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# Global Laser Enrichment

DOE/NEI HALEU Workshop

April 28, 2020

# Agenda

Background

Key milestones

Technology overview & advantages

Technology status & next steps

Commercial case

Questions

# Background

# GLE Background

- Formed in 2006 by GE to develop uranium enrichment services capability
- Exclusive rights to commercialize the SILEX laser enrichment technology
- Hitachi and Cameco join in 2007 and 2008, respectively
- Approximately $500 million invested in GLE to date
- Presently undergoing a restructuring
  - Proposed ownership structure of Silex (51%) and Cameco (49%)
  - Cameco option to become a 75% owner
  - Restructure agreement signed – now going through USG approval process
  - Agreement expected to close late 2020

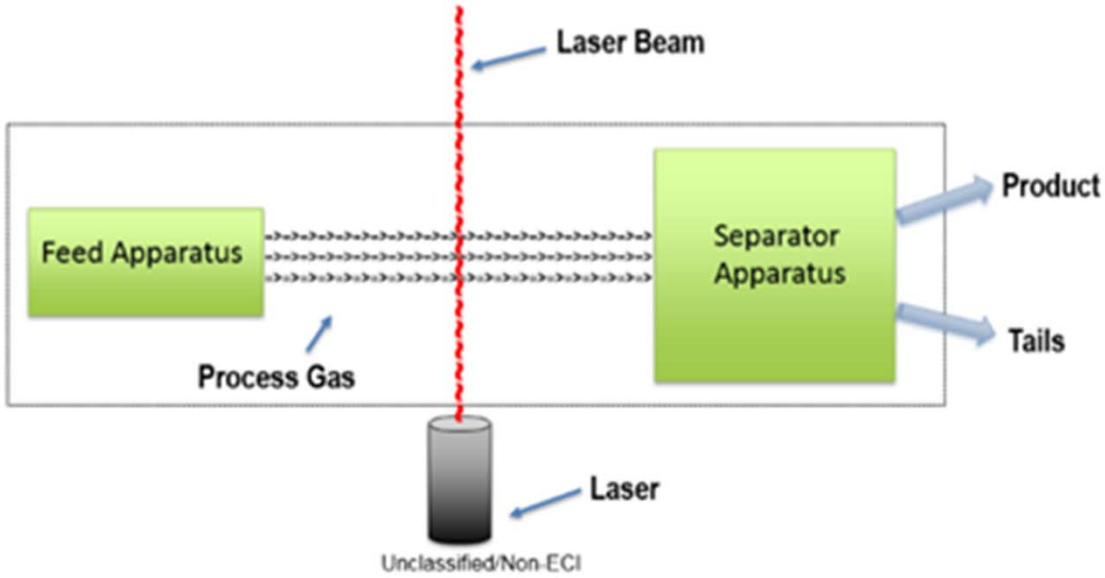
# Key milestones

# Key Milestones

- 2012: Receipt of NRC License SNM-2019
- 2013: Completion of Phase 1 technology development
- 2016: Concluded an agreement with DOE for $DUF_6$ re-enrichment
- 2017: GLE submits response to DOE's request for information on HALEU production for advanced and small modular nuclear power reactors
- 2019: Agreement signed by GEH, Cameco and Silex for restructure of GLE
- 2020: Application for USG approvals for restructure of GLE submitted for review by NRC

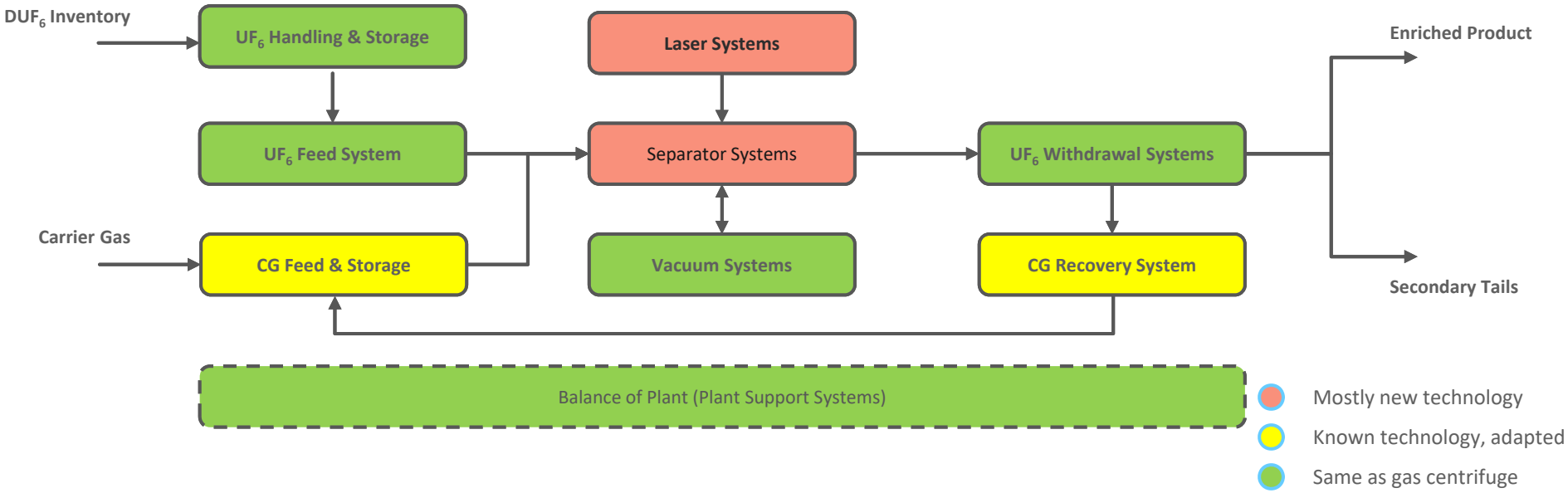
# Technology overview & advantages

# Technology Overview




- 3rd generation (laser) enrichment technology
- Highly selective lasers to selectively excite $UF_6$ and efficiently separate $U^{235}$
- Expected to be significantly more efficient than centrifuge technology

# Basic GLE facility




- Existing $UF_6$ enrichment technologies ~65% of plant
- Separators/lasers ~35% of plant

# Technology advantages

- **Highly selective and efficient** – ability to fine-tune the process to excite and separate $U^{235}$ with higher throughput compared to centrifuge technology
- **Modularity/flexibility** – ability to meet lumpy SWU demand; HALEU production with only a few compact cascades
- **Lower Capital Costs** – laser enrichment SWU capacity can be deployed at lower cost than existing gas centrifuge technology.
- **Bolster U.S. competitive position** – leapfrog existing centrifuge technology

**GLE is uniquely positioned to meet DOE's requirements for HALEU**

# Technology status & next steps

# Technology status & next steps

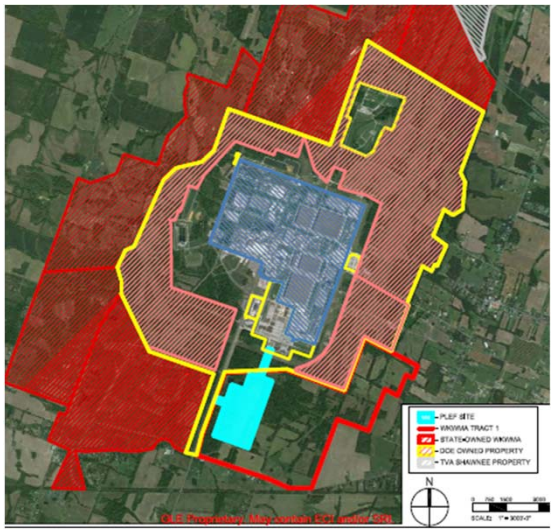
- Ongoing program development in Wilmington, NC and Lucas Heights, Australia
  - Wilmington, U.S.: process equipment
    - Test Loop commissioned in 2009; operational for over 10 years
    - Separation equipment advanced to TRL-4/5
  - Lucas Heights, Australia: laser systems;
    - Lasers and control systems advanced to TRL-5
- Engineering scale TRL-6 (commercial pilot scale) demonstration test in Test Loop in mid-2020's timeframe.
- Market-driven commercialization timeline dependent on uranium price
  - DOE tails: commercialization currently targeted for late 2020's
  - HALEU: ability to address nearer-term if funding for acceleration available
- GLE currently on a reduced-risk commercialization path

# Commercial case

# Commercial Case

- DOE $DUF_6$ contract supports commercialization plan in Paducah, KY
  - License for a tails re-enrichment facility
  - Targeting commercial operation date in late 2020's
  - Potentially 3 - 6 MSWU capacity, deployed in 1 - 1.5 MSWU halls
  - Easily expandable for HALEU – or start with HALEU

- Nearer-term opportunities could be explored
  - Potential to modify deployment plans to accelerate HALEU capability on a smaller commercial scale



# Questions