Introduction

Western Interstate Hydrogen Hub LLC (WIH2) offers the Department of Energy (DOE) the most promising and expedited launch and full supply chain delivery for hydrogen production, distribution, storage, and use in the nation through a unique collaboration among Colorado, New Mexico, Utah, and Wyoming. WIH2 is a wholly owned subsidiary of Atkins Inc., which is serving as the prime contractor for these states **(Figure 1)**. The governors of our four states united in February 2022 to create the Western Inter-States Hydrogen Hub (WISHH). They established a memorandum of understanding to coordinate regional clean hydrogen system planning. For support, the governors enlisted the Rocky Mountain Alliance for Next Generation Energy (RANGE), a regional organization composed of 12 research universities, three national laboratories, and numerous community colleges and training institutions.

These four states offer a bipartisan opportunity to launch hydrogen production and use throughout the Mountain West and beyond. Our states span 408,000 square miles, and we now produce one sixth of the nation's energy. The region is an energy exporter, supplying

Introduction
The WIH2 Difference

- Integration of seven major utility projects and one
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- munity engagement with stakeholders who have been traditionally excluded and create meaningful partnerships and innovative tools and metrics that ensure the needs of those stakeholders are met
- Workforce development plans that leverage the resources of universities, community colleges, utilities, and unions throughout the WIH2 region
- Experienced leaders in research and technology (including three national laboratories), state government, and stakeholder engagement who are knowledgeable about hydrogen production and use

WIH2 WESTERN INTERSTATE HYDROGEN HUB LLC

ATKINS
Member of the SNC-Lavalin Group

▪Manages 4 current DOE contracts totaling $21.7B ▪Led or assisted in 27 hydrogen-related programs in U.S. and abroad ▪Operates Center of Excellence for Net Zero Energy with extensive hydrogen expertise offering lessons learned and insights from hydrogen projects worldwide ▪U.S. company with 4,000+ U.S. employees ▪ Government-approved cost-accounting system, including certified DOE 413.3b-compliant EVMS ▪Database of 30+ electrolyser manufacturers, with specialty models

WISHH
WESTERN INTER-STATES HYDROGEN HUB

Colorado ▪Office of the Governor ▪Colorado Energy Office ▪Colorado Office of Economic Development and International Trade ▪CO Dept of Natural Resources

Utah ▪Office of the Governor ▪Utah Office of Energy Development

New Mexico ▪Office of the Governor ▪Economic Development Department ▪Energy Minerals and Natural Resources Department ▪ Environment Department

Wyoming ▪Office of the Governor ▪Wyoming Energy Authority ▪Wyoming Business Council

RANGE
ROCKY MOUNTAIN ALLIANCE for NEXT GENERATION ENERGY

Colorado ▪National Renewable Energy Lab (NREL) ▪Colorado School of Mines ▪University of Colorado, Boulder ▪Colorado State University ▪Colorado Community College System

Utah ▪Utah System of Higher Education ▪University of Utah ▪Utah State University ▪San Rafael Energy Research Center

New Mexico ▪Los Alamos National Laboratory ▪Sandia National Laboratories ▪University of New Mexico ▪New Mexico State University ▪San Juan College ▪NM Community College System ▪New Mexico Tech

Wyoming ▪University of Wyoming ▪Community College(s) ▪Wyoming Innovation Partnership (WIP)

Project Partners

- ▪Xcel Energy Colorado
- ▪Tallgrass New Mexico
- ▪Tallgrass Wyoming
- ▪New Mexico Gas Co.
- ▪AVANGRID
- ▪Navajo Agricultural Product Industries
- ▪Dominion Energy Utah
- ▪Libertad

Community Engagement

- ▪Labor Unions
- ▪Energy Equity and Environmental Justice (EEEJ) Communities
- ▪Tribal Nations
- ▪Justice40 Communities

Figure 1. WIH2 partners. *WIH2 includes Atkins, four states, eight principal projects, 12 universities and numerous colleges, and three national laboratories.*

surrounding states and beyond. Our solar, wind, geothermal, and natural gas capability is immense. Our infrastructure spans both sides of the Rocky Mountains, and our populations, which include many Native American tribes, are among the nation's most diverse.

Our location is vital to the success and adoption of hydrogen nationwide, as we are strategically positioned between West Coast hydrogen markets and the hubs east of the Rockies. WIH2 will become a major producer and exporter of hydrogen to these regions and a generator of end-use applications within our hub. We are critical to connecting energy markets across the nation.

Our hub concept coordinates, integrates, supplements, and accelerates hydrogen production, transport, storage, and use in a sustainable and socially just manner and promotes workforce development to create high-quality jobs for our diverse populations. Our concept includes underserved and economically disadvantaged communities (DAC). It includes massive hydrogen production, well beyond FOA requirements, to strategically reduce carbon emissions and other pollutants in our region. The hub will trigger coordinated growth of markets and end use, enabled by eight specific projects that link our state efforts, produce hydrogen for multiple end users, and leverage current pipeline and storage infrastructure.

Key features of our hub include: (1) seven 10 years, (2) one major agricultural-use producer and user with a focus on sustainable farming, (3) projects that provide near-term use certainty to stimulate development of additional hydrogen production with pathways to hard-to-abate sectors, (4) private sector investment well exceeding our request for $1.0-1.25 billion in Bipartisan Infrastructure Law (BIL) funding, (5) use of much of this hydrogen to produce electricity, gradually converting existing power plants from natural gas and coal to a mix of hydrogen and natural gas, complementing renewable energy development, with a goal of zero-carbon power firmed by hydrogen within 15 years, (6) additional end uses, including residential and transportation and, over time, industrial uses, and (7) full integration of EEEJ, Justice40, workforce development, and all other federal requirements. The funding we seek for this concept will be a catalyst for all of these efforts, accelerate additional production and end uses, advance well-defined EEEJ goals, and make our four-state vision a reality.

1.0 Hub Description
The WIH2 Difference

- Eight major hydrogen projects that will replace coal-fired power plants and supply a mix of hydrogen and natural gas to local communities and for transportation
- Generation of 1,000 MT/day by year 7 with an increase to about 1,900 MT/day by year 12
- Proven, high TRL technologies, including both electrolyzers and gas reforming, expediting development of our hub
- Established distribution and storage, using existing pipeline corridors, minimizing additional environmental impacts
- Identified uses for most hydrogen generated early on, with broader uses as generation increases, ultimately spanning the Mountain West and linking hubs to east and west

1.0 H2Hub Concept Description

Our concept paper is organized in compliance with the Funding Opportunity Announcement's (FOA) IV.C.i: Concept Paper Content Requirements and in particular the table on pages 68 and 69. Each bullet is addressed individually.

1.1 Overall Hub Description Including Locations

WIH2 proposes to:

MAKE hydrogen through eight major production projects, exceeding DOE's production target while demonstrating best-in-class carbon reduction and full commitment to the principles of EEEJ, Justice40, and diversity, equity, inclusion, and accessibility (DEIA).

MOVE hydrogen as a mixed gas in existing pipelines, as 100% hydrogen through new pipelines, and as cryogenic hydrogen for more remote usage sites.

STORE hydrogen underground in favorable geologic storage in the region, through "line pack" on hydrogen pipelines, and using on-surface cryogenic storage in key locations.

USE hydrogen in a wide variety of ways, including power generation; load-leveling of the region's increasing use of renewable energy; and for transportation and industrial applications, including refineries, ammonia production, steel production, cement production, brewing, and mining. We also will demonstrate general residential/commercial heating, using safe blends of hydrogen/natural gas. By grounding near-term use as electricity generation and blending hydrogen into distribution lines, initial use is guaranteed and will provide time for production and transportation infrastructure to grow to a level that will support high-value industrial decarbonization.

ADVANCE Justice40 and EEEJ goals by advancing and investing in respectful, sustainable partnerships with underserved communities.

DEVELOP job opportunities in hub communities, focusing on benefits to underserved communities and easing the transition to clean energy jobs.

Figure 2 presents the locations of projects we propose for our H2Hub. Our industry partners have largely developed these production and storage projects while the WIH2 team has helped build end-use applications and markets. We will integrate these projects (and others not included in our hub) to ensure a full ecosystem of hydrogen generation, transportation, and use. We then will supplement, ensuring our hub continuously grows and ultimately serves all populations in our states.

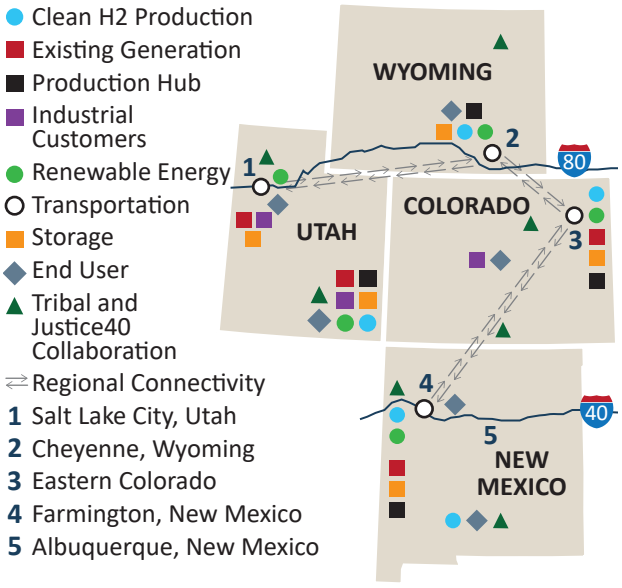

Figure 2. Linked. *Eight projects connecting four states.*

Water Considerations

Water use for hydrogen production in our arid states must be considered carefully. We support our production partners in their consideration of alternative water sources, including repurposed water from coal plant decommissioning, brackish water unsuitable for agriculture, a wide variety of repurposed wastewater streams, and produced water from oil and gas development. Other available water sources include underground saline aquifers. At the levels of production envisioned by our concept, water use for hydrogen production is a small fraction of what will be freed by retiring thermal generation.

1.1.1 Production Technologies and Systems

The WIH2 region offers world-class energy resources of wind, solar, geothermal, and natural gas and proposes to produce clean hydrogen using technologies best suited to each state's resources, economic priorities, and social considerations. Our selection of technologies has been informed by expertise from the universities and national laboratories that make up RANGE and discussions with private sector developers and technology providers.

Power generation is a principal end use of the WIH2 hydrogen hub. In our four states, we have retired or are retiring 18 coal-fired power plants generating more than 12 gigawatts of electricity. Hydrogen will play a major role in firming the grid as renewable energy replaces these coal plants. Below we present the production and technologies to be employed by the eight projects:

1) Xcel Energy Production Hub – Eastern Colorado. Xcel Energy has committed to 100% carbon-free energy by 2050. Xcel Energy will

additional hydrogen

the carbon intensity of Xcel Energy-owned natural gas power plants on the eastern plains and supply hydrogen blends to customers in Colorado through existing transmission and distribution systems. Xcel Energy proposes building dedicated hydrogen pipelines to serve its power generation facilities and large users in the refining, transportation, and industrial sectors as well as for potential cryogenic liquefication for high-impact users in the Denver

Technology Considerations

We are working with our partners to identify the most appropriate electrolysis technologies, including proton exchange membrane (PEM), alkaline, solid oxide, and emerging technologies such as advanced alkaline and anion exchange membranes (AEM) technologies. The actual technologies will be reserved until National Environmental Policy Act (NEPA) analysis is completed so that we can minimize impacts. Similarly, for producing low carbon-intensity hydrogen through gas reforming, we will require the ability to sequester CO_2 and ultra-low methane emissions from the production and transport of natural gas. Our states are national leaders in both. Wyoming is one of only two states that have Class 6 Primacy for permitting of CO_2 wells used for geologic sequestration.

2) Tallgrass H_2 Production with CO_2 Sequestration – Southern Wyoming. Tallgrass has been awarded DOE funding (~$5 million) for its Blue Bison project to carry out a front-end engineering design (FEED) study on the integration of autothermal reforming technology with carbon capture and storage to produce decarbonized hydrogen. Tallgrass is also developing its Eastern Wyoming Sequestration Hub in partnership with the State of Wyoming.

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west New Mexico. Tallgrass is the majority owner in conversion of the Escalante Generating Station from coal to hydrogen. The hydrogen will be produced from natural gas, with the CO_2 captured and sequestered. This will be the first 100% clean hydrogen power plant capa-

4) Libertad Power - Northwest New Mexico. In partnership with Hyundai Motor Corporation and Direct Diesel, which supplies diesel fuel for

long-haul trucks, Libertad is developing a network of hydrogen fueling stations that will span from Texas to California. The hydrogen will be

5) AVANGRID – Northwest New Mexico and elsewhere. Using a mixture of its existing and planned renewable assets in the four-state

end-use capability through an existing municipal bus fueling project. There are also opportunities in the other states given AVANGRID's overall portfolio in the region.

6) NM Gas Company - Northwest New Mexico.

bili

Far

customers. WIH2 is also coordinating a potential partnership between NM Gas and Navajo Agricultural Products Industries (NAPI) for up

large farm equipment use.

7) Dominion Energy Utah (DEU) - Utah. DEU has committed to achieving net zero carbon and methane emissions by 2050. Its ThermH2 Project has already successfully completed a pilot phase with an intermediate pressure blending phase underway. This hydrogen is be-

ing produced using electrolysis and clean energy. By 2027, DEU plans to begin high-pressure blending with the intent to produce synthetic natural gas from hydrogen, through methana-

for heavy-duty trucking at Utah's Inland Port.

8) Navajo Agricultural Production Industries. With 110,000 acres of farmland on the Navajo Reservation, NAPI is committed to sustainable farming. It intends to convert its farming operation to hydrogen fuel, including fuel for all major farm equipment, greenhous-

These eight projects offer a wide range of generation, storage, and use demonstrations intended to begin our WIH2 hydrogen ecosystem. While a full lifecycle analysis of our eight principal projects is yet to be completed, preliminary estimates indicate that they will reduce carbon emissions by our states by 35,000 MT per day. In addition, these eight projects will stimulate additional projects as our communities recognize that a steady supply of hydrogen is available for ever-expanding end uses and will allow maturing of our ecosystem into a national network, connecting hydrogen hubs both east and west of the Rocky Mountains. In addition to these eight projects, the WIH2 team is also in discussions with Williams Pipeline and other local utilities and end users that complement the eight core projects. **Figure 3** summarizes our hub's eight principal projects.

1.1.2. Connective Infrastructure Technologies and Systems

Our four states represent 10.8% of total U.S. land area, so the ability to move hydrogen safely, economically, and reliably through the region is key to demonstrating "close proximi-

WIH2 Utility-Based Strategic Partners

MAKE | MOVE | STORE | USE

Partner	Available Renewable	H2 Production	Carbon Capture	Production Technology	Transport	Storage	End User
				Electrolysis	Pipeline/ Truck/Rail	Y	Energy Generation, Gas Distribution Heavy Vehicle, Refinery
				Gas Reform	Pipeline/ Truck	Y	Energy Generation, Refinery/Steel, Heavy Vehicle
				Gas Reform	Pipeline/ Truck	Y	Energy Generation, Commercial, Residential, Agricultural, Heavy Vehicle
				Electrolysis	Truck	Y	Fuel for Heavy-Haul Trucks
				Electrolysis	Truck	Y	Fuel for Heavy-Haul Trucks, industrial
				Gas Reform	Pipeline	N	Residential use in Farmington, NM
				Electrolysis	Pipeline/ Truck	Y	Residential, Commercial, Heavy Vehicle
				Electrolysis	Pipeline/ Truck	Y	Farming Operations
							Initial use: >1,000 MT/ day; long Term: +1,900+ MT/day

Figure 3. Eight projects, one region*. Our projects offer a wide range of end uses.*

ty" between production and usage. In the time frame of the H2Hub program, our projects will transport hydrogen (1) through the existing natural gas pipeline system along established corridors through gas blending, (2) through new, dedicated hydrogen pipelines along existing and new corridors, (3) through surface transport as a compressed gas and as a cryogenic liquid, and (4) in hydrogen carriers, primarily ammonia. In the longer term, WIH2 will demonstrate the ability to economically transform hydrogen into a wide variety of products, including renewable methane and sustainable aviation fuels. Key connective projects include:

1) Wyoming-Colorado Linkages. Approximately 40% of the population in the Mountain West is in a 2,250-mi² area between Colorado Springs and the Wyoming border immediately east of the Rockies. The largest metropolitan area is Denver, with ~3 million people, or ~25% of the population in the Mountain West region. Xcel Energy will create pipelines to transport hydrogen produced in Wyoming and eastern Colorado to the Front Range region. This network will ultimately transport pure hydrogen in new, dedicated pipelines that can carry thousands of tons/day. Prior to commissioning, however, hydrogen can flow into the Xcel Energy's existing distribution system as blended gas with an early upper threshold of ~10% (by volume), with higher blends for industrial customers. While hydrogen will be provided by pipeline to large users, cryogenic liquefaction facilities are proposed for the Front Range, which will facilitate surface transport of hydrogen to uses within 300 miles of Denver. Salt caverns, already developed in eastern Colorado for natural gas storage, are being evaluated for hydrogen storage.

2) Colorado-New Mexico Linkages. Once major industrial users develop, hydrogen flow from New Mexico north to the southern part of the Colorado Front Range is possible. During the H2Hub program, transport will occur as mixed gas in existing pipelines. Dedicated hydrogen pipeline segments are planned for the future but most likely in 2030 or later.

3) Colorado/Wyoming-Utah Linkages. Utah has tremendous potential for hydrogen production from both renewable energy and natural gas. Utah will house the world's largest hydrogen geological storage center using salt caverns near Delta, UT. Hydrogen will be transported to Utah by truck to support user hubs in the Salt Lake City area with a focus on regional heavy rail and mining operations.

4) Linkages to Eastern and Western Hubs. We are actively exploring pipeline infrastructure to transport hydrogen from WIH2 partners to eastern and western markets. Our hub, therefore, supports DOE's goal of a national network of linked hubs.

1.1.3 End-Use Technologies and Systems

The WIH2 region will utilize hydrogen for all of the major use categories: electric power generation, industrial use, transportation, and residential/commercial heating. The immediate and principal uses, though, will be for electric power throughout the region, as gas for heating, and as fuel for heavy haul trucks. The other uses will follow.

Additional H_2 Uses

While power generation, residential/commercial heating, and heavy equipment fuel are the principal uses for our hydrogen during the early years of development, the production and infrastructure allows for the development of other uses over time, including:

Mining – Exploring hydrogen use for 1-2 pilot sites, possibly including Kennecott mine near Salt Lake City, with >100 300-ton haul trucks, each using about 1 ton/day of hydrogen. Potential use in all 4 states.

Refining – Proposing pilot plant in a Justice40 community to offtake hydrogen from natural gas refineries and sequester carbon. Potential use in all 4 states.

Steel Production – Exploring clean hydrogen use at EVRAZ steel facility in Pueblo, CO. Near-term capacity of 40 tons/day for furnaces. Ultimate capacity of almost 500 tons/day.

Distribution Centers – Proposing partnerships to convert to hydrogen from current use of natural gas with no carbon capture. Supply potential for hydrogen-fueled forklifts, particularly in Southern NM and its fast-growing U.S.-Mexico ports of entry.

Other Industrial Uses – Potential for adoption by food processing facilities, bakeries, breweries, ceramics production, aerospace, rail, and semiconductor operations through region.

Electric Power Generation – This is anticipated to be the largest use in the region during the H2Hub program and provides guaranteed offtake for all hydrogen produced.

Although each state has different goals on decarbonization, our region includes some of the nation's most ambitious carbon-reduction strategies. The region is integrating its tremendous renewable energy into its generation portfolio but faces near- and long-term needs for storage/load-leveling, which hydrogen provides.

The approach to decarbonizing electricity generation in the region varies by facility. Some facilities, such Escalante in New Mexico and Pawnee in Colorado, are proposed for modification to use hydrogen to fuel the existing steam boiler. Other plants propose increased use of combined-cycle and simple-cycle gas turbines to operate on a variable mixture of hydrogen and natural gas. While the majority of capacity needs will be provided by modification of existing generation plants, construction of new hydrogen-compatible facilities are under consideration in all four states.

Residential and Commercial Heating – Project partners Xcel Energy, NM Gas, and DEU propose delivery of mixed gas to residential

ly demonstration, with extensive safety monitoring. This will be an important early-phase offtaker of hydrogen in our hub.

Heavy Vehicle Fuels. All four states support clean hydrogen corridors to provide hydrogen for heavy duty trucking, mining equipment, and rail. Three of our partners, NAPI, DEU, and Libertad are particularly focused on increasing hydrogen use for trucking and heavy duty equipment. Our intention is to establish corridors along our principal interstate highways that allow for fueling using hydrogen. These include the I-40 and I-80 corridors. In addition, DEU will focus on supplying hydrogen for fueling at Utah's Inland Port.

DOE's Clean Hydrogen Production Standard

- All of the projects in the WIH2 portfolio will seek to meet the DOE's's proposed Clean Hydrogen Production Standard as demonstrated by an annual independent assessment.

1.1.4 How Our Hub Advances Hydrogen Production/Consumption in U.S.

Our H2Hub establishes a full ecosystem for a hydrogen-driven economy spanning the Mountain West. Once developed, we will seek to integrate the hydrogen efforts of neighboring states into our ecosystem, exporting hydrogen to areas with larger populations and reducing national carbon emissions. Our hub, therefore, greatly enhances hydrogen production and consumption in the United States.

1.2 Preliminary Development Plan and Timeline

WIH2 already is developing and will fully establish a formal project development and management plan as part of its full application. Our plan will include all DOE requirements. Our project management plan will include a work breakdown structure (WBS) to level 4 for every phase of hub development and construction, an organizational breakdown structure, roles and responsibilities for all senior and key staff, a resource-loaded schedule that will include labor and non-labor costs, a plan for procuring all necessary materials, and earned value management reporting, including schedule performance index (SPI), cost performance index (CPI), estimate to complete (ETC), and estimate at complete (EAC). A full risk management plan and program will be included in our project management plan and will identify and address all risks. We will report on all progress, including new risk, EVM metrics, and our performance on EEEJ, DEIA, and Justice40 requirements at least monthly to DOE. A high-level WBS and schedule is presented in **Figure 4**.

1.2.1 Key Risks and Challenges

Our risk management approach is based on best practices of the Project Management Institute (PMI) and is in alignment with DOE

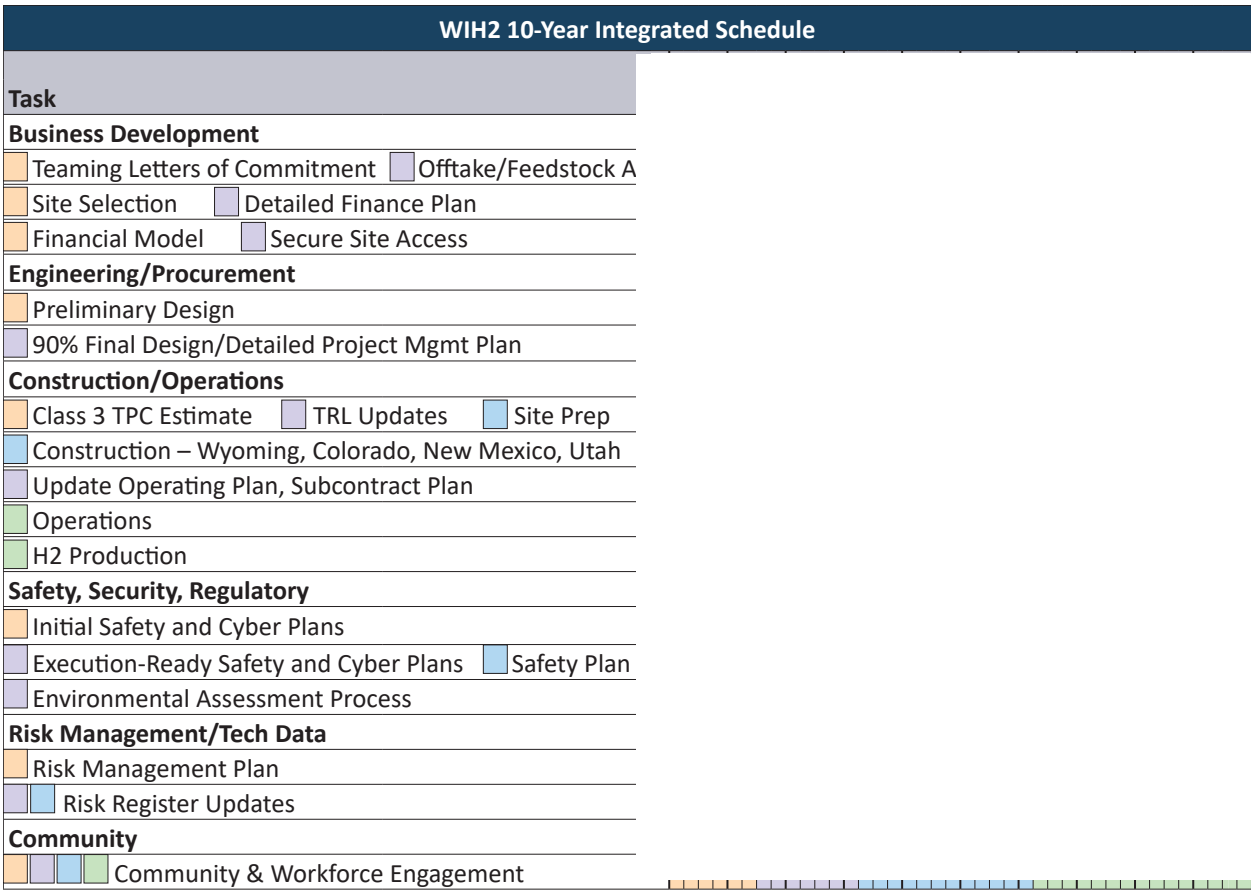


***Figure 4. Schedule**. Our 10-year integrated schedule spans all four of DOE's defined phases.*

Order 413.3b. Identification and mitigation of risks increases stability, reduces legal liability, promotes stakeholder confidence, and contributes to business valuation and reputation. We document known risks and capture as many of the unknown risks as possible to reduce the number of surprises and allow time to address the unknowables. Our risk management program is summarized in **Figure 5**. Key risks already identified are presented in **Figure 6**.

1.2.2 Impact on Hydrogen Production and Consumption Infrastructure

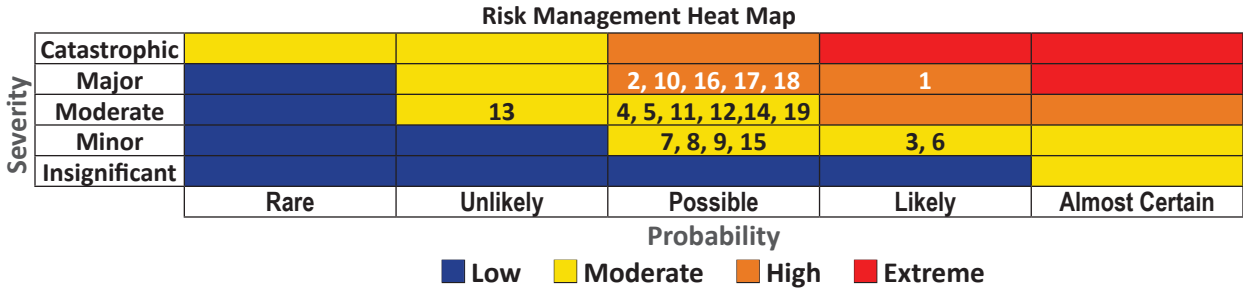
The transition to sustainable and renewable energy has already begun. WIH2 will accelerate hydrogen production, leading development of a sustainable energy market. The result is expected to reduce carbon emissions from our region by more than 35,000 metric tons per day. Our hub also will play the important role of connecting hubs east and west of the Rockies, thereby creating the fully national hydrogen ecosystem envisioned in BIL. We view DOE funding as the essential catalyst for coordinating an economically sustainable hydrogen economy for the West, avoiding a scattershot set of private sector efforts with limited interests in the long-term durability and growth of the ecosystem, including local impacts, DEIA communities, and workforces.

1.3 Impact of DOE Funding

In our full application, we will request $1.0-1.25 billion in funding through BIL. This funding will be a key catalyst to our eight projects. Without this funding, the WIH2 concept cannot be developed in the expedited manner we are seeking. While we have many private sector projects under development, they are not coordinated, do not serve the entire range of our communities and Justice40 objectives, and do not establish the generation, transportation, storage, and end-use infrastructure required to address energy security while reducing CO_2

Risk Management Process					
1 →	2 →	3 →	4 →	5 →	6
Program Planning	**Identification**	**Assessment**	**Ranking**	**Mitigation Planning**	**Risk Monitoring, Control and Reporting**
▪ Establish key metrics ▪ Develop key program evaluation criteria ▪ Categorize impact areas ▪ Identify risk management leadership	▪ Hold sessions to identify risks ▪ Seek multiple perspectives ▪ Document risks ▪ Leverage lessons learned ▪ Report new risks to management and clients	▪ Establish impact values ▪ Hold brainstorming sessions with SMEs to rate risks ▪ Review assessment to eliminate "inflated" risks and redundancies, highlight nuances	▪ Document the likelihood and impact of all risks in risk register ▪ Include moderate or high risks in risk planning ▪ Monitor low risks to ensure their ranking does not increase	▪ Identify risk and apply best risk response strategy ▪ Determine if response is to an established trigger ▪ Query risk managers if imminent risks exist at management meetings	▪ Track and report risks in risk register ▪ Ensure continuous viability of a response/strategy plan ▪ Periodically reassess new and existing risks

Figure 5. Risk Management Process. *The WIH2 risk management process has been proven by Atkins at sites nationwide.*



1 DOE slows/decreases funding
2 DOE issues no-go decision
3 DOE directives change or conflict with project needs
4 Offtaker demand decreases
5 Can't obtain sufficient matching funds and/or partner funding expectations don't align
6 Economic recession
7 Supply chain or workforce tightening/disruptions
8 Limited ability to scale EJ program
9 Lack of projects integrating disadvantaged/underrepresented communities
10 Lack of regulator approval (NEPA or other process)
11 Lifecycle emissions balancing fails to meet DOE requirements
12 EIS process identifies significant unforeseen challenges
13 Production technology won't scale
14 Lack of competitive feedstock capacity, cost
15 Lack of transport system(s) capacity and/or competitive cost
16 Production capacity doesn't meet offtaker requirements
17 Inter-consortium partner conflicts on individual IP
18 Loss of critical IP
19 Lack of necessary IP (due to cost or access)

Figure 6. Initial Risk Assessment. *Our initial risk assessment spans a full range of risks.*

emissions. Only with federal funding will these efforts be integrated as priorities. Only with such funding will they be expedited.

1.4 How the HUB Meets FOA objectives

Our proposed hub exceeds all FOA objectives, including long-term viability, financial strength, and private sector funding. Specifically, we meet the objectives requested in the FOA requirements for the concept paper using the methods presented in Sections 1.4.1-1.4.3 below.

1.4.1 Achieving Long-Term Financial and Operational Viability

The WIH2 approach to long-term financial and operational viability is driven by our utilities and project partners, who are able to reduce risk due to their sophisticated cost analysis and operational capability. Our region's needs for storage and load leveling are extensive, resulting in large-scale hydrogen needs

that will drive our financial viability.

Operationally, Atkins uses independent benchmarking to determine best-in-class performance, then uses a combination of continuous improvement programs and challenge teams to bring cost performance to the next level. We will invest in workforce training and identify front-end energy cost, capital expenditure cost, fixed operation and maintenance costs, and labor as areas subject to continuous improvement. We also will identify early supply chain bottlenecks and use our competitive subcontracting and sourcing systems to achieve the lowest cost.

To ensure operational viability, we engage our continuous improvement program with a rolling wave set of assessments to deliver best quality. We use proven project management methods with attention to controlling scope, schedule, cost, and risk, working to the full range of project management disciplines included in PMI methodology and the requirements of DOE O 413.3b. We ensure equity to all four states, and we partner with each state to engage local businesses, particularly small and minority-owned businesses. We also partner with our unions, non-union workforces, universities, community colleges, apprenticeship organizations, local residents, EEEJ communities, and tribes on workforce and economic development to ensure the continuance and growth of economically viable jobs.

To identify entities willing to share in the cost for hub opportunities, Atkins will consult with the states and RANGE and also reach into our network of clients and contacts, including energy and utility companies.

1.4.2 Achieving Market Liftoff

The WIH2 proposal relies on our utilities and project partners to develop significant infrastructure for hydrogen production, transport, and storage, driven by stable demand from electrical generation and by modest blending into distribution systems over the near to medium term.

By providing long-term offtake by utilities and electrical generators, investment in production and transportation infrastructure will provide other users the confidence that hydrogen will be available. This will enable industrial and transportation users to make investments to become hydrogen users.

We envision a future where hydrogen is used to decarbonize electricity generation, for industrial operations, for heavy transportation, and potentially for buildings. It is anticipated that use cases for hydrogen will not remain static but will evolve, driven by market factors.

Market liftoff also is dependent on a successful project management plan, use of a disciplined approach to execution of that plan, and constant attention to risk management. It depends on a plan that sequences capital expenditures and infrastructure construction in a way that provides the lowest cost pathway and the greatest integration of our projects, ultimately achieving the highest value production, transport, and end use of hydrogen achievable.

WIH2 will establish a project management office, a construction and operations section, an expanded engineering section, and human resources functions to support project planning and execution. We will implement the necessary systems and structures for successful project management following PMI methodology, including integrated project teams, an earned value management system, an interface control system, a quality assurance program, a change control process, a risk management system, a configuration management system, an integrated safety management system, and a document control system. We will meet all DOE requirements, reporting regularly on progress and issues hindering market liftoff.

1.4.3 Acquiring Follow-on Funding from the Private Sector

Atkins and the WIH2 partners have strong balance sheets and are able to fund follow-on

WIH2 fundraising methods include engagement of venture capitalists, investment funds, entrepreneurial organizations, tribal business

development organizations, our state economic development organizations, and private sector investors. In the past, we also have developed financial forecasts for raising bond funding if necessary.

2.0 Community Benefits Plan

WIH2 understands that partnership with communities, at every stage of project development, is essential for deployment of robust research and technology capabilities necessary to create quality jobs, provide education, and grow new and existing industries. We share DOE's vision of broadly shared prosperity in the clean energy transition, and our commitment to EEEJ is built into all aspects of our LLC. We are in discussions with key stakeholders across the region to inform our planning process, our approach to EEEJ, and workforce development.

A key aspect of our partnership strategy is to provide data that is transparent and easily accessed by those in and near hub projects. This begins with a detailed and nuanced understanding of the impacted communities, especially those on the front line of hub development who have the greatest vulnerability, as well as those who have been traditionally excluded. Additionally, a holistic understanding of the benefits and costs of the hydrogen economy is necessary and must include EEEJ.

To accomplish this, WIH2 is developing a transparent indexing tool based on multicriteria decision analysis (MCDA), coupled with the development of future scenarios using System Dynamics (SD) modeling. Together, these components leverage Justice40 metrics to provide an assessment mechanism, and assess EEEJ goals and risks identified/defined by a diverse group of experts, including tribal leaders, residents of impacted communities, and other stakeholders. Once a baseline is created, MCDA and SD continuously provide information on progress toward community-based goals in an accessible format to communities and DOE. We understand and will respect that some communities may request exclusion from hosting H_2 infrastructure.

2.0 Community Benefits Plan The WIH2 Difference

- Multi-layered approach to community engagement to foster partnership with all stakeholders, prioritize communication, and build trust
- Engagement of all stakeholders, including tribes and fossil fuel-dependent communities, in planning efforts at all stages of project development
- Workforce development and expanded access to debt-free qualified education and training, a priority of WIH2 president
- Creation of, and providing resources for, a DEIA Plan that emphasizes inclusivity and access for under-represented groups in STEM, construction, and operations opportunities

2.1 Meaningful Community and Labor Engagement

Active and visible involvement of communities from the very beginning of hub project creation is essential to ensure that WIH2 programs and plans are truly aligned with, and driven by, the needs of the communities impacted. Our hub, spanning four states, requires a multi-layered approach to community engagement and includes in-person as well as virtual outreach to educate, receive input, and resolve concerns. Our focus will be on building new relationships and strengthening existing state efforts and relationships with labor and communities. For example, in a letter to the New Mexico House of Representatives, the President and Vice President of the Navajo Nation voiced support for hydrogen development, citing its potential economic and environmental benefits to both the state and the Navajo Nation.

The WIH2 Communication and Community Engagement Team is working to produce informational tools accessible to all audiences, in multiple languages, and available on state websites. Our approach will be dynamic and tailored to the needs of each community and designed to educate, receive input, resolve concerns, and build relationships.

To date, WIH2 community outreach **(Figure 7)** includes discussions with industry and community leaders and stakeholders and meetings with North America Building Trades Unions

WIH2 Community Outreach
Received 100+ responses to the Request for Expressions of Interest (RFEI)
Met with NABTU 10/11/22, initiating memorandum of understanding discussions
Hosted Industry and Community Engagement Roundtable discussions: ■ Industry Roundtable on 9/30/22 to inform development of an engagement strategy, with 30 participants ■ Community Engagement Roundtable on 10/7/22 to inform engagement strategy, with 40+ participants **Future Community Engagement:** ■ Ensure community benefit and engagement areas are addressed ● Educate and engage local communities on hydrogen, relevant infrastructure development, and investment initiatives, to help local communities access opportunities from and/or voice concerns about the emerging hydrogen hubs ● Engage community groups/stakeholders to synthesize emerging justice and environmental protection issues ● Collaborate with community groups with the intention to help facilitate, provide analysis, and negotiate community benefits into an agreement, if and when hub development is finalized (beyond 2023)
Colorado
■ Monthly meetings of the Colorado Hydrogen Network, formed in 2019 and representing leading companies and organizations advancing innovative, clean, safe, and reliable energy technologies ■ CO Energy Office, with a dedicated EJ liaison to develop relationships/facilitate community engagement ■ Environmental Justice Advisory Board, appointed by the Governor, focused on engaging disproportionately impacted communities and environmental justice issues ■ Colorado Commission of Indian Affairs (CCIA) is a key partner and available to ensure tribes who may have an interest or be impacted by the planning/deployment of hydrogen are included early and often
New Mexico
■ Executive agency leadership briefing of All Pueblo Council of Governors (APCG) ■ Governor's Hydrogen Roundtable March 2022 ■ Informal conversations led by NM agencies with various Tribes and Pueblos, including discussion with Navajo about a partnership with WISHH and WIH2 that may be similar to our partnership with Xcel Energy and Tallgrass ■ Preliminary workshop held by NM universities for faculty and national laboratory personnel to identify technical/research expertise ■ Provided the first of ongoing updates to tribal leadership about our efforts ■ Informal conversations with tribal leaders and community stakeholders ■ Presentations regarding hydrogen and its potential for regional economic development, San Juan Basin Energy Conference, Farmington, NM, October, 2021 ■ Hydrogen Roundtable with industry, regulatory, tribal, state, and regional leaders in Farmington, July, 2021, with follow-up sessions throughout late 2021 and early 2022 ■ Hydrogen Breakfast for general public in Four Corners region in Farmington, February, 2022 ■ Hydrogen hub presentations to the Four Corners Economic Development Association ■ Hydrogen hub presentations at gathering of the Gallup Economic Development Association
Utah
■ Multiple focus groups hosted by the Salt Lake Chamber of Commerce in early 2022 to seek input from a broad range of business leaders, business sectors, and communities to better understand how new energy (renewable and hydrogen) might impact business and lives and to produce a vision for Utah's energy future. Focus groups included community college, university, and tech college students, education/workforce development leaders, Utah legislators, individuals, and communities engaged in agriculture and food; banking and finance; energy, minerals, and mining; health care; hospitality and tourism; real estate; construction; technology, and transportation ■ Outreach by the Utah Office of Energy Development and conversations with the Navajo Nation and local businesses in Southeastern Utah
Wyoming
■ Hydrogen hub presentations to Wyoming Economic Development Association on 2/16/22 and 9/29/22 ■ Why Hydrogen? Webinar hosted by University of Wyoming, School of Energy Resources June, 2021 ■ Formation of Center of Excellence Hydrogen Energy Resource Center in University of Wyoming, School of Energy Resources, focusing on all forms of clean hydrogen, as well as technoeconomics and policy

Figure 7. WIH2 Outreach. *Our team has established early connections with a wide variety of stakeholders.*

(NABTU) as well as state-level union leadership. Additionally, Xcel Energy, in partnership with the International Brotherhood of Electrical will provide new union-represented hydrogen production positions.

2.2 Workforce Development

WIH2 is committed to an integrated workforce development program that is fully inclusive of all, with emphasis on historically disinvested communities. Organizationally, our program will be directed from the WIH2 Office of the President and will develop the next-generation workforce as well as mid-career and displaced workers to support the hydrogen economy in our region. Our program will include training on EEEJ objectives for management and partners. Our workforce development vision of "cleanest energy and best jobs" underpins our every action.

The four WIH2 states have existing workforce development programs, ready to connect

community members with new training and employment opportunities. A strong example is New Mexico's Job Training Incentive Program, which funds classroom and on-the-job training for newly created jobs in expanding businesses. Other existing efforts include:

- Colorado's Office of Just Transition, which supports workers, employers, and communities as they transition away from coal
- New Mexico's Department of Workforce Solutions with a focus on workforce development and protections
- Talent Ready Utah, part of the Utah System of Higher Education, optimizes pathways between education and industry partners
- Wyoming's Innovation Partnership, coordinating job and worker training between the University of Wyoming and community colleges and the Department of Workforce Services, supporting a quality workforce

Using estimates from the American Council for an Energy Efficient Economy, WIH2 estimates the hydrogen economy in our region will generate >10,000 high-quality employment opportunities. We will recruit workers from Justice40 areas across each of our states and provide education, training, re-skilling, up-skilling, and committed job opportunities. On the state level, New Mexico has engaged the NM Buildings and Construction Trades Council and has active engagement in the Workforce Working Group. The education and training are designed to support five principal components of the WIH2 hydrogen economy: (1) energy feedstock/water feedstock, (2) clean hydrogen production, (3) connective infrastructure, (4) end users/co-products and services, and (5) export-oriented equipment manufacturers.

Education for the Hydrogen Economy

WIH2 will sponsor a corporate-supported qualified, debt-free education program involving 59 colleges and universities that will provide hydrogen economy-related technical courses and two-year degrees. This program will be integrated with high schools in disproportionately impacted communities, offering scholarships and internship programs. Our region, which has 37 minority-serving institutions (MSI), some of which are in RANGE, has established comprehensive education programs that will support success at every level and stage of the hydrogen cycle. WIH2 will work with the following state systems:

- Colorado, with 13 community colleges and 40 statewide locations
- New Mexico, with 18 community colleges and four Tribal Colleges, passed a first-of-a-kind Opportunity Scholarship Act that provides free tuition to citizens and tribal members pursuing a training certificate, associate degree, or bachelor's degree
- Utah has 16 colleges and universities with presences in eight economic regions
- Wyoming has eight community colleges

The envisioned workforce development system would ensure individuals could receive training within 80 miles of their homes. The San Juan College School of Energy in Farmington, NM, will serve as our pathfinder or model. As New Mexico's Center of Excellence for Renewable Energy and Sustainability, the school, working closely with industry, provides a highly skilled, fit-for-purpose workforce. In the past four years, the school has conducted multiple hydrogen-focused outreach efforts, been named the training provider of choice for an onsite scalable hydrogen solutions company, and sits on the Education Committee at the Center for Hydrogen Safety. We will assess the success of our programs through a series of metrics tracking the alignment of jobs filled in target workforce areas, along with the demographics of individuals enrolled in and completing aligned education/training programs.

Training for the Hydrogen Economy

The WIH2 team has met with the president and leadership team of NABTU to plan an integrated partnership focused on recruiting and training the specialized workforce required for the construction, installation, and commissioning of clean hydrogen projects. We have mapped the skillsets required for all aspects

of the hydrogen workforce across the 14 craft affiliates of NABTU and have discussed how WIH2 and NABTU can work together to resolve any jurisdictional disputes in this still-nascent industry. We are engaged in establishing a Project Labor Agreement (PLA) for WIH2, and as the project progresses, we anticipate going through a similar process with the AFL-CIO.

Through the NABTU agreement, WIH2 will have access to the Multi-Craft Core Curriculum (MC3). This nationally recognized apprenticeship program will be fully supported and endorsed by WIH2. The track record of MC3 is exceptional, demonstrating the ability to accept and train 75,000 applicants a year. In addition, WIH2 will work with NABTU to identify specialty skillsets required by particular crafts. Examples might be specialty training on electrolyzer installation and instrumentation for the International Brotherhood of Electrical Workers, or best practices for hydrogen piping systems for the United Association-Union of Plumbers, Fitters, Welders, and Service Techs. NABTU has proposed setting up training centers in existing training facilities or setting up new centers if required. This program will be formalized during the process leading to the full application. NABTU MC3 also is working with community college programs to ensure flexibility for students/employees, i.e. eliminate the need for them to restart if they move from a community college program to union apprenticeship pathway and vice versa. This is a transformational strategy for our region.

2.3 Advancing Diversity, Equity, Inclusion, and Accessibility

The WIH2 commitment to creating an equitable, diverse, inclusive, and accessible workforce for our hub is foundational to our vision of a clean energy economy. A diverse and equitable workforce will ensure that the public and private investments in new technologies will benefit all communities and provide particular economic opportunities for environmental justice communities – largely low- income households and people of color. In collaboration with community partners, WIH2 is developing a DEIA plan in keeping with OCED Guidance to build a shared vision of opportunity – for workforce pathways for disadvantaged communities, particularly in good-paying science, technology, engineering, and math (STEM) and construction fields, for inclusive and meaningful engagement and collaborative decision making, and for the shared long-term benefits of a just clean energy transition.

As discussed in Section 2.0, the MCDA/SD indexing tool will support identification of, and track progress toward, quantifiable goals. These goals will be developed with input from community members, tribal nations, job training programs serving DACs, professional organizations, education institutions, and clean energy business leaders and will be included in our DEIA plan. Areas of interest to track might include metrics of engagement and workforce diversity outcomes. We will report metrics to DOE and the WISHH Executive Committee and make them publicly available, in part to inform our ongoing engagement with communities.

Diversifying the workforce, at both the management and executive level, will promote collaboration, innovation, revenue generation, and entrepreneurship.

While employment for Hispanic/Latino workers is higher in most cases (**Figure 8),** many jobs are in low-wage occupations. Hispanic/Latino workers also accounted for ~23 percent of the energy sector's COVID-related job losses in 2020. Such diversity gaps must end. Diversified workforces and leadership will boost both innovation and financial performance of companies.

Our strategy may include training modules and networking events to increase DEIA awareness of opportunities and challenges. WIH2 plans meaningful engagement with the 35 tribal nations and DACs in our region and to measure and monitor metrics such as opportunities for minority entrepreneurs; diversity of the applicant pool, hiring panel, workforce, and leadership team; dollars allocated to DEIA; retention and advancement; job satisfaction

Clean Energy Employment Demographics, 2020

Demographic	Overall U.S. Labor Force	Clean Energy	Colorado	New Mexico	Wyoming	Utah
White	76%	73%	71%	79%	71%	77%
Black or African-American	13%	8%	6.5%	7.9%	7.4%	8.5%
Asian	7%	8%	7.5%	7.1%	6.3%	6.8%
Native Hawaiian or Other Pacific Islander	<1%	1%	.09%	0.9%	0.8%	1.3%
American Indian or Alaska Native	<1%	1%	1.2%%	2.2%	2.5%	1.3%
Two or more races	2%	8%	7.8%	14.4%	5.9%	7.1%
Hispanic or Latino	18%	17%	16.6	21.9%	12.9%	16.2%
People of Color	22%	27%	24%	32.4%	22.9%	25%
Women	48%	27%	29.5	27.1%	25.9%	27.1%

Figure 8. Clean Energy Employment. *Participation by state and demographic.*

and engagement; accessibility, and whether employees are paid equitably independent of race and gender. We will refine these metrics during preparation of our full application and make them available publicly to inform our engagement with communities.

2.4 Contributing to the Justice40 Initiative

WIH2 recognizes the importance of building trust and cultivating relationships with DACs, tribes, and communities most harmed by environmental burdens. These communities may be justifiably skeptical or fearful of new energy development in their area, or have questions about the economic transition and what it will mean for them. To ensure meaningful community engagement, we will focus on clear communications, holding listening sessions, and building long-term relationships and trust.

For WIH2, building trust and cultivating relationships with tribes and fossil fuel-dependent communities is critical to achieving our Justice40 vision, including using BIL funding to advance equitable solutions in climate change, clean energy/energy efficiency, clean transit, affordable and sustainable housing, training/workforce development, remediation and reduction of legacy pollution, and the development of clean water and wastewater infrastructure.

WHI2 will implement a robust communications plan to ensure all people —regardless of racial, economic, cultural, and educational backgrounds — are heard and regarded. It includes talking points in multiple languages that are clear, jargon-free, specific, and relatable.

The WIH2 Communications and Engagement Team will work with a core leadership group of community and tribal leaders and state designees on ongoing engagement to include:

- Virtual and in-person town halls with language- and hearing-impaired interpreters
- Engaging trusted community leaders and service providers as points of communication
- Translation of materials that clearly explains to all audiences WIH2/Hydrogen 101
- Printed materials for handouts and for mailings to people without internet access
- WIH2 media strategy for print, TV, and radio
- Social media strategy, securing social media handles, pages, and conduits
- Informational YouTube videos and a website
- Educational tours of our hub facilities to build familiarity and comfort within the DACs
- Focus groups and roundtables, which may include compensation to participants
- Mechanism to solicit best ideas and real-time feedback from residents
- Quarterly accountability updates
- Community oversight committees
- A WIH2-centric communications/engagement strategy with a core leadership group
- WIH2 Symposiums featuring workshops and open forums for stakeholders and leadership

- E-newsletters to update progress

To measure progress with Justice40 programs, we will update WIH2 metrics highlighted in **Figure 9,** and other metrics developed with input from our partners, on a periodic basis with reports to DOE and through websites and e-newsletters to other entities. We have also selected accountability advocates in each state who will be responsible for oversight and reporting of all metrics. Also, our organization includes a senior manager, Robert Behunin, who is responsible and accountable for community engagement, EEEJ, Justice40, and DEIA.

3.0 Qualifications, Experience, and Capabilities of the Proposed Project Team

WIH2 brings the capabilities and commitment to engineer, design, construct, and operate a hub. Serving as prime contractor is Atkins, currently managing $22 billion in DOE contracts. Atkins is a front-runner in net zero engineering and development, with experience in 27 hydrogen programs ranging from conceptualizing electrolysis facilities, to developing transportation and distribution networks, to expanding hydrogen storage capacity and uses.

Partnering in the effort is WISHH, a bipartisan state coalition ensuring we capitalize on our region's abundant wind, solar, geothermal, and natural gas resources and intellectual capital to optimize clean hydrogen production and meet the practical needs of citizens.

3.0 Qualifications & Experience
The WIH2 Difference

- Decades of experience leading complex, multibillion-dollar DOE contracts
- Led or assisted in 27 hydrogen-related programs in U.S. and abroad
- Bipartisan coalition of Mountain West states partnered with expertise from Atkins, universities, and national laboratories
- Skilled at managing large public-private and interjurisdictional projects
- Input from key state agencies to advance EEEJ, workforce development, economic development, regulatory licensing, air quality, natural resource stewardship, and tribal relations

Our third partner, RANGE, is a nonprofit corporation including >15 research universities, national laboratories, and educational institutions in the Mountain West. As the technical support and engagement directorate, RANGE ensures WIH2 incorporates scientific advancements to maximize hub performance. In addition, we have partners who are leading specific projects and community engagement partners, including tribal nations and labor unions.

3.1 WIH2 Key Personnel Skills and Experience

WIH2 harnesses the skills, expertise, and commitment of hydrogen experts, business developers, DOE-experienced leaders, and cab-

Justice40 Policy Priorities	Metric	Measurement
Reduce energy burden	Reduced energy costs due to technology adoption	Annual energy expenditures (total dollars) in DACs before and after program intervention
Reduce environmental burden	Reduction in criteria emissions	Measurement of local pollutant (NO_x, SO_2, $PM_{2.5}$) in DACs before and after program intervention
Increase clean energy access	Increase access to clean energy serving DACs	% of local electricity generation mix from clean energy that serves DACs
Increase access to low-cost capital	More loans to minority business enterprises (MBE)/disadvantaged business enterprises (DBE)	Loan dollars awarded to MBEs/DBEs/Total dollars awarded
Increase enterprise creation	More contracts to MBEs/DBEs	# contracts awarded to MBEs/DBEs, total # contracts
Increase clean energy jobs & training	More clean jobs in DACs	# of jobs created in DACs/total # of jobs created (union and non-union jobs)
Increase resilience	Increased community resilience	Energy storage deployed in DACs/total energy deployed
Increase energy democracy	Increased stakeholder engagement	# of events with community groups in DACs/ total # of events

Figure 9. Measuring Progress. *Monthly updates will ensure continuous improvements and accountability.*

inet-level agencies in each state to conceptualize, develop, build, test, and operate H2Hub projects. The full organization and its key staff are summarized in **Figures 10** and **11.**

The WIH2 organization structure protects equity and upward communication. Our board of managers tracks and reports program status, appoints the WIH2 program manager, assures compliance with the operating agreement and bylaws, and advises the management team.

WIH2 ensures the participation of frontline and disadvantaged communities by placing both the advisory group and community engagement/EEEJ functions in direct communication with the program manager, second in upward influence only to the legal and safety/quality functions. Thus, we maximize public health, safety, labor, and accountability.

Direct reports to our program manager include the Chief Operations Officer, who coordinates the four essential functions: project management, engineering, construction management, and operations. This ensures the efforts of each function are fully integrated and challenges are effectively addressed by leadership and stakeholders.

3.2 Experience Demonstrating Performance of Tasks of Similar Risk and Complexity

Atkins, a prime contractor on DOE projects since the early 1990s, currently manages four major DOE contracts, enabling us to bring to the hub extensive tools, methods, and experience with DOE orders and requirements. The company has led or assisted in 27 hydrogen programs focused on developing electrolysis facilities, hydrogen transportation and distribution, and hydrogen storage in salt caverns. Atkins has a Center of Excellence for Net Zero Energy that offers extensive hydrogen expertise and lessons learned and insights from hydrogen projects in the U.S. and worldwide.

Atkins also has experience managing large, multibillion-dollar interjurisdictional and public-private partnership infrastructure projects. Its team includes specialists in technoeconomic analysis with energy experience, socioeconomic analysis, and stakeholder engagement, including with DAC and Native American tribes, and a full range of government contracting needs.

In addition, our partners bring exceptional experience in infrastructure construction and operations including in the energy sector. They have installed assets of more than $100 billion. Our state agencies fully engage with tribal nations and other DACs.

Finally, RANGE members offer capabilities such as hydrogen electrolysis labs at NREL's main campus and megawatt-scale H_2 electrolysis/fuel cell capabilities at its ARES facility; hydrogen-compatible materials engineering (e.g., for piping and storage) and safety-related R&D at SNL; megawatt-scale hydrogen engines at Colorado State University's Powerhouse Energy Campus, a hydrogen research and development lab at Colorado School of Mines, and a Hydrogen Technology Center at the University of Wyoming.

Figure 12 presents examples of Atkins work demonstrating our capability, experience, and readiness to ensure the success of the hub.

3.3 Work with teaming partners on prior projects or programs

WIH2 leaders have worked together for more than five years. Alan and Fred provided executive leadership for DOE's DUF6 project. Jeff Kendall worked with them, providing legal support.

3.4 Access to Equipment and Facilities

WIH2 will provide necessary equipment and facilities to our hub sites and utility partners. Atkins provides >$1.1 billion a year in project-related services for DOE, subcontracting >$300 million a year by renting or buying major pieces of rolling stock and facilities at project sites. Our contracting and procurement process is certified by DOE and acquires goods and services from a broad range of communities and businesses, including Justice40 communities.

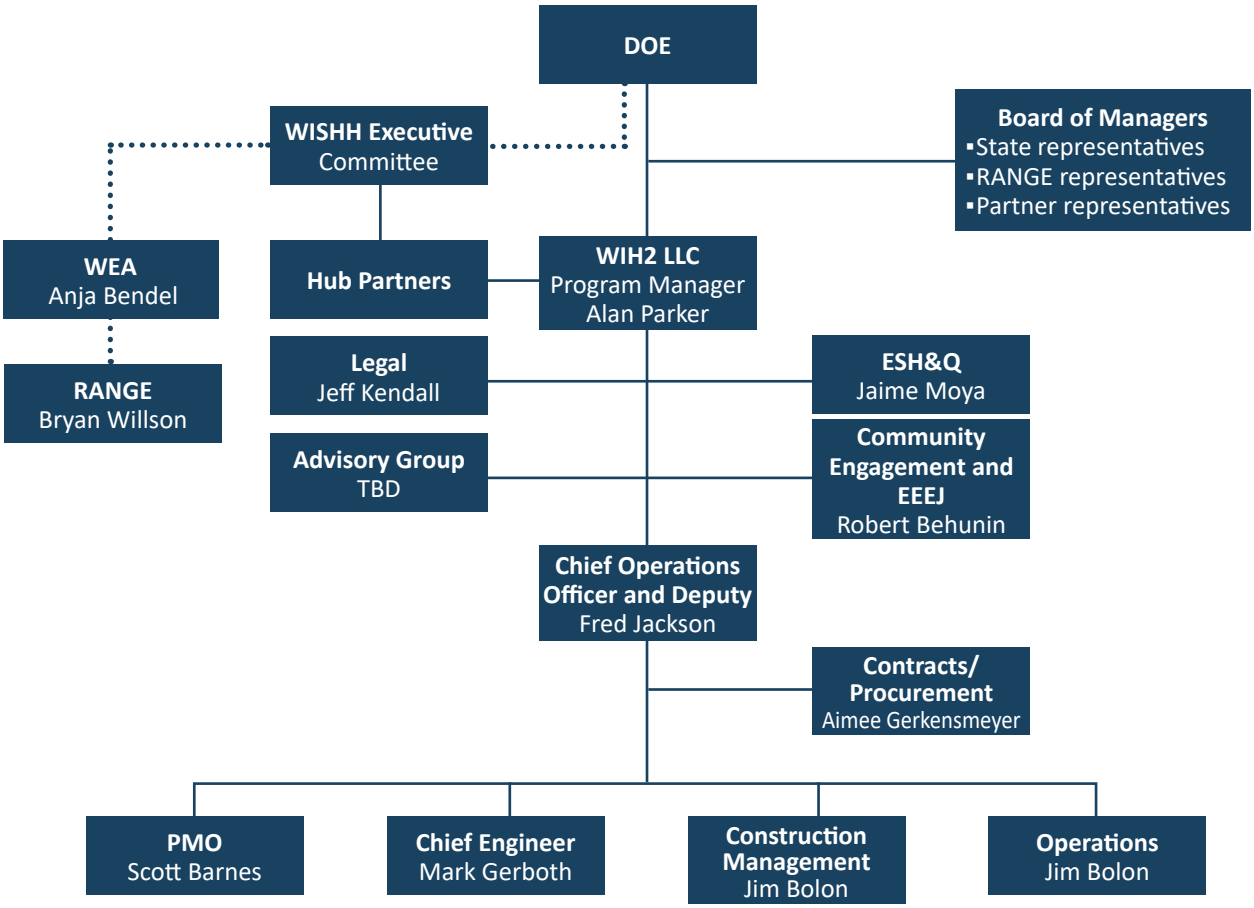


Figure 10. Organization. *WIH2 brings an experienced team to develop, build, test, and operate an H2Hub.*

WIH2 Key Personnel
Alan Parker, *Program Manager* ■40 yrs. project management for DOE, e.g., Rocky Flats environmental cleanup ■Led $710M DUF6 project, 2016-19 ■Management team, Canadian Nuclear Laboratories' hydrogen research/ deployment innovations ■Long-term ties to regional energy projects
Fred Jackson, *Chief Operations Manager* ■30 yrs. developing safe operations for chemical production facilities ■Eng. Dir. at DUF6: installation and commissioning of hydrogen generation and storage systems and small- and large-scale steam reforming hydrogen production facilities
Robert Behunin, *Community Engagement and EEEJ Manager* ■20-yr. expert in govt. relations and regional development ■Works w/public officials and private sector to build coalitions with local and state leaders, industry, and environmental groups ■For Utah's first energy plan, convened stakeholders across the state
Aimee Gerkensmeyer, *Contracts/Procurement Manager* ■20 yrs. procurement and finance in federal and commercial contracting. ■Manages eight federal (predominantly DOE) & commercial entities in five U.S. locations
Mark Gerboth, *Chief Engineer* ■30 yrs. developing comprehensive approaches to safely operating chemical/nuclear production facilities ■Current level-one manager, DOE's Hanford Tanks Operations Contract
Jaime Moya, *ESH&Q Lead* ■35 yrs. ES&H experience ■Former ES&H Manager for SNL ■Current Safety Dir., $7.5B Chalk River Laboratory project, a Canadian center of excellence for hydrogen development
Scott Barnes, *Project Manager* ■20 yrs. leading cost, schedule, and project management ■Directs a wide range of Atkins nuclear and commercial projects ■Previously led contracts and project management for Isotek
Jeff Kendall, *General Counsel* ■15 yrs. overseeing legal matters for major DOE and commercial programs and projects ■Former Director of Environment for NM, collaborating with regulators in CO, WY, and UT
Jim Bolon, *Construction and Operations Lead* ■30 yrs. leading DOE construction and operations contracts ■VP Atkins Field Service Group ■President of Isotek at ORNL ■Construction VP, DOE's American Centrifuge Project

Figure 11. Key Staff. *Our team brings decades of leadership experience on DOE contracts and hydrogen projects.*

Examples of Relevant Hydrogen Projects

Examples of Major Projects for DOE
DOE Hanford Tank Operations Contract. *Value:* $10.1B. *Scope:* Manage and operate high-hazard tanks containing highly radioactive waste. Meeting all requirements, including NEPA; stakeholder engagement, including with tribes and communities; project management; management of intellectual property; and reporting.
DOE Hanford Central Plateau Cleanup Contract. *Value:* $10B. *Scope:* Complete cleanup of the Central Plateau area where nuclear materials leached into groundwater. NEPA; stakeholder engagement, including local tribes; project management; extensive procurement; subcontractor management; management of intellectual property.
DOE DUF6 Conversion Project. *Value:* $710M. *Scope:* Lead partner managing and operating two DOE facilities converting highly hazardous depleted uranium hexafluoride to uranium oxide. Led design and installation of hydrogen generation and bulk storage facilities and also led hot functional testing of the plants under a previous DOE prime contract. Meeting all requirements, including NEPA; stakeholder engagement; project management, extensive procurement and subcontractor management; management of intellectual property; and reporting.
Examples of Other Energy Projects
SSE Thermal. *Value:* $3.6M/year. *Scope:* SSE owns and operates two salt cavern gas storage facilities in East Yorkshire, the largest operational storage caverns in the UK. Atkins is SSE's Owner's Engineer, responsible for development, design, engineering, and implementation of capital projects. Involved in major project support since 2013, including management, engineering, FEED & detailed design, site supervision, plant modifications. **Nord West Kavernengesellschaft mbH (NWKG).** *Value:* $2.4M/year. *Scope:* Created a strategic partnership with the operator of the German national oil reserve NWKG, which operates four large storage sites across Germany that provide a strategic 90-day reserve of oil and oil products for the German economy. As an integrated delivery partner, provide owner's engineer technical services and project management support.
Examples of Major Infrastructure Projects
UK High Speed 2 (HS2) Railway. Value: $61.2B. Scope: New high-speed railway being constructed between London and the North of England. Serving as engineering delivery partner for the first two phases of complex project that will ultimately yield ~24,000 jobs, with 2,000 contracts already in place and hundreds of SMEs involved. Provided expertise to develop the project's carbon management system.
International Thermonuclear Experimental Reactor (ITER) Nuclear Fusion Project. Executing >$350M in full scope A/E design services for 34 buildings and five service areas. Responsible for all site infrastructure and buildings. Scope includes construction management of the appointed contractors onsite. ITER is a $24B+ international mega-project (35 nations) for the design, construction, commissioning, and operation of the world's largest experimental nuclear fusion reactor. Requires extensive, complex interactions with hundreds of suppliers and stakeholder representatives of multiple nations.

Figure 12. Experienced. *Atkins has a long record of success managing large DOE contracts and hydrogen projects.*