Topic Area 2: Treatment and Management of Non-Traditional Waters
非传统水资源的处置与管理

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Treatment and Management of Non-Traditional Waters
非传统水资源的处置与管理

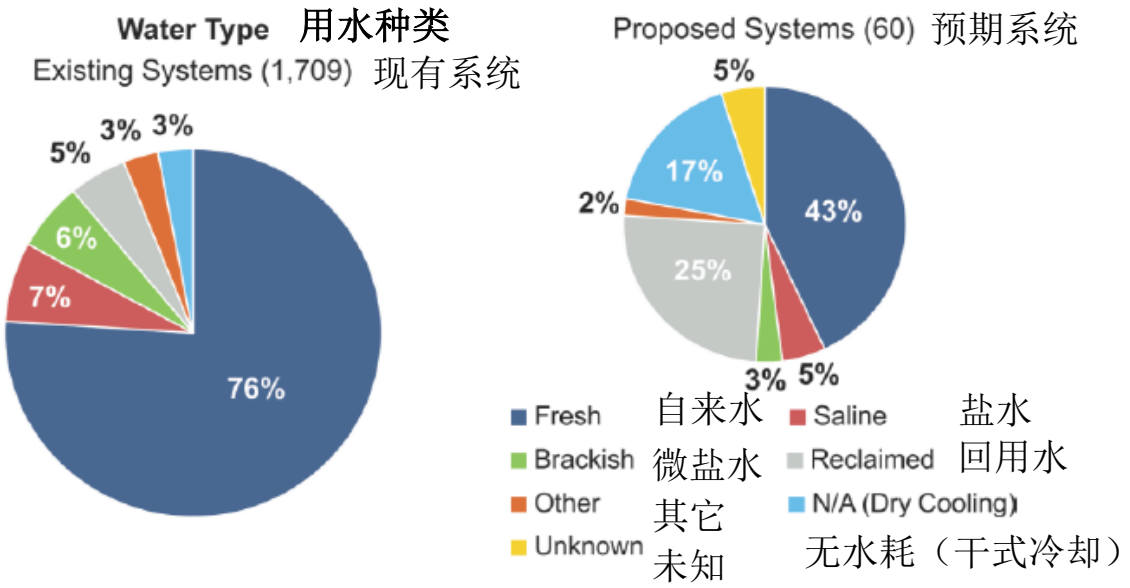
Challenge: Increasing importance of non-traditional waters requires an integrated framework for creating cost-effective treatment trains that protect public health and the environment.

挑战: 提升非传统水源的使用率需要一个能够带来高费效比的处理工序的综合框架，以实现保护公众健康和环境的目的。

Opportunity: New technologies allow using non-traditional waters (e.g., municipal wastewater, brackish groundwater, seawater) to address issues related to water scarcity.

机遇: 新技术适于对非传统水源（市政污水、地下苦盐水、海水）进行利用，解决缺水问题。

Expected Changes in Cooling Water Technologies
冷却水技术的预期变化



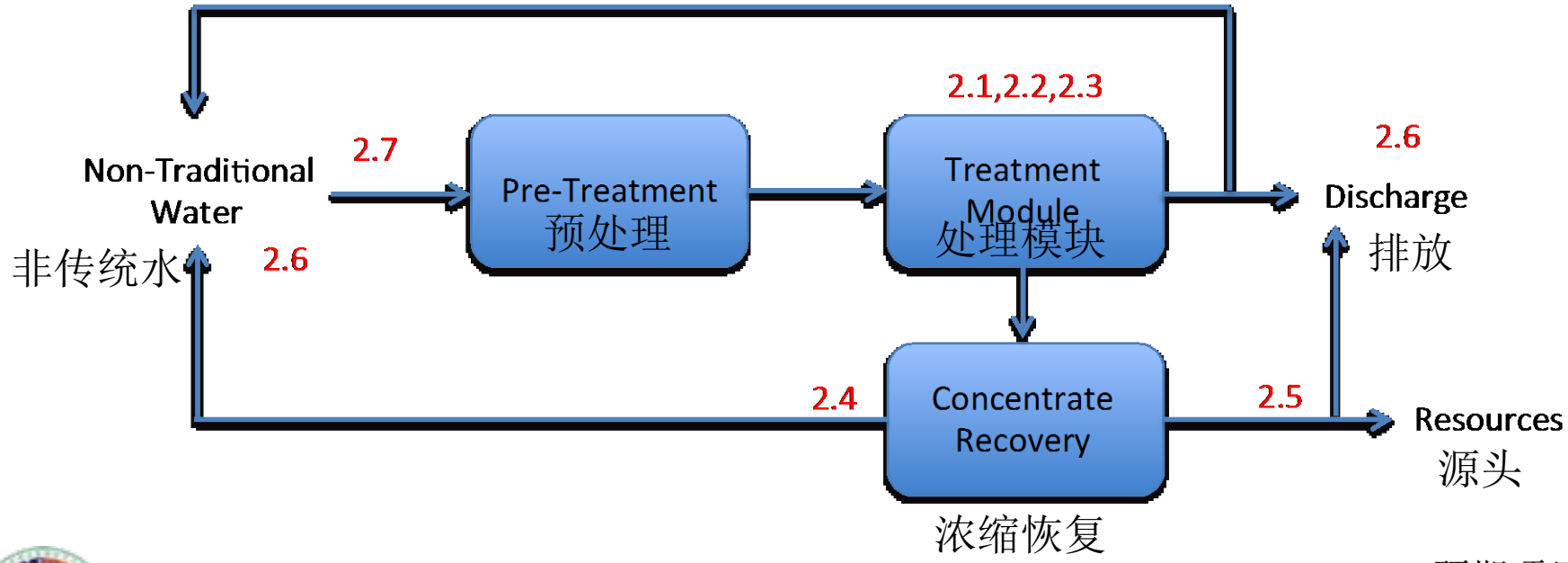
Expected Changes in US Cooling Water Technologies between 2013 and 2022 (DOE 2014)

2013年与2022年冷却水技术的预期变化 (DOE 2014)

Topic Area 2 Approach
解决方案

Approach: CERC-WET will leverage existing expertise to create new, integrated solutions that will enable the expanded use of non-traditional waters. Emphasis on salt management and protection of environment.

途径*:* CERC-WET 利用先有的专业技术提供新的综合性解决方案，以适应非传统水源利用的增长。强调盐度控制及保护环境。



Schematic Representation of the relationships among proposed projects. 预期项目图

Topic Area 2: Projects
项目

2.1: Capacitive Deionization of Brackish Waters苦盐水电极去离子技术

Ashok Gadgil, UC Berkeley/LBNL
XU Ke(徐克) Institute of Seawater Desalination and Multipurpose Utilization 海水淡化和综合利用研究所

2.2: Selective Removal of Divalent Cations with Graphene Oxide Membranes氧化石墨烯膜二阶离子的选择性移除技术

Baoxia Mi, UC Berkeley
WEI Yangyang(魏杨扬) Institute of Seawater Desalination and Multipurpose Utilization海水淡化和综合利用研究所

2.3: Forward Osmosis with Ionic Liquids离子液体正向渗透技术

Robert Kostecki, LBNL
ZHAO Xu(赵旭) Institute of Seawater Desalination and Multipurpose Utilization 海水淡化和综合利用研究所

Topic Area 2: Projects
项目

2.4: Enhanced Treatment of Desalination Brines淡盐水强化处理技术
David Sedlak, UC Berkeley
QIU Jinquan(邱金泉) Institute of Seawater Desalination and Multipurpose Utilization 海水淡化和综合利用研究所

2.5: A Systems-Level Analysis of Non-Traditional Water Management非传统水资源管理系统层面分析
Diego Rosso, UC Irvine
JIANG Minzheng(姜民政) Northeast Petroleum University东北石油大学
JIA Deli(贾德利) Research Institute of Petroleum Exploration and Development石油勘探开发研究院

Topic Area 2: Projects
项目

2.6: Geochemical Approaches for Managing of Non-Traditional Waters非传统水源管理的地球化学方法
William Stringfellow, LBNL
Chinese Partner Undecided

2.7: High Water Recovery Desalination of non-traditional waters高位水的非传统水淡化技术
Eric Hoek, Richard Kaner, UCLA
Chinese Partner Undecided

US 2.8: Engineering the Solution Interface for Membrane Distillation
Lee-Ping Wang, UC Davis

China Project 2.8. Waterless dry CO_2 fracturing
二氧化碳无水/少水压裂

YANG Qinghai(杨清海), MENG Siwei(孟思炜)
RIPED中国石油集团科学技术研究院

Challenge: Tight/shale oil, which suffers from poor reservoir physical parameters, has become a main development object for both China and the US. Usually, hydraulic fracturing is needed to exploit these reservoirs, which leads to a large consumption of water and groundwater pollution.
挑战: 致密油/页岩油是中美双方重点开发对象。但其储层物性差，通常需要水力压裂进行增产改造，将导致水资源的大量消耗与地下水污染。

Opportunity: Waterless dry CO_2 fracturing is regarded as the alternative technology, which helps realize multiple objectives such as conservation of water, sequestration of greenhouse gases and enhancement of single-well productivity and ultimate recovery.
机遇: 二氧化碳无水/少水压裂被视为水力压裂的替代技术，能够实现节约水资源、温室气体封存、提高单井产量与采收率的多重目标。

Approach: Apply numerical simulation, laboratory experiment, pilot-scale test and field test, develop efficient fracturing fluid system and key equipments, improve the technological level, achieve the technological breakthroughs in CO_2 fracturing.
途径: 结合数值模拟、室内实验、中试试验和现场试验，开发高效压裂液体系，研发关键设备，提升施工工艺水平，实现无水压裂技术突破。

Topic Area 2: Outputs/Outcomes
输出/成果

Outputs输出:

- **Modular Technologies**
  模块技术
- **Capacitive deionization**
  电极去离子
- **Graphene membranes**
  石墨烯膜
- **Forward Osmosis**
  正向渗透
- **Open water wetlands**
  开放水域湿地

Outcomes成果:

- **Decision Support Tools**
  决策支持工具
- **Systems Design**
  系统设计
- **Water source assessment**
  水源评估
- **Integrated systems synergies**
  综合系统协同

Topic Area 2: Industry Benefits产业效益

- **Access 评估**

  Leading Researchers / Students / Programs 主要研究者 / 学生 / 机构

  Cutting-Edge Technologies 前沿技术

  China opportunities 在华机会

- **Test-Bed Integration 实验平台整合**

  Partner technologies 合作伙伴技术

  Integrated system 整合系统

- **Decision Support Tools 决策支持工具**