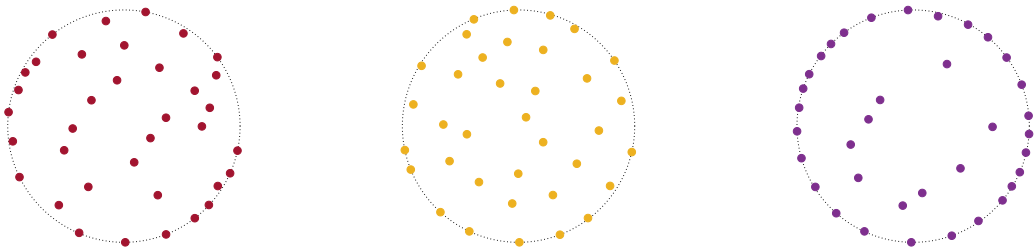
(a) *sub1* (b) *sub2* (c) *sub3*

(d) *sub4* (e) *sub5* (f) *sub6*

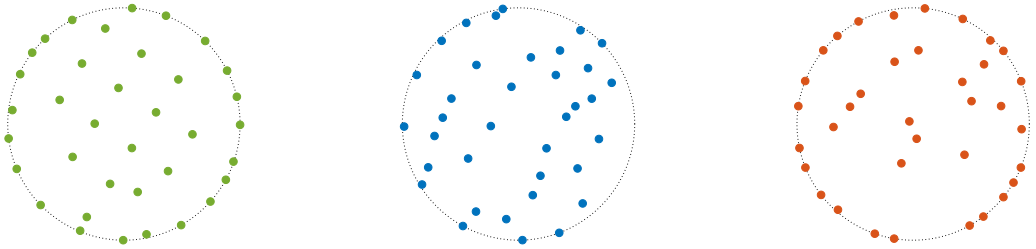
(g) *sub7* (h) *sub8* (i) *sub9*

(j) *sub10* (k) *sub11* (l) *sub12*

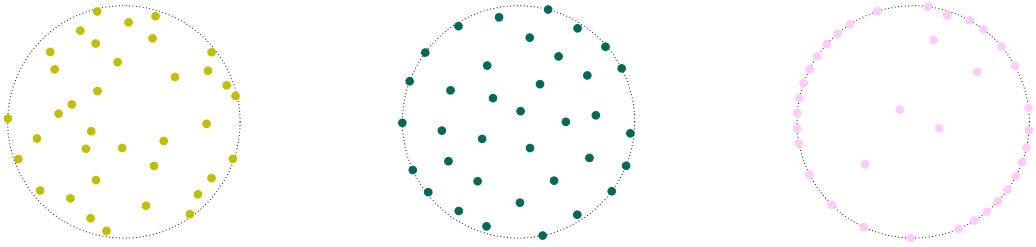
Figure 1 Case study 1: optimized wind farm layouts with 16 wind turbines.



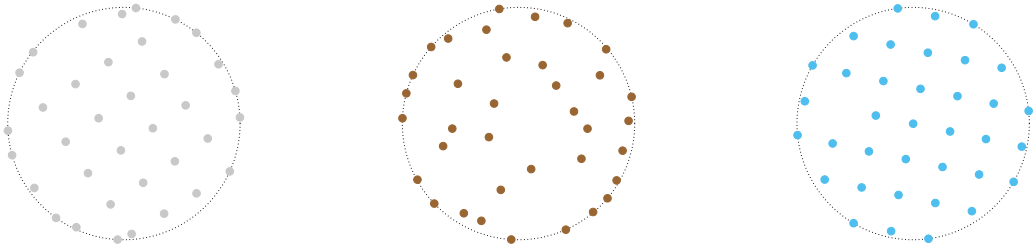
(a) *sub1* (b) *sub2* (c) *sub3*



(d) *sub4* (e) *sub5* (f) *sub6*

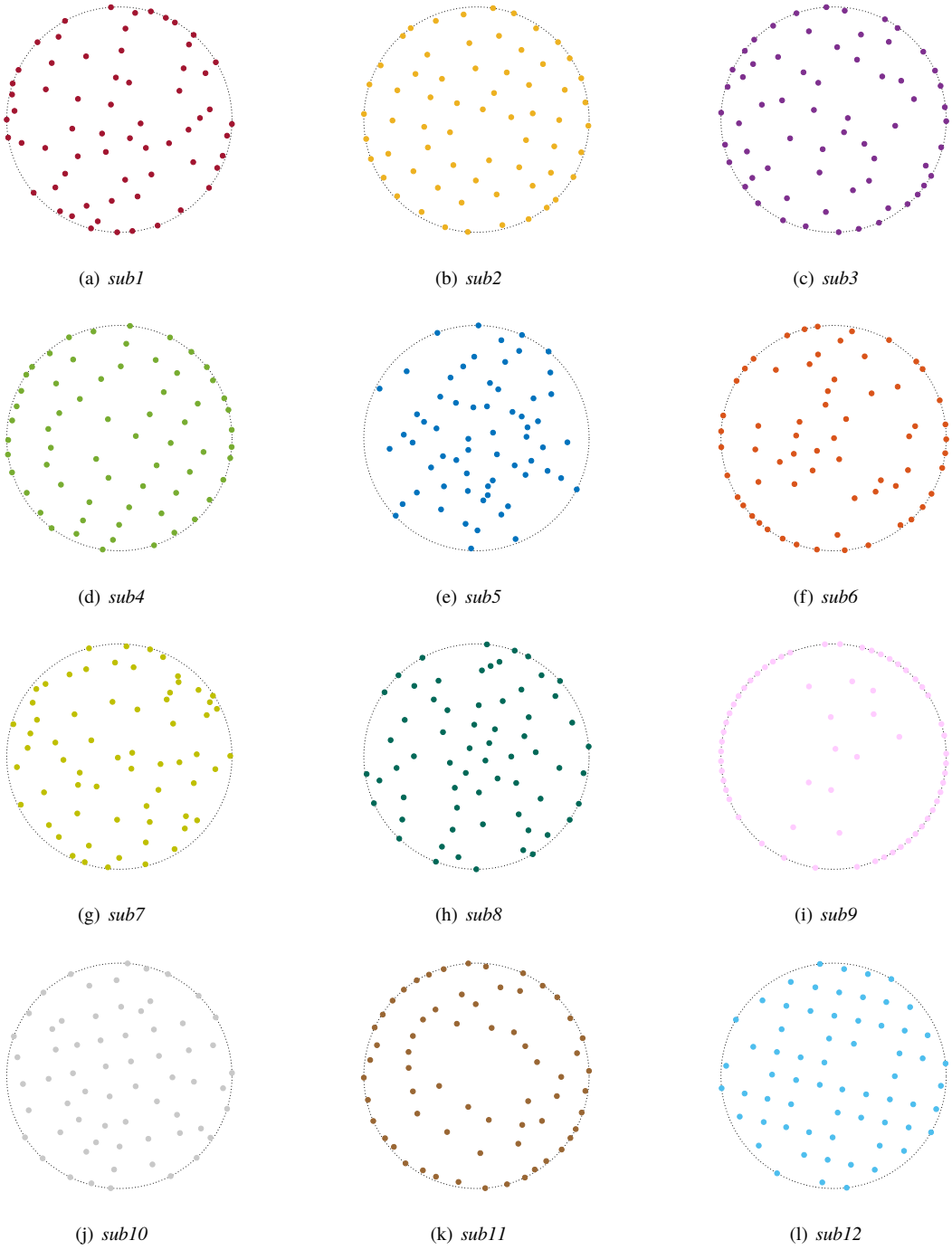


(g) *sub7* (h) *sub8* (i) *sub9*



(j) *sub10* (k) *sub11* (l) *sub12*

Figure 2 Case study 1: optimized wind farm layouts with 36 wind turbines.



(a) *sub1* (b) *sub2* (c) *sub3*

(d) *sub4* (e) *sub5* (f) *sub6*

(g) *sub7* (h) *sub8* (i) *sub9*

(j) *sub10* (k) *sub11* (l) *sub12*

Figure 3 Case study 1: optimized wind farm layouts with 64 wind turbines.

Table 1 16 turbine scenario participant results

Rank	Algorithm	sub#	Grad.	AEP	Increase
1	Quantum	12	GF	421561.8972	14.88 %
2	SNOPT+WEC	4	G	418924.4064	14.17 %
3	fmincon	5	G	414141.2938	12.86 %
4	SNOPT	8	G	412251.1945	12.35 %
5	SNOPT	1	G	411182.2200	12.06 %
6	SLSQP	11	G	409850.3275	11.69 %
7	Preconditioned Sequential Quadratic Programming	2	G	409689.4417	11.65 %
8	Multistart Interior-Point	10	G	408360.7813	11.29 %
9	Full Pseudo-Gradient Approach	3	GF	402318.7567	9.64 %
10	Basic Genetic Algorithm	7	GF	392587.8580	6.99 %
11	Simple Particle Swarm Optimization	6	GF	388758.3573	5.95 %
12	Simple Pseudo-Gradient Approach	9	GF	388342.7004	5.83 %
13	(Example Layout)	-	-	366941.5712	-

Table 2 36 turbine scenario participant results

Rank	Algorithm	sub#	Grad.	AEP	Increase
1	Quantum	12	GF	882383.3040	19.58 %
2	SNOPT+WEC	4	G	863676.2993	17.05 %
3	Multistart Interior-Point	10	G	851631.9310	15.42 %
4	Preconditioned Sequential Quadratic Programming	2	G	849369.7863	15.11 %
5	SNOPT	8	G	846357.8142	14.70 %
6	SLSQP	11	G	846255.1503	14.68 %
7	SNOPT	1	G	844281.1609	14.42 %
8	Full Pseudo-Gradient Approach	3	GF	828745.5992	12.31 %
9	fmincon	5	G	820394.2402	11.18 %
10	Simple Pseudo-Gradient Approach	9	GF	813544.2105	10.25 %
11	Basic Genetic Algorithm	7	GF	777475.7827	5.37 %
12	Simple Particle Swarm Optimization	6	GF	776000.1425	5.17 %
13	(Example Layout)	-	-	737883.0985	-

Table 3 64 turbine scenario participant results

Rank	Algorithm	sub#	Grad.	AEP	Increase
1	Quantum	12	GF	1526474.8025	17.88 %
2	SNOPT+WEC	4	G	1513311.1936	16.86 %
3	Preconditioned Sequential Quadratic Programming	2	G	1506388.4151	16.33 %
4	SLSQP	11	G	1484287.2607	14.62 %
5	Multistart Interior-Point	10	G	1480850.9759	14.35 %
6	SNOPT	1	G	1476689.6627	14.03 %
7	Full Pseudo-Gradient Approach	3	GF	1455075.6084	12.36 %
8	SNOPT	8	G	1445967.3772	11.66 %
9	Simple Pseudo-Gradient Approach	9	GF	1422268.7144	9.83 %
10	Simple Particle Swarm Optimization	6	GF	1364943.0077	5.40 %
11	fmincon	5	G	1336164.5498	3.18 %
12	Basic Genetic Algorithm	7	GF	1332883.4328	2.93 %
13	(Example Layout)	-	-	1294974.2977	-