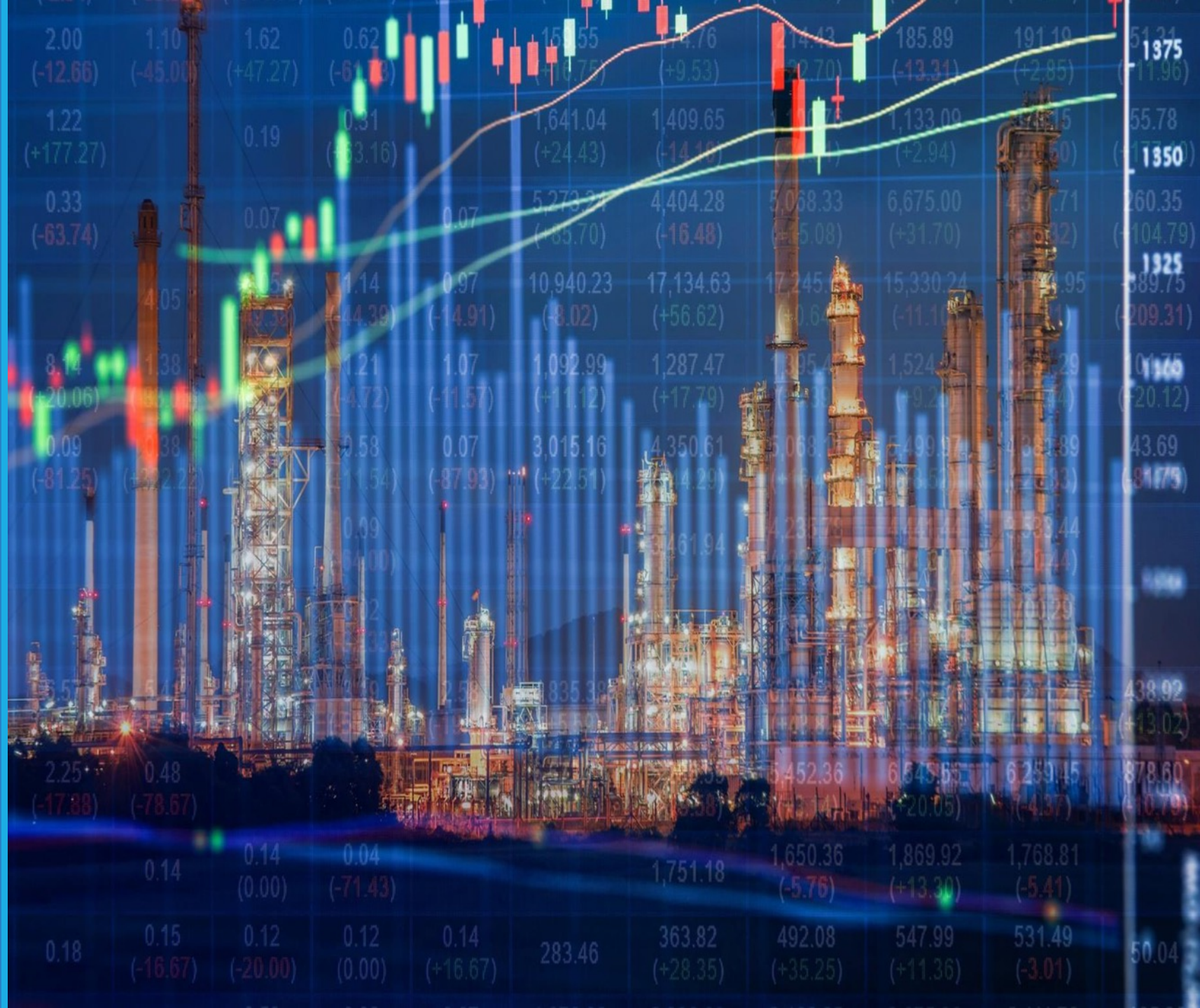


Energy Academy

Session #5: Energy Transition
Goals and Constraints

Metropolitan Mayors Caucus |
The Power Bureau

March 15, 2023



AGENDA

HOUSEKEEPING

- Course-related items

RESOURCES

- Readings
- Website of the Week

LECTURE

- Transition
- Goals
- Constraints

DISCUSSION

- Open



HOUSEKEEPING

HOUSEKEEPING

Announcements from MMC

Cheryl and Edith

Requests for Specific Course Items

We are completing the background portion of the course, and will be moving into more specific topics in the next few sessions

Are there specific issues that the attendees would like for us to cover in the next few sessions?

Recommendations

As always, please feel free to share any ideas and recommendations for improvements to the course and its content!



RESOURCES

RESOURCES

Weekly Readings

Illinois Adjustable Block Program

Link: [Illinois Shines](#)

Source: Illinois Power Agency

Description: In-depth information and data concerning distributed energy incentives and projects for Illinois.

Illinois Energy Efficiency

Link: [Illinois Energy Efficiency Stakeholder Advisory Group](#)

Source: Illinois SAG

Description: Planning and progress reports for all energy efficiency programs operated by investor-owned utilities in Illinois.

Annual Snapshot on Illinois Utilities

Link: [2022 Annual Report on Electricity, Gas, Water and Sewer Utilities](#)

Source: Illinois Commerce Commission

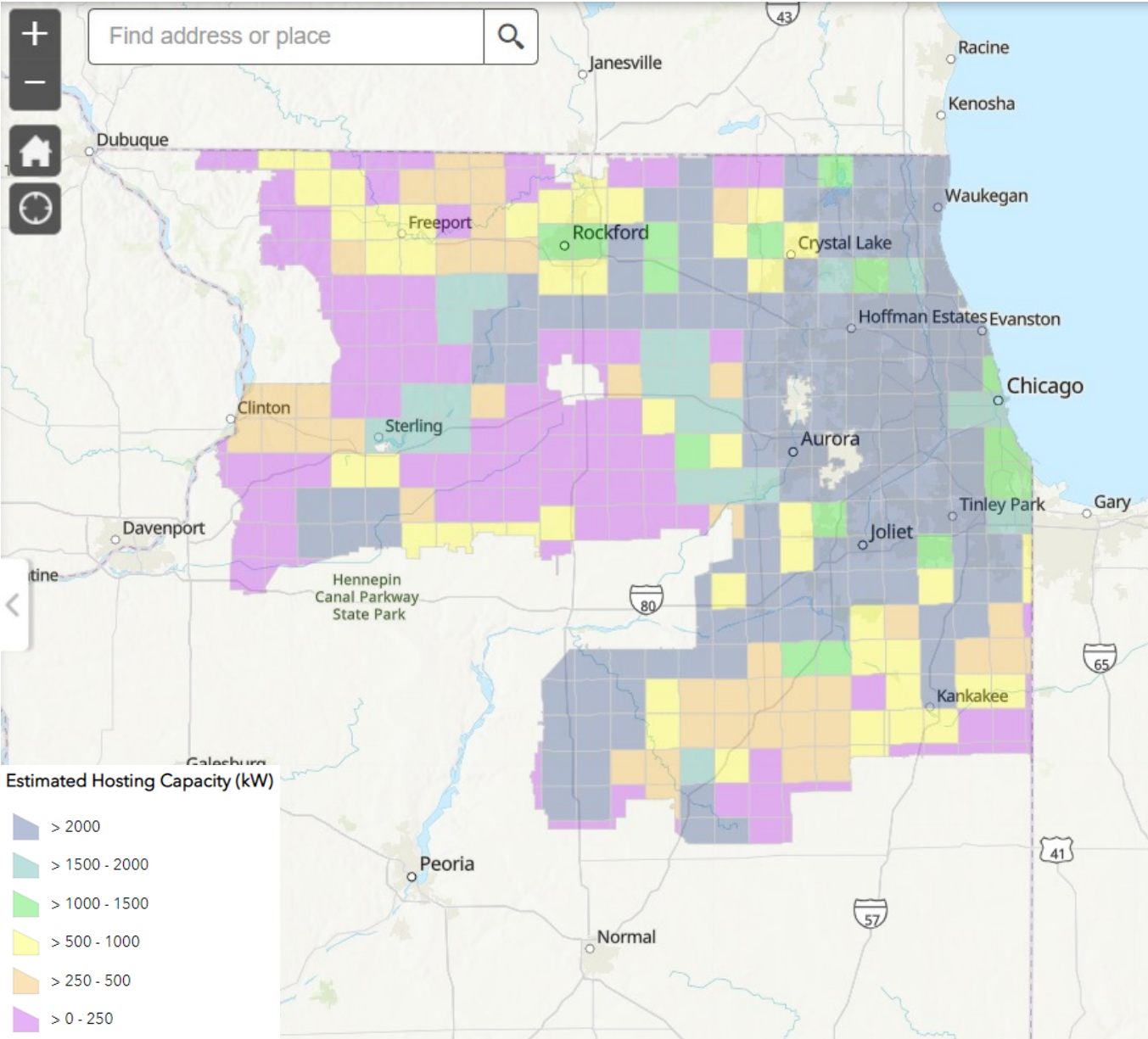
Description: Annual report on the major developments (regulation, rulings, rates, etc.) for the electric, natural gas, water and sewer utilities in Illinois

ComEd provides a color-coded map of available DG hosting capacity

WEBSITE OF THE WEEK

Commonwealth Edison Hosting Capacity Mapping Tool

<https://exelonutilities.maps.arcgis.com/apps/webappviewer/index.html?id=d282a890afb34956a906ae224c9f708e>

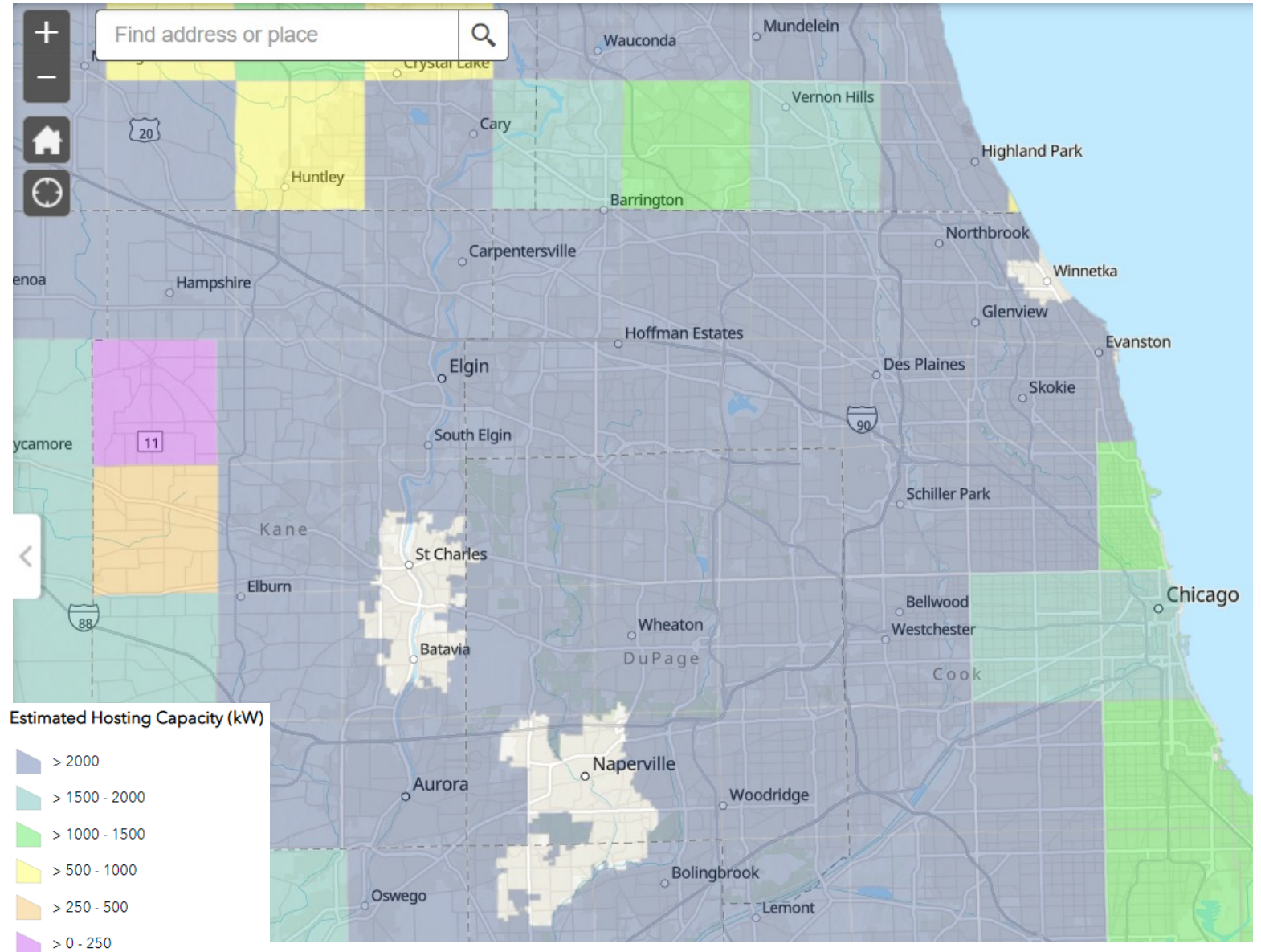


Zoom in to subregional levels to for DG connection capacity to the ComEd System

WEBSITE OF THE WEEK

Commonwealth Edison Hosting Capacity Mapping Tool

<https://exelonutilities.maps.arcgis.com/apps/webappviewer/index.html?id=d282a890afb34956a906ae224c9f708e>

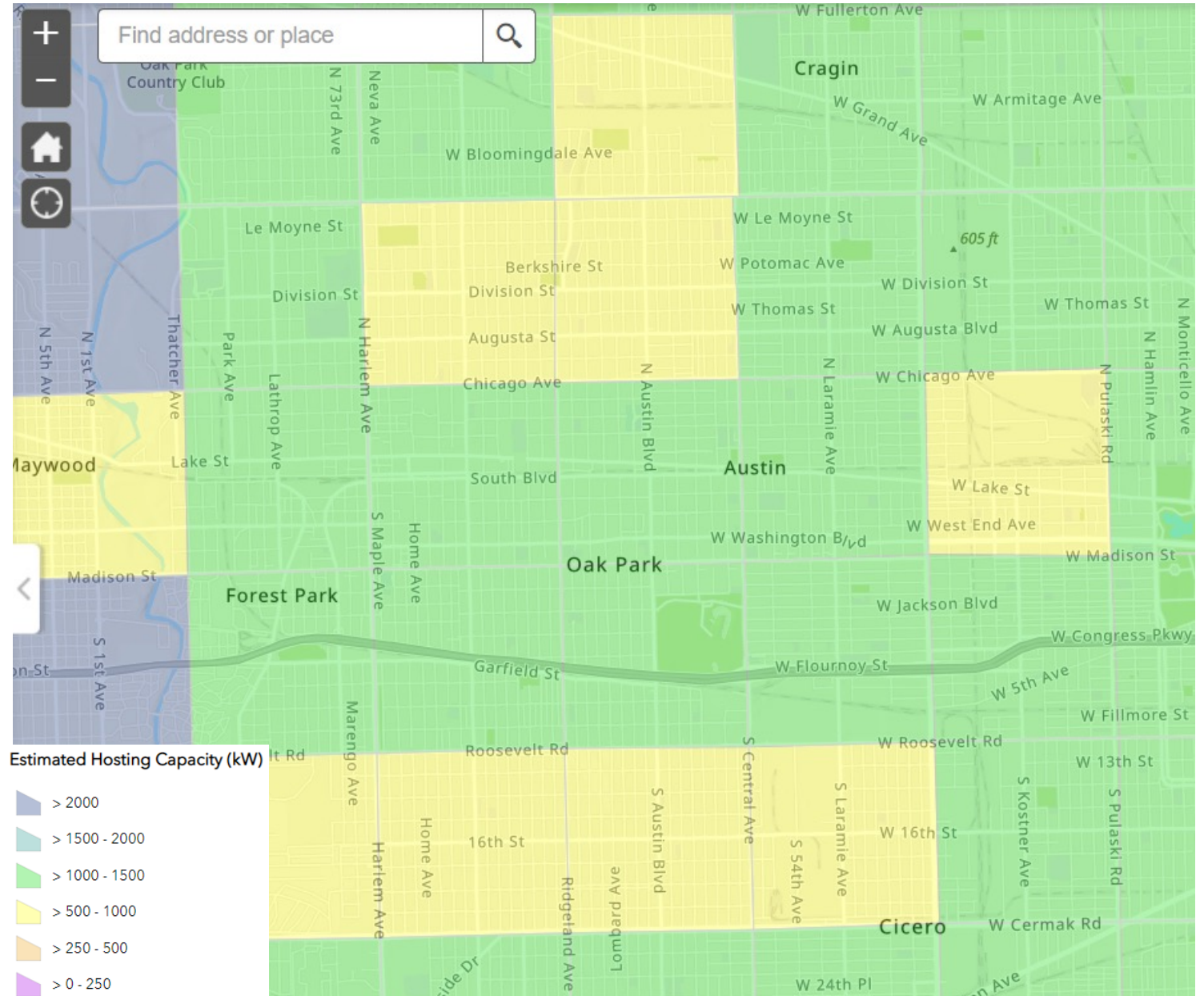


Even down to the neighborhood level

WEBSITE OF THE WEEK

Commonwealth Edison Hosting Capacity Mapping Tool

<https://exelonutilities.maps.arcgis.com/apps/webappviewer/index.html?id=d282a890afb34956a906ae224c9f708e>

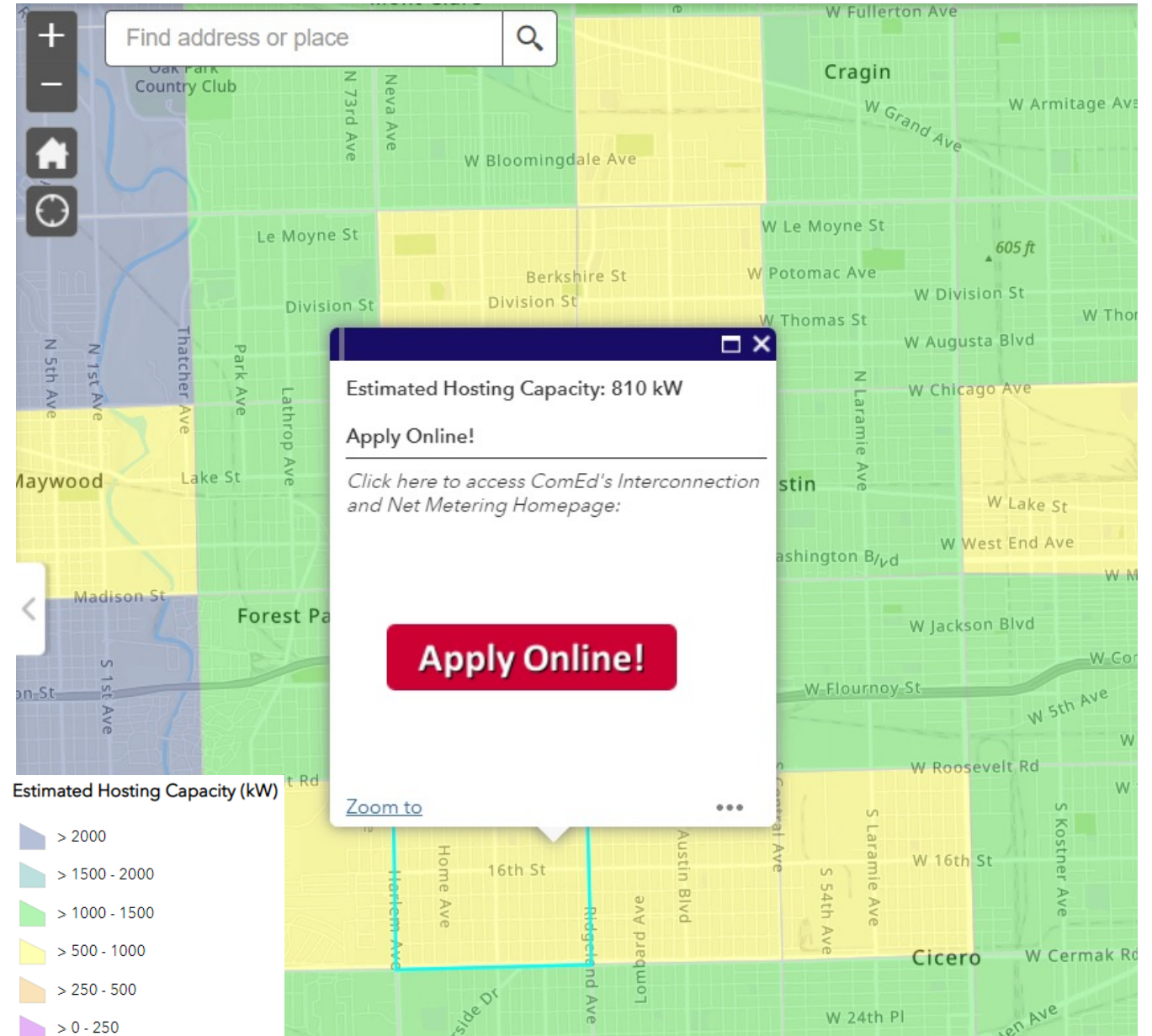


And get the latest hosting value for the neighborhood

WEBSITE OF THE WEEK

Commonwealth Edison Hosting Capacity Mapping Tool

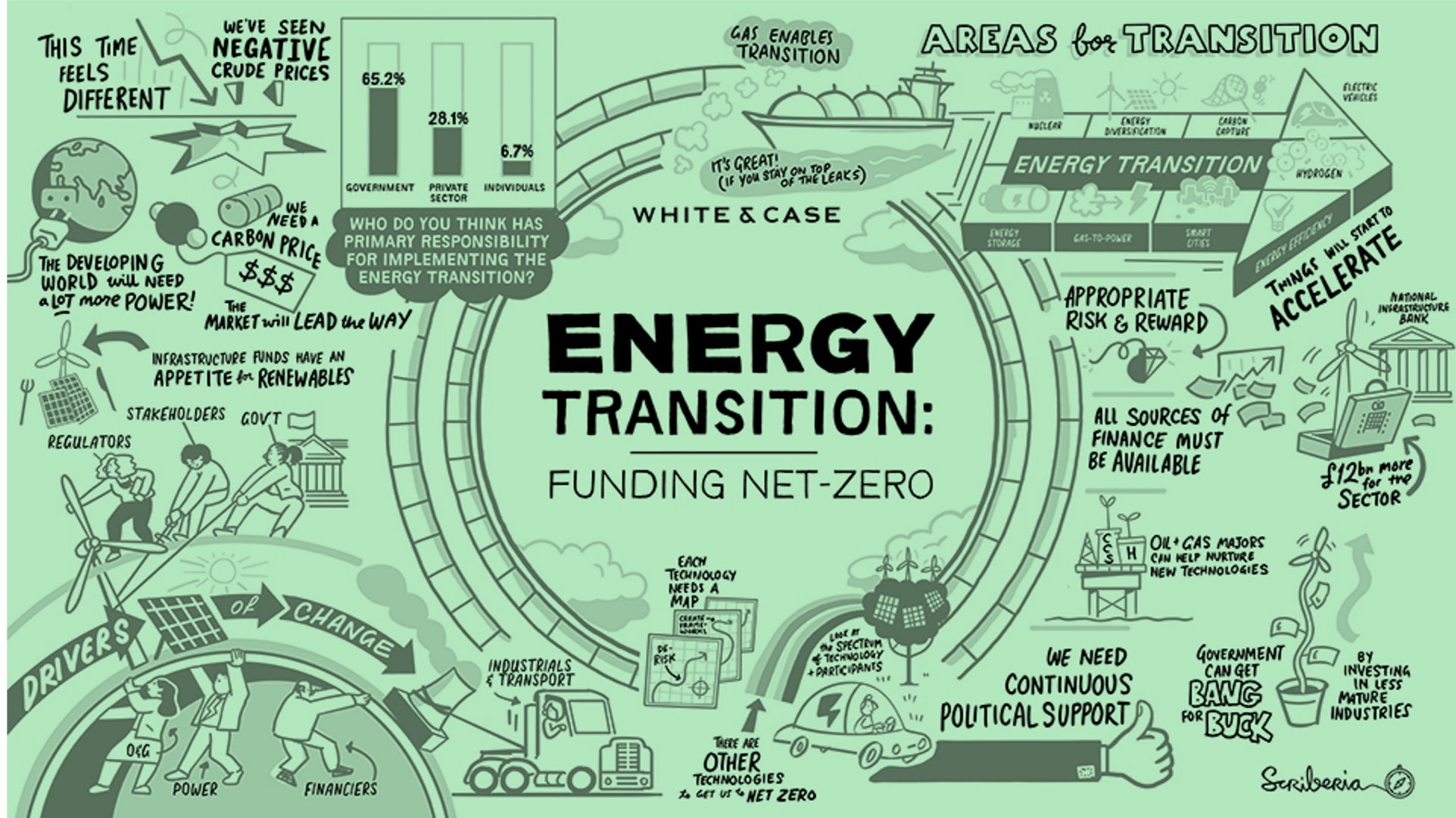
<https://exelonutilities.maps.arcgis.com/apps/webappviewer/index.html?id=d282a890afb34956a906ae224c9f708e>





LECTURE

What the Public sometime hears when people talk about "The Energy Transition"



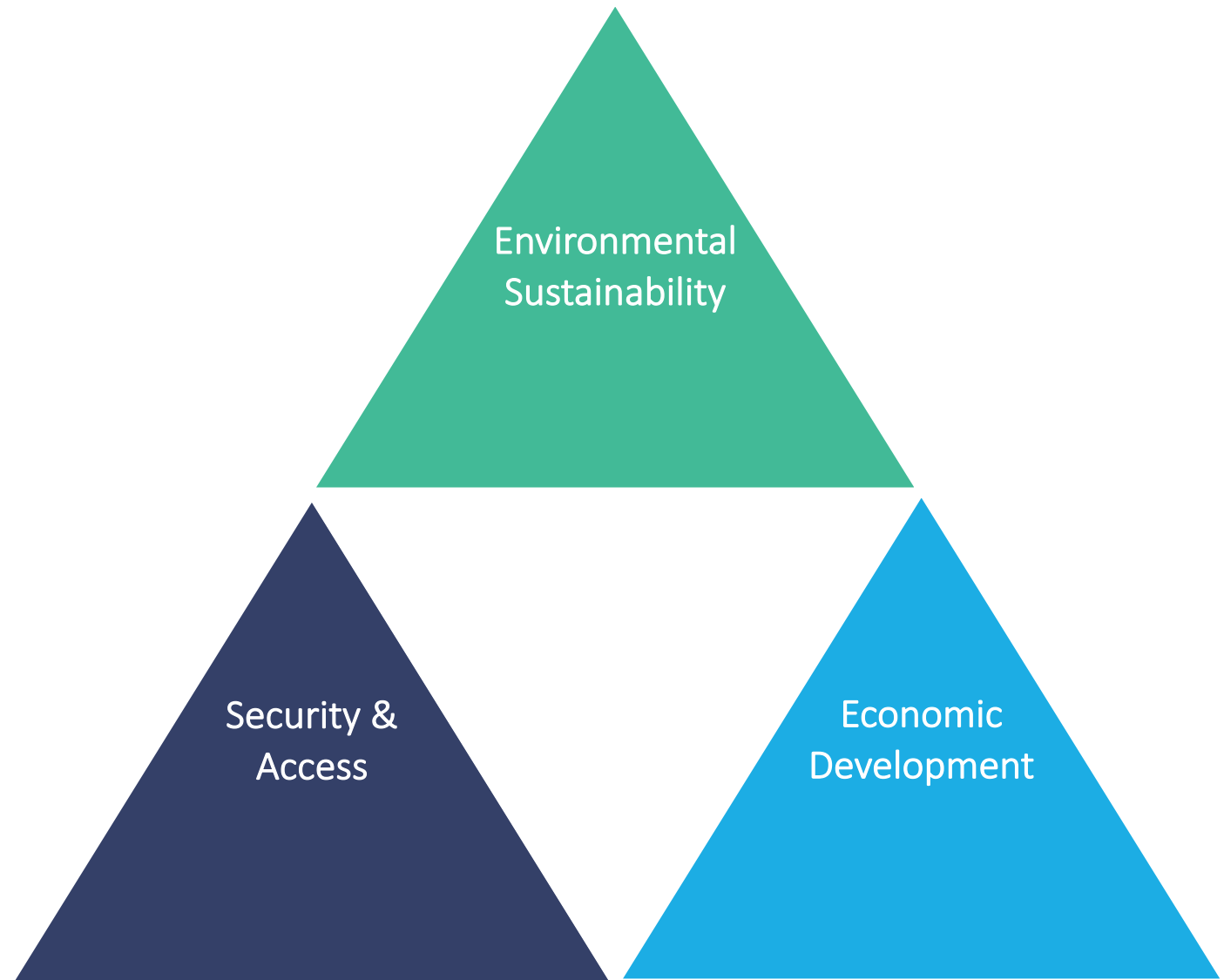
Source: [White & Case](#)

We might need to simplify the message: The World Economic Forum has a simple yet comprehensive concept

ENERGY TRANSITION

KEY ELEMENTS

- Vision
- Approaches
- Progression

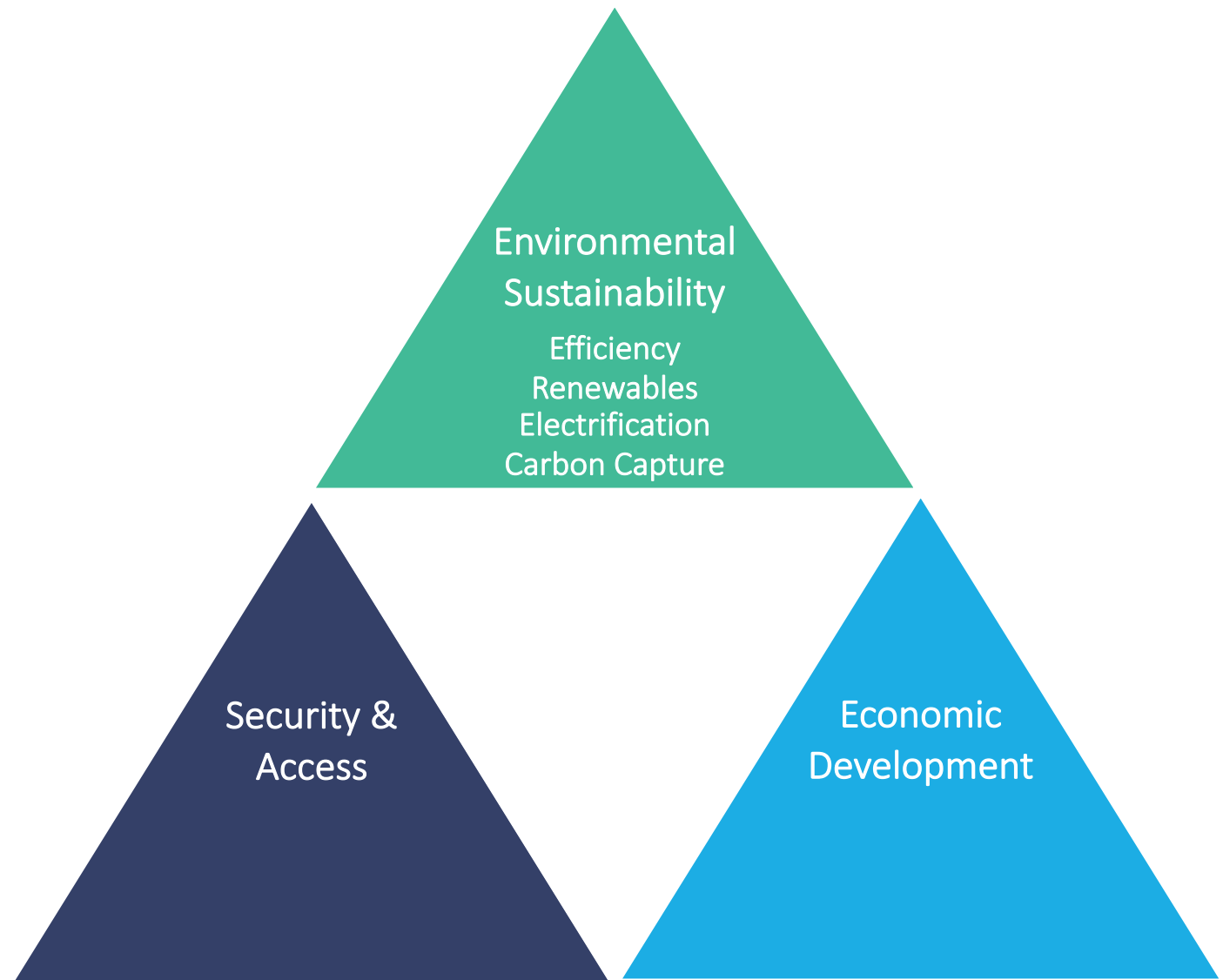


There are multiple options to addressing sustainability

ENERGY TRANSITION

KEY ELEMENTS

- Vision
- **Approaches**
- Progression

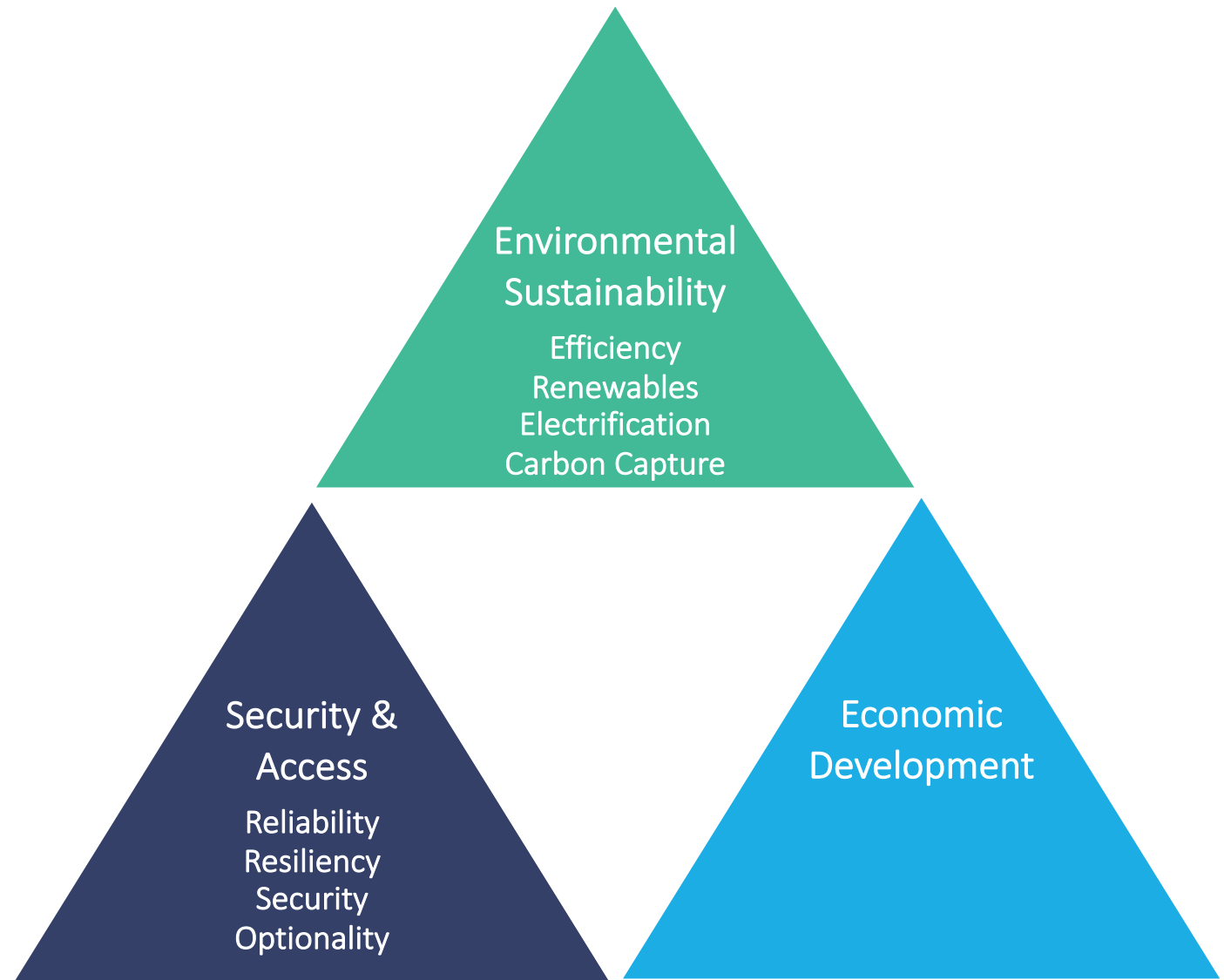


And we need to assure consumers that they will not be sacrificing security

ENERGY TRANSITION

KEY ELEMENTS

- Vision
- Approaches
- Progression

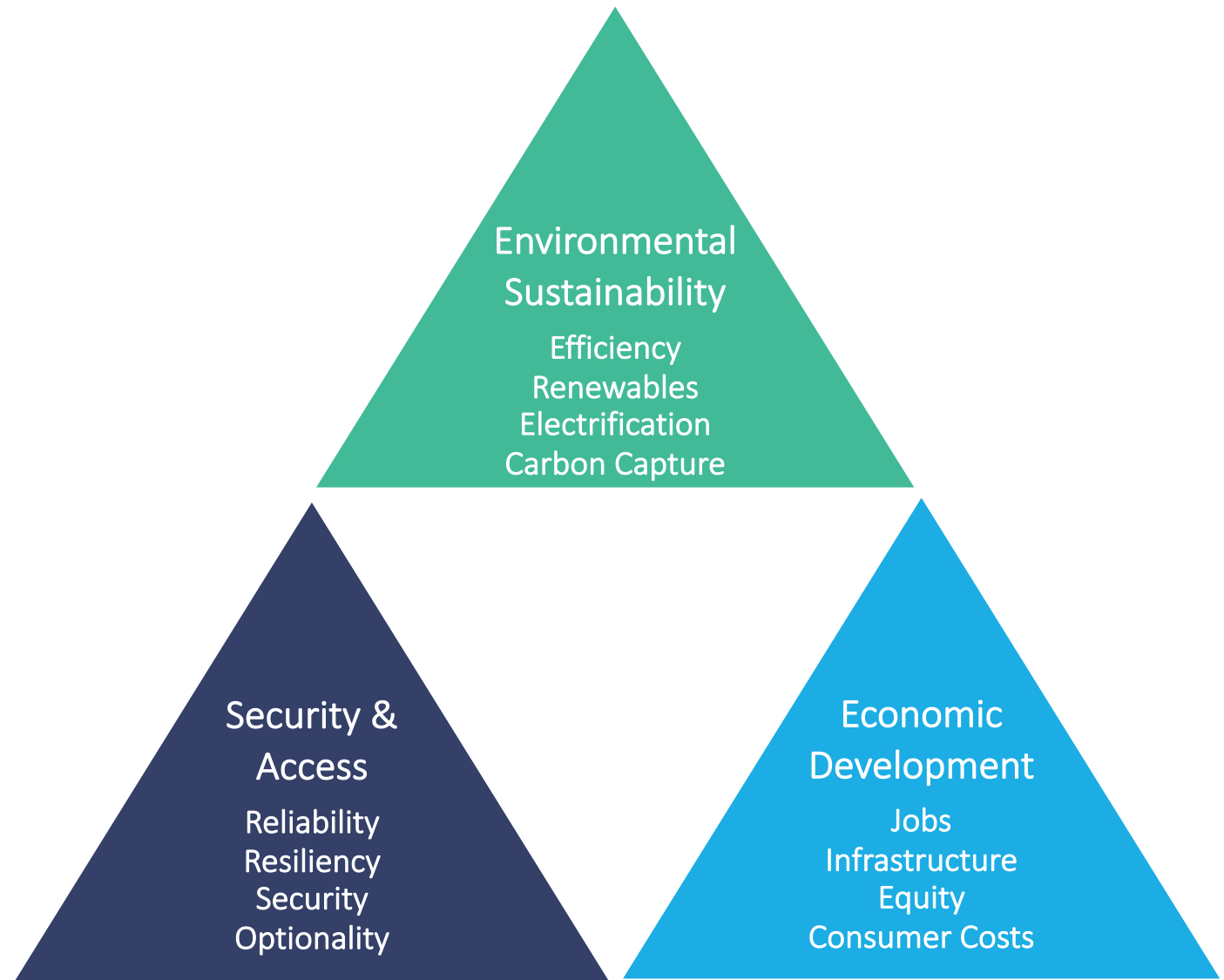


And we need to be honest about the economic benefits and costs

ENERGY TRANSITION

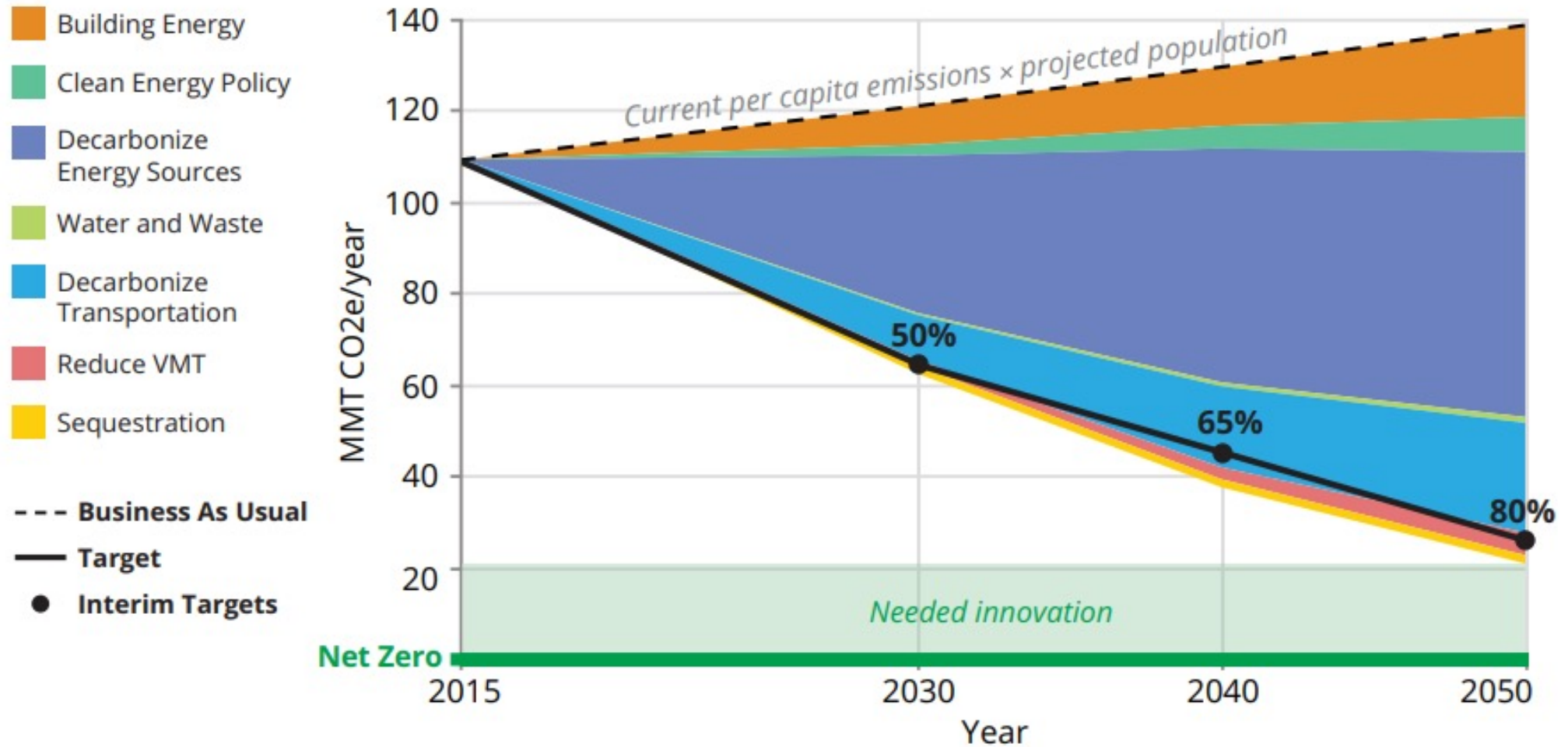
KEY ELEMENTS

- Vision
- Approaches
- Progression



ENERGY TRANSITION

Approaches: Longer term planning accesses a range of options to achieve goals



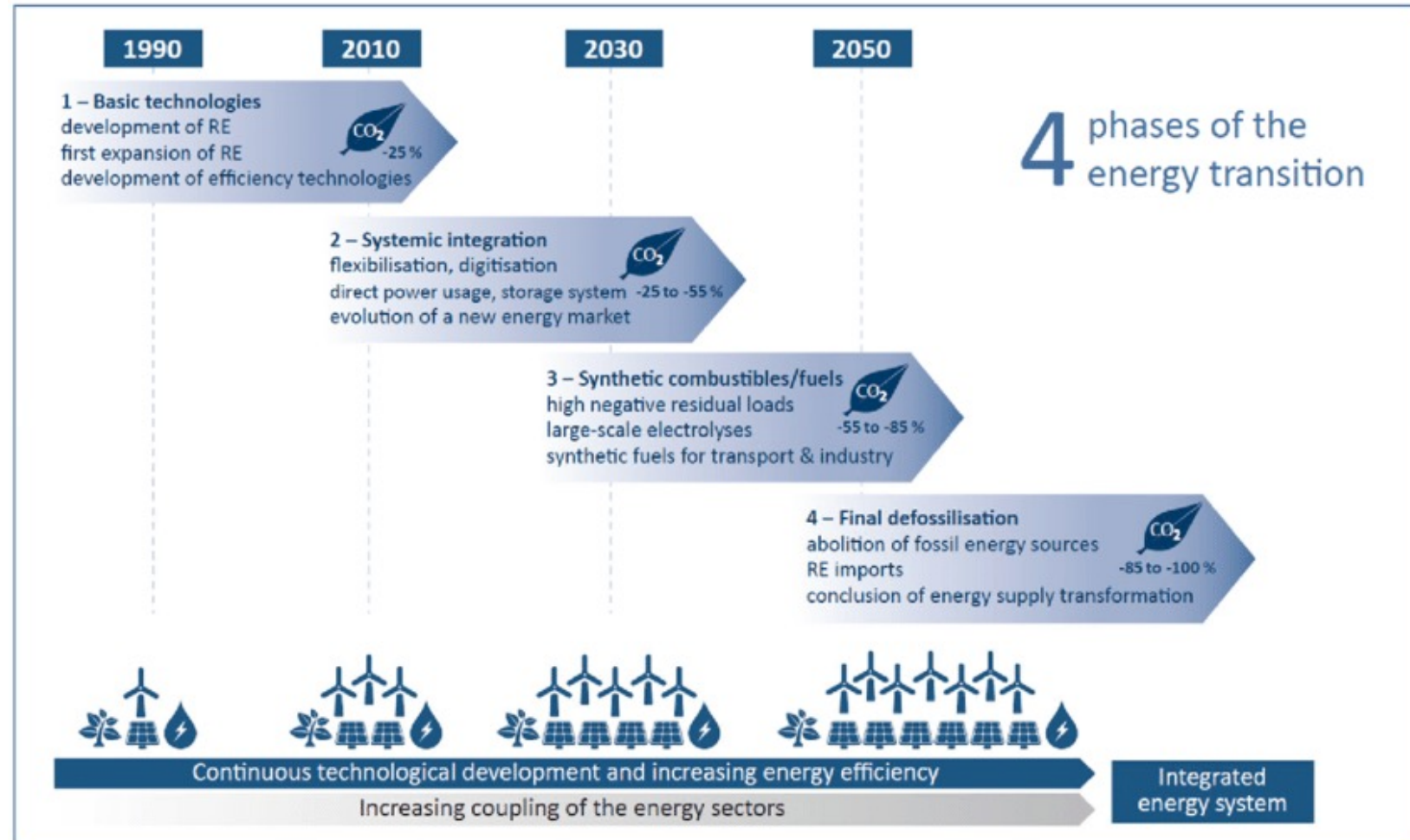
Source: [Climate Action Plan for the Chicago Region](#), Metropolitan Mayors Caucus

Generally, the Transition focuses on deployment through progressive phases

ENERGY TRANSITION

KEY ELEMENTS

- Vision
- Approaches
- Progression

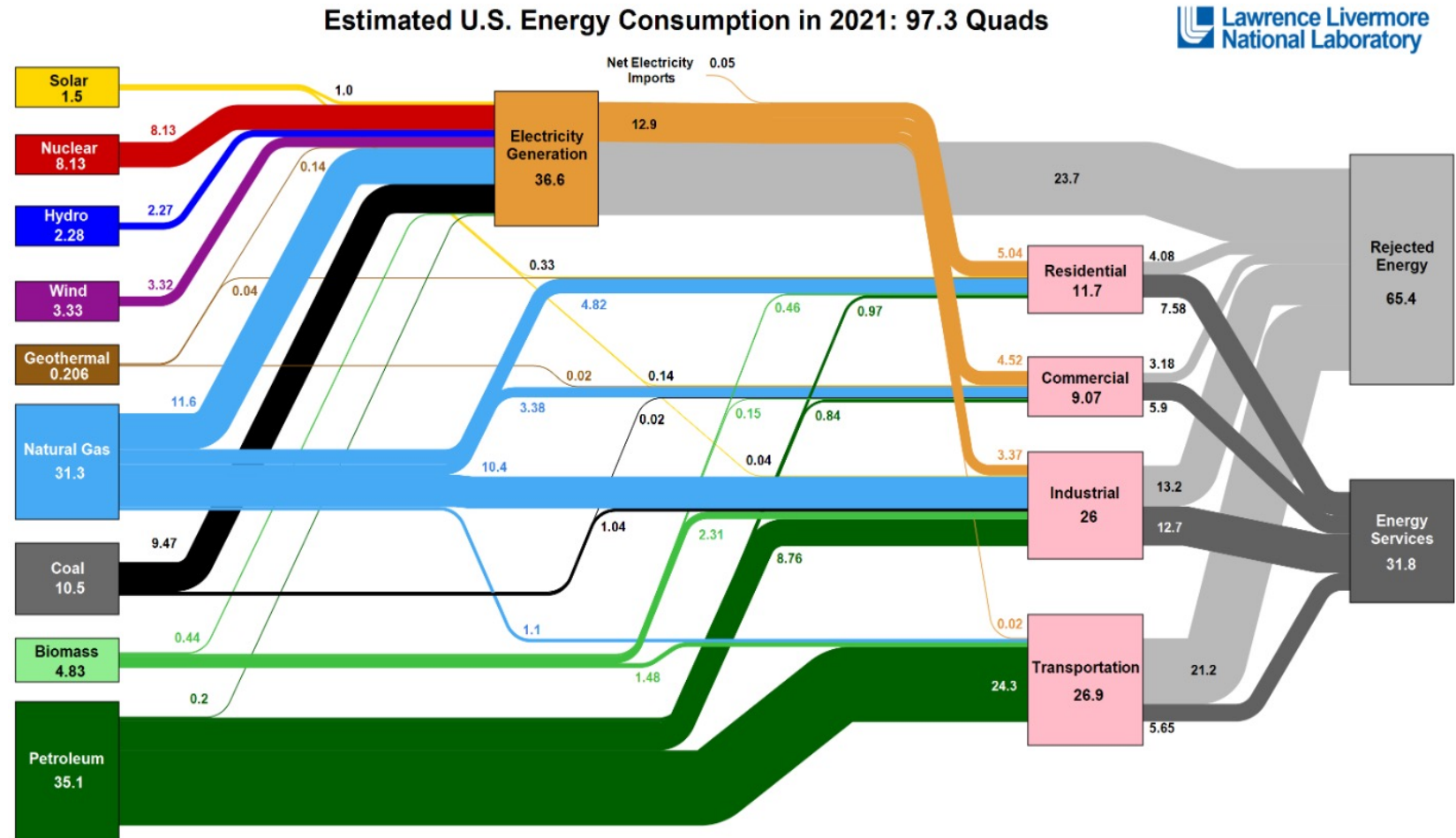


Efficiency focuses on using fewer resources to achieve the same outputs

ENERGY TRANSITION

DECARBONIZATION

- Efficiency
- Generation
- Electrification



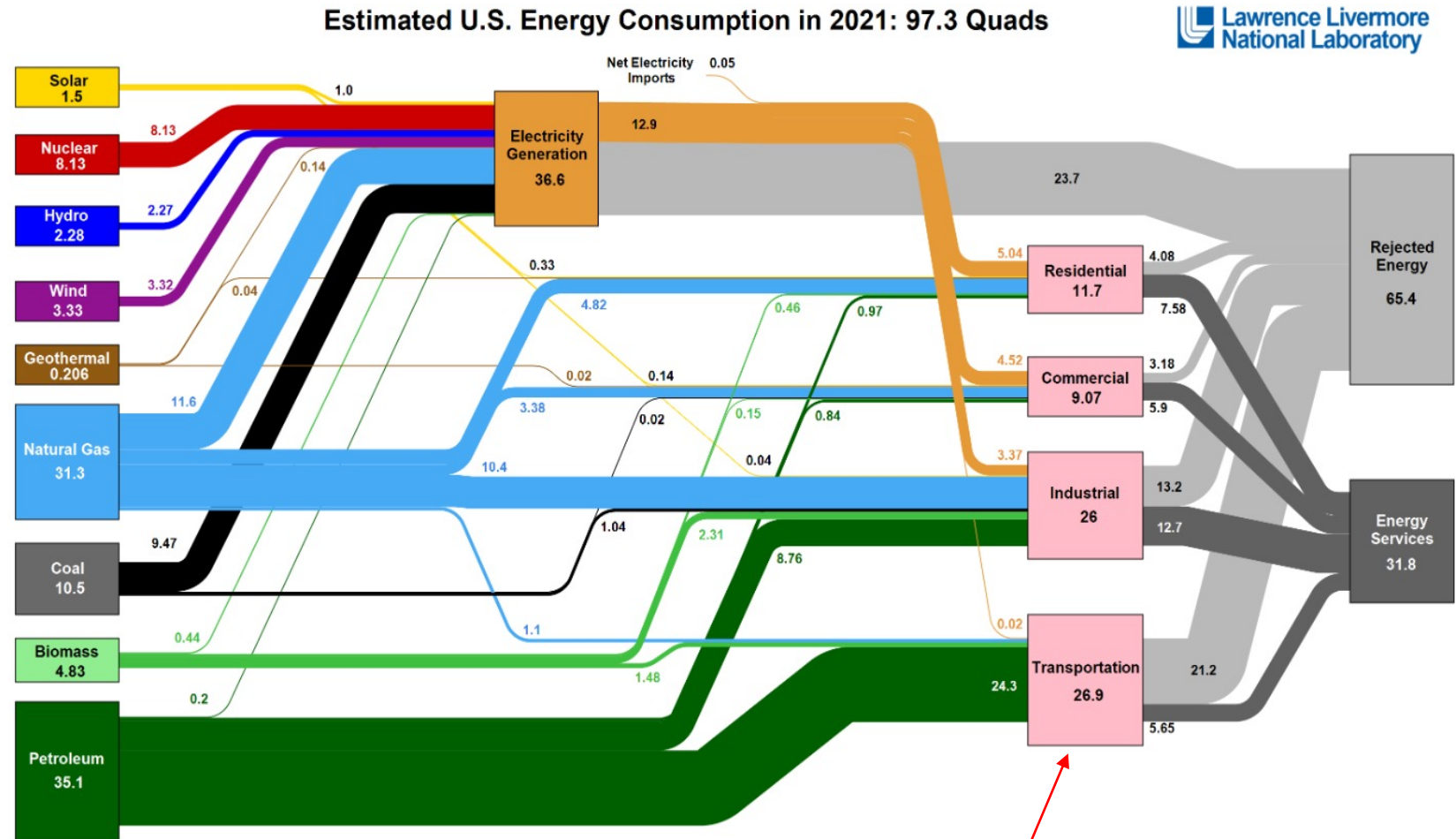
Lawrence Livermore
National Laboratory

Efficiency can focus on reducing end-uses (e.g., efficient lighting, heat pumps, etc.)

ENERGY TRANSITION

DECARBONIZATION

- Efficiency
- Generation
- Electrification



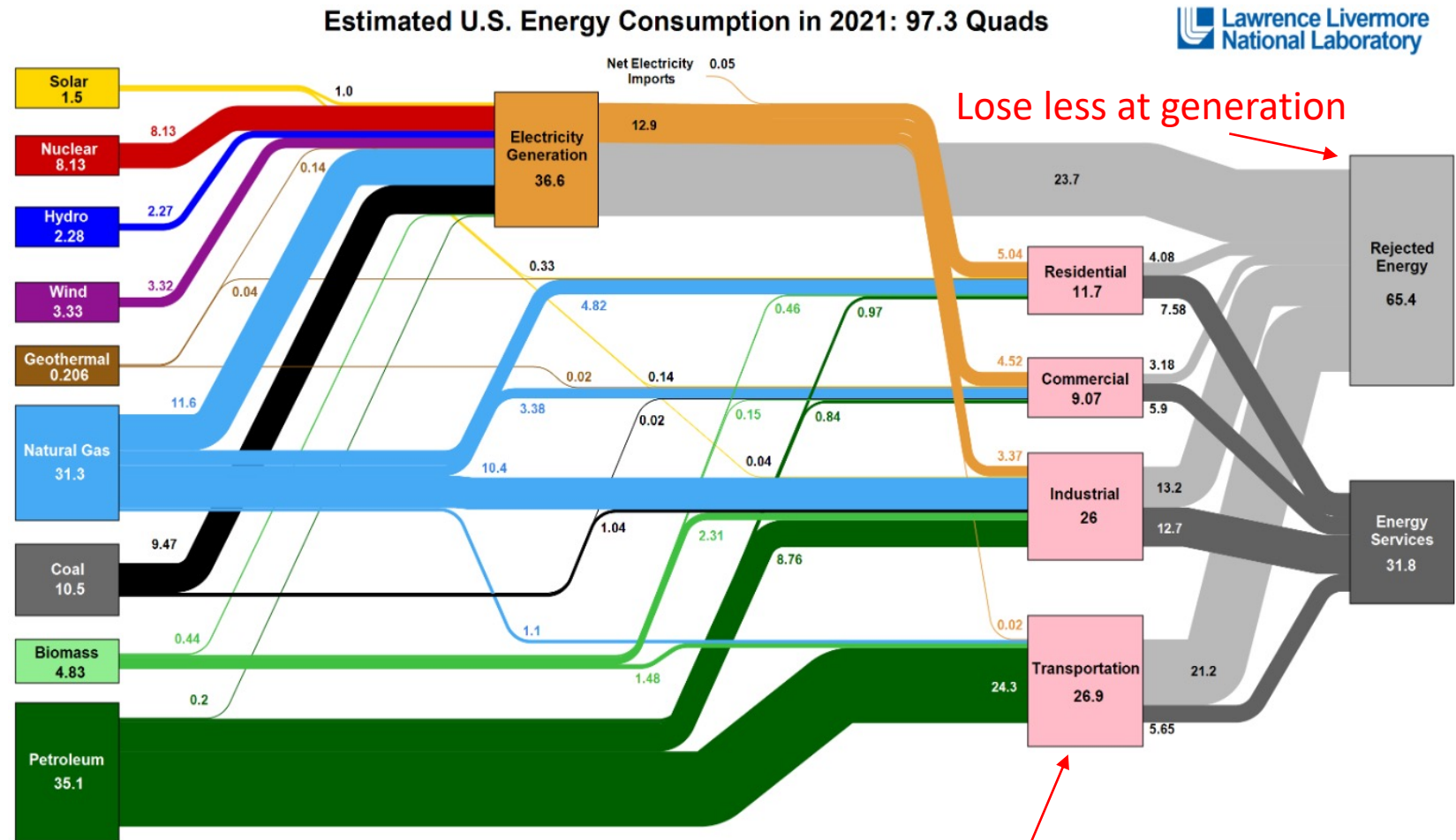
Consume less at task level

But even more efficiency gains are available by reducing Rejected Energy (e.g., less line loss, distributed energy generation, etc.)

ENERGY TRANSITION

DECARBONIZATION

- Efficiency
- Generation
- Electrification



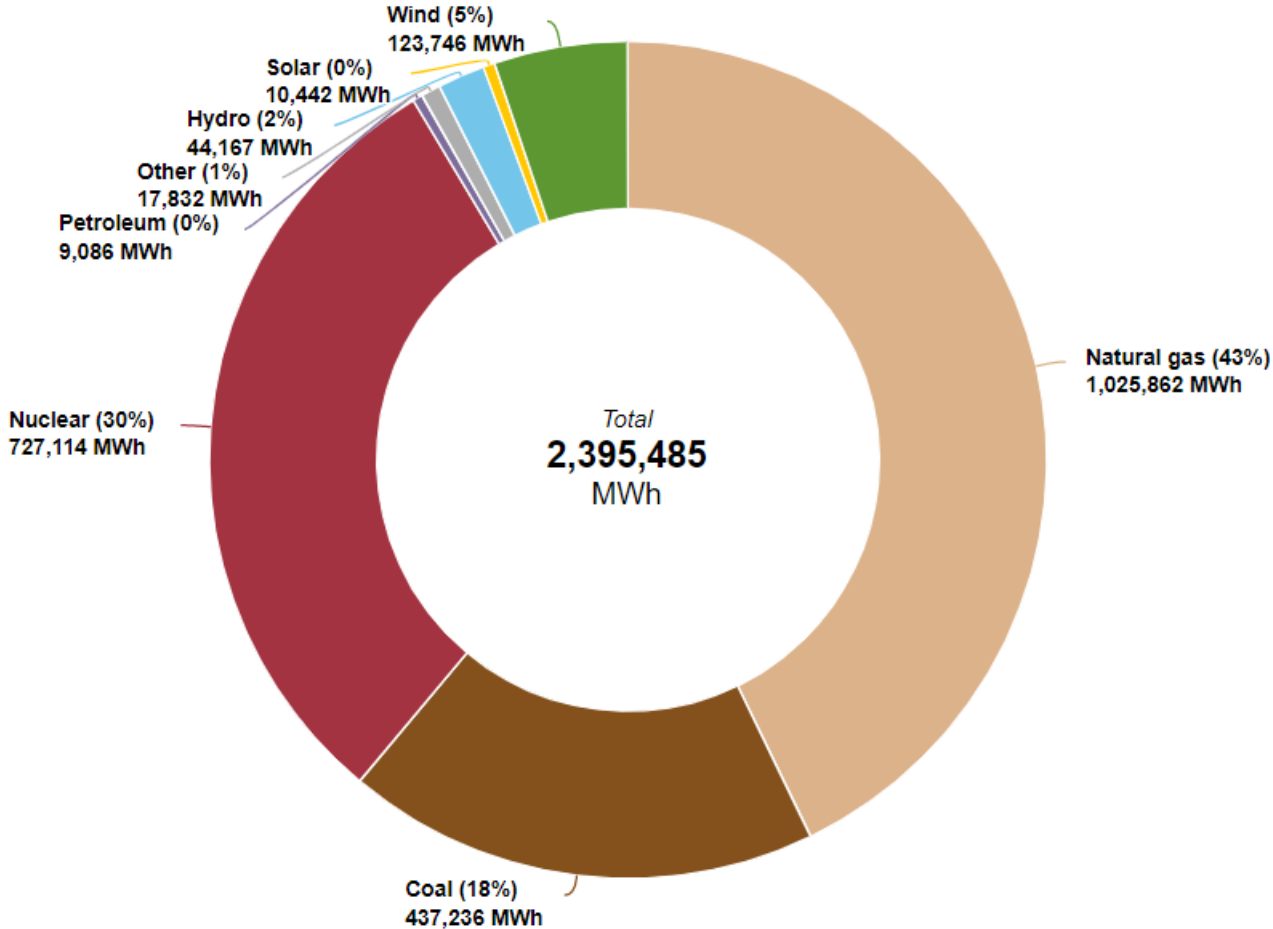
Lose less at generation

Consume less at task level

ENERGY TRANSITION

DECARBONIZATION

- Efficiency
- **Generation**
- Electrification



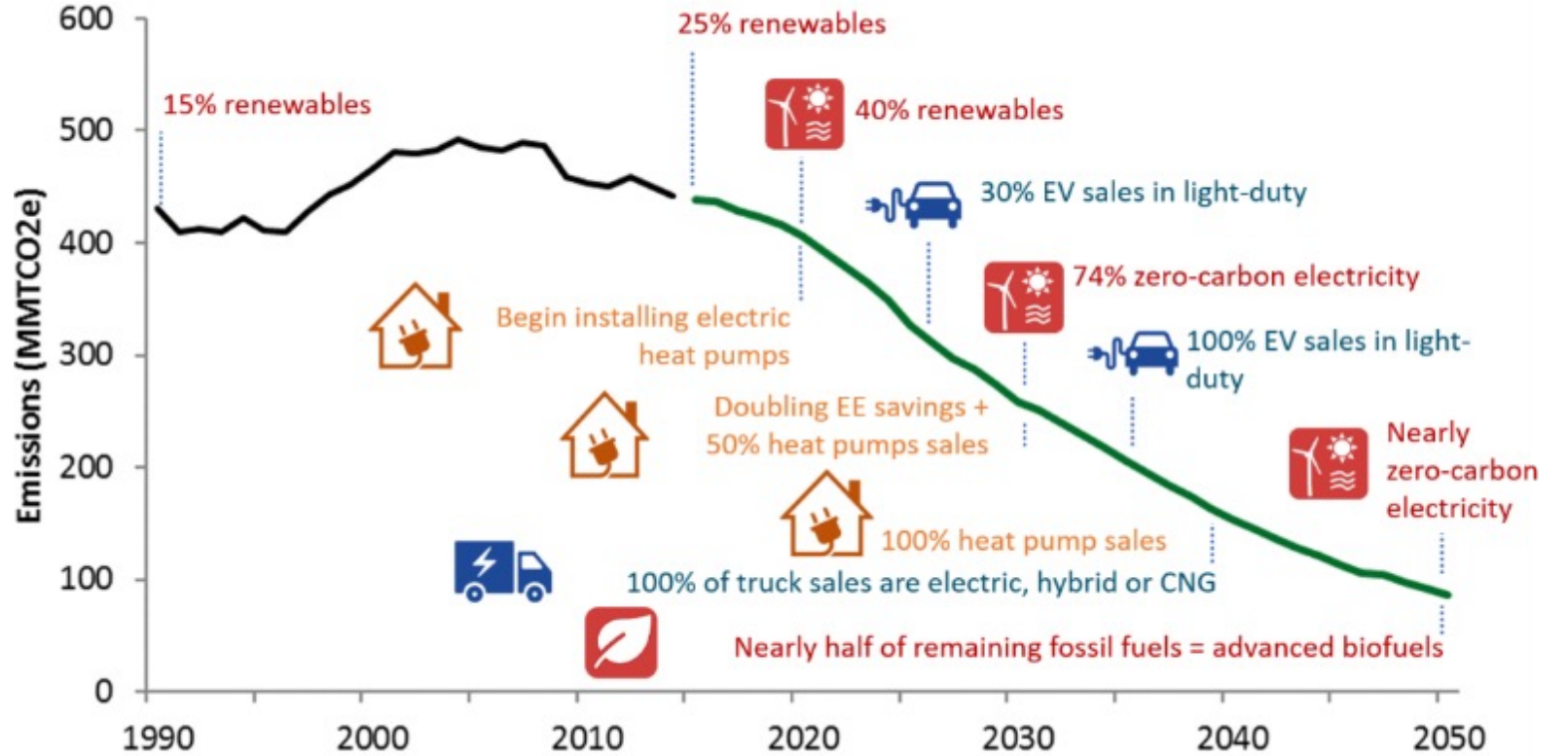
Source: [Energy Information Administration, PJM](#)

Milestones in decarbonizing California's economy

ENERGY TRANSITION

DECARBONIZATION

- Efficiency
- Generation
- Electrification

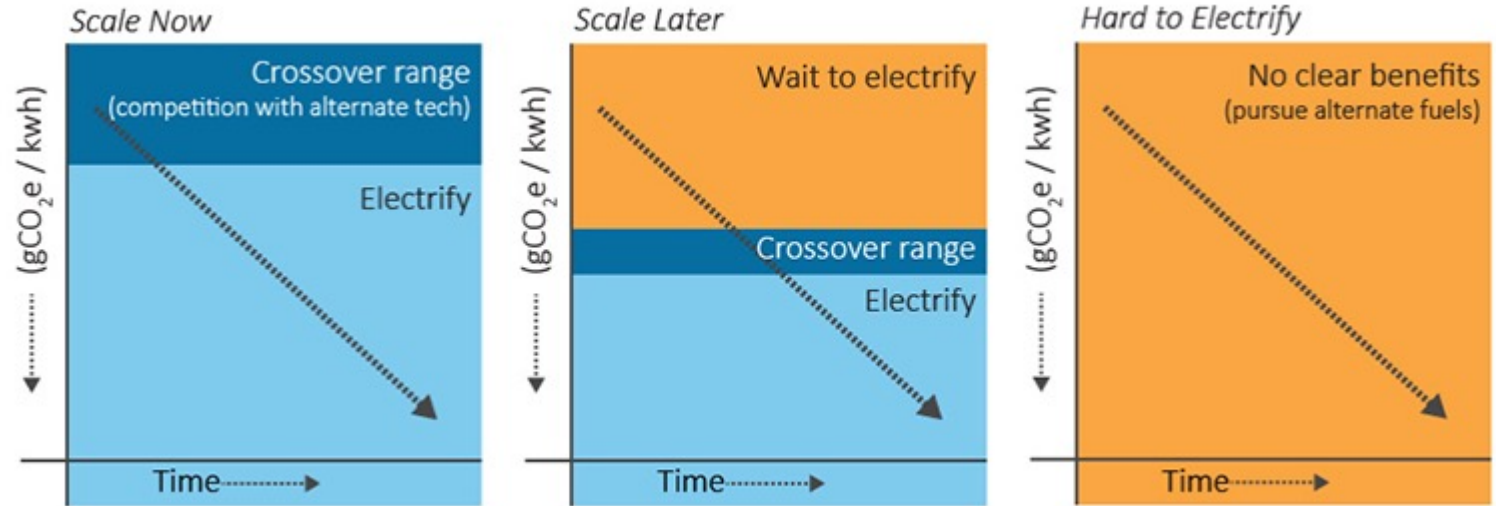


Maybe we can “Electrify Everything”, but maybe not all at once

ENERGY TRANSITION

DECARBONIZATION

- Efficiency
- Generation
- Electrification



	Scale Now	Scale Later*	Hard to Electrify*
Transport	Light duty vehicles, buses, two & three-wheelers	Medium-duty trucks (incl. short/ medium-haul freight)	Long-haul applications for freight, marine transport and aviation
Buildings	End-use heat in new construction	End-use heat in older buildings	Some district heat
Industry	Heat pumps for low heat industries, elec-arc furnace, paint curing, 3-d printing	More options for medium heat industries	Some high-heat processes

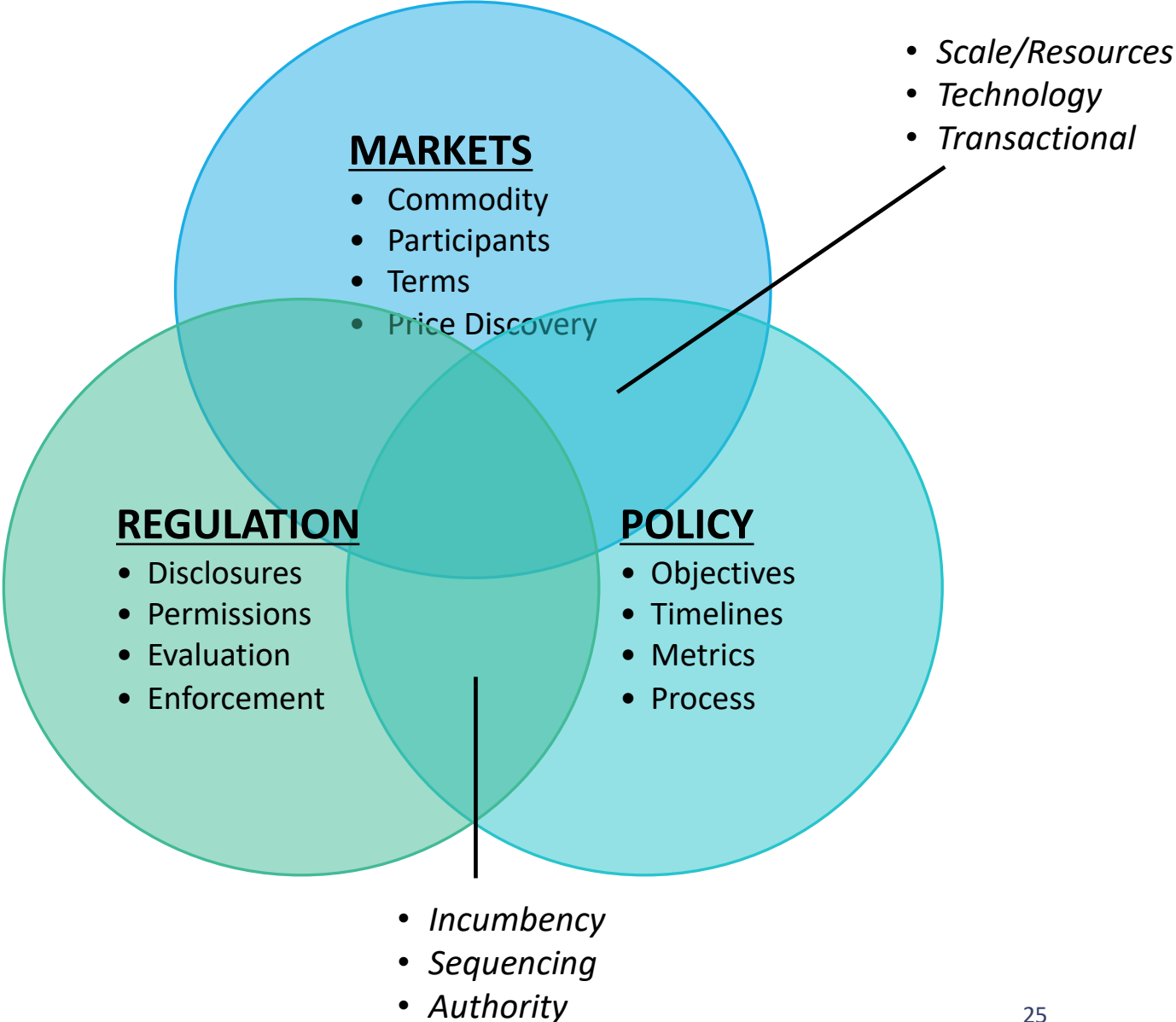
Source: [Climateworks](#)

Friction at the interplay of Policy & Markets, Policy & Regulation are the primary constraints for the Transition

ENERGY TRANSITION

CONSTRAINTS

- Authority
- Incumbents
- Sequencing
- Scale/Resources
- Technology
- Transactional

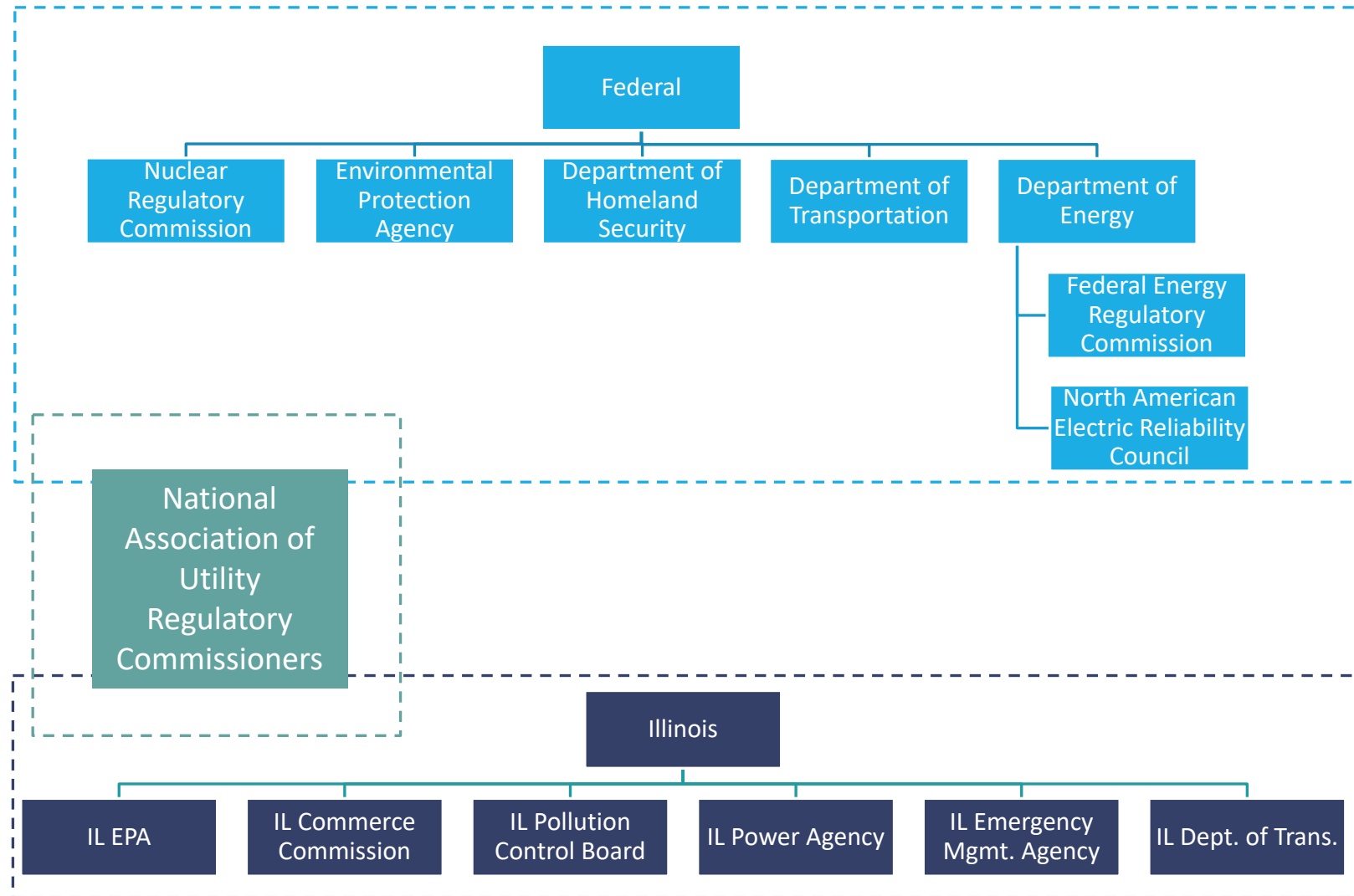


Authority on energy issues is split between multiple federal and state entities

ENERGY TRANSITION

CONSTRAINTS

- Authority
- Incumbents
- Sequencing
- Scale/Resources
- Technology
- Transactional



Any transition is going to have to work with and through incumbent parties

ENERGY TRANSITION

CONSTRAINTS

- Authority
- **Incumbents**
- Sequencing
- Scale/Resources
- Technology
- Transactional

PRODUCERS	INTERMEDIARIES	CONSUMERS
<p>Primary Parties</p> <ul style="list-style-type: none">▪ Extractors and Refiners (oil/gas/coal)▪ Independent Power Producers <p>Secondary Parties</p> <ul style="list-style-type: none">▪ Transporters▪ Employees▪ Unions	<p>Utilities and Infrastructure</p> <ul style="list-style-type: none">▪ Electricity▪ Natural gas▪ Water	<p>Classes</p> <ul style="list-style-type: none">▪ Industrial▪ Commercial▪ Residential <p>Interest Groups</p> <ul style="list-style-type: none">▪ Environmental▪ Industry

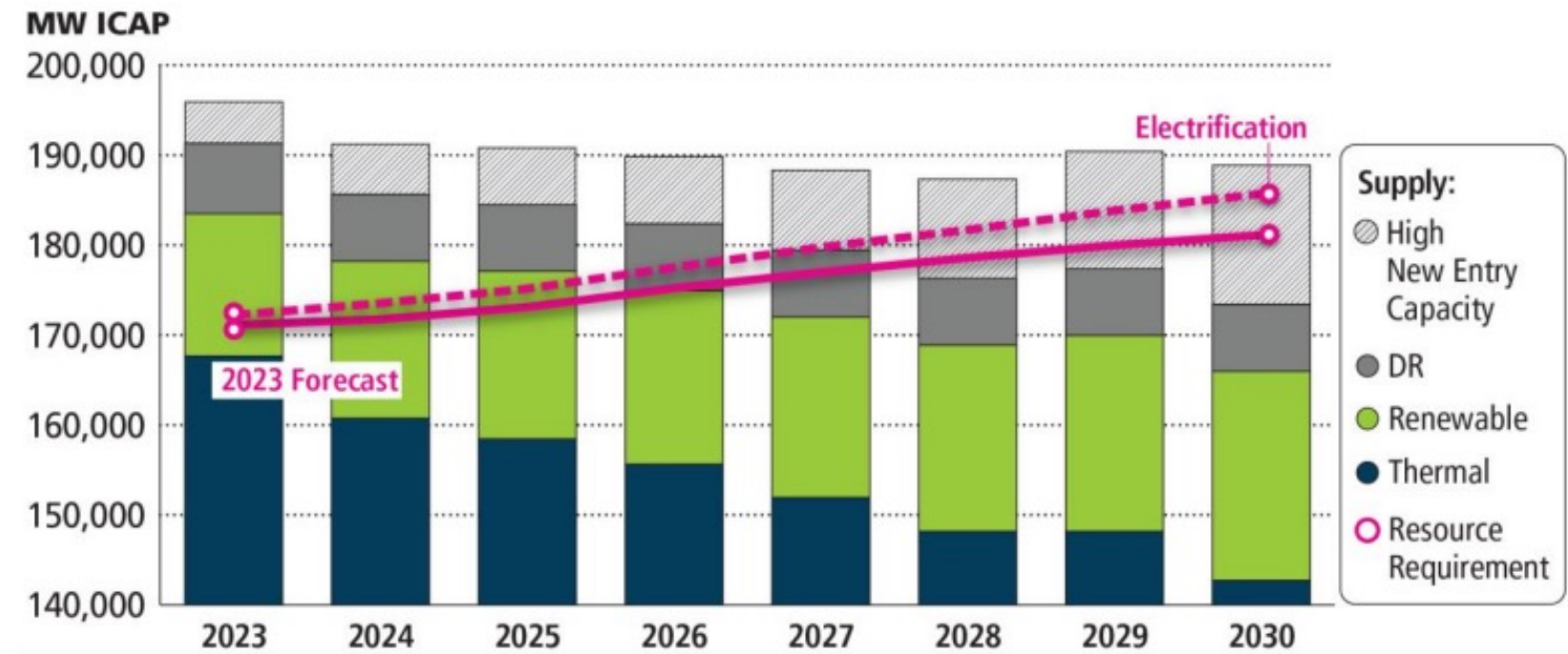
ENERGY TRANSITION

CONSTRAINTS

- Authority
- Incumbents
- **Sequencing**
- Scale/Resources
- Technology
- Transactional

To ensure reliability new clean energy supply must come online at the highest rate of deployment

Figure 7. The Balance Sheet



Illinois renewable policy sets a 40% goal by 2030-31...resource and scale constraints indicate a much lower achievable goal of 8%

ENERGY TRANSITION

CONSTRAINTS

- Authority
- Incumbents
- Sequencing
- Scale/Resources
- Technology
- Transactional

Table 3-5: Statewide Overall Goal REC Gap^{144, 145}

Delivery Year	2010 LTPPAs	Legacy DG	2017-2019 Forward Procurements	2019-2021 Adjustable Block and Illinois Solar for All Programs	ABP Reopening	May 2022 Forward Procurements	Total	Overall RPS Target	Goal REC Gap
2020-21	1,861,725	3,273	730,000	710,880	-	-	3,305,878	21,149,182	17,843,305
2021-22	1,861,725	21,732	2,983,671	1,093,239	-	-	5,960,367	22,785,453	16,825,086
2022-23	1,861,725	5,613	4,571,149	1,177,058	270,933	-	7,886,477	24,661,977	16,775,500
2023-24	1,861,725	-	4,571,149	1,314,907	644,285	-	8,392,066	26,530,401	18,138,335
2024-25	1,861,725	-	4,571,149	1,308,770	641,064	-	8,382,707	28,243,094	19,860,387
2025-26	1,861,725	-	4,571,149	1,302,669	637,858	1,416,584	9,789,985	29,941,929	20,151,943
2026-27	1,861,725	-	4,571,149	1,296,589	634,669	1,411,801	9,775,932	33,570,903	23,794,971
2027-28	1,861,725	-	4,571,149	1,289,945	631,496	1,407,042	9,761,356	37,276,270	27,514,913
2028-29	1,861,725	-	4,571,149	1,283,842	628,338	1,402,307	9,747,361	41,078,330	31,330,969
2029-30	1,861,725	-	4,571,149	1,277,567	625,196	1,397,595	9,733,232	44,756,858	35,023,626
2030-31	1,861,725	-	4,571,149	1,271,621	622,070	1,392,907	9,719,473	48,533,851	38,814,378

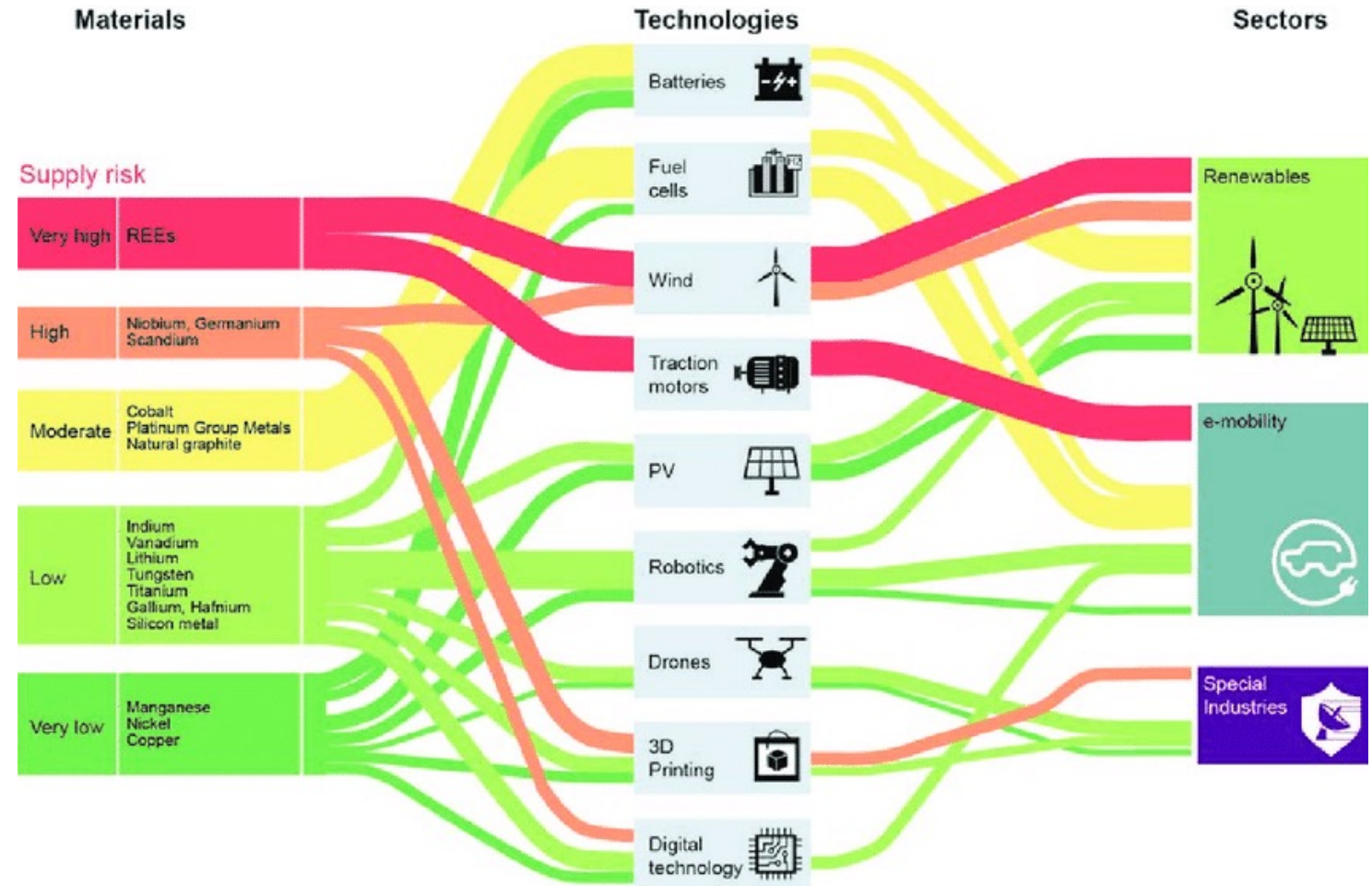
Source: [Long Term Renewable Resources Plan \(2022\)](#), Illinois Power Agency

Technology development and deployments are largely dependent on supply chains and associated risks

ENERGY TRANSITION

CONSTRAINTS

- Authority
- Incumbents
- Sequencing
- Scale/Resources
- **Technology**
- Transactional



Source: [The Nordic supply potential of critical metals and minerals for a Green Energy Transition](#)

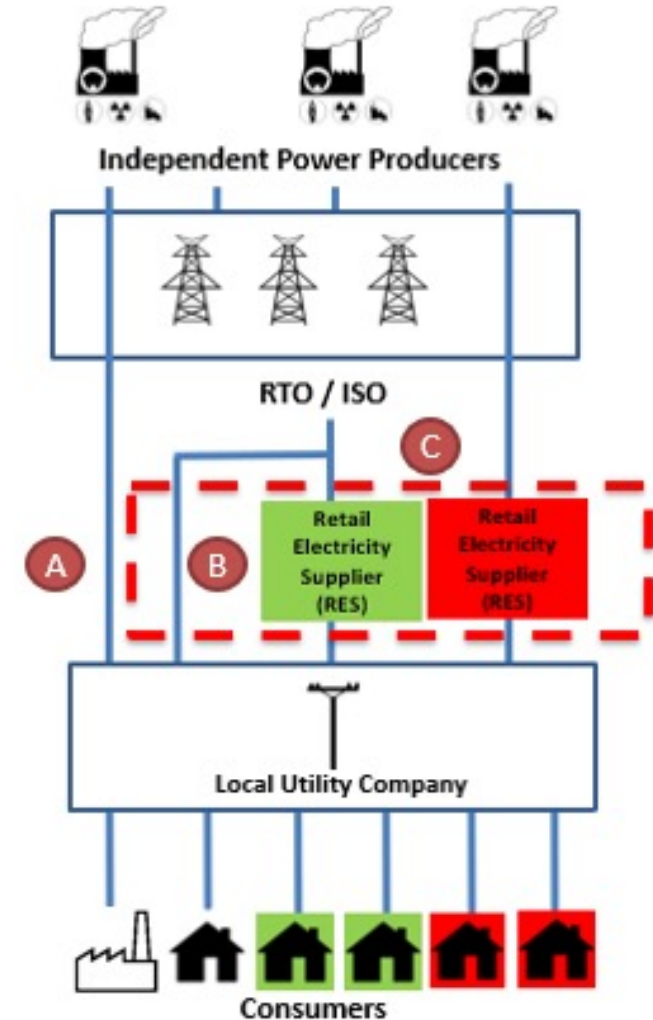
Every ComEd customer has the right to choose their own supplier – so local policies cannot control the type of supply that residents receive

ENERGY TRANSITION

CONSTRAINTS

- Authority
- Incumbents
- Sequencing
- Scale/Resources
- Technology
- Transactional

- A** Industrial consumers could contract directly with an IPP and arrange for delivery through the regional transmission system and local utility
- B** Some consumers (residential and small commercial) can still secure electricity supply through the local utility which would source that supply through the RTO/ISO
- C** Any consumer could purchase electricity through a retail electricity supplier which will secure supply through the RTO/ISO or directly with an IPP

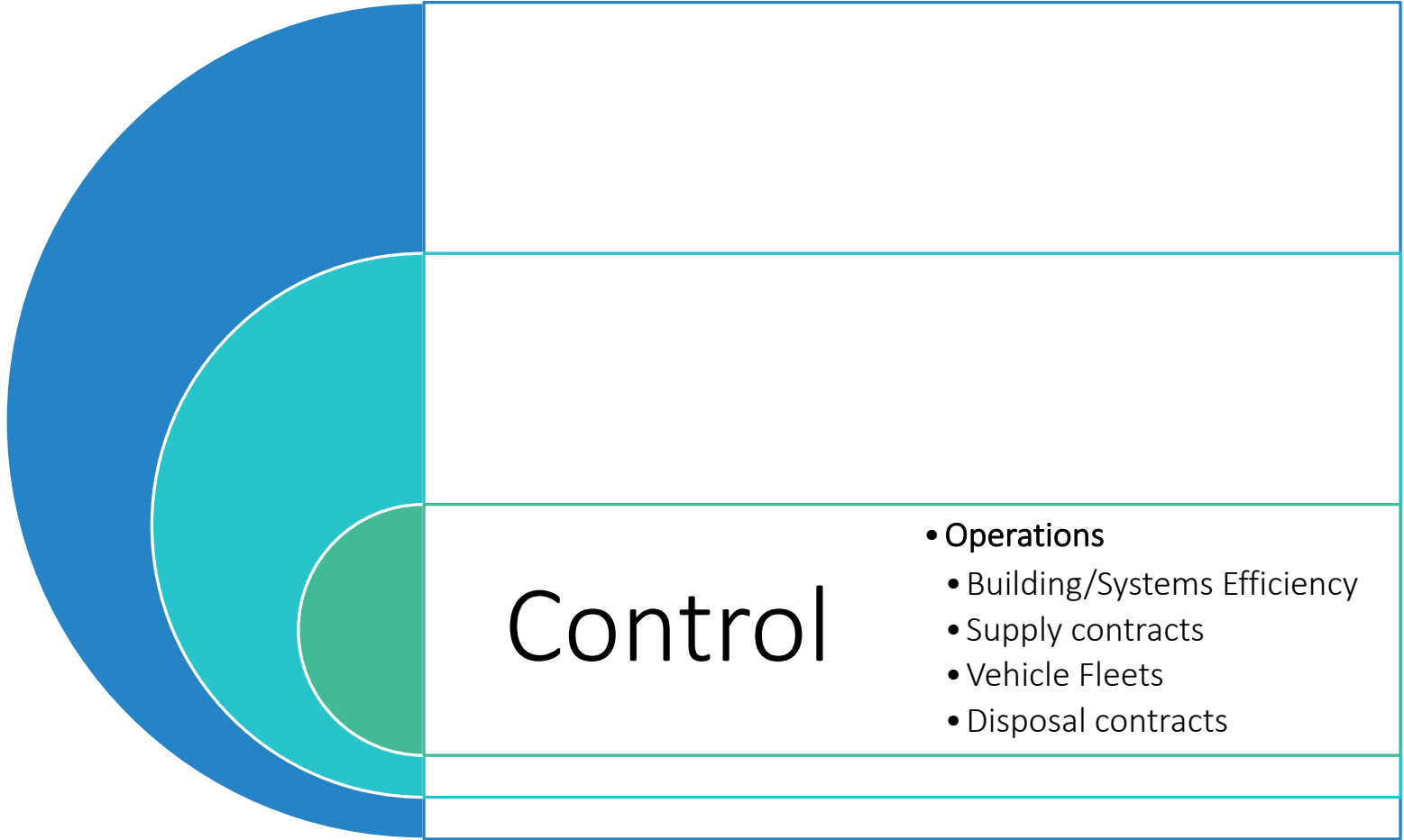


Municipalities can enhance credibility by improving what they directly control (e.g., facilities, equipment, personnel)

ENERGY TRANSITION

ROLE FOR MUNICIPAL GOVERNMENT

- Control
- Sponsor
- Influence

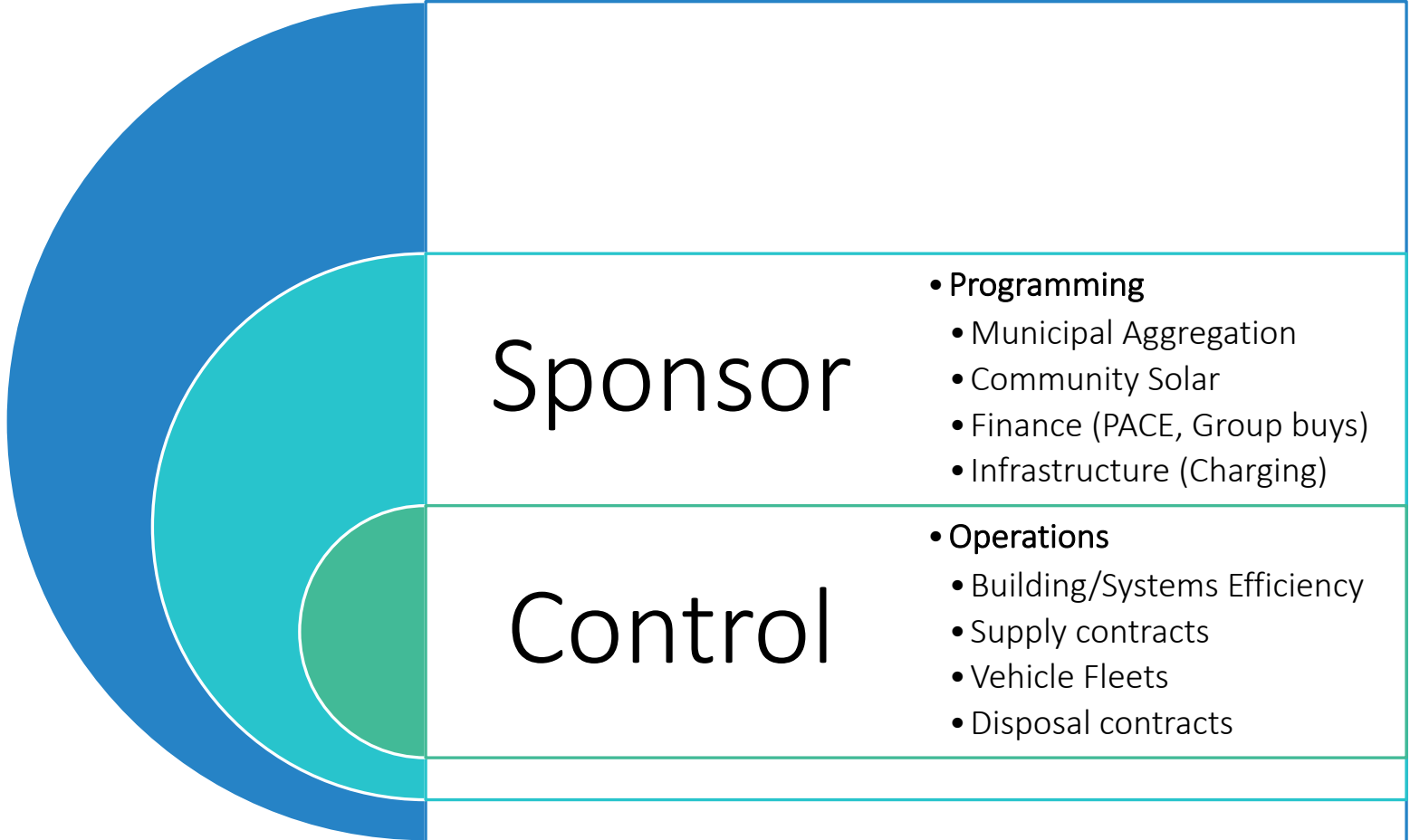


Municipalities can extend their influence by streamlining and simplifying access to more sustainable options for their residents (e.g., programs initiatives, education)

ENERGY TRANSITION

ROLE FOR MUNICIPAL GOVERNMENT

- Control
- Sponsor
- Influence

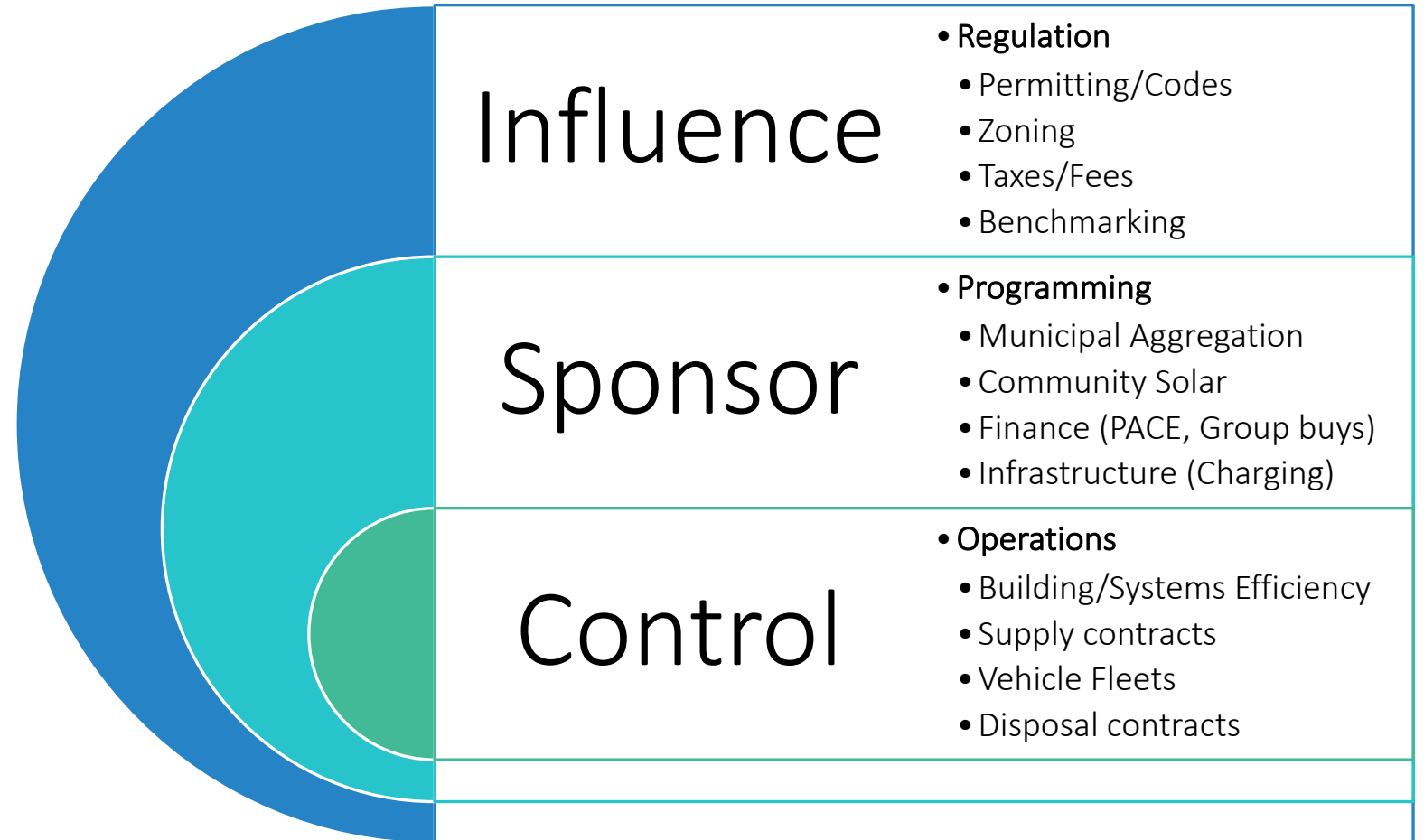


ENERGY TRANSITION

ROLE FOR MUNICIPAL GOVERNMENT

- Control
- Sponsor
- Influence

Municipalities have the authority to regulate certain aspects of development, operations and reporting from private sector entities that can support sustainability policies and programs





DISCUSSION

DISCUSSION AND QUESTIONS

Open to the class

THANK YOU

Mark Pruitt

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