SUSTAINABLE SOLAR-POWERED SOIL VAPOR EXTRACTION (SVE)

SURF Case Study #0013

This case study highlights the use of solar-powered SVE to remediate former evaporation pits at remote natural gas compressor stations. Sustainability metrics were evaluated for implementing solar SVE vs. the traditional dig-and-haul treatment typically selected for these types of sites.

BACKGROUND

- Pits were identified and investigated in 2014 as part of due diligence activities.
- Over 3,000 cubic yards of soil up to 35 feet below ground surface were impacted by total petroleum hydrocarbon (TPH) and volatile organic compounds (VOCs).
- Multiple pads in the area required remediation in accordance with Colorado Oil and Gas Conservation Commission (COGCC) regulations for pits.
- The site is in a remote natural gas field with no power infrastructure nearby.
- The closest landfill is over 60 miles away – one way.

Production pit prior to backfill and assessment

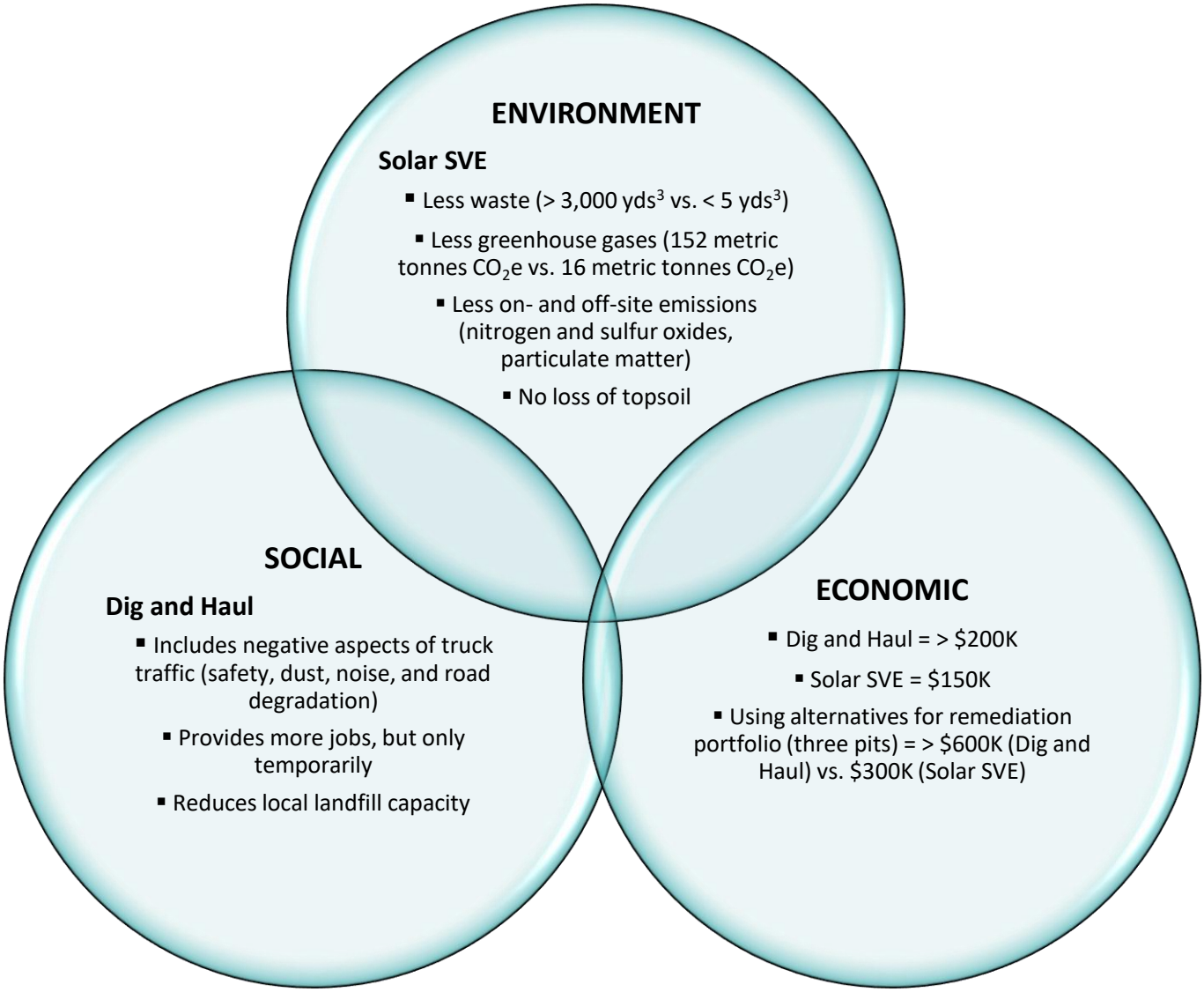
REMEDIAL STRATEGY

VariSun Mobile Solar System, 6 kW array, 5 hp Regenerative blower with telemetry capabilities

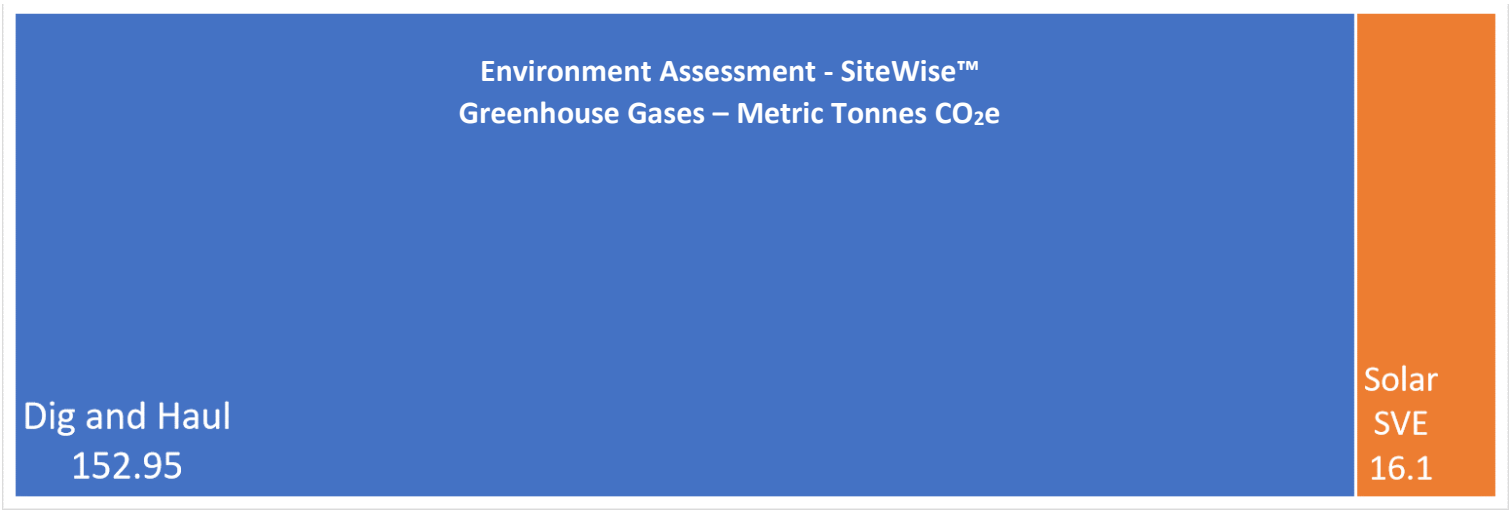
- The remedial objectives were to clean up soil to meet COGCC cleanup standards and BLM lease requirements.
- The following two remedial options were screened based on effectiveness, implementability, and cost:
  - Dig and haul (excavation and off-site disposal)
  - SVE
- With no power infrastructure in the area, the SVE system was powered via solar panels, further reducing the environmental footprint of the remedy.

SUSTAINABLE REMEDIATION TRIPLE BOTTOM LINE

Dig and Haul vs. Solar Soil Vapor Extraction



ENVIRONMENTAL FOOTPRINT ASSESSMENT

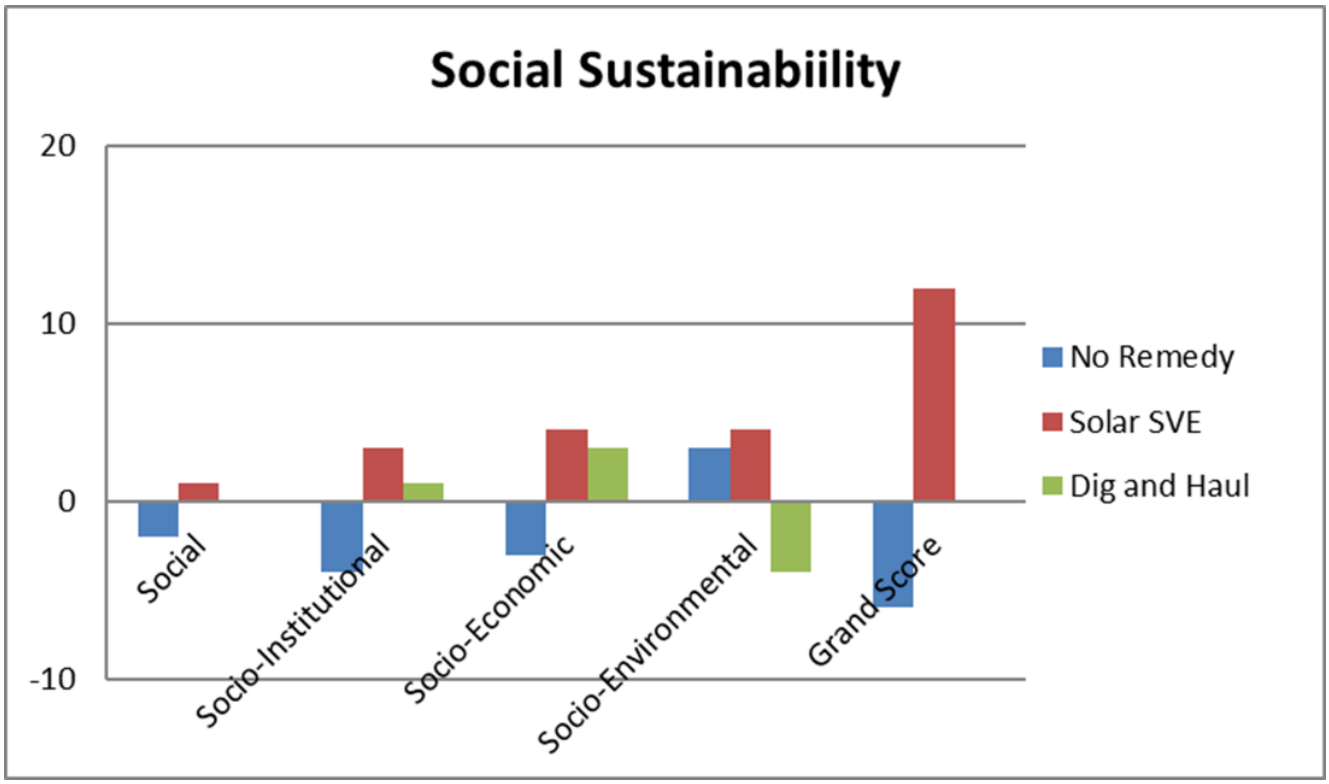


Environment Assessment - SiteWise™

Remedial Alternatives	GHG Emissions	Total energy Used	Water Consumption	Electricity Usage	Onsite NO_x Emissions
	metric ton	MMBTU	gallons	MWH	metric ton
Dig and Haul	152.95	2.73E+03	0.00E+00	0.00E+00	4.26E-02
Solar SVE	16.10	3.29E+03	0.00E+00	0.00E+00	1.30E-02

Remedial Alternatives	Onsite SO_x Emissions	Onsite PM_{10} Emissions	Total NO_x Emissions	Total SO_x Emissions	Total PM_{10} Emissions	Accident Risk Fatality	Accident Risk Injury
	metric ton	metric ton	metric ton	metric ton	metric ton		
Dig and Haul	1.06E-02	4.88E-03	5.54E-01	5.14E-01	6.24E-01	2.80E-04	3.40E-02
Solar SVE	1.34E-03	1.18E-03	3.97E-02	2.63E-02	4.67E-03	5.20E-05	6.12E-03

Social Assessment – Social Sustainability Evaluation Matrix



KEY LESSONS LEARNED

- Using sustainability metrics to support selection of the remedial options provided stakeholders additional information beyond selecting excavation for its short-term effectiveness.
- Perception of the project by agency representatives has influenced other pit owners in the area to consider green technologies.
- Although not in state regulations or guidance, stakeholders were interested in reviewing the output of the sustainability assessment.

FOR MORE INFORMATION…

This case study is the topic of a SURF webinar.

To access the webinar, click here.

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