H2Valley

Pioneering Natural Hydrogen (H2) and Helium (He) Exploration and Extraction

H2Valley - home

CEO, Founder: Sergey.Frolov@h2valley.tech
mob. + 90-534-285-97-04

Introduction to H2Valley

We are

professionals
in exploration and extraction
of **GEOLOGICAL HYDROGEN*** **AND HELIUM**

Geological H_2 is inexhaustible, clean and most efficient

significantly cleaner and more efficient than **green** and **blue** hydrogen

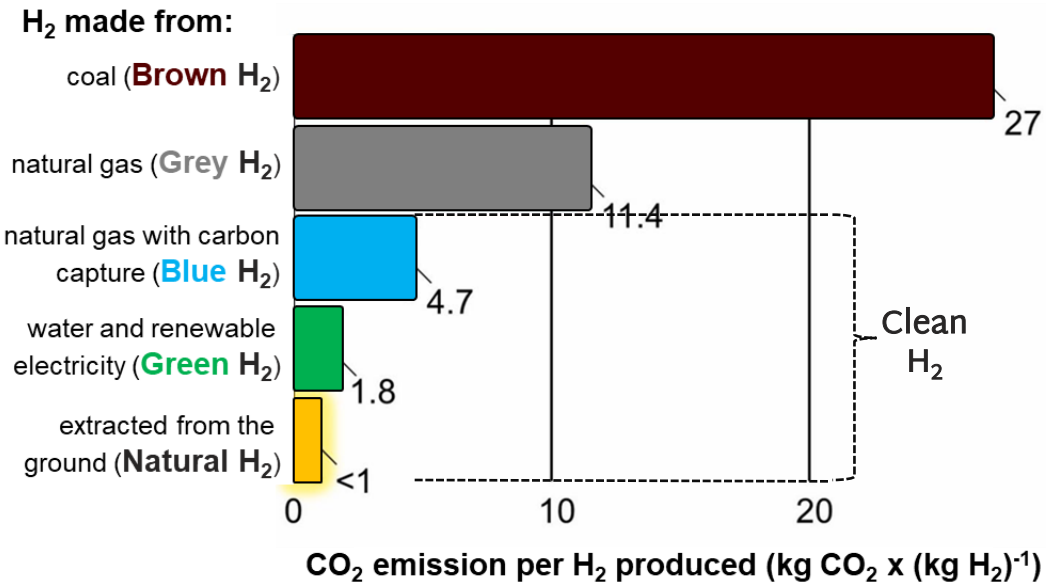
We use unique and proven geological model

revealing **inexhaustible and abundant** H_2&He resources at low exploration and extraction costs

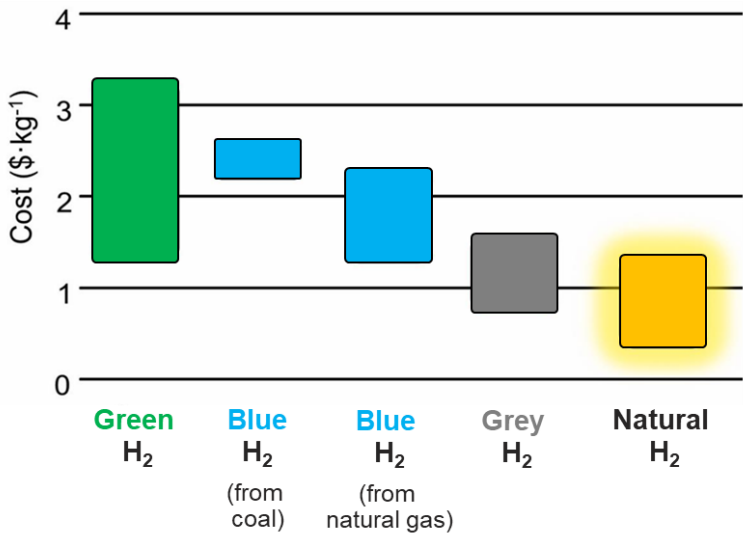
*also known as white, golden or natural hydrogen

Natural H_2 is Cleaner and The Most Efficient

Carbon footprint comparison (2021)



H_2 estimated cost in 2050



Source: Natural hydrogen in the energy transition: Fundamentals, promise, and enigmas

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Unique and Proven Geological Model

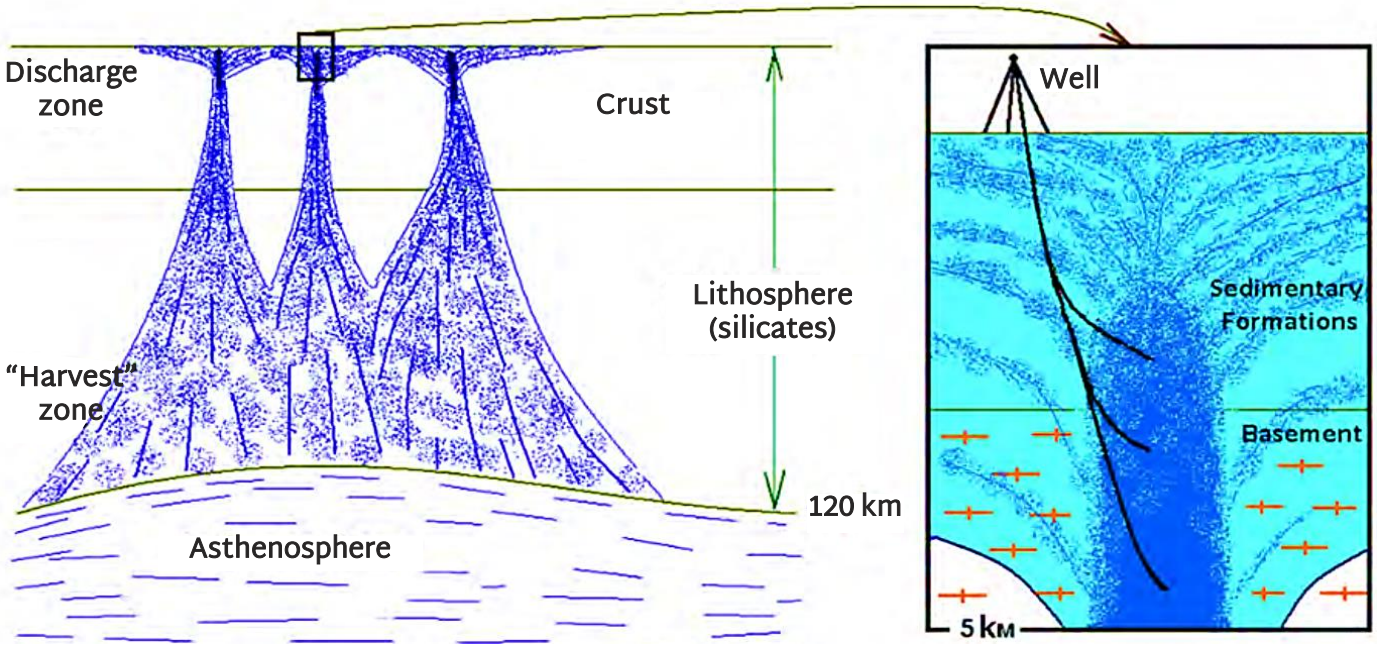
One of our founders, Nikolay Larin, drilled the

FIRST DESIGNATED H_2&He WELL

as a chief geologist of the legal entity operating the Hoarty-3 well in Nebraska, USA

This well, drilled in 2019, marked a historic milestone in successful exploration and extraction of natural H_2&He

H_2 Concentration Schematics



Source: V. Larin, N. Larin, 2008. Hydrogen De-Gassing on the Russian Platform: Pros and Cons

H_2 Market

Global H_2 market

$174B
in 2023
or **94M** tons

$700B
by 2030
6-9% annual growth

$1T
by 2050
or **212M** tons

Clean H_2 market by 2030

25%
share of total H_2

=

$175B
clean H_2

→

$50B
natural H_2

Sources: IEA, McKinsey, Hydrogen Council, Bloomberg

He Market

Semiconductor industry will drive the market

Global He market

$2,3B	$3,4B	$6B
in 2022	by 2030	by 2035
or **29k** tons	or **34k** tons	or **57k** tons

Sources: Globe newswire, Reuters, USGS, Infomine, IDTechEx

Target H_2 Customers

Chemical Manufacturers

such as **Yara** (ammomia) and **Methanex Corp.** (methanol) are looking for low-carbon alternatives of natural gas and coal

Steel Manufacturers

such as **ArcelorMittal ,** and **thyssenkrupp**, need clean hydrogen to decarbonize operations lowering natural gas and coal consumption

Refineries

such as **BP** and **Shell**, shifting toward cleaner operations replacing **grey** and **green** H_2

Energy Companies

such as **EDF, Enel and Duke Energy**, could use natural H_2 for power generation and grid balancing during the time when there is no wind or sun

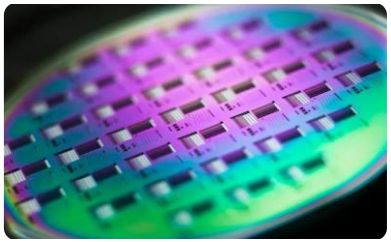
Target He Customers

Medical & Healthcare

Medical, Imaging centers and **hospitals** consume He mainly for cooling in MRI machines

Aerospace

such as **NASA, ASA, CNSA, ISRO, JAXA** and **Space X** use He for cooling rocket fuel and pressurizing fuel tanks



Electronics & Electrical

such as **Intel** and **TSMC** use He for cooling and as an inert environment in fabrication processes, **CERN** uses He for cooling super conducting magnets

Metal Fabrication

Metal processing companies use He as an inert atmosphere in specialized welding applications for metals like aluminum and titanium

Industry Problems

Unaffordably high electrolysis costs

Green H_2 production is hindered by high costs due to inefficient process – **1 kg of H_2 consumes 55 kWh but it yields only 33 kWh**

High costs of carbon capture

Blue and turquoise H_2 production relies on carbon capture technology, which is expensive and unreliable (leaks)

Limited nuclear energy availability

Pink (or purple or red) H_2 production depends on nuclear energy, which faces challenges related to availability and safety

High costs of carbon footprint

Gray, **black**, and **brown** H_2 production relies on fossil fuels, leading to greenhouse gas emissions, covered by carbon credits

Lack of H_2 infrastructure

prevents the widespread adoption of hydrogen as a fuel source

Helium supply scarcity

due to lack of exploration, depleting existing reserves and geopolitical turbulence leading to drastic price volatility (by 2-4 times)

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Clean H_2 Projects Challenges

Green H_2 project delays and cancellations

due to:

- huge investments,
- extremely energy inefficient production process leading to high costs,
- lack of infrastructure
- and decreasing government incentives

Money wasted on natural H_2 random drilling

due to:

- misleading geological concepts (serpentinization and biogenesis)
- and lack of natural H_2 exploration and extraction know-how

leading to unsuccessful drillings and mistrust from investors and industrial community

Business Opportunities

Extremely high margin and sustainable H_2&He business

with **cost-effective** business model of natural H_2&He extraction, **based on unique and PROVEN GEOLOGICAL MODEL**

Bringing clean H_2 to every consumer

capitalizing on the **opportunity to discover natural H_2** in almost every country

Skimming clean H_2&He markets

satisfying booming H_2&He market demand in different countries with a highest margin **as a new industry pioneer**

H2Valley's Proven Solution

Lower investments and costs

Our approach **lowers CAPEX (by 30-50%) and OPEX** (cash costs: **natural H_2** – about **$1/kg**, **green H_2 – $4-10/kg** and **blue H_2 – $2.3-4.5/kg**)

Extremely valuable helium

with **2-4%** concentration, $90 market price and $12 cash cost (**87% margin profit**)
BOOSTS PROJECT'S NET PROFIT BY 3-5 TIMES!

Competitive pricing

We aim to **sell H_2 at least at $3-3,5/kg**, compared to **green H_2 ($4-14/kg)** and **blue H_2 ($3-5/kg)**

Infrastructural independence

Our model allows **finding natural H_2 sources as close to consumers as possible, improving** their businesses' bottom-line

Sources: Wood MacKenzie, PWC, Company data

Case Study: JV with Industrial Partner

Location	H2Valley identifies H_2&He-rich sites globally near H_2 consumers (off-takers)
Consumer	Large Industrial company (business partner) seeking affordable H_2
Project Structure	Joint venture where H2Valley explores and extracts H_2&He using partner's (or banks'/investors') financing with a long-term H_2 offtake agreement
Outcome	Annual extraction of **15,000 tons of H_2 and 1,000 tons of He**
Financials	**$50-75M** CAPEX, **$130-160M** annual revenue, **70-75%** EBITDA margin, **$400-500M NPV** (12% discount rate), **3.5-4 years** DPP from the start of investments

Source: Company data

H2Valley's Competitive Advantages

	H2Valley's advantages	Competitors' disadvantages
Geological basis	• Operating the **proven and working** geological model • **First to explain** the natural H_2 phenomenon	Use **unproven and misleading** geological models, based on hypotheses
Natural H2 exploration experience	• Our founder **drilled the first designated H2 well** in the USA (Nebraska) in 2019 • Company founders **have positive exploration results** – H_2 sources identified in the USA, Mongolia, Morocco, India, Oman, Australia and Egypt	• **Lack of natural H_2 positive exploration experience** • Use **Oil&Gas algorithms not suitable** for natural H_2 • **Wasted random drilling** without results

Costs Comparison for 15,000 tons/year Clean H_2 Production Project

Type of the H_2 Project	Initial investments	Operating cash costs (per 1 kg H_2)
Blue H_2 production	$110 – 190M	$2.3 – 4.5
Green H_2 production	$160 – 265M	$4 – 10
Natural H_2 extraction by competitors	Unpredictable due to using misleading geological concept	
Natural H_2 extraction using H2Valley's proven geological model	$50 – 75M	About $1

Sources: S&P Global, Bloomberg, Company data

Standard Project Initiation

Funding stage	Use of proceeds	Results	Timeline
PRE-SEED **$2–2.5M**	• project company legal setup • staffing • geological surveys • field research • pre-feasibility study • marketing	• project legal entity • project team • pre-feasibility report • exploration license	5 - 7 months
SEED **$4–5M**	• staffing • geophysics • geochemistry • feasibility study • marketing	• feasibility report • drilling license	5 - 7 months

The exact numbers depend on location of the project