

2023 SENATE ENERGY AND NATURAL RESOURCES

SB 2161

2023 SENATE STANDING COMMITTEE MINUTES

Energy and Natural Resources Committee Peace Garden Room, State Capitol

SB 2161
1/19/2023

A bill relating to the state energy research center and the center's funding.

9:34 a.m. Chairman Patten opened the hearing.
Chairman Patten, Senators, Magrum, Beard, Boehm, Kannianen, and Kessel were present.

Discussion Topics:

- Sunset clause
- Increased funding
- Before SERC
- SERC focus areas
- Innovation
- Managing Uncertainty
- SERC Accomplishments
- SERC Effect on Innovation
- Energy Hawks-Concept
- The Kettles
- Energy field trips

9:35 AM Senator Sickler introduced SB 2161.

9:39 AM Tom Erikson, Director, Exploratory Research, IP and Technology Commercialization, testified. #14181

Additional written testimony:

Brian Ritter, President & CEO of the Bismarck Mandan Chamber EDC, #14310

9:58 AM Chairman Patten closed the meeting.

Patricia Wilkens, Committee Clerk

2023 SENATE STANDING COMMITTEE MINUTES

Energy and Natural Resources Committee
Peace Garden Room, State Capitol

SB 2161
1/19/2023

A bill relating to the state energy research center and the center's funding.

10:11 AM Chairman Patten called hearing to order.
Chairman Patten, Senators, Magrum, Beard, Boehm, Kannianen, and Kessel present.

Discussion Topics:

- Commercialization
- Financial numbers
- Earth Minerals

10:11 AM David Straily, Manager of Government & Public Affairs-North American Coal, testified.

10:13 AM Ron Ness, President ND Petroleum Council, testified.

10:15 AM Jonathan Fortner, Lignite Energy Counsel, testified.

10:16 AM Tom Erickson, COO &VP for Intellectual Property UND Energy & Environmental Research Center, answered additional questions.

10:21 AM Chairman Patten closed the hearing.

Patricia Wilkens, Committee Clerk

2023 SENATE STANDING COMMITTEE MINUTES

Energy and Natural Resources Committee
Peace Garden Room, State Capitol

SB 2161
1/19/2023

A bill relating to the state energy research center and the center's funding.

2:48 PM Chairman Patten opened the meeting.

Chairman Patten, Senators, Magrum, Beard, Boehm, Kannianen, and Kessel were present.

Discussion Topics:

- Sunset language
- Funding
- Rare minerals
- National security

2:48 PM Chairman Patten spoke about the status of the bill.

2:55 PM Chairman Patten adjourned the meeting.

Patricia Wilkens, Committee Clerk

2023 SENATE STANDING COMMITTEE MINUTES

Energy and Natural Resources Committee
Peace Garden Room, State Capitol

SB 2161
1/20/2023

A bill relating to the state energy research center and the center's funding.

9:59 AM Chairman Patten opened the meeting.

Chairman Patten, Senators Magrum, Beard, Boehm, Kannianen, and Kessel were present.

Discussion Topics:

- Federal funds
- Graphene/graphite
- CO2 Removal/precipitation technology
- Investment return
- Lignite utilization
- Bakken development
- Carbon capture and utilization
- Innovation and invention
- Education
- Future revenue
- The Kettles
- Energy field trips

10:00 AM Tom Erickson, COO & VP for Intellectual Property UND Energy & Environmental Research Center, gave a presentation. #14765

Senator Kannianen moved **DO PASS** on **SB 2161** and to **Rerefer to Appropriations**. **Senator Beard** seconded.

Senators	Vote
Senator Dale Patten	Y
Senator Jeffery J. Magrum	Y
Senator Todd Beard	Y
Senator Keith Boehm	Y
Senator Jordan L. Kannianen	Y
Senator Greg Kessel	Y

Motion passed. 6-0-0

Senator Beard will carry SB 2161.

10:14 AM Chairman Patten closed the meeting.

Patricia Wilkens, Committee Clerk

REPORT OF STANDING COMMITTEE

SB 2161: Energy and Natural Resources Committee (Sen. Patten, Chairman) recommends **DO PASS** and **BE REREFERRED** to the **Appropriations Committee** (6 YEAS, 0 NAYS, 0 ABSENT AND NOT VOTING). SB 2161 was rereferred to the **Appropriations Committee**. This bill affects workforce development.

2023 SENATE APPROPRIATIONS

SB 2161

2023 SENATE STANDING COMMITTEE MINUTES

Appropriations

Rough Rider Room, State Capitol

SB 2161

2/2/2023

Relating to the State Energy Research Center and the center's funding.

11:12 AM Chairman Bekkedahl called the meeting to order.

Present: Senators Bekkedahl, Burkhard, Davison, Dever, Dwyer, Erbele, Krebsbach, Kreun, Mathern, Meyer, Roers, Schaible, Sorvaag, Wanzek, Vedaa, and Rust.

Discussion Topics:

- Agency productivity
- Funding
- Operations
- Creating innovation
- Projects
- Patents
- Hydrogen hub
- Graphene/graphite
- Lithium battery anodes
- Energy Hawks
- Patent revenue
- Educational impact
- ROI

11:13 AM Senator Sickler introduced Senate Bill 2161, which removes the funding sunset clause and increases the funding to ten million for the State Energy Research Center.

11:15 AM Tom Erickson, COO and VP for Intellectual Property, SERC, gave an overview of the SERC, a subsidiary of EERC and testified in support of SB 2161. #18432

11:50 AM Senator Meyer moved DO PASS. Senator Roers seconded the motion.

Senators	Vote
Senator Brad Bekkedahl	Y
Senator Terry Wanzek	Y
Senator Karen K. Krebsbach	Y
Senator Kyle Davison	Y
Senator Dick Dever	Y
Senator Michael Dwyer	Y
Senator Robert Erbele	Y
Senator Curt Kreun	Y
Senator Tim Mathern	Y
Senator Scott Meyer	Y
Senator Jim P. Roers	Y
Senator David S. Rust	Y
Senator Donald Schaible	Y
Senator Ronald Sorvaag	Y
Senator Shawn Vedaa	Y
Senator Terry M. Wanzek	Y

Motion passed. 16-0-0

Senator Beard will carry SB 2161.

11:50 AM Chairman Bekkedahl closed the meeting.

Carol Thompson, Committee Clerk

REPORT OF STANDING COMMITTEE

SB 2161: Appropriations Committee (Sen. Bekkedahl, Chairman) recommends **DO PASS** (16 YEAS, 0 NAYS, 0 ABSENT AND NOT VOTING). SB 2161 was placed on the Eleventh order on the calendar. This bill affects workforce development.

2023 HOUSE ENERGY AND NATURAL RESOURCES

SB 2161

2023 HOUSE STANDING COMMITTEE MINUTES

Energy and Natural Resources Committee Coteau AB Room, State Capitol

SB 2161
3/9/2023

Relating to the state energy research center and the center's funding.

9:00 AM

Vice Chairman D Anderson opened the hearing. Members present: Chairman Porter, Vice Chairman D. Anderson, Representatives Bosch, Conmy, Dockter, Hagert, Heinert, Ista, Kasper, Marschall, Novak, Olson, and Roers Jones. Absent: Representative Ruby.

Discussion Topics:

- Environmental challenges
- Transmission authority proposal
- Education and outreach
- Energy technologies
- Sunset clause

Sen John Sickler, Grand Forks, introduced SB 2161, oral testimony
Tom Erickson, COO and VP for Intellectual Property, EERC, Testimony 22724
Jonathan Fortner, Vice President, Government Relations & External Affairs, Lignite Energy Council, oral testimony
Brady Pelton, ND Petroleum Council, oral testimony

9:38 AM Vice Chairman Anderson closed the hearing.

Kathleen Davis, Committee Clerk

2023 HOUSE STANDING COMMITTEE MINUTES

Energy and Natural Resources Committee Coteau AB Room, State Capitol

SB 2161
3/16/2023

Relating to the state energy research center and the center's funding.

11:15 AM Chairman Porter opened the meeting.

Members present: Chairman Porter, Vice Chairman D. Anderson, Representatives Bosch, Conmy, Dockter, Hagert, Heinert, Ista, Kasper, Marschall, Novak, Olson, Roers Jones, and Ruby.

Discussion Topics:

- Committee action

Rep Bosch moved to amend SB 2161, Page 1 Line 6, to remove the overstrike over, "effective date June 30, 2027", and Page 2 Line 12-13 removed the overstrike over "effective".

Seconded by Rep Dockter.

Voice vote, motion carried.

Rep Bosch moved a Do Pass as amended.

Seconded by Rep Ista.

Representatives	Vote
Representative Todd Porter	Y
Representative Dick Anderson	Y
Representative Glenn Bosch	Y
Representative Liz Conmy	Y
Representative Jason Dockter	Y
Representative Jared Hagert	Y
Representative Pat D. Heinert	Y
Representative Zachary Ista	Y
Representative Jim Kasper	AB
Representative Andrew Marschall	Y
Representative Anna S. Novak	Y
Representative Jeremy Olson	Y
Representative Shannon Roers Jones	Y
Representative Matthew Ruby	Y

13-0-1 Motion carried. Rep Bosch is carrier.

11:18 AM Meeting adjourned.

Kathleen Davis, Committee Clerk

23.0397.02001
Title.03000

Adopted by the House Energy and Natural
Resources Committee

March 16, 2023

DR

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3-16-2023

PROPOSED AMENDMENTS TO SENATE BILL NO. 2161

Page 1, line 6, remove the overstrike over "~~(Effective through June 30, 2027)~~"

Page 2, line 12, remove the overstrike over "~~(Effective~~ "

Page 2, remove the overstrike over line 13

Renumber accordingly

REPORT OF STANDING COMMITTEE

SB 2161: Energy and Natural Resources Committee (Rep. Porter, Chairman)
recommends **AMENDMENTS AS FOLLOWS** and when so amended, recommends
DO PASS (13 YEAS, 0 NAYS, 1 ABSENT AND NOT VOTING). SB 2161 was placed
on the Sixth order on the calendar.

Page 1, line 6, remove the overstrike over "~~(Effective through June 30, 2027)~~"

Page 2, line 12, remove the overstrike over "~~(Effective~~ "

Page 2, remove the overstrike over line 13

Renumber accordingly

2023 HOUSE APPROPRIATIONS

SB 2161

2023 HOUSE STANDING COMMITTEE MINUTES

Appropriations Committee
Brynhild Haugland Room, State Capitol

SB 2161
3/28/2023

Relating to the state energy research center and the center's funding.

10:11 AM Chairman Vigesaa Called the meeting to order and roll call was taken-

Members present; Chairman Vigesaa, Representative B. Anderson, Representative Bellew, Representative Brandenburg, Representative Hanson, Representative Kreidt, Representative Martinson, Representative Mitskog, Representative Meier, Representative Mock, Representative Monson, Representative Nathe, Representative J. Nelson, Representative O'Brien, Representative Pyle, Representative Richter, Representative Sanford, Representative Schatz, Representative Schobinger, Representative Strinden, Representative G. Stemen and Representative Swiontek.

Members not Present- Representative Kempenich

Discussion Topics:

- Reinvestment into Research and Development
- Sunset Date

Representative Porter- Introduces the bill and its purpose.

Tom Erickson Chief Operation Officer and Director EERC- Introduces the bill and its purpose.

10:36 AM Chairman Vigesaa Closed the meeting for SB 2161

Risa Berube, Committee Clerk

2023 HOUSE STANDING COMMITTEE MINUTES

Appropriations Committee Brynhild Haugland Room, State Capitol

SB 2161
3/28/2023

Relating to the state energy research center and the center's funding.

11:09 AM Chairman Vigesaa Called the meeting to order and roll call was taken-

Members present; Chairman Vigesaa, Representative B. Anderson, Representative Bellew, Representative Brandenburg, Representative Hanson, Representative Kreidt, Representative Martinson, Representative Mitskog, Representative Meier, Representative Mock, Representative Monson, Representative Nathe, Representative J. Nelson, Representative O'Brien, Representative Pyle, Representative Richter, Representative Sanford, Representative Schatz, Representative Schobinger, Representative Strinden, and Representative G. Stemen.

Members not Present- Representative Kempenich and Representative Swiontek

Discussion Topics:

- Committee Action

Chairman Vigesaa Opens up committee discussion.

Representative J. Nelson Move to amend from 10 million to 7 ½

Representative Mitskog Seconds the motion.

Roll call vote;

Representatives	Vote
Representative Don Vigesaa	Y
Representative Keith Kempenich	A
Representative Bert Anderson	Y
Representative Larry Bellew	Y
Representative Mike Brandenburg	N
Representative Karla Rose Hanson	Y
Representative Gary Kreidt	Y
Representative Bob Martinson	N
Representative Lisa Meier	Y
Representative Alisa Mitskog	N
Representative Corey Mock	N
Representative David Monson	Y
Representative Mike Nathe	Y
Representative Jon O. Nelson	Y
Representative Emily O'Brien	N
Representative Brandy Pyle	N

Representative David Richter	N
Representative Mark Sanford	N
Representative Mike Schatz	N
Representative Randy A.	Y
Representative Schobinger	Y
Representative Greg Stemen	Y
Representative Michelle Strinden	Y
Representative Steve Swiontek	A

Motion Carries 12-9-2

Representative J. Nelson Move a Do Pass as Amended

Representative G. Stemen Seconds the motion.

Committee discussion -Roll call vote

Representatives	Vote
Representative Don Vigesaa	Y
Representative Keith Kempenich	A
Representative Bert Anderson	Y
Representative Larry Bellew	Y
Representative Mike Brandenburg	Y
Representative Karla Rose Hanson	Y
Representative Gary Kreidt	Y
Representative Bob Martinson	Y
Representative Lisa Meier	Y
Representative Alisa Mitskog	Y
Representative Corey Mock	Y
Representative David Monson	Y
Representative Mike Nathe	Y
Representative Jon O. Nelson	Y
Representative Emily O'Brien	Y
Representative Brandy Pyle	Y
Representative David Richter	Y
Representative Mark Sanford	Y
Representative Mike Schatz	Y
Representative Randy A.	Y
Representative Schobinger	Y
Representative Greg Stemen	Y
Representative Michelle Strinden	Y
Representative Steve Swiontek	A

Motion Carries 21-0-2 Representative J. Nelson will carry the bill.

11:39 AM Chairman Vigesaa Closed the meeting for SB 2161

Risa Berube, Committee Clerk

March 29, 2023

AG
3-29-23
(1-1)

PROPOSED AMENDMENTS TO SENATE BILL NO. 2161

In addition to the amendments adopted by the House as printed on page 1267 of the House Journal, Senate Bill No. 2161 is further amended as follows:

Page 2, line 17, replace "ten" with "seven"

Page 2, line 17, after "million" insert "five hundred thousand"

Renumber accordingly

STATEMENT OF PURPOSE OF AMENDMENT:

This amendment provides for up to \$7.5 million from oil revenue to be deposited in the state energy research center fund each biennium, an increase of \$2.5 million from the 2021-23 biennium level of \$5 million. The Senate approved up to \$10 million be deposited in the fund.

REPORT OF STANDING COMMITTEE

SB 2161, as amended: Appropriations Committee (Rep. Vigesaa, Chairman)
recommends **AMENDMENTS AS FOLLOWS** and when so amended, recommends
DO PASS (21 YEAS, 0 NAYS, 2 ABSENT AND NOT VOTING). SB 2161, as
amended, was placed on the Sixth order on the calendar.

In addition to the amendments adopted by the House as printed on page 1267 of the House Journal, Senate Bill No. 2161 is further amended as follows:

Page 2, line 17, replace "ten" with "seven"

Page 2, line 17, after "million" insert "five hundred thousand"

Renumber accordingly

STATEMENT OF PURPOSE OF AMENDMENT:

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2023 CONFERENCE COMMITTEE

SB 2161

2023 SENATE STANDING COMMITTEE MINUTES

Energy and Natural Resources Committee Peace Garden Room, State Capitol

SB 2161
4/11/2023
Conference Committee

A bill relating to the state energy research center and the center's funding.

10:59 AM Chairman Patten opened the meeting.

Chairman Patten and Senators Boehm, Beard and Representatives Bosch, D. Anderson and B. Anderson are present.

Discussion Topics:

- Sunset clause
- Amendments

10:59 AM Representative Bosch reviewed amendment LC 23.0397.02003 and the committee had further discussion on the bill.

11:07 AM Chairman Patten closed the meeting.

Rick Schuchard, Committee Clerk

2023 SENATE STANDING COMMITTEE MINUTES

Energy and Natural Resources Committee Peace Garden Room, State Capitol

SB 2161
4/13/2023
Conference Committee

A bill relating to the state energy research center and the center's funding.

9:30 AM Chairman Patten opened the meeting.

Chairman Patten and Senators Boehm, Beard and Representatives Bosch, Dick Anderson and Bert Anderson are present.

Discussion Topics:

- Sunset clause
- Project funding

9:30 AM The committee has discussion on the bill.

9:39 AM Representative Bosch moved that the House Recede from House amendments and further amend, "in section 1 to strike sunset as is and change to 2029 and in section two to add back in 7.5 million.

9:39 AM Motion is seconded by Representative Dick Anderson.

9:39 AM Roll Call vote was taken. Motion carried 6-0-0.

Chairman Patten will carry the bill for the Senate and Representative Bosch will carry the bill for the House.

9:40 AM Chairman Patten closed the meeting.

Rick Schuchard, Committee Clerk

April 13, 2023

DR

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4-13-23

PROPOSED AMENDMENTS TO SENATE BILL NO. 2161

That the House recede from its amendments as printed on page 1332 of the Senate Journal and pages 1413 and 1414 of the House Journal and that Senate Bill No. 2161 be amended as follows:

Page 2, line 12, remove the overstrike over "~~Effective~~ "

Page 2, line 13, remove the overstrike over "~~through~~ "

Page 2, line 13, after "~~2027~~" and insert "June 30, 2029"

Page 2, line 13, remove the overstrike over the overstruck parenthesis

Page 2, line 17, replace "ten" with "seven"

Page 2, line 17, after "million" insert "five hundred thousand"

Renumber accordingly

**2023 SENATE CONFERENCE COMMITTEE
 ROLL CALL VOTES**

BILL/RESOLUTION NO. SB 2161 as engrossed

Senate "Enter committee name" Committee

- Action Taken SENATE accede to House Amendments
 SENATE accede to House Amendments and further amend
 HOUSE recede from House amendments
 HOUSE recede from House amendments and amend as follows
- Unable to agree, recommends that the committee be discharged and a new committee be appointed

Motion Made by: Bosch Seconded by: D. Anderson

Senators	4/18		Yes	No	Representatives	4/18		Yes	No
Patten	P		X		Bosch	P		X	
Boehm	P		X		D. Anderson	P		X	
Beard	P		X		B. Anderson	P		X	
Total Senate Vote			3		Total Rep. Vote			3	

Vote Count Yes: 6 No: 0 Absent: 0

Senate Carrier Patten House Carrier Bosch

LC Number 23.0397 . 02000 of amendment

LC Number 23.0397 .06000 of engrossment

Emergency clause added or deleted

Statement of purpose of amendment

Change sunset clause to June 30, 2029, and change ten million to seven million five hundred thousand.

Insert LC: 23.0397.02004
Senate Carrier: Patten
House Carrier: Bosch

REPORT OF CONFERENCE COMMITTEE

SB 2161, as engrossed: Your conference committee (Sens. Patten, Boehm, Beard and Reps. Bosch, D. Anderson, B. Anderson) recommends that the **HOUSE RECEDE** from the House amendments as printed on SJ page 1332, adopt amendments as follows, and place SB 2161 on the Seventh order:

That the House recede from its amendments as printed on page 1332 of the Senate Journal and pages 1413 and 1414 of the House Journal and that Senate Bill No. 2161 be amended as follows:

Page 2, line 12, remove the overstrike over "~~Effective~~ "

Page 2, line 13, remove the overstrike over "~~through~~ "

Page 2, line 13, after "~~2027~~" and insert "June 30, 2029"

Page 2, line 13, remove the overstrike over the overstruck parenthesis

Page 2, line 17, replace "ten" with "seven"

Page 2, line 17, after "million" insert "five hundred thousand"

Renumber accordingly

Engrossed SB 2161 was placed on the Seventh order of business on the calendar.

TESTIMONY

SB 2161



Energy & Environmental Research Center (EERC)

State Energy Research Center (SERC) – Driving North Dakota’s Energy Future

Presented to the Senate Energy and Natural Resources Committee
January 19, 2023

Tom Erickson
COO and VP for Intellectual Property

EERC VISION

TO LEAD THE WORLD IN
DEVELOPING SOLUTIONS
TO ENERGY AND ENVIRONMENTAL
CHALLENGES.

EERC QUICK FACTS FY22



FISCAL YEAR FUNDING

\$76 MILLION

TOTAL ACTIVE
CONTRACTS



179

77%
OF CONTRACTS
WERE WITH

PRIVATE
INDUSTRY



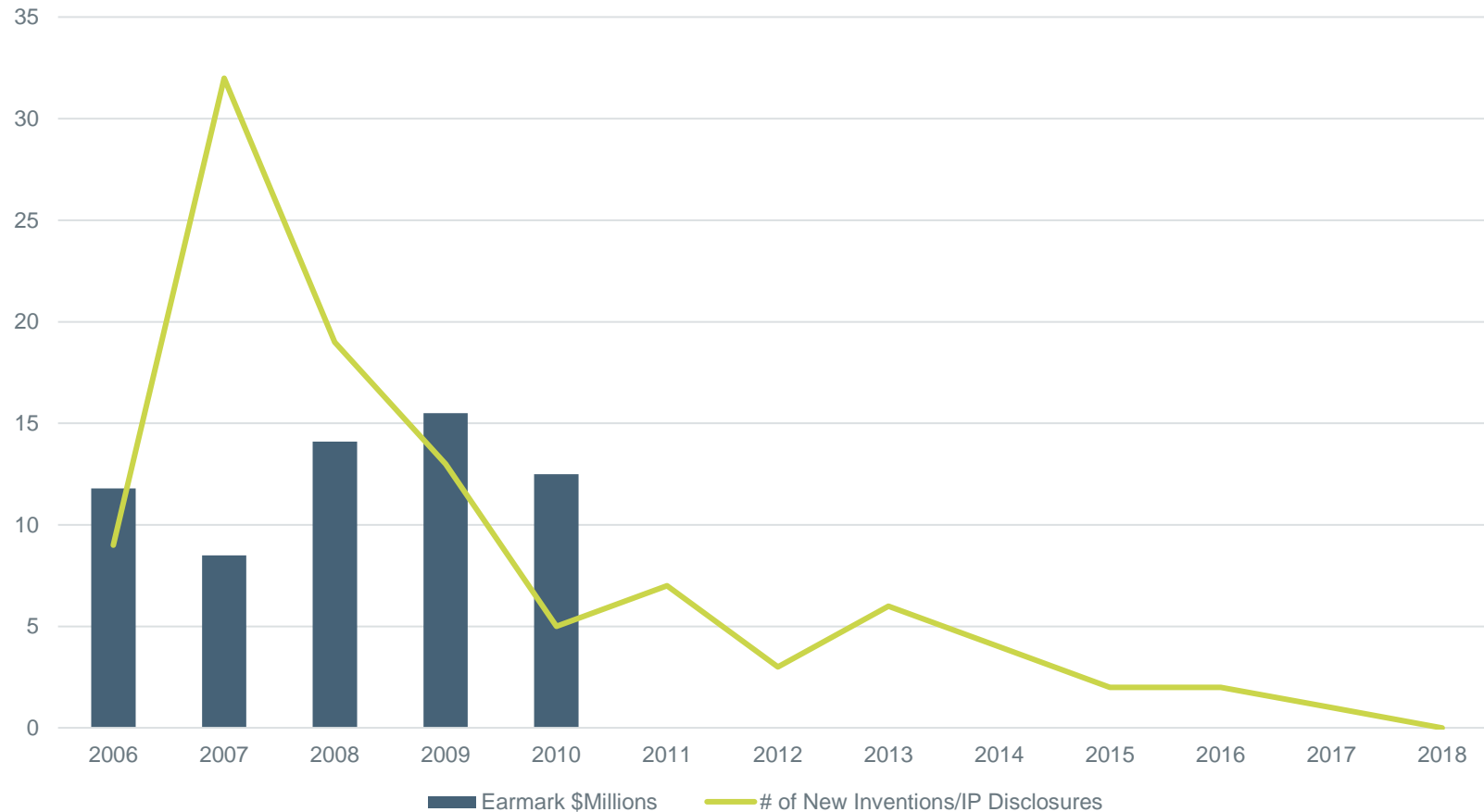
ECONOMIC
IMPACT
IN THE GRAND
FORKS REGION



**\$108.3
MILLION**

BEFORE SERC: Significant Reduction in New EERC Innovation and Invention

Reduced Exploratory Research Funding Results in Fewer Inventions

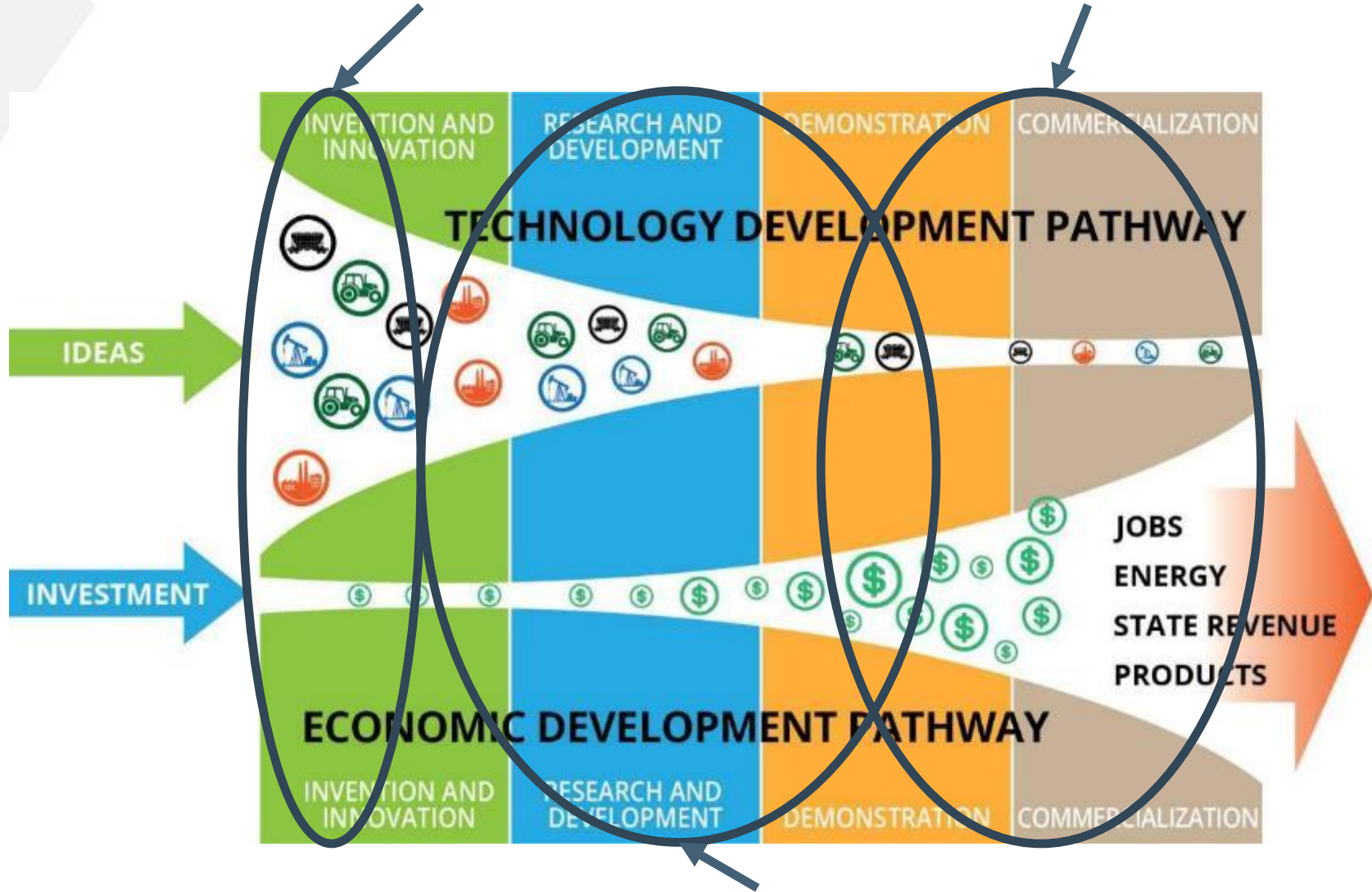


SERC FOCUS AREAS

- Exploratory energy research
 - Explore fundamental, transformational ideas to shape the future energy portfolio of North Dakota.
- Rapid response to critical North Dakota issues
 - At the request of the North Dakota Industrial Commission (NDIC), conduct research to address emerging issues.
- Education and outreach
 - Provide opportunities for all ages and demographics to learn about North Dakota energy – not academic.
- \$5 million/biennium (currently has a sunset clause in 2027)
- Funded by NDIC contract, with reporting requirements to NDIC and the interim Energy Development and Transmission Committee (EDTC)

State Energy Research Center

Clean Sustainable Energy Authority



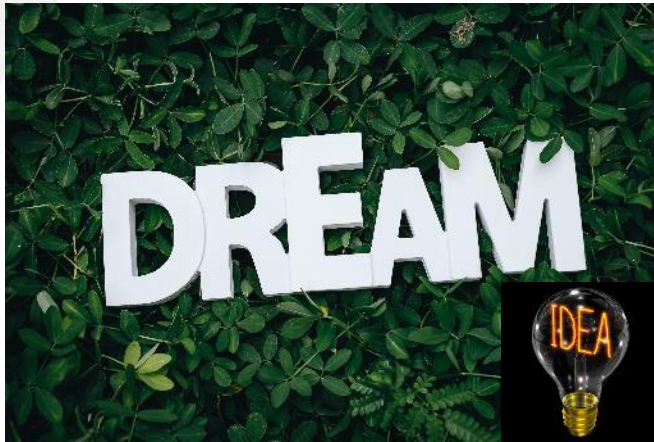
Lignite, Oil and Gas, Renewable
Research Programs, and Legislatively Directed Projects

KEYS TO INNOVATION

- Innovation is inclusive not exclusive.
 - ◆ Broad involvement and broad topics
- Innovation needs time and resources.
- Innovation needs a nurturing atmosphere.
 - ◆ Healthy balance of structure and freedom
- Innovation is not a project or a program; it's a culture.
 - ◆ Innovation breeds innovation.

<https://www.inc.com/erik-sherman/3-rules-to-encourage-innovation.html>

MANAGING UNCERTAINTY IS THE KEY TO INNOVATION



INNOVATION



Minimize Financial Uncertainty



Risk Acceptance



Agility



**COMMERCIAL
EMPLOYMENT**



Flexibility



Changing
Dynamics of
the Future

Critical Challenges. Practical Solutions.

SERC ACCOMPLISHMENTS

\$21 Million in
Other Proposals

\$9 Million in
Pending Proposals

\$6 Million in
Other Awards

Nearly **60**
Energy Hawks from
5 Higher Education
Institutions

50 Projects
Focused on ND Energy

3 Federal Opportunities
Pursued for the State – Grid,
Hydrogen, Direct Air Capture

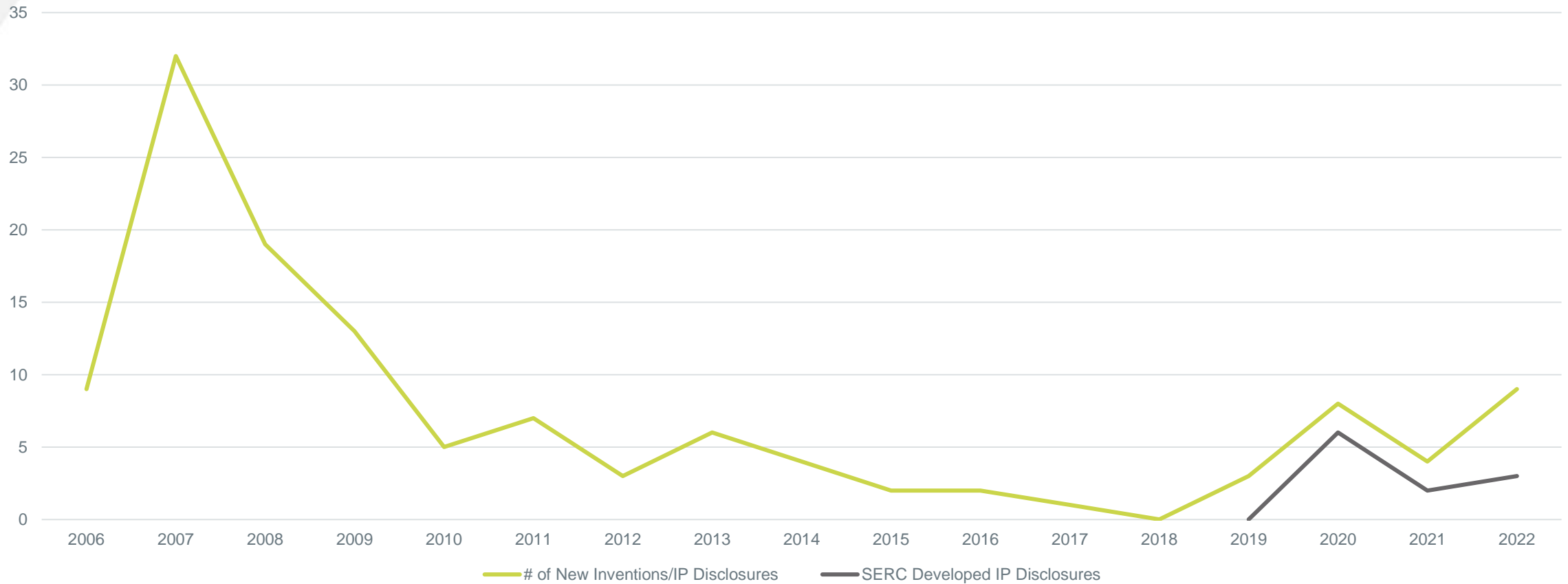
13 Invention
Disclosures

8 Patent
Applications

3 Patents
Granted

SERC EFFECT ON INNOVATION

Invention Disclosures since SERC



ENERGY HAWKS – CONCEPT

- Bring together a diverse group of college students and immerse them in all things North Dakota energy, resulting in the following:
 - A new perspective on the energy research needs for North Dakota
 - Future energy leaders
 - Knowledgeable North Dakota energy advocates/peers
 - Knowledgeable voters (North Dakota and beyond) on topics affecting energy

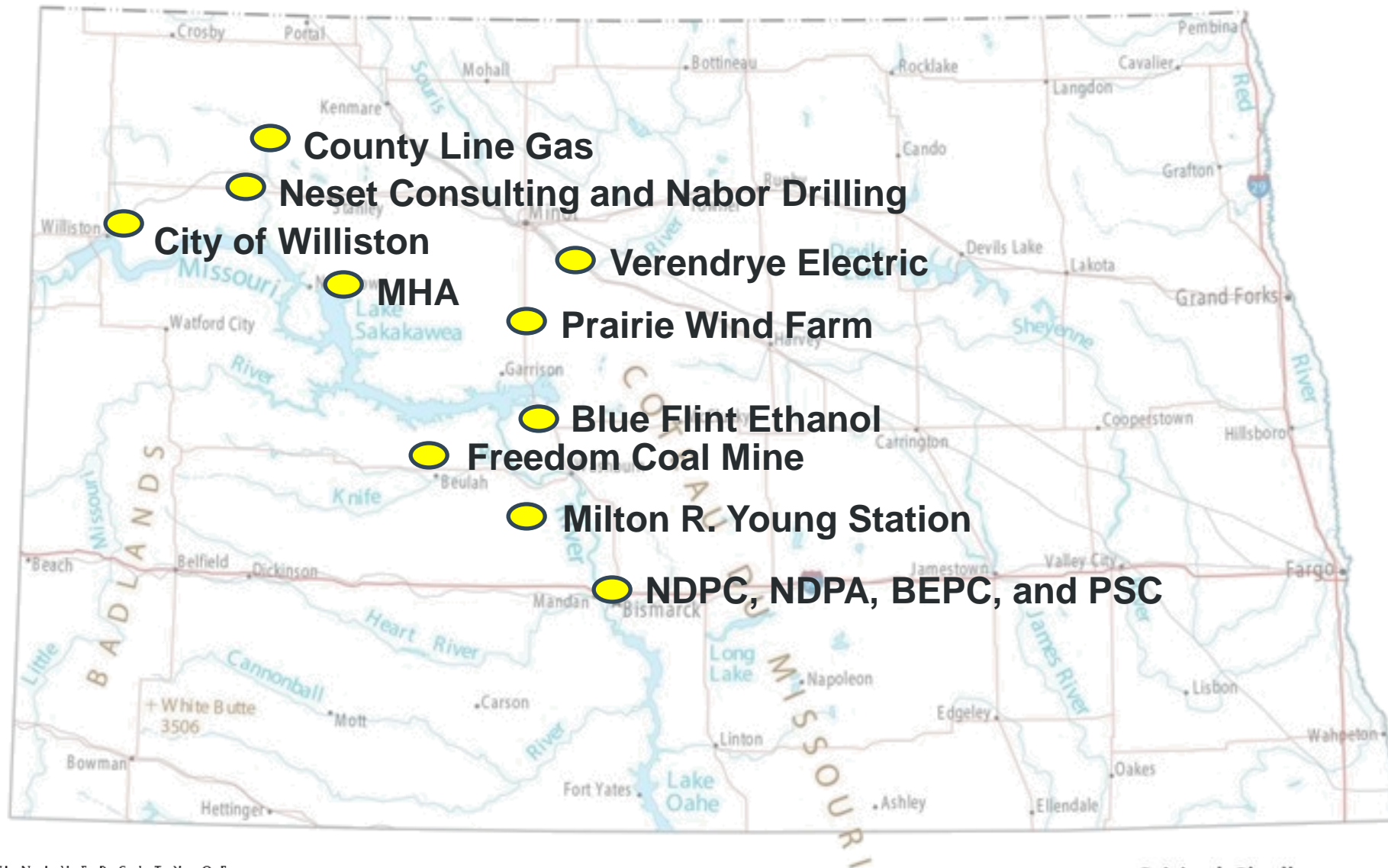


THE KETTLES



Critical Challenges. Practical Solutions.

2022 ENERGY FIELD TRIP



SUMMARY

- SERC has reignited invention and innovation by EERC researchers leading to:
 - New energy technologies for
 - Additional nonstate funding in
 - Technology demonstrations in
 - Student experiences across
- Removing the sunset clause will allow SERC to continue to do the same with certainty.
- Increased funding will be used effectively for even greater results.

North Dakota!



Thomas A. Erickson
COO and VP for Intellectual Property
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701.777.5153 (phone)

**Energy & Environmental
Research Center**
University of North Dakota
15 North 23rd Street, Stop 9018
Grand Forks, ND 58202-9018

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701.777.5000 (phone)
701.777.5181 (fax)

A wide-angle photograph of a university campus at sunset. The sun is low on the horizon, casting a warm glow over the scene. In the foreground, there are large trees with some yellowing leaves. In the background, there are several large, multi-story brick buildings, likely university halls or administrative buildings. A parking lot with several cars is visible in the middle ground.

THANK YOU

Critical Challenges. Practical Solutions.



Senate Energy and Natural Resources Committee – SB 2161

Senator Dale Patten, Chair

January 19, 2023

Chairman Patten, Members of the Committee:

My name is Brian Ritter and I'm the President & CEO of the Bismarck Mandan Chamber EDC. Please accept the following testimony on behalf of our organization's more than 1,200 business members in support of SB 2161.

Bismarck-Mandan's economy is built upon a diverse number of industries, including: government, healthcare, education and energy. For at least two generations, Bismarck-Mandan residents have commuted to surrounding coal mines, power plants and other energy-related employers. In addition, our community is home to the headquarters for energy generation companies like Basin Electric Power Cooperative and Montana-Dakota Utilities Company.

However, the energy industry is changing in the face of a number of environmental, societal and governmental factors. In order to ensure that our energy producers can not only adapt, but thrive in the future, we must do all that we can to support research and development efforts that will lead to the next generation of energy generation projects. The funding for the State's research center at the Energy & Environmental Research Center (EERC) will do just that.

As such, I would respectfully ask that the Committee give a DO PASS recommendation to SB 2161.



State Energy Research Center (SERC) – Discussion of Follow-on Funding

Presented to the Senate Energy and Natural Resources Committee
January 20, 2023

Tom Erickson
COO and VP for Intellectual Property

SERC ACCOMPLISHMENTS

\$21 Million in
Other Proposals

\$9 Million in
Pending Proposals

\$6 Million in
Other Awards

Nearly **60**
Energy Hawks from
5 Higher Education
Institutions

50 Projects
Focused on ND Energy

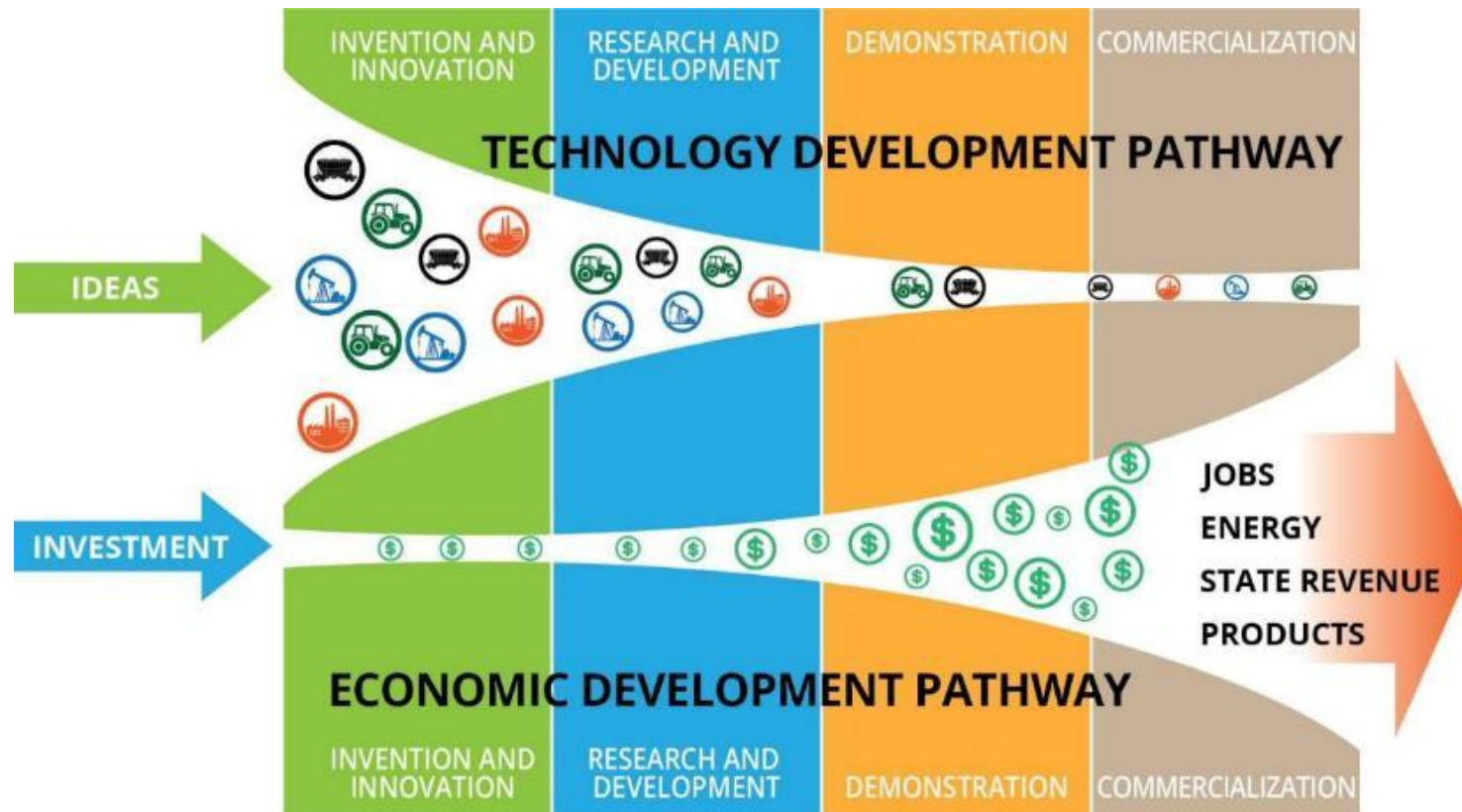
3 Federal Opportunities
Pursued for the State – Grid,
Hydrogen, Direct Air Capture

13 Invention
Disclosures

8 Patent
Applications

3 Patents
Granted

GENERAL Distribution of Federal Funding for Energy Research



As a nonprofit, 100% of all revenue received by the EERC is spent conducting the research we are contracted to do.

100% Federal, State, University	80-90% Federal	20-50% Federal	100% Non Federal
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5-10 % of EERC Workload

60-70 % of EERC Workload

20-35 % of
EERC Workload

GRAPHENE/GRAPHITE

- SERC funded
 - Evaluation of high-value solid carbon products from North Dakota lignite - **\$200,000**
 - Evaluation of graphene-enhanced low-viscosity engine oil for automotive, aerospace, and unmanned aerial vehicle applications - **\$192,000** (Currently underway)
- Led to two funded projects to advance the technology:
 - Federal proposal awarded for laboratory-scale graphene production –Total Funding **\$931,000** (DOE - \$744,00, NDIC LRC \$162,500, North American Coal - \$25,000)
 - Advanced Processing of Coal and Coal Waste for Anodes in Fast Charging Batteries - Total Funding **\$1.45 million** (\$1.0 million DOE, \$0.5 Million NDIC LRC, \$45,000 North American Coal) –

CO2 Removal/Precipitation Technology

- SERC Funded:
 - Developing Value from North Dakota Geologic Brines - **\$60,000**
- Follow-On Funding
 - ARPA-E, Total Funding **\$500,000 DOE** (100% DOE)
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Project Title	PI(s)	Proposal Sponsor(s)	Proposed \$	Awarded \$
Novel Concepts in Support of Lignite Coal	Jivan Thakare	DOE	\$187,500	\$187,500
Solvent Extraction of Rare Earth Elements from Lignite Coal In-Situ Bench-Scale Extraction of Rare Earth Elements from Lignite Coal Ash	Bruce Folkedahl, Ian Feole	DOE (\$1,579,000 with \$337,924 for UND IES) NDIC (\$750,000) NACC (\$75,000) BNI (\$75,000) Minnkota (\$25,000) BEPC (\$25,000)	\$2,529,000	\$2,529,000
Evaluation of High-Value Solid Carbon Products from ND Lignite	Alex Azenkeng	DOE (\$744,064) NDIC (\$162,500) NACC (\$25,000)	\$931,564	\$931,564
Evaluation of High-Value Solid Carbon Products from ND Lignite	Alex Azenkeng	DOE (\$1,000,000) NDIC (\$500,000) NACC (\$45,000)	\$1,545,000	\$1,545,000
Developing Value in North Dakota's Produced Geologic Brines	Chris Martin	DOE, ARPA-E (\$500,000)	\$500,000	\$500,000
Hosting Capacity Analysis for Improved Planning and Operations of North Dakota Distribution Networks	Daisy Selvaraj	NDIC (\$75,000)	\$75,000	\$75,000
Examination of In-situ Hydrogen Conversion in Oil Reservoirs	Lu Jin	DOE (\$1,500,000) Turning Point Power (\$353,907) CMG (\$21,093)	\$1,875,000	
Polar Bear – Robust Adaptive Technology to Economically Capture Flared Gas in North Dakota	Darren Schmidt	DOE (\$1,000,000) NDIC (\$250,000)	\$1,250,000	
Low-Density Proppants from Low-Alumina Clays and Lignite Fly Ash	Bruce Folkedahl	DOE through Univ. of Utah (FORGE) (2,106,080) NDIC - LRP (125,000)	\$2,231,080	
300PEE for NH3	Ted Aulich	DOE (3,000,000) NDIC (500,000) Commercial partner (306,462)	\$3,806,462	
A Computational Approach to Facilitate Efficient Extraction and Isolation of PGMs (platinum group metals) and REEs (rare-earth elements)	Alex Azenkeng	DOE (\$1,041,698 with \$399,358 going to UND chemistry)	\$1,041,698	\$0
ND Wind Turbine Blade Recycling	Josh Strege	REMADE Institute, DOE flow through (\$273,593) NDIC (\$250,000) BNI (\$12,500) Allete Clean Energy (\$12,500)	\$548,593	\$0
ND Wind Turbine Blade Recycling	Josh Strege	DOE, EERE (\$800,000 with \$3,277 to UND Chemistry) NDIC (\$200,000) Allete Clean Energy (\$23,594)	\$1,023,594	\$0
Developing Value in North Dakota's Produced Geologic Brines	Chris Martin	DOE, ARPA-E (\$449,970) this is an add-on to 2020-0232	\$449,970	\$0
Developing Value in North Dakota's Produced Geologic Brines	Chris Martin	DOE, CO2 SolventRegen (\$1,250,000)	\$1,250,000	\$0
Waste Utilization for Bio-Based Alternatives to Chemicals and Fuels	Jasmine Oleksik	DOE, EERE, BETO (\$1,350,000) NDIC (\$562,500 with \$62,500 coming from SERC)	\$1,912,500	\$0

Big Picture Return on Investment – Past/Current Examples

- Lignite Utilization
 - \$Million on fundamental research understanding how lignite reacts/burns
 - Tens of \$Million on research and development for lignite utilization
 - Impact to the state - \$Billions
- Bakken Development
 - \$Millions on fundamental research understanding bakken and the associated by-products
 - Tens of \$Millions on research and development to enhance production and overcome issues
 - Impact to the state - \$Billions
- Carbon Capture and Utilization
 - Tens of \$Million on fundamental research understanding how to capture and store CO₂
 - Hundreds of \$Million on research and development for CO₂ capture and storage
 - Impact to the state - \$Billions

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Presented to the Senate Appropriations Committee
February 2, 2023

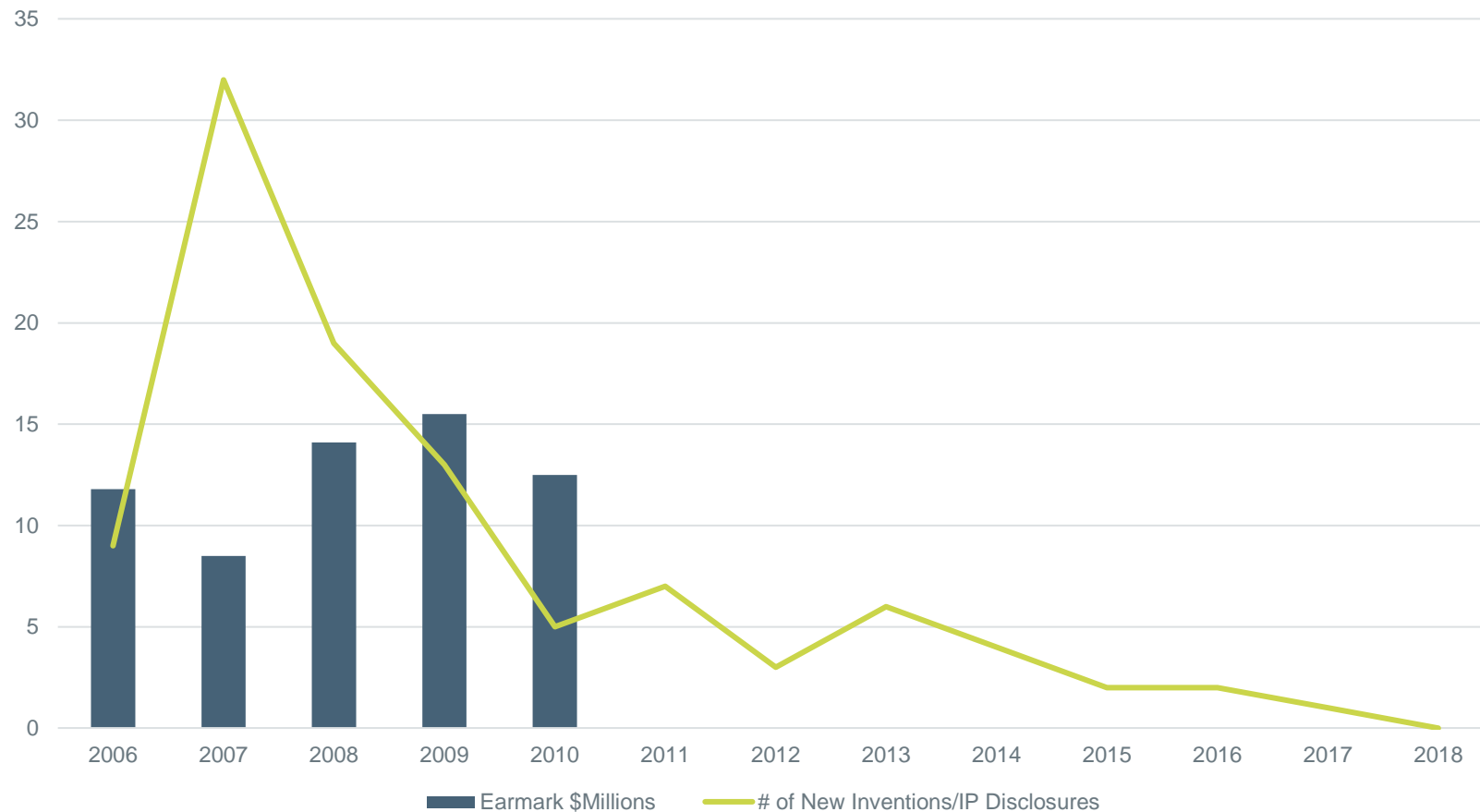
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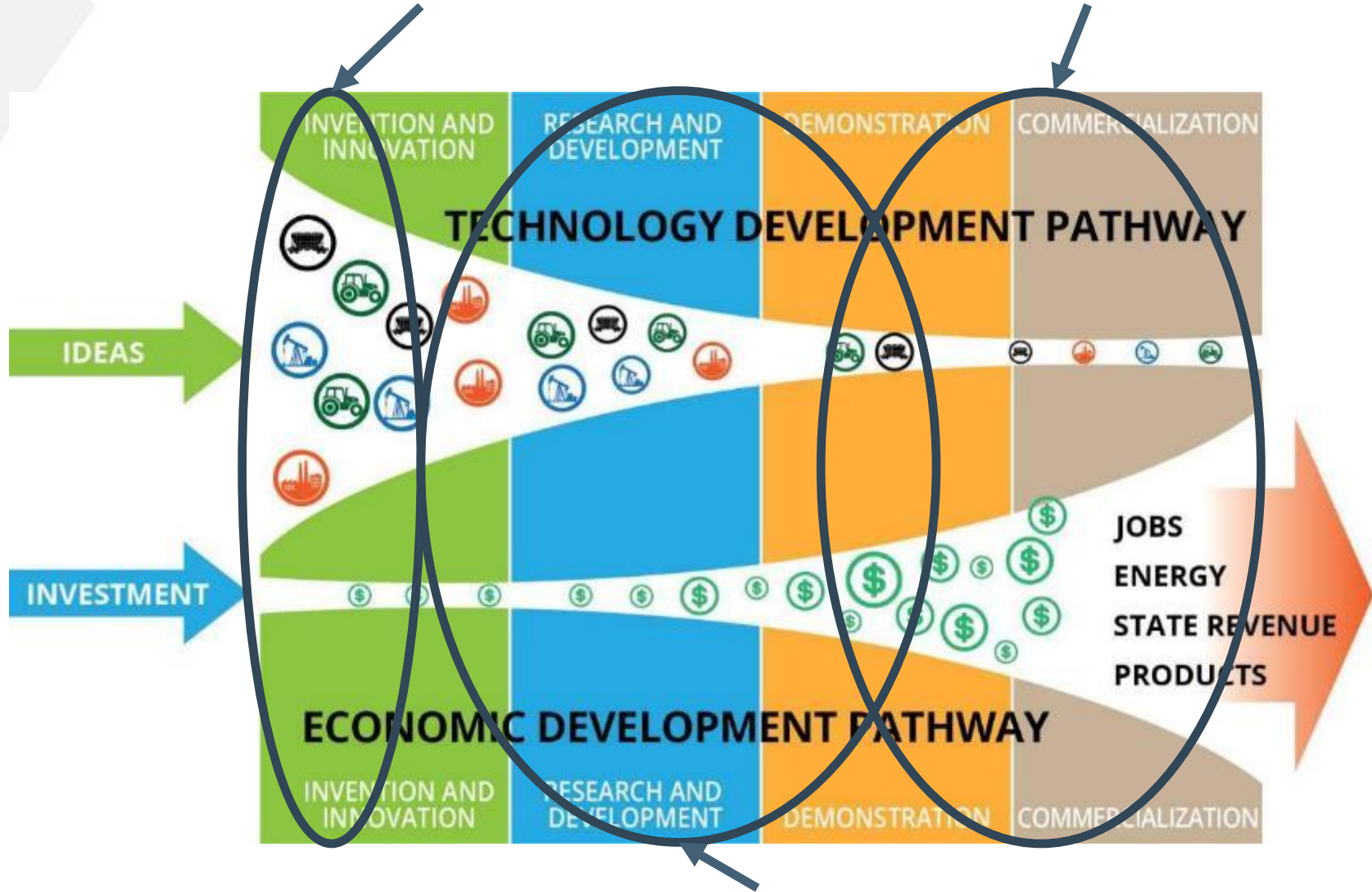
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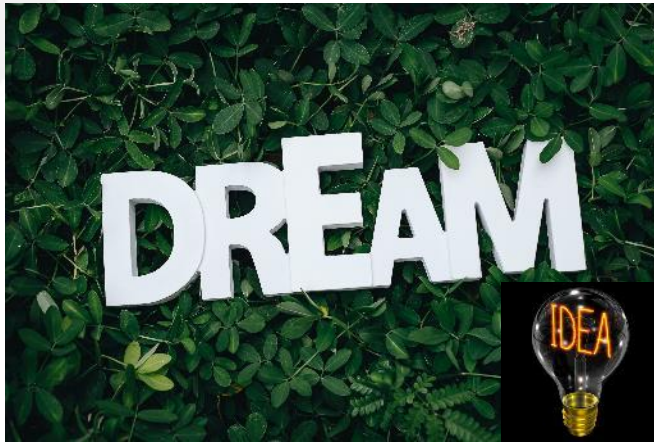


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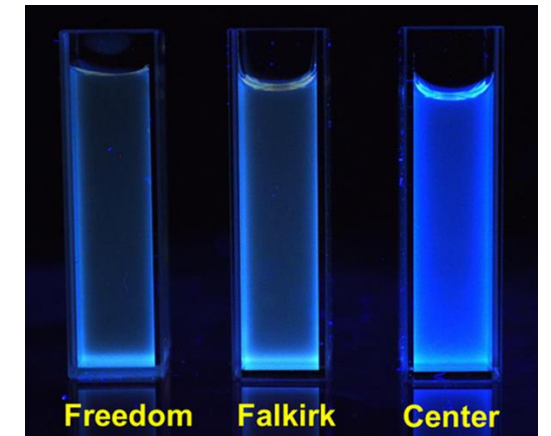
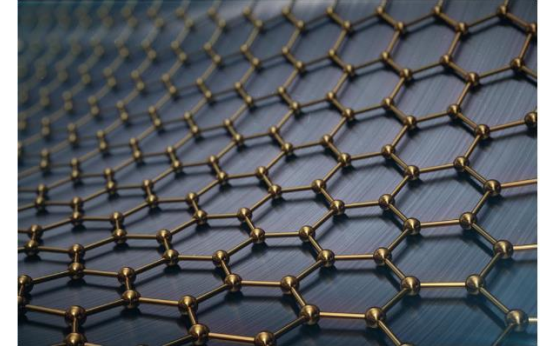
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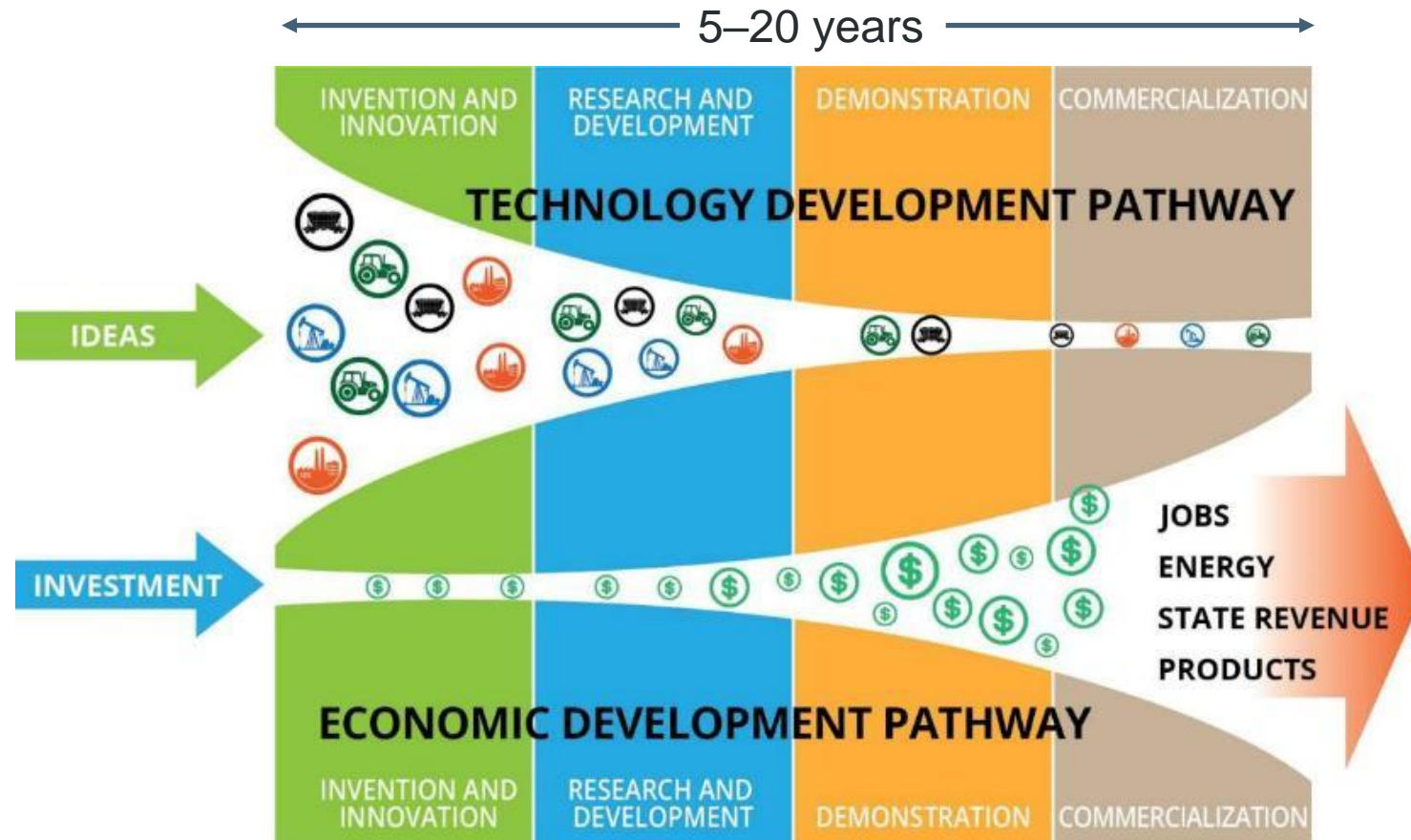
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RARE-EARTH ELEMENTS

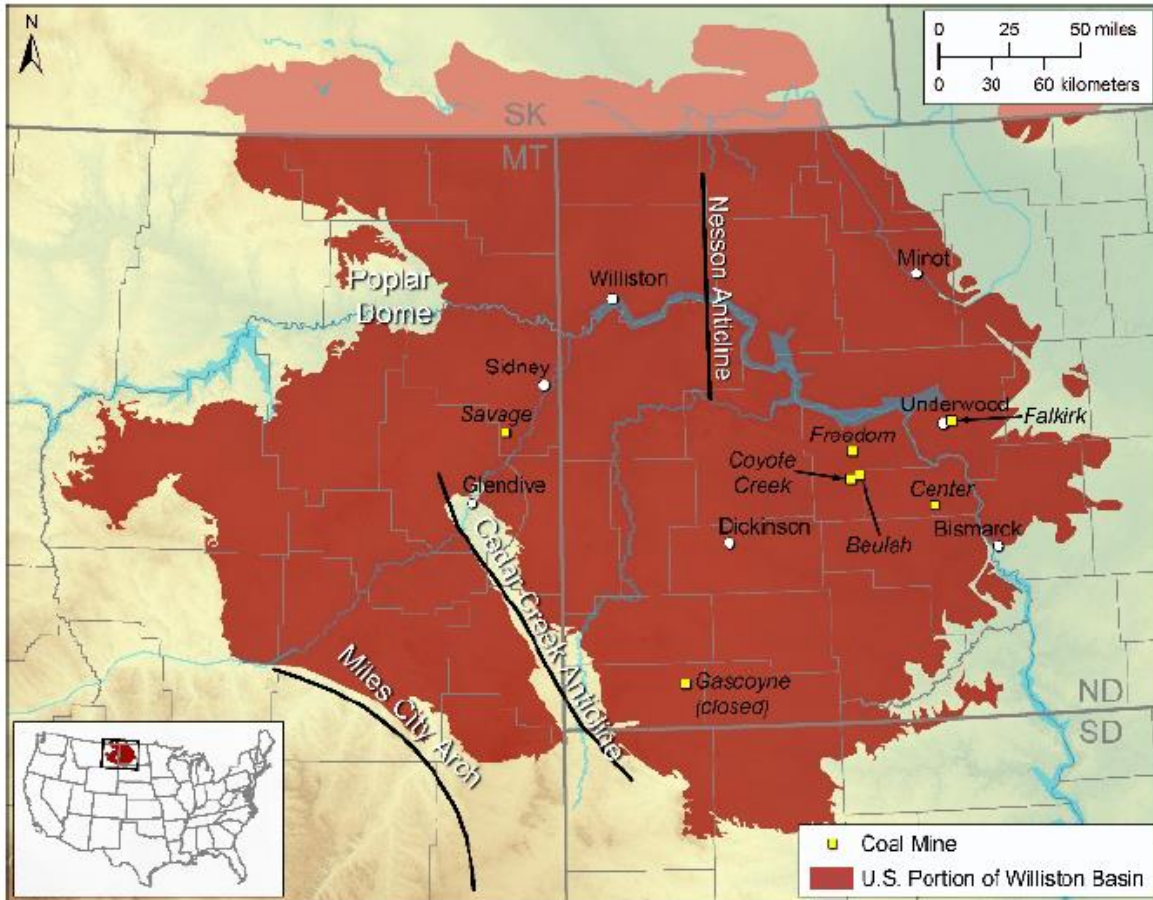
- SERC funded
 - Recovery of REEs from coal ash
 - Quantifying REEs in coal seams and shale
 - Electrochemical extraction of REEs from coal and produced water
 - Tunable electrochemical extraction for purification of REEs and CM
- Led to:
 - Williston Basin CORE-CM: \$1.5 million federal funding with additional cost share from Lignite Research Program, North American Coal, BNI, Basin Electric Cooperative, and Minnkota Power

The image shows a periodic table with color-coded elements. A legend in the top right corner defines the categories: Light Rare Earth Elements (blue), Heavy Rare Earth Elements (green), Critical Rare Earth Elements (red), and Critical Minerals (black). The elements Scandium (Sc), Yttrium (Y), and Lanthanum (La) are highlighted in blue. Elements from Cerium (Ce) to Lutetium (Lu) are highlighted in green. Elements from Scandium (Sc) to Europium (Eu) are highlighted in red. Elements from Uranium (U) to Plutonium (Pu) are highlighted in black. The lanthanide and actinide series are shown at the bottom of the table.

*Gd, Rf, Ac Light REE, USGS Heavy REE - **Included with rare earth elements

Image Credit: DOE NETL

WILLISTON BASIN CORE-CM INITIATIVE



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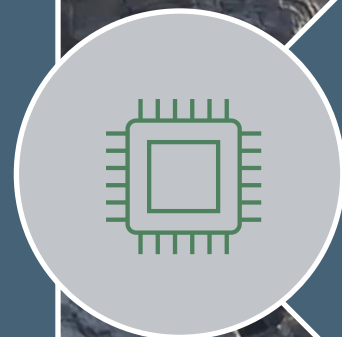
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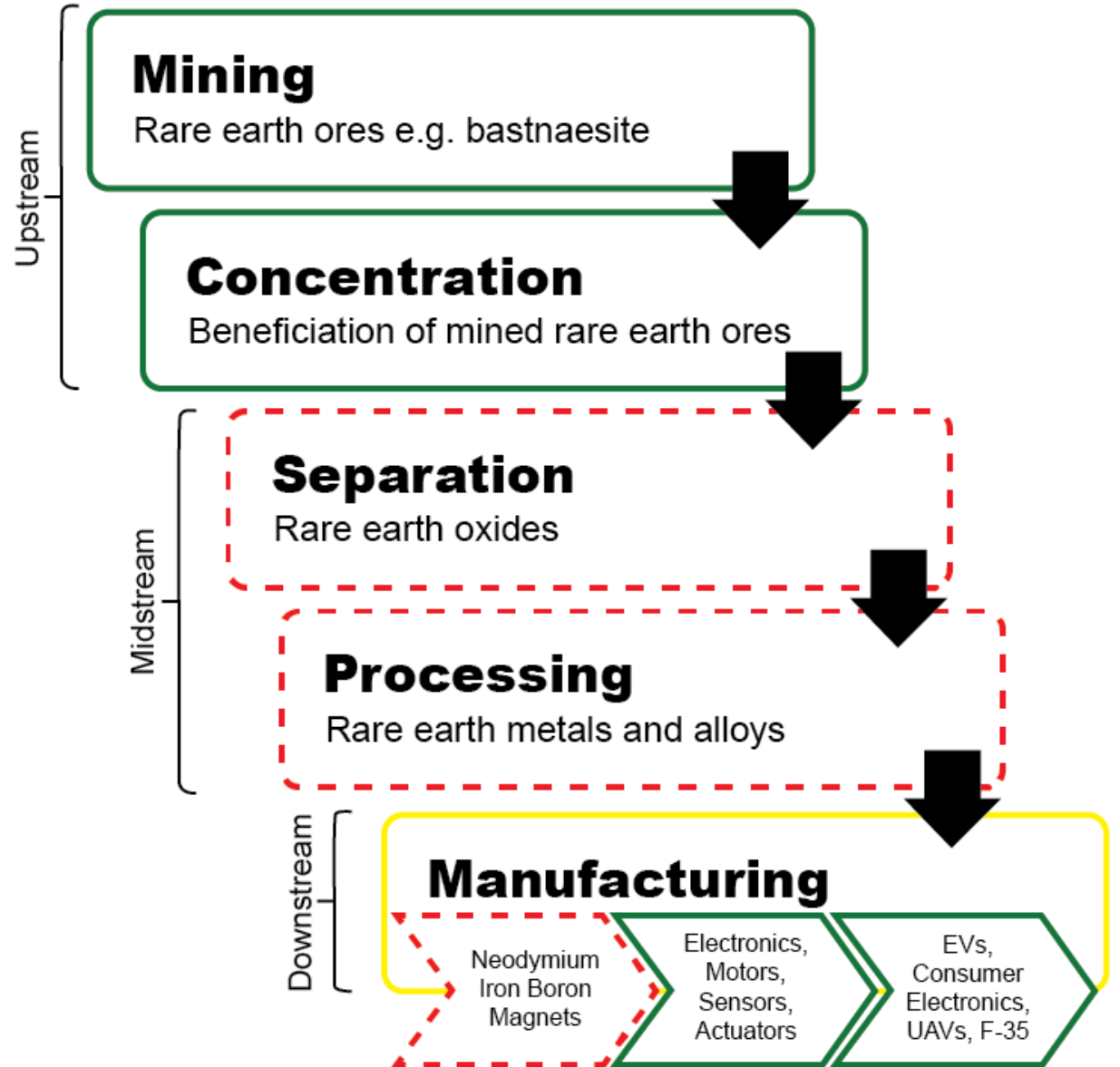
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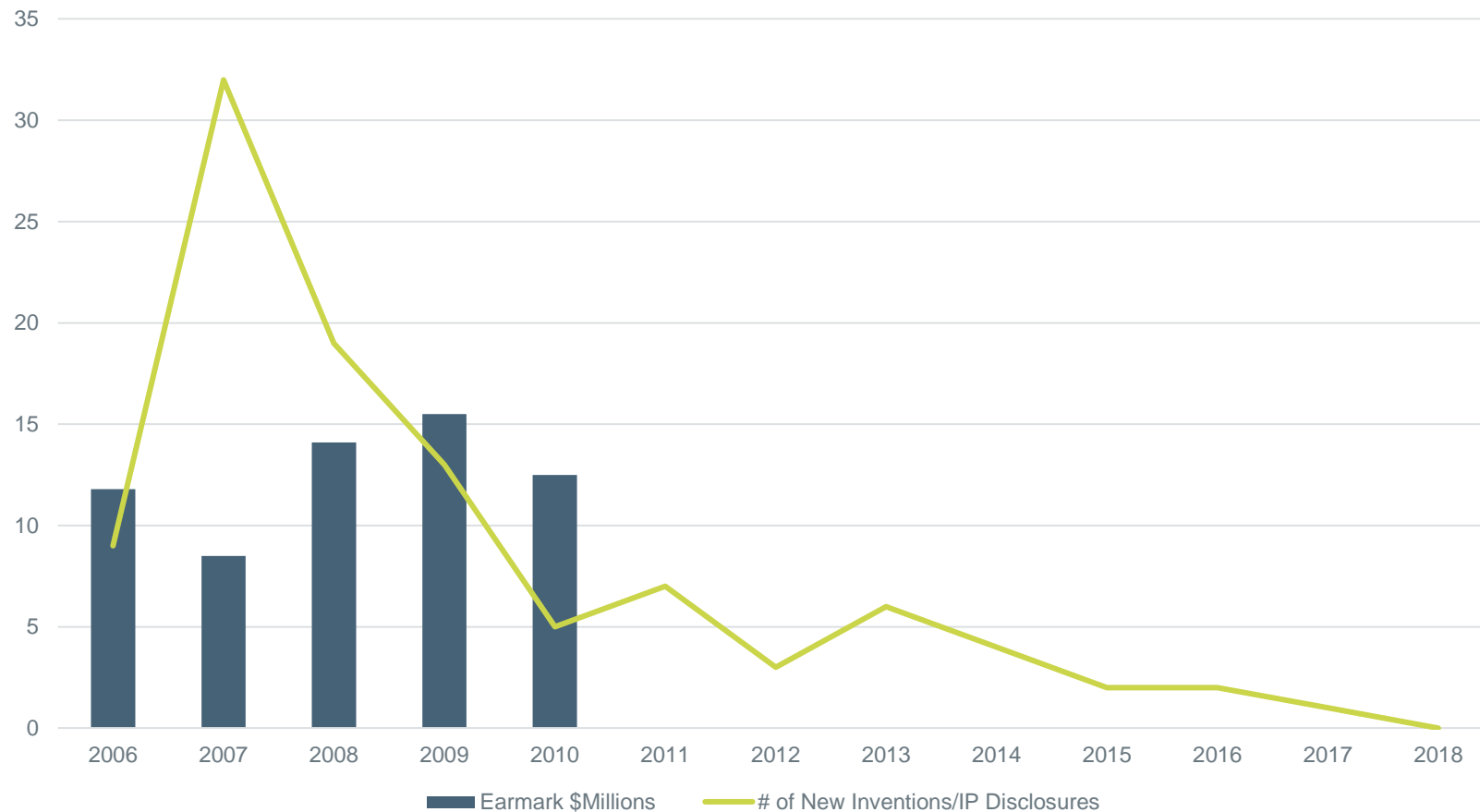
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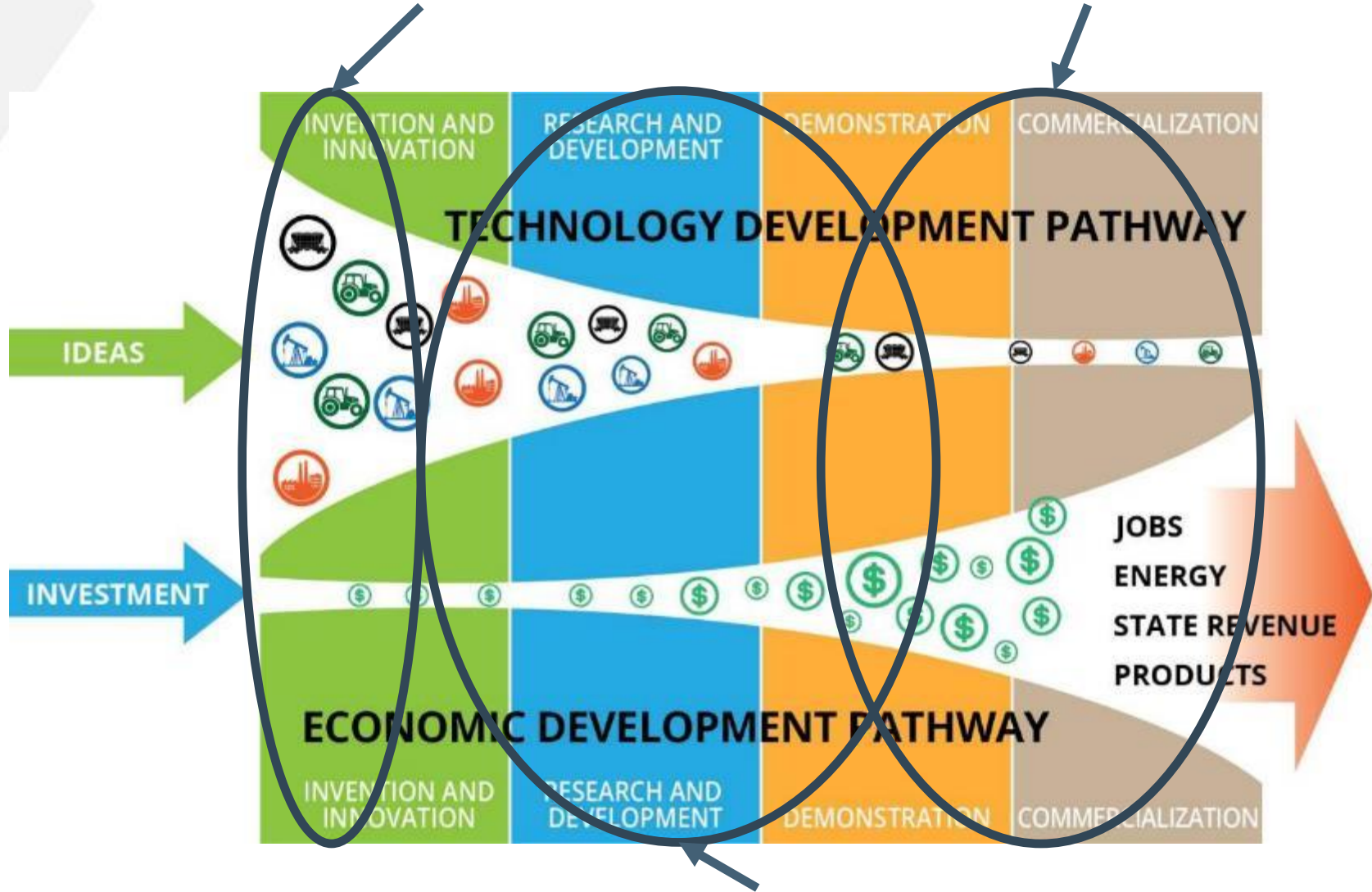
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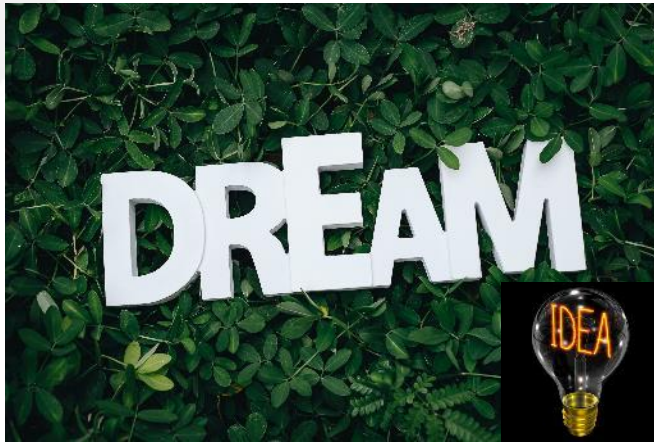


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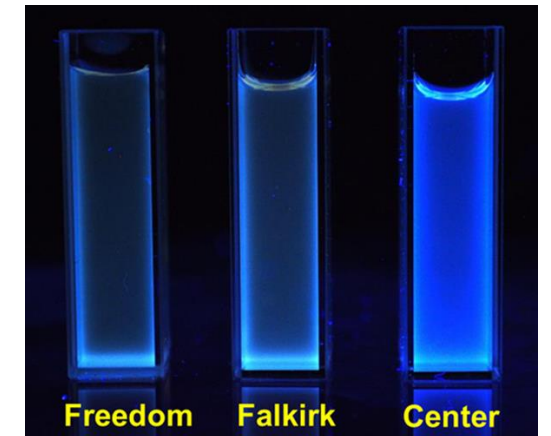
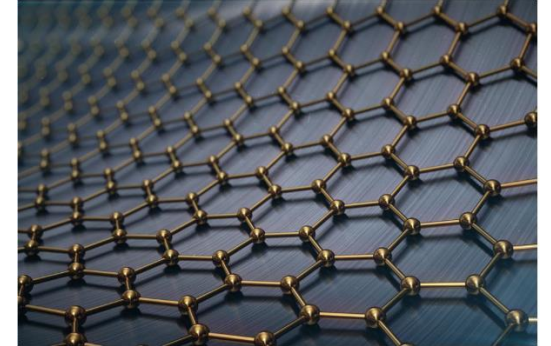
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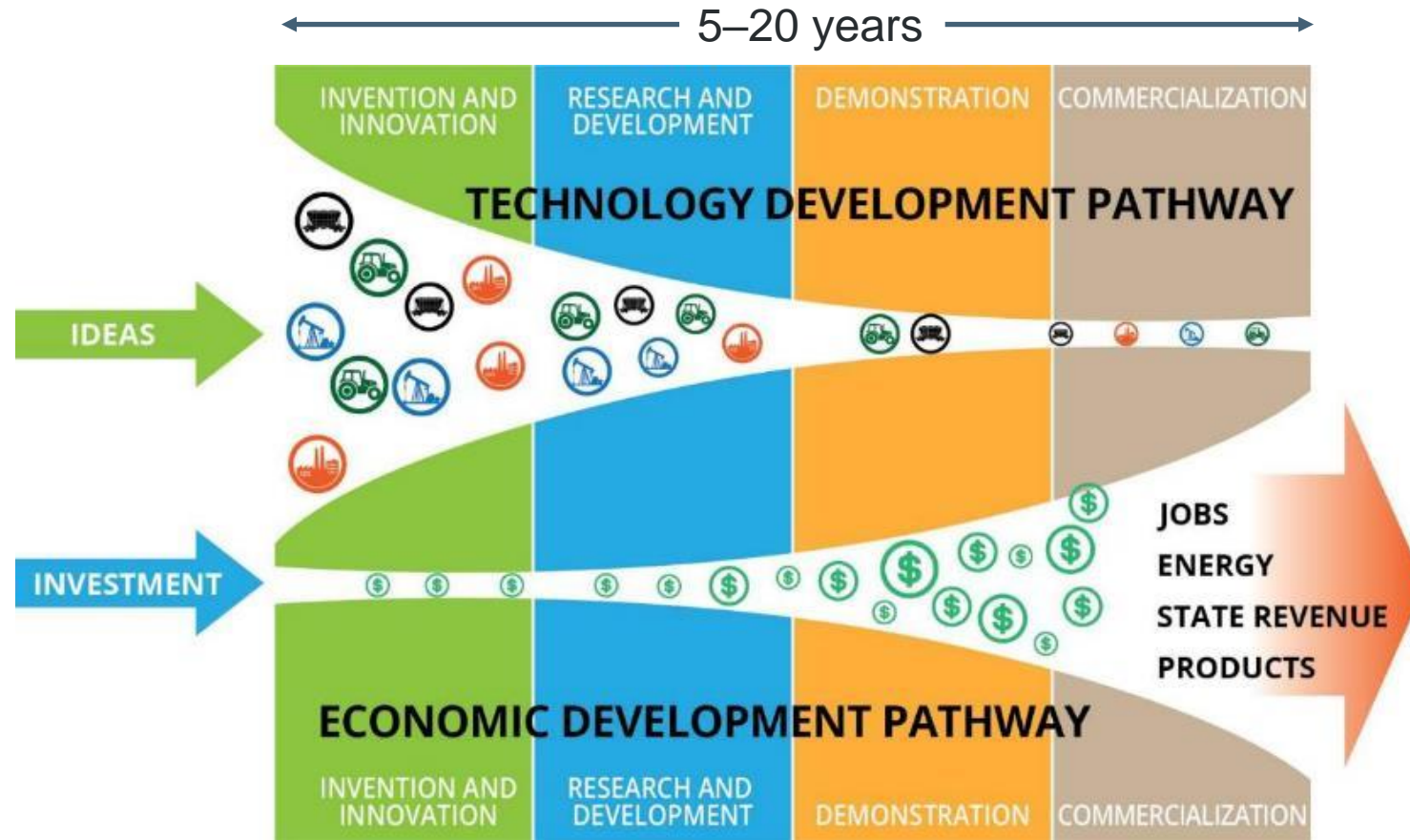
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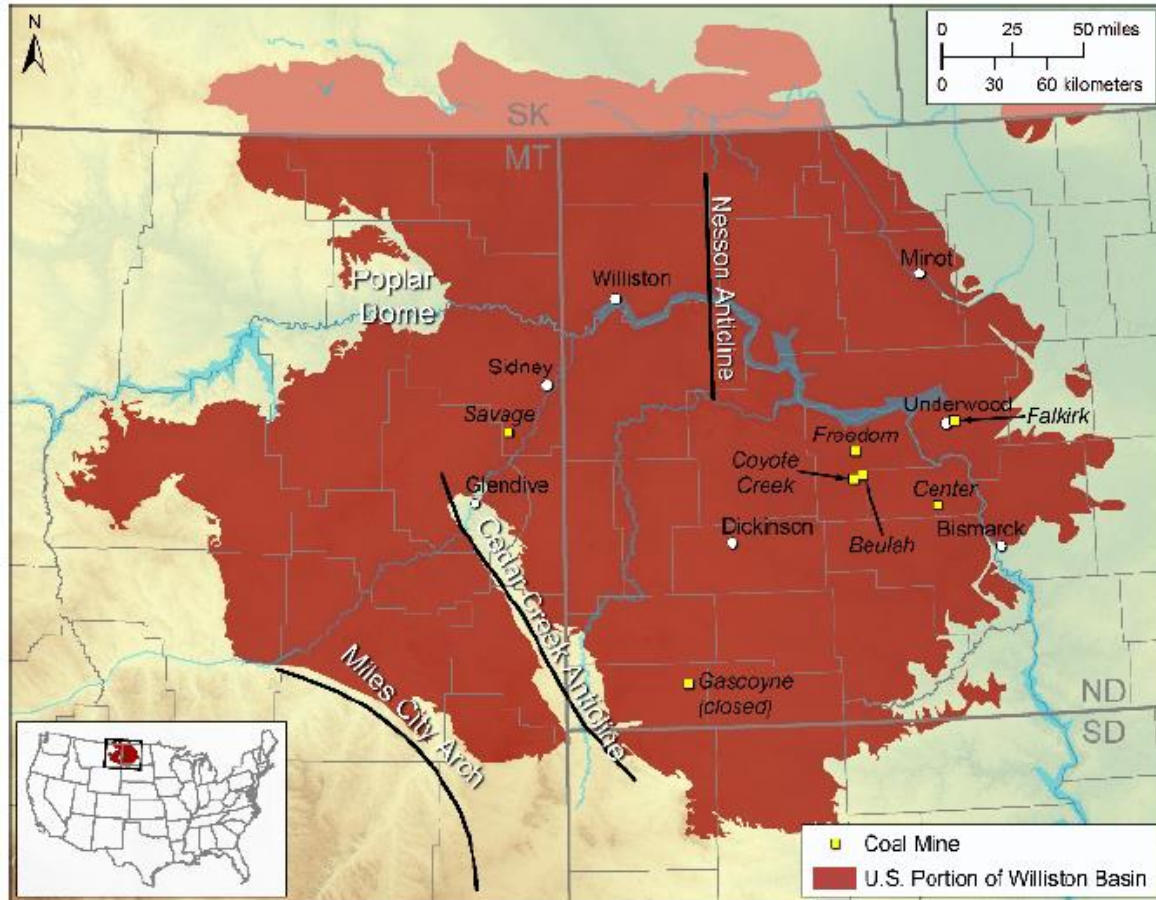
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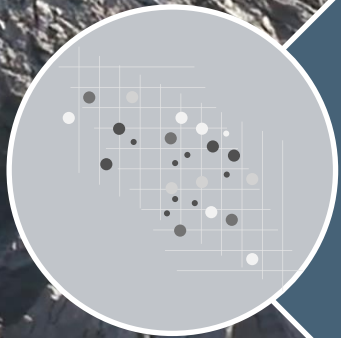
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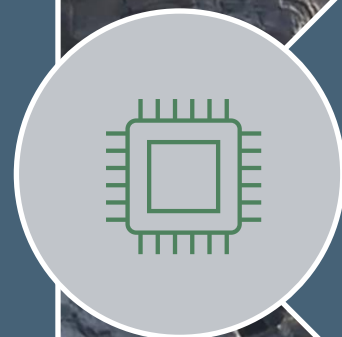
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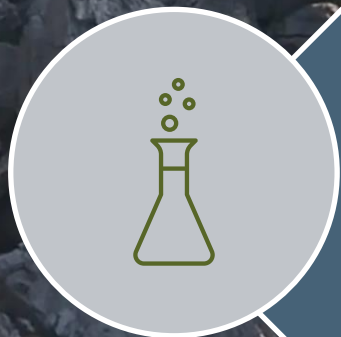
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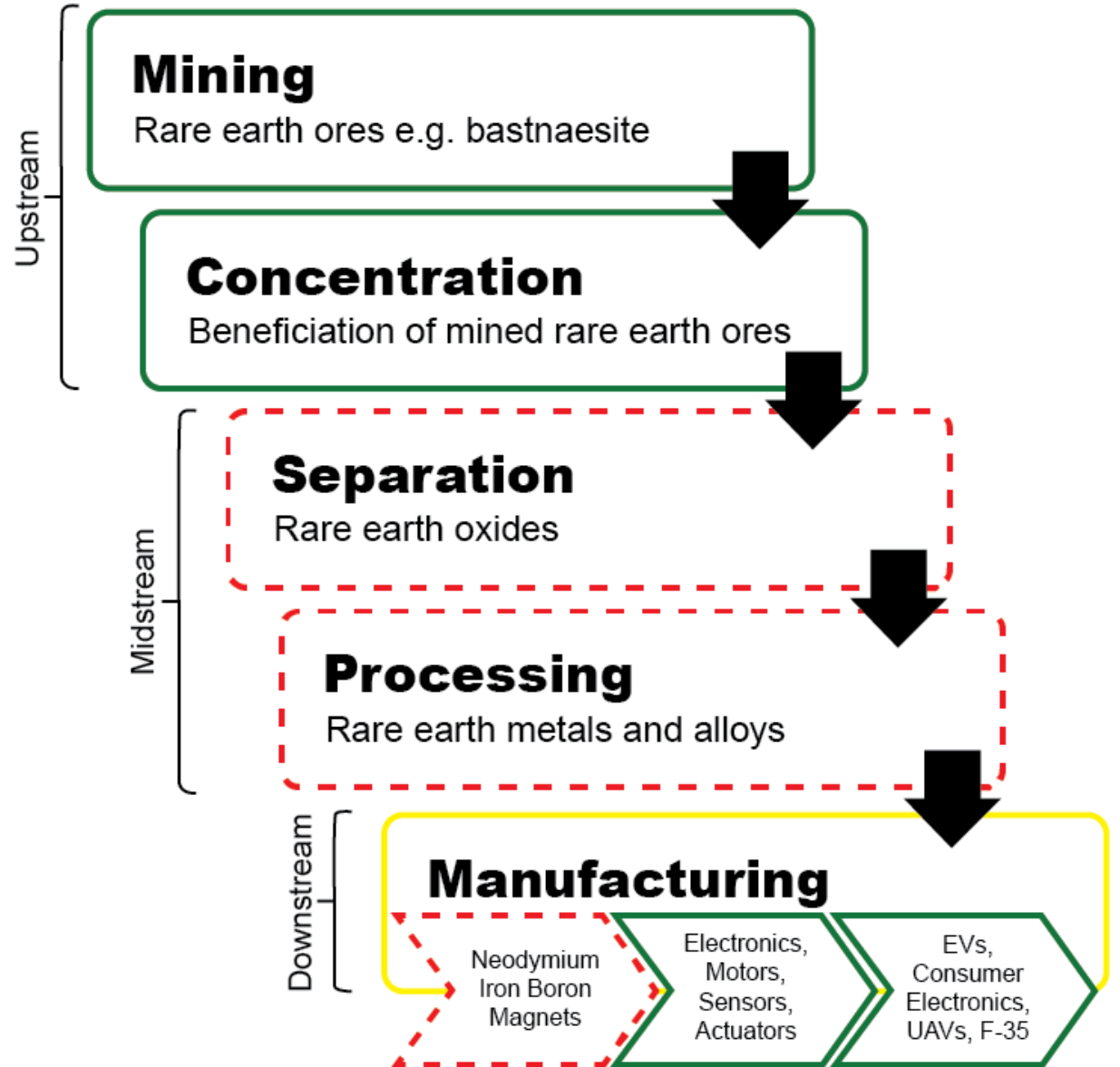
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