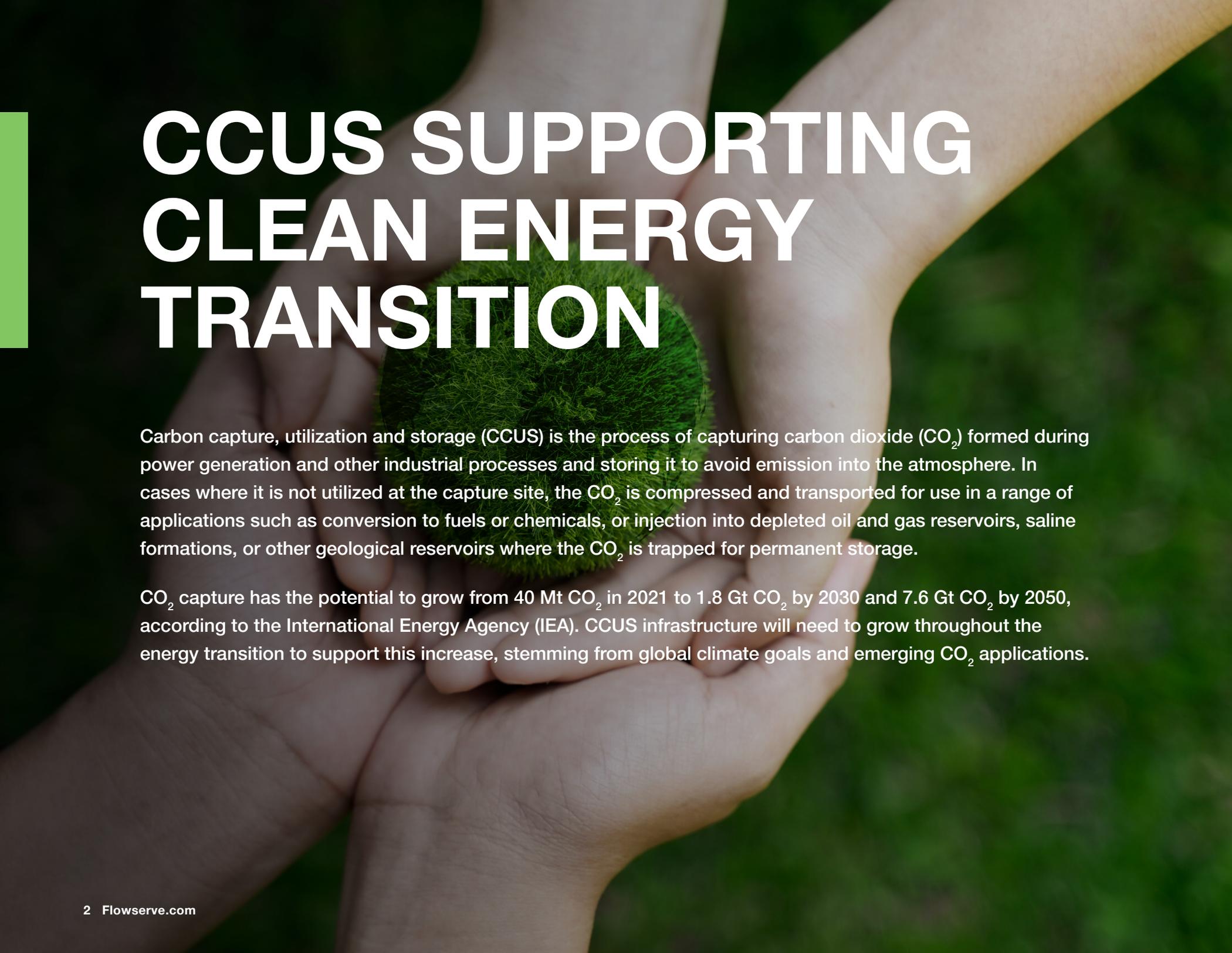


An aerial photograph of a large industrial complex, likely a power plant or refinery, is the background. The facility is filled with various structures, pipes, and several tall smokestacks emitting plumes of white smoke. The foreground is dominated by a dense forest with trees in shades of green and yellow, suggesting an autumn setting. The sky is a clear, bright blue.

CARBON CAPTURE, UTILIZATION & STORAGE (CCUS) APPLICATIONS

A Complete Flow Control Portfolio to Enable Your Energy Transition Initiatives



CCUS SUPPORTING CLEAN ENERGY TRANSITION

Carbon capture, utilization and storage (CCUS) is the process of capturing carbon dioxide (CO₂) formed during power generation and other industrial processes and storing it to avoid emission into the atmosphere. In cases where it is not utilized at the capture site, the CO₂ is compressed and transported for use in a range of applications such as conversion to fuels or chemicals, or injection into depleted oil and gas reservoirs, saline formations, or other geological reservoirs where the CO₂ is trapped for permanent storage.

CO₂ capture has the potential to grow from 40 Mt CO₂ in 2021 to 1.8 Gt CO₂ by 2030 and 7.6 Gt CO₂ by 2050, according to the International Energy Agency (IEA). CCUS infrastructure will need to grow throughout the energy transition to support this increase, stemming from global climate goals and emerging CO₂ applications.

ONE EXPERT CHOICE TO HELP WITH YOUR CCUS PROCESSES

Flowserve is not just an equipment supplier. We're your ideal partner with the right products, engineering prowess, services and expertise to help companies across industries identify opportunities to enhance process efficiency and cost-effectiveness. What's more, Flowserve offers the following unique advantages that can enable your company to achieve its energy transition objectives, including:

- The most complete portfolio of flow control equipment designed to work as a system and optimize CCUS processes
- An end-to-end internet of things (IoT) suite of solutions that can:
 - Increase process and operational efficiency with remote monitoring of assets
 - Utilize predictive analytics to anticipate equipment failures before they happen
 - Enable operators to take preventive measures to avoid process disruptions
- A single point of contact for:
 - Project planning with engineering, procurement and construction (EPC) consultants and company project managers
 - Commissioning and operations with plant managers and technicians
- Unparalleled service and technical support expertise backed by a global network of Quick Response Centers (QRCs)

A COMPREHENSIVE FLOW CONTROL PORTFOLIO

With unrivaled expertise in developing and implementing flow control systems for capturing, transporting and storing carbon dioxide (CO₂), Flowserve is uniquely qualified to be the primary flow control partner for customers endeavoring to reduce their carbon emissions. We understand how pumps, valves and seals should work in complete systems. As a result, Flowserve can help you engineer, design, commission and maintain end-to-end solutions so they perform optimally.

In 1984, Flowserve pioneered the use of pumps for high-pressure CO₂ pipeline and injection service and later became the first company to use dry gas seals in dense-phase CO₂ pumps. Flowserve also can demonstrate unsurpassed experience in pumping the many solvents used to capture CO₂. Similarly, our valve and automation solutions provide unmatched reliability in carbon capture, transportation and storage applications.

TECHNICAL SUPPORT AND SERVICES



Detect, diagnose and quickly respond to equipment and system issues

Successful CCUS projects will need more than engineered-to-order (ETO) systems. In addition to providing the industry's most complete flow control solutions portfolio, Flowserve introduced RedRaven, an end-to-end IoT solution encompassing sensors to cloud architecture, condition monitoring and predictive analytics services.

CCUS operators can use RedRaven to monitor thousands of assets over sprawling facilities reliably and cost-effectively. With real-time RedRaven monitoring, plant personnel and Flowserve technicians can view aggregated data to make decisions on-site. Our monitoring center along with our team of service and support personnel can provide you with insights, alerts and recommendations.

OVERVIEW OF FLOWSERVE PRODUCTS IN CCUS: PUMPS, SEALS, VALVES AND AUTOMATION

API 610 Pumps • ISO and ASME Chemical Process Pumps • Mechanical Seals

CAPTURE AND PROCESS 1		
Configuration	Model	
Pumps and Compressors	API 610 OH2	HPX
	API 610 BB1	LPN, UZDL
	API 610 BB2	HDX, HED
	API 610 BB3	DMX, DMXD
	ISO 2858/5199	Durco® Mark 3™ ISO
	ASME B73.1	Durco Mark 3
	Hard Metal	MND
	Between Bearings	LNN
	Liquid Ring Compressor	SIHI® KPH
	Liquid Ring Vacuum Pump	SIHI LPH
Recovery System	PL	
Seals	Dry Gas Seal	Gaspac®

PIPELINE - MAINLINE 2 AND INJECTION 4		
Configuration	Model	
Pumps	API 610 BB3	DMX, DMXD
	API 610 BB5	WIK/WIKO, HDO/HSO
Seals	Dry Gas Seal	Gaspac

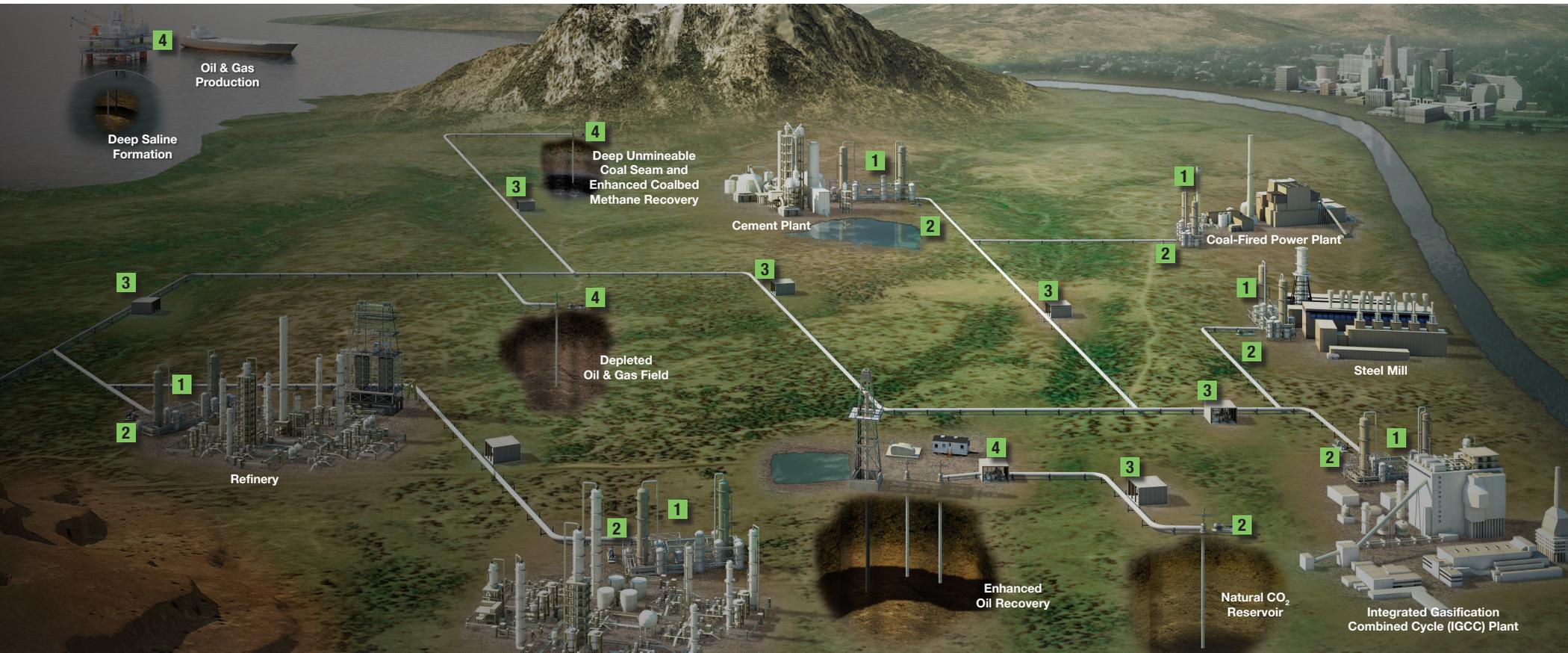
PIPELINE - BOOSTER 3		
Configuration	Model	
Pumps	API 610 BB2	DVSR
	API 610 BB5	DMX, DMXD
Seals	Dry Gas Seal	Gaspac

Isolation Valves • Control Valves • Automation

CAPTURE AND PROCESS 1		
Configuration	Model	
Isolation Valves	Argus® FK76M, FK79 and others	
	Valbart™ VB2, VB3	
	Worcester® Series 51/52, 819/829 and others	
	Durco TX3	
Control Valves		
	<i>Linear</i>	Valtek® Mark One™, Mark 100, Mark 200
	<i>Rotary</i> <i>Severe</i>	Valtek MaxFlo 4™, Valdisk™; Valbart TMCBV
Automation		
	<i>Positioner</i>	Logix™ 3800
	<i>Fluid Power Actuation</i>	Limitorque® LPS
		Automax™ Supernova Norbro™ 40

TRANSPORTATION AND STORAGE 2 3 4		
Configuration	Model	
Isolation Valves	Argus FK76M, FK79 and others	
	Valbart VB2, VB3	
	Worcester (various models)	
	Durco TX3	
Control Valves		
	<i>Rotary</i>	Valtek ShearStream™; Valbart TMCBV
	<i>Anti-Surge</i>	Valtek Mark 100, Mark 100SC
Automation		
	<i>Positioner</i>	Logix 3800
	<i>Electric Actuation</i>	Limitorque MXb
	<i>Fluid Power Actuation</i>	Limitorque LPS

YOUR COMPLETE CCUS SOLUTIONS PROVIDER



Pumps



DVS R



HDO/HSC



MARK 3



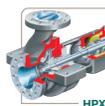
MARK 3 ISO



DMX



HED



HPX



WIK/WIKO



KPH



LNN



UZDL



MND

Byron Jackson®

Durco

Flowserve®

SIHI

Worthington®

Seals



GASPAC

Flowserve



ARGUS



VALBART



DURCO



WORCESTER

Isolation Valves



MARK ONE



MARK 100SC

Valtek



DIAMONDBACK



TMCBV

Valbart

Control Valves



LOGIX



LIMITORQUE



NORBRO

Automation



Our commitment to energy transition

At Flowserve, our approach to energy transition begins and ends with our purpose: to make the world better for everyone. We understand that when we enable our customers to tackle climate change and address increasing energy demands through our innovative flow control solutions, we can make the world better – now and for generations to come.

Our approach is threefold. We are diversifying, decarbonizing and digitizing to support the global energy sector's transformation toward low-carbon sources.



DIVERSIFICATION

Our innovative portfolio of flow control solutions and services will support energy systems around the world to diversify the energy mix and adopt cleaner sources of energy.



DECARBONIZATION

We will support the reduction of energy-related CO₂ emissions across the mix of energy sources through our innovative portfolio of flow control solutions and services.



DIGITIZATION

We will enable improvements in efficiency, productivity, sustainability and safety of energy systems around the world through our digital solutions and services.

Flowserve Corporation
5215 North O'Connor Blvd.
Suite 700
Irving, Texas 75039-5421 USA

MULTIBR000575-02 (EN/AQ) July 2023

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