Terraforming LIFE

Turning fish sludge & manure into biogas & fertiliser

Ölfus Municipality Town Hall – September 29th, 2025
Sigurður Trausti Karvelsson, Project Coordinator

Co-funded by
the European Union

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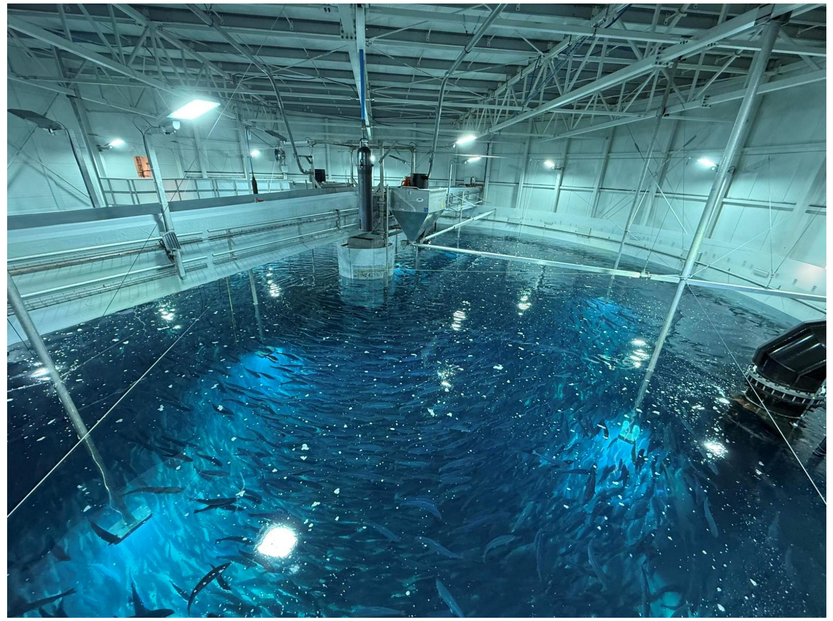
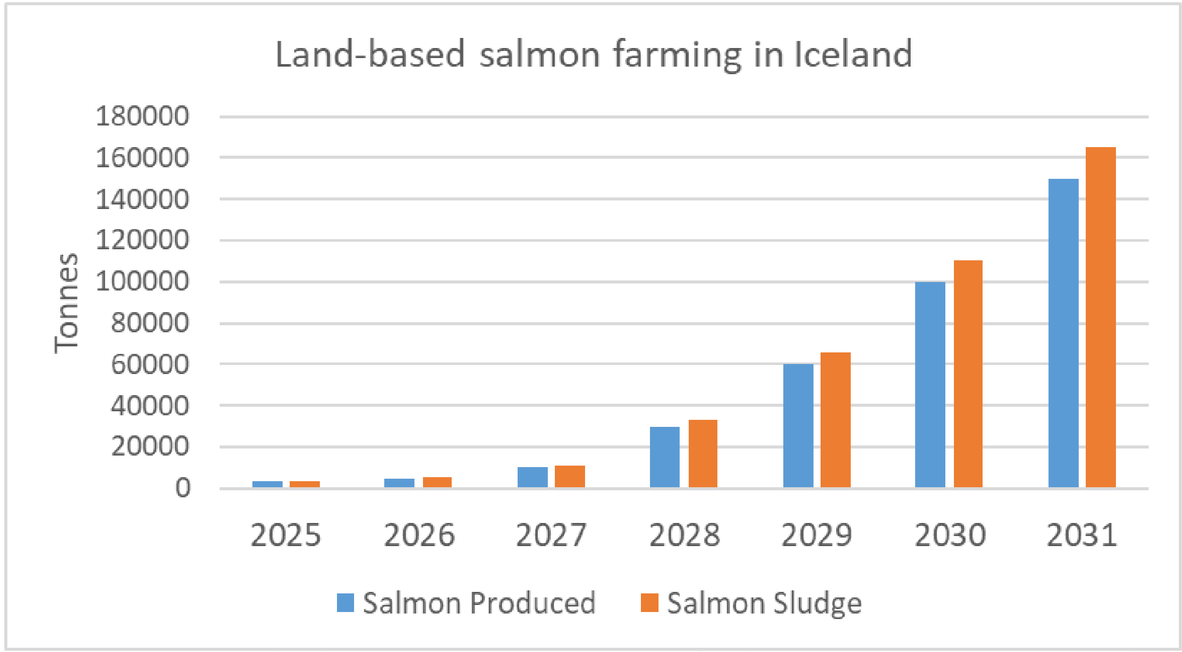
Land-based fish farming in Iceland

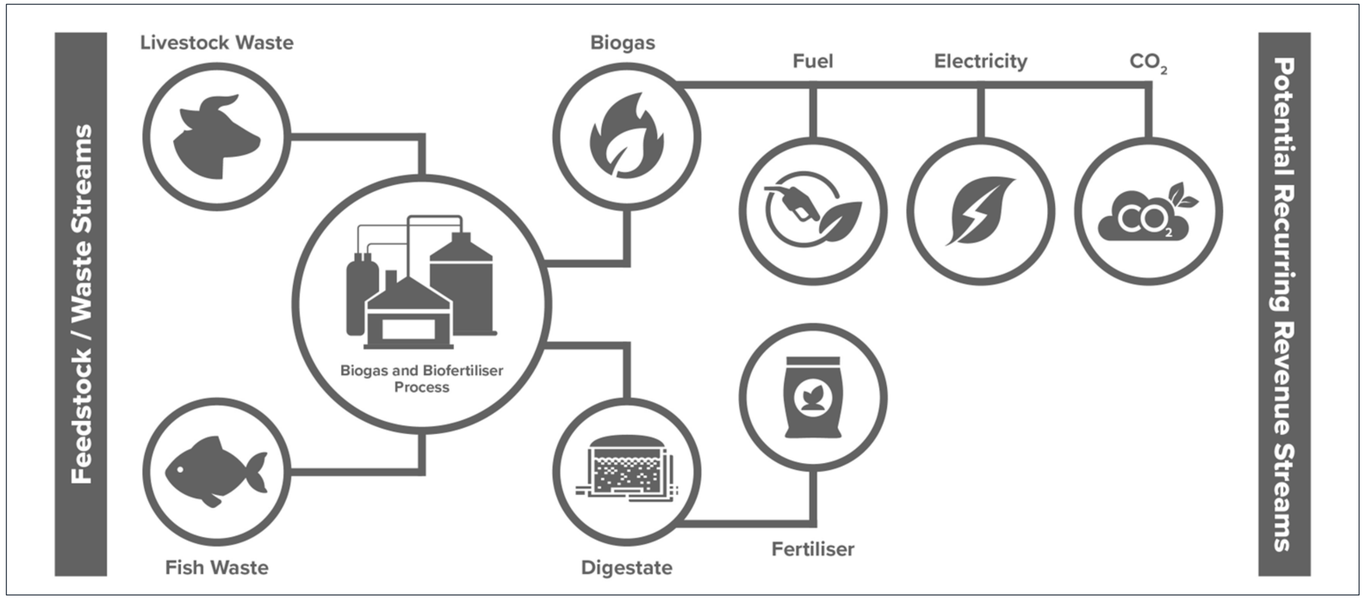
- Land-based salmon farming growing fast in Iceland
  - Around 3,000 tonnes produced in 2025
  - Estimation of 150,000 tonnes in 2031
- All farms required to filter sludge
- Sludge currently used for land reclamation
  - Too much amount too soon
  - No other sustainable pathway!
- Solution needed for fish sludge!





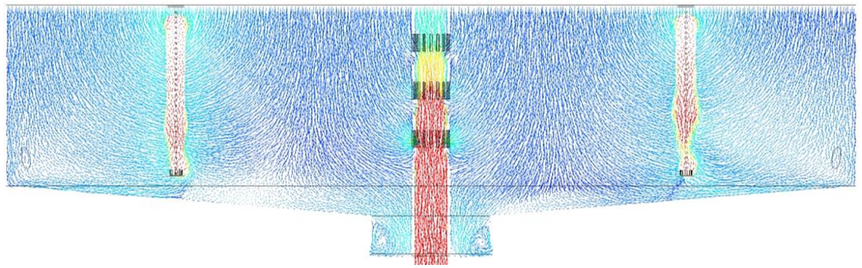
What is Terraforming LIFE?

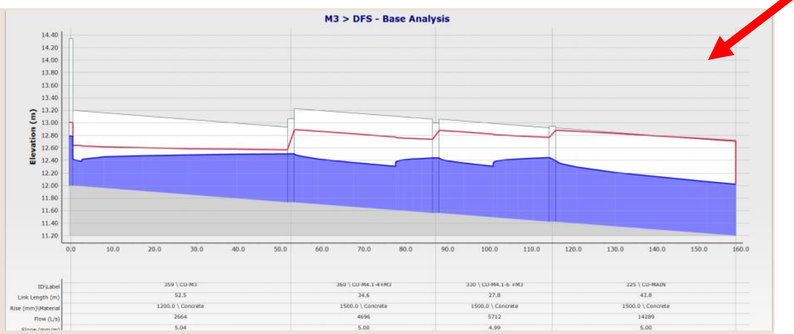
- **Terraforming LIFE** is an EU-funded collaborative project
  - 2023-2028
  - Five companies/organisations
  - Total cost: € 10,433,185
- Fish Waste + Livestock Waste → Biogas + Fertiliser
  - Circular economy
  - Waste-to-value
- 100,000 tonnes/year capacity



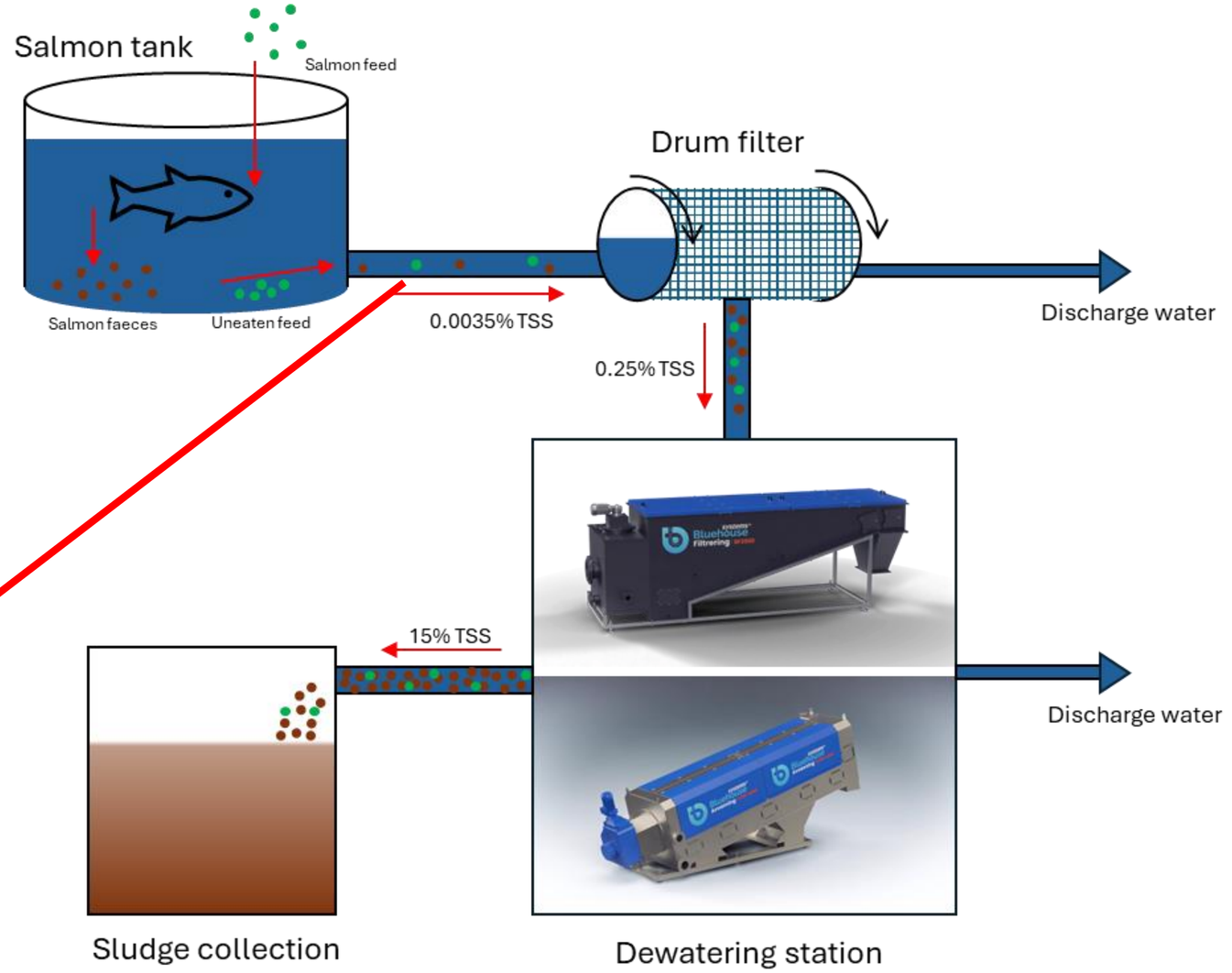
What are we doing?

- Optimising fish sludge collection from a land-based fish farm



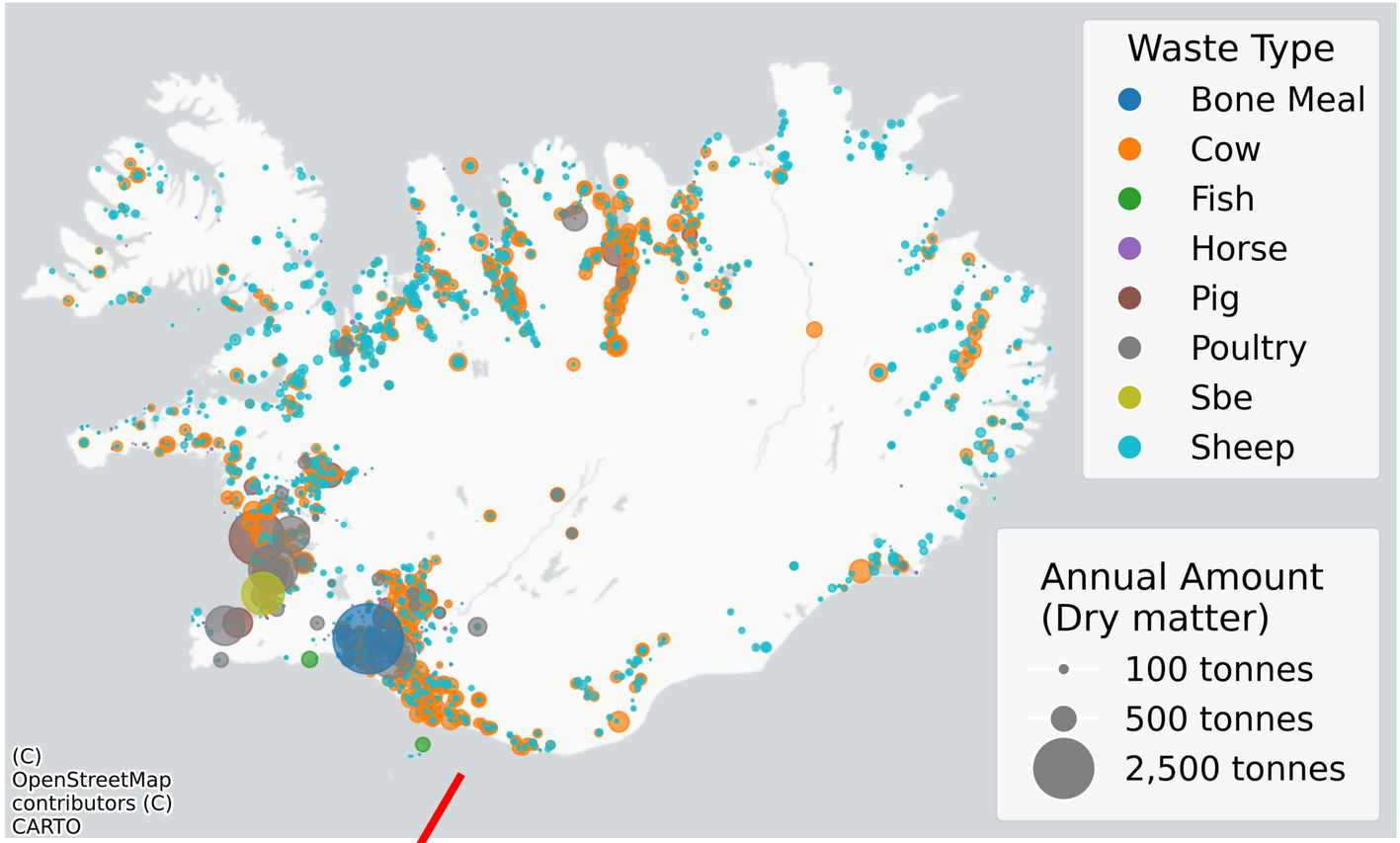


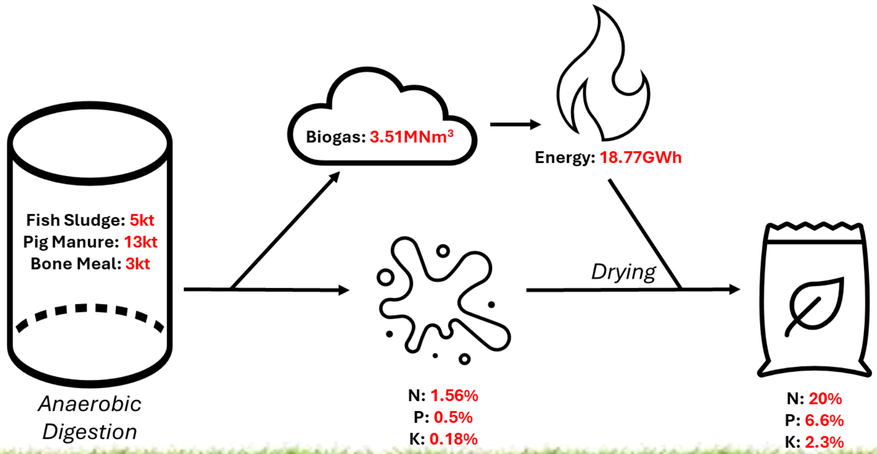
Label	CU-M3	CU-M4.1-4+M3	CU-M4.1-6 +M3	CU-MAIN
Flow (L/s)	2 664	4 696	5 712	14 289
Velocity (m/s)	2.42	3.08	3.25	3.83
Depth (m)	0.37	0.69	0.8	0.79
Has Hydraulic Jump?	TRUE	TRUE	TRUE	FALSE
Froude Number	1.276	1.179	1.162	1.378



What are we doing?

- Optimising fish sludge collection from a land-based fish farm
- Researching Icelandic organic waste streams lacking dedicated treatment or stable end users
  - Type and availability
  - Quantity
  - Chemical analysis
  - Biogas/fertiliser calculations





Sample	Total solids (%)	Volatile solids (%)	Ash (%)	Total Nitrogen, N (g/kg)	NH4-N (g/kg)	Phosphor, P (g/kg)	Potassium, K (g/kg)	Total sulphur, S (g/kg)	Chloride, Cl (g/kg)	pH
Pig manure 1	4.14	3.21	0.93	5.99	4.23	0.58	1.84	0.34	1.31	7.27
Pig manure 2	4.26	3.31	0.95	6.02	4.32	0.70	2.48	0.40	1.25	7.42
Pig manure 3	5.41	4.30	1.11	6.49	4.26	0.91	3.26	0.54	1.27	7.26
Bone meal 1	94.71	74.81	19.90	96.45	0.61	28.11	6.33	5.85	4.36	6.28
Bone meal 2	94.02	74.16	19.87	99.58	0.68	27.12	5.62	4.95	3.95	6.26
Bone meal 3	95.07	74.98	20.10	100.07	0.56	27.91	6.25	5.52	4.56	6.20
SBE 1	80.24	40.87	39.37	0.00	0.00	0.10	0.89	2.56	0.15	3.00
SBE 2	83.97	43.55	40.42	0.00	0.00	0.07	0.95	2.67	0.22	3.15
SBE 3	86.94	45.77	41.17	0.00	0.00	0.28	1.03	2.79	0.49	3.14
Horse manure 1	23.00	21.28	1.72	3.84	0.01	0.79	0.50	0.54	0.35	8.30
Horse manure 2	21.40	19.85	1.55	3.50	0.02	0.77	0.68	0.50	0.30	8.06
Horse manure 3	24.16	22.46	1.70	3.51	0.02	1.00	0.85	0.54	0.34	8.14
Fish sludge 1	31.10	26.44	4.67	13.40		6.13	0.47		0.49	
Fish sludge 2	30.90	26.27	4.64	12.90		6.99	0.49		0.36	
Fish sludge 3	30.70	26.10	4.61	12.40		6.99	0.48		0.49	

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- Analysing transport and logistics of organic waste for biogas + fertiliser
  - Identifying optimal plant location

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Status: Optimal
Total Cost: 109,134,617 ISK
Number of Trucks Needed: 2.0

Selected Farms:
- Saltvík, Reykjavíkurborg (Pig): 1575.0 tonnes, Distance: 65.34 km
- Vallá, Reykjavíkurborg (Pig): 2184.7 tonnes, Distance: 67.01610000000001 km
- Minni Vatnsleysa, Sveitarfélagið Vogar (Pig): 6190.4 tonnes, Distance: 70.6402 km
- Bjarnastaðir, Grímsnes- og Grafningshreppur (Pig): 2550.6 tonnes, Distance: 61.8052 km
- Ormsstaðir, Grímsnes- og Grafningshreppur (Pig): 5927.6 tonnes, Distance: 59.6799 km
- Sléttaból, Skeiða- og Gnúpverjahreppur (Pig): 1571.7 tonnes, Distance: 55.7141 km
- Laxabraut, Ölfus (Fish): 10170.0 tonnes, Distance: 0.0 km

Total Amount by Manure Type:
- Pig: 20,000.0 tonnes
- Horse: 0.0 tonnes
- Fish: 10,170.0 tonnes
- Bone Meal: 0.0 tonnes
- Sbe: 0.0 tonnes
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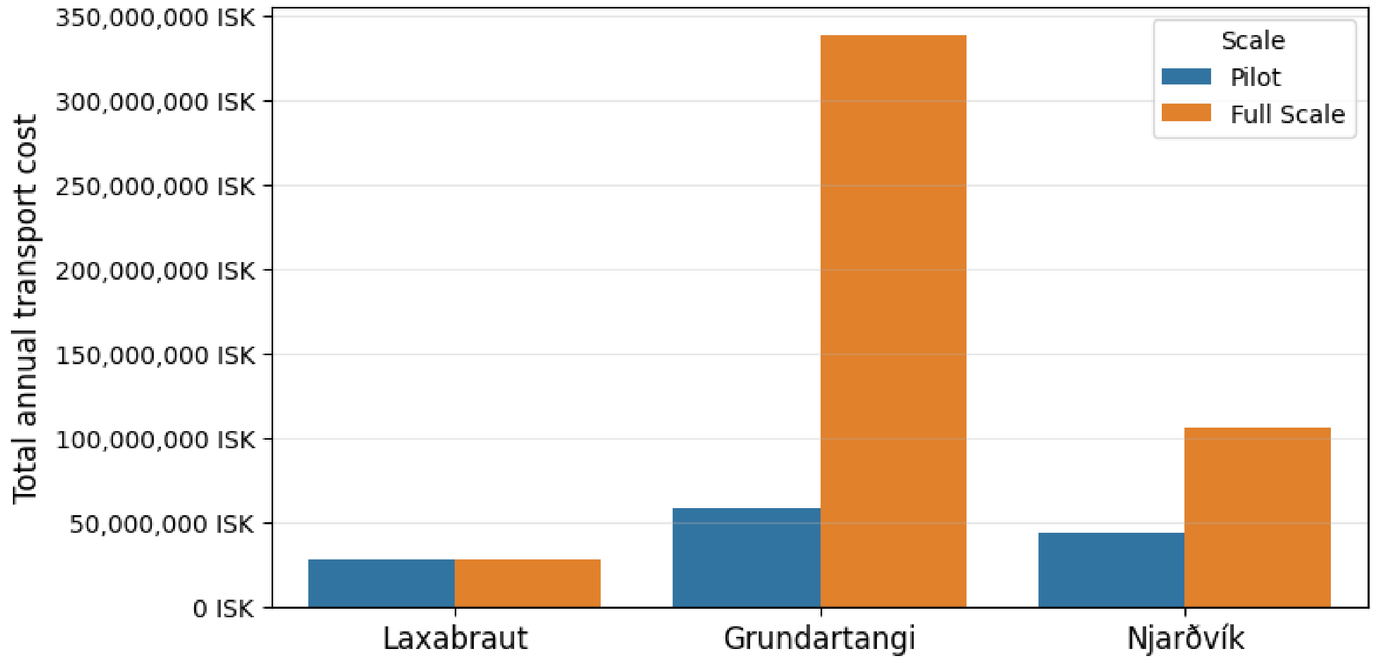

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- Designing a biogas + fertiliser plant
- Engaging end-users and society

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