



**Port of
Whitman
County**

Whitman County Economic Development Informational Meeting (EDIM)

January 10, 2024
11:45 am – 1:30 pm
The Center
110 S. Main St.
Colfax, WA

www.portwhitman.com



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Core Elements of Work

- Small Business Development
- Economic Profiling
- Existing Business Retention/Expansion
- Business Recruitment, Marketing & Advertising
- Site and Infrastructure Development
- Economic Development Advocacy

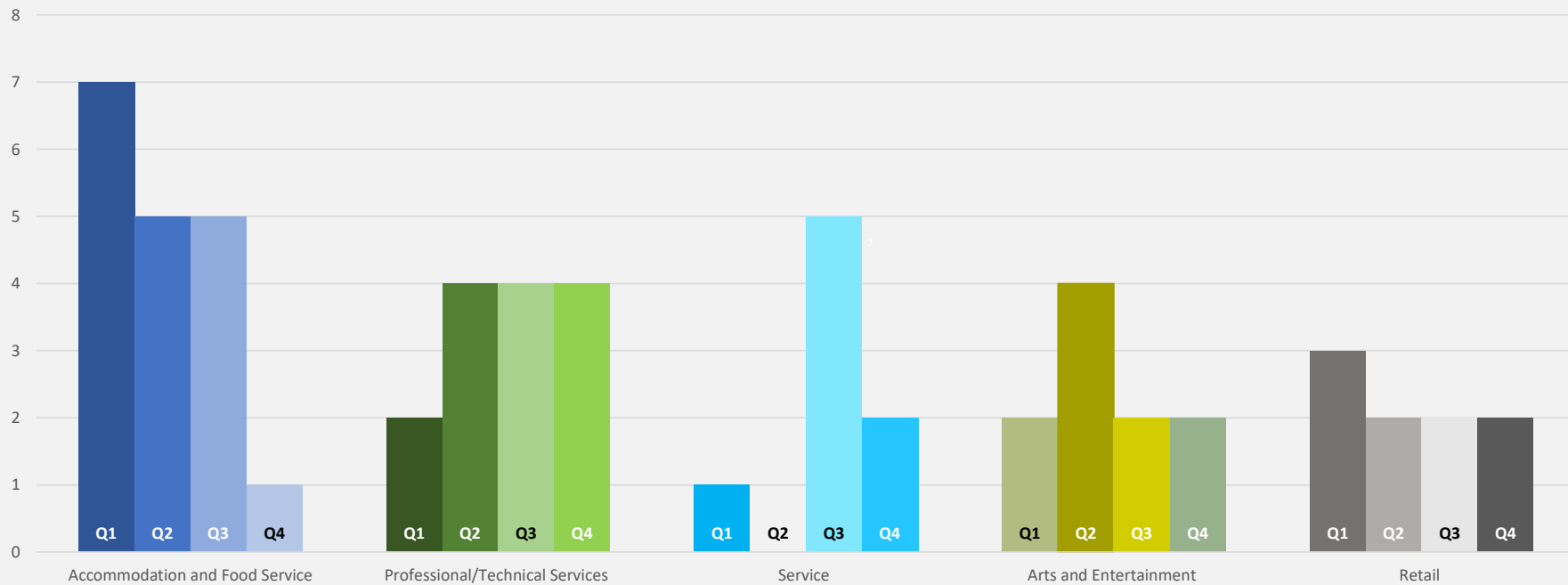
* Elements of work are not listed in any order of importance. Each element is important in this economic development plan.

Small Business Development Center (SBDC)



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Most Common SBDC Client Demographics, YTD

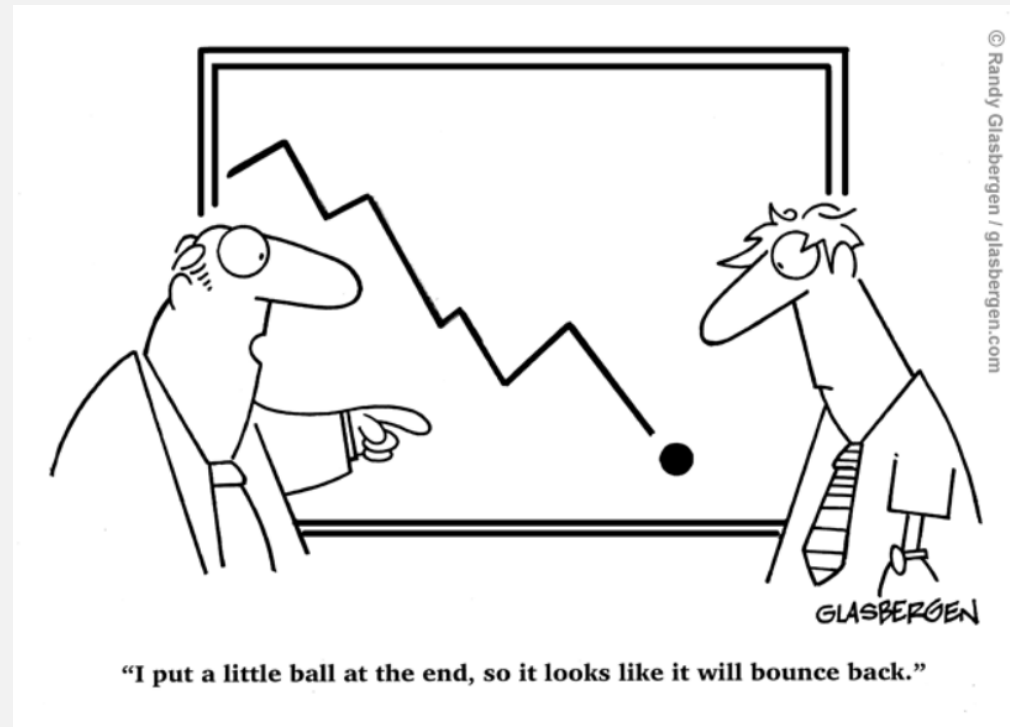


Economic Indicators

- Employment Report
- Labor Force and Employment
- Median Home Prices
- Housing Market Snapshot
- Taxable Retail Sales Comparison



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Existing Business Retention & Expansion (BRE)



Outreach Plan

- Information related to future business needs and identify issues that impede growth
- Profile local businesses at future EDIM's
- Provide existing business assistance through the Small Business Development Center, Port staff, and other partner resources
- Identify critical economic development partners and roles

PROFILE | Alternative Energy Materials (AEM)

- Headquartered in Pullman, WA
- 3,200 sq. ft. facility for scale-up and prototype testing
- Commercializing a clean hydrogen electrolyzer technology, name VYZion
- 5 employees at inception and growing
- Applying for a \$200,000 Evergreen Manufacturing Growth Grant through Department of Commerce



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ALTERNATIVE ENERGY MATERIALS

REALIZE YOUR VYZION!

PROF. DUSTIN MCLARTY

CEO & FOUNDER

VYZION IS A MATERIAL AND MANUFACTURING
INNOVATION THAT FACILITATES FUEL AND POWER
DECARBONIZATION THROUGH PRESSURIZED HIGH
TEMPERATURE ELECTROCHEMISTRY

Summary

- **About**

- Headquartered in Pullman WA, Alternative Energy Alternative Energy Materials (AEM) is commercializing VYZion, a clean hydrogen electrolyzer technology built from a groundbreaking high-pressure material and additive manufacturing process
- Founded in February of 2023, AEM has contracts for >\$2M in testing services and test station construction and Federal R&D grants for \$150k with >\$1M pending
- AEM has retrofitted a 3,200 sqft facility in Pullman Washington
- AEM's founder is a tenured WSU engineering professor, Fulbright Scholar, and world-recognized leader in pressurized testing for high temperature ceramics

- **VYZion Technology Overview**

- VYZion converts renewable electricity collected into green hydrogen 20% more efficiently than PEM
- VYZion can directly electrolyze CO₂
- VYZion integrates with pressurized thermochemistry to synthesize green ammonia, green methanol or other liquid fuels twice as efficient as state-of-the-art
- VYZion increases power density 20x and lowers cost 5x compared to state-of-the-art SOEC
- VYZion can operate reversibly to generate power from sustainable fuels in applications ranging from defense, marine propulsion, heavy trucking, trains, offroad and construction equipment, and aerospace

Test Station Fabrication

- Fabricated prototype and delivered 2nd & 3rd articles
 - Delivered to startup Petra Power in Cleveland, Ohio
- Developing multi-stack test station and pressurized cell test stations
- Testing new EIS and potentiostat integration



Solid Oxide Cells

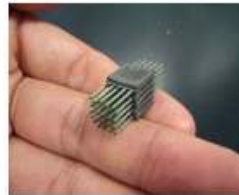
Long history of miniaturization to achieve more active surface per unit material



Tubular cells from Westinghouse in 90's



Rolls-Royce high density tubular cells 00's



Imperial College microtubular cells 00's

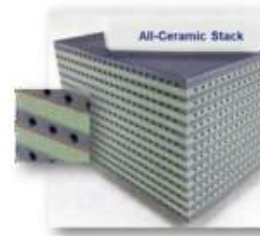
Long history of design and manufacturing evolution to eliminate seals and lower cost



Bloom Planar Stack 00's



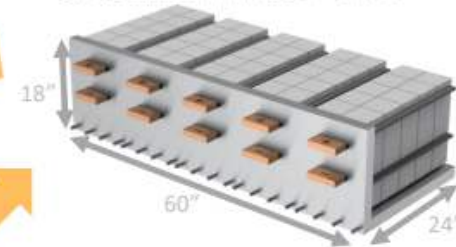
Ceres Metal supported cells 2010's



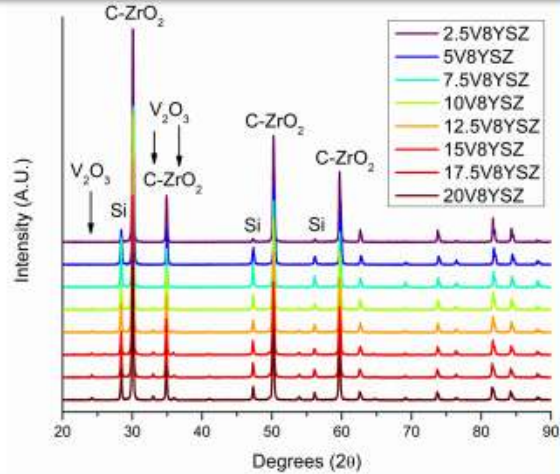
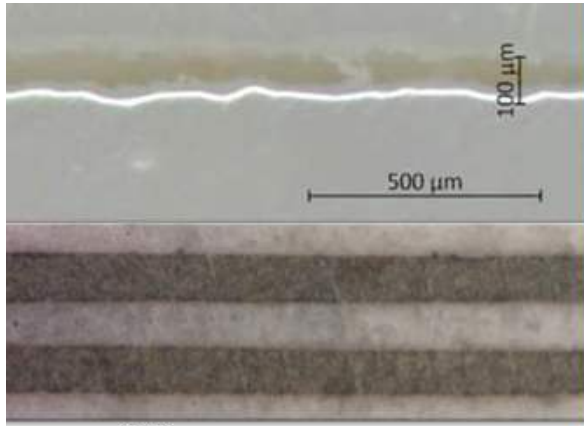
Saint-Gobain Monolith 2010's

VYZion is next logical progression of both, but required material and manufacturing innovation

5x 10 stacks modules ~ 1MW



AEM's VYZion monoliths 2020's



Innovation # 1: VYZ

Vanadia and Ytria co-doped Zirconia

- Patented new material composition
 - (US 11,594,738 B2)
- Forms same stable cubic compatible with YSZ electrolyte
- Survives at pressure
- Catalyzes reactions

20V8YSZ



12.5V8YSZ



2.5V8YSZ



Innovation # 2: DPP-AM

Dry Powder Pressing Additive Manufacture

- Deposits multi-compositional powder layers deposited
- Internal gas routing formed via fugitive powder
- Seal less 3-D architecture with topological optimization
- No hot metal components



A VYZion for the future

High pressure steam electrolysis

- Centralized
- Distributed (H₂ superchargers)

Prime movers & APU's

- Aircraft / ships / class 8 trucks / trains / drones

Synthetic fuels

- Energy storage
- Fertilizer
- Pipeline ready syngas from CO₂ capture
- Green methanol

Key Advantages

1. Pumping liquid water instead of compressing gaseous hydrogen
 - Avoids costly compressors and 5-15% energy parasitic
2. High power density / high efficiency
 - Could operate on sulfur containing fuels
 - Could operate reversibly, e.g. onboard charger
3. Thermochemical Integration
 - Haber-Bosch waste heat produces pressurized steam
 - Net efficiency >75%, vs. PEM + traditional production at 35%

Business Recruitment Marketing and Advertising



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Metric	Annual Goal (July 2023-June 2024)	Through Q4 2023
Marketing Plan	1	1
Start-ups (businesses started within the last 2 years)	8	5
Existing Business Interactions	75	21
Business Recruitment (initiated contact with out-of-state businesses)	6	1
Export Assistance	3	0
Training Opportunities	12	Formal partners include SBDC and One Palouse

Department of Commerce Marketing Plan



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PLAN REQUIREMENTS:

- Focus Areas
- Regional Marketing Strategy
- Marketing Elements to focus on for 2023-2025
- Diversity, Equity, and Inclusion Strategies

Dept. of Commerce Marketing Plan



Marketing Best Practice Elements
Data-driven outreach
Digital Marketing
Economic Research
Newsletters
Organizational Branding
Organizational Visibility and Community Presence
Other Publications
Partner Organization Initiatives
Regional Branding and Marketing
Social Media
Storytelling
Video and Photography
Workshops and Seminars
- Other -



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- Organizational Branding
- Organizational Visibility and Community Presence
- Partner Organization Initiatives

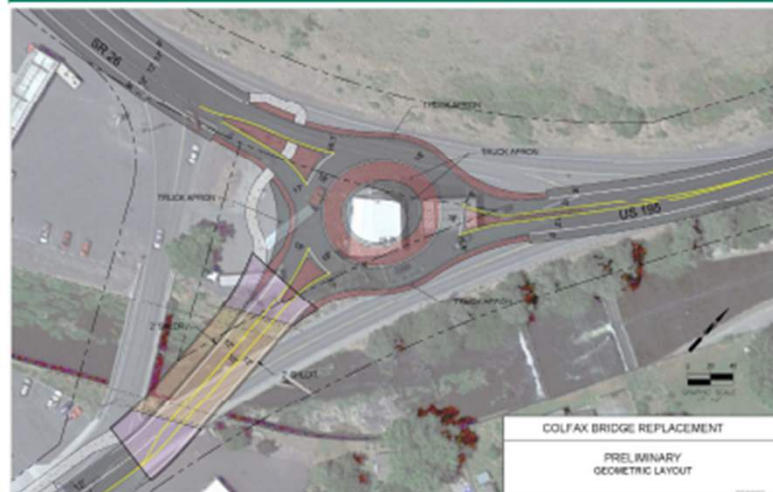
Site & Infrastructure



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PRESENTATION:

- Washington State Department of Transportation's US 195/SR 26 Intersection Improvement Project



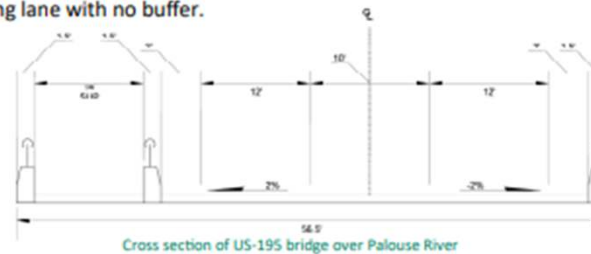
Basic geometry of the roundabout and bridge

Project Overview:

- Removal of (2) existing bridges
- Constructing (1) new bridge in between the removed bridges
- Constructing 3-legged roundabout at JCT. SR 26/195 designed to accommodate wide loads and heavy traffic
- Shared use path on bridge and roundabout to connect the community via multimodal opportunities. Existing sidewalk is narrow and next to the driving lane with no buffer.

Bridge Features:

- (2) Drivable 12' Lanes with a 10' median
- Wide median allows large vehicles typical in this area to cross bridge without stopping oncoming traffic
- 14' shared use path
- Shared use path separated by traffic barriers and railings for safety and comfort



Cross section of US-195 bridge over Palouse River

Project Schedule



2023—Predesign Phase 2024—Design Phase 3/10/25—Ad Date 2025-27—Construction Phase Anticipated Completion in 2027

- Previous Community Meetings:
- ◆ 12/5/22 Colfax City Council
 - ◆ 12/8/22 Open House Meeting
 - ◆ 3/6/23 Colfax City Council
 - ◆ 3/15/23 Commission to Commission
 - ◆ 3/28/23 Public Meeting Presentation
 - ◆ 9/13/23 Onsite JTI

Project Budget:
\$13.28 Million

Projected Completion
2027

Open House:
January 31 @ 5 PM
The Center Colfax WA

Ad Date
March 10, 2025

Draft 01/08/2024

Economic Development Advocacy



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- 2024 State and Federal Legislative Priorities
- Port of Whitman County 2023 Report Card
- SCALEUP Business Training Opportunity
- Other Economic Development Organization Reports



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Closing & Contact Information

Email: ado@portwhitman.com

Next EDIM: March 20, 2024

www.portwhitman.com