Market Outlook Construction Forum

Summary

as of March 5th, 2021

Presenters

- Richard Vermeulen, Lead-Economist, Vermeulens
- Donna Deckard, Director of Strategic Projects, The Center for Health Design

The State of the Ambulatory System, Center for Health Design, Vermeulens

- the pandemic has resulted in the 10x increase in on-demand healthcare services
- e-visits and telemedicine have drastically expanded in the past year
- protocols taken by healthcare facilities included differing non-essential ambulatory care and consolidating specific clinic locations
- future ambulatory benefits can be derived by re-optimizing the access and efficiency of the facilities

State of Lumber, Vermeulens

- timber costs have been very volatile due to surging demand and supply chain disruptions
- the growth of forests throughout North America allows for significant carbon capture and low-cost construction materials
- the non-residential design will accelerate timber adoption and technologies
- forest reserves are much larger than current demand; Home and Wood prices will spur rapid growth in supply
- the growth of forests can offset liquid fuel transportation emissions, medium-term
- urban canopy can comprise a significant share of forest cover
- wood fuels can comprise a significant share of power generation

Economic Update, Vermeulens

- 10% increase in GDP for Q1 2021
- USD continues to decline while commodities continue to rise
- anticipating rapid inflation soon
- construction employment is still down by 300,000 jobs since last February
- most of the US and Canada is currently in a contracting construction market

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Design & Construction Market Outlook

Donna Deckard– Built Environment Network (BEN)
Richard Vermeulen – Co-CEO
Blair Tennant – Associate Principal

North America's Construction Economist
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Boston New York Toronto San Antonio Denver Los Angeles

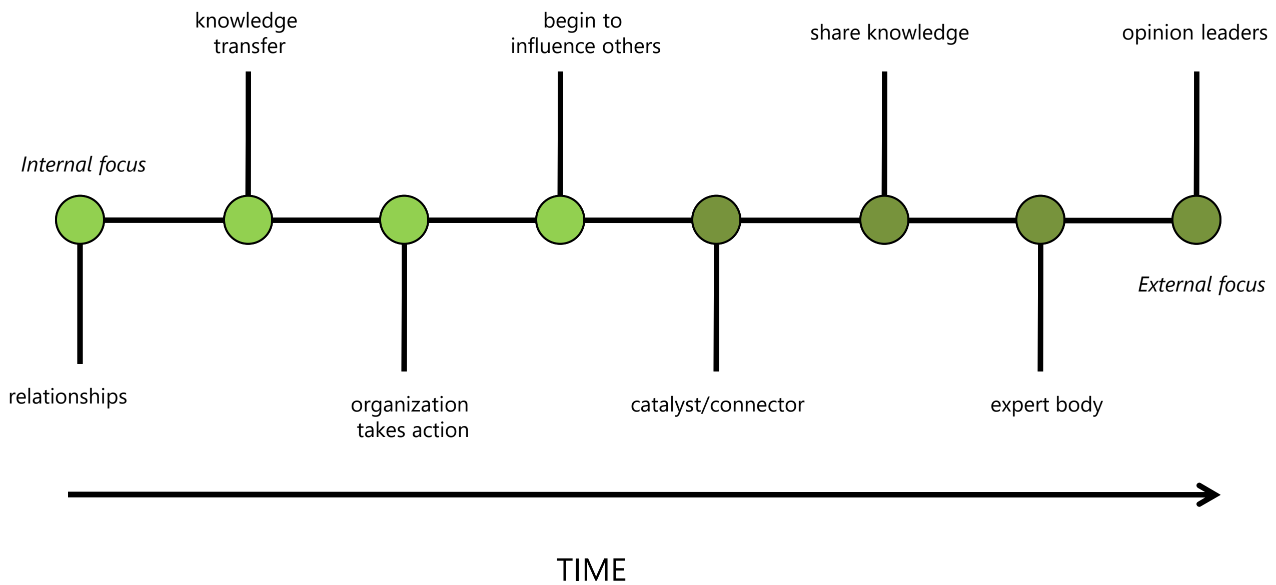
Logistics

- Please keep camera function off
- Interim questions and comments via chat
- Publish Slide Deck & Audio
- Summary Report & Video
- Next session Monthly – February 2nd

The Built Environment Network is…

The Center for Health Design's premier collegial network of executive-level facilities professionals who are dedicated to improving safety, quality, and sustainability in healthcare. Learn and connect with industry leaders by participating in open, strategic discussions that will set a direction for the future of the built environment.

Value Proposition



GROUND RULES
Managed Chaos, Intellectual Ping-Pong
Don't Pile On (No Dog Pile, Snowballing)
Quaker Approach, Listening is Key
Stand Up When Needed
Don't Get Feelings Hurt
Test Where we Are, Reflect as a Group
Be Confidential if Asked

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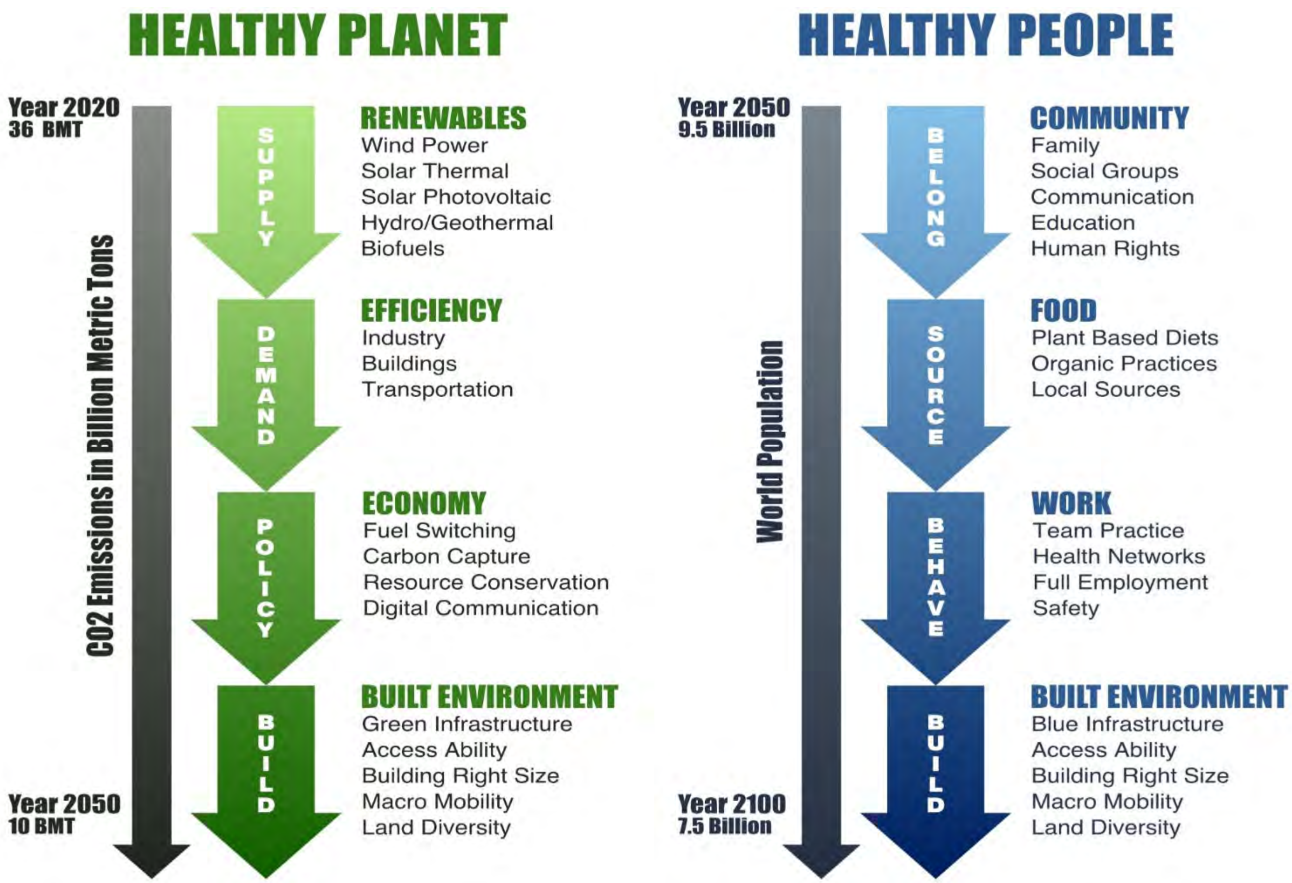
Total Benefit – Health Networks

Health Care comprises 18% of the North American economy
A 50% improvement in the sector is easily achieved through

Health Outcomes
Access
Communication
Diversity
Blue and Green Infrastructure
Education
Mobility



Ambulatory Re-Optimization Plan

Vision – improve response and conserve resources through integrated and distributed models

Mission - consolidate footprint, implement and expand telehealth, identify impact and benefits of virtual care

Outcome - significant benefits for access to care, improved patient experience, staff and provider wellbeing, and reduced operational expenses to the health system

Vision Mission Values

Patient needs at the center of planning efforts
Convenient access sites, stabilize clinics
Optimal patient flow
Comprehensive service, patient as partner
Population health

Consistent clinical experience, ancillary services
Unify educational programs
Standardize metrics, hours of operation
Optimize provider office space
Strategic plan, market strategies

Increase facility utilization
Unify scheduling, services
Consolidate programs to highest and best use
Eliminate redundancy

Telehealth

- Robust portfolio prior-rapid expansion of Vidyo for inpatient consult, ambulatory scheduled visits, patient/visitor and ancillary support teams
- eICU
- E-Visits
- Teleophthalmology
- Telestroke
- UW Health Care Anywhere
- UW Health Care Anywhere Urgent Care
- Vidyo—Rapid Expansion
- TAC Visits for Specialties
- Telemedicine for DOC

10x increase in on-demand service

UWHealth

UW Health FleXX Strategy: Facilities

UWHealth

PHASE 1

Planning

Planning across the entire system of care:

- *Ambulatory*
- *Inpatient*
- *Surgical + Diagnostic*
- *Ancillary Services*
- *Facilities Support Services*
- *Administration*

- Consolidated 179 clinic locations into 59
- Stood up drive through testing center in tent at AOB
- Identify training facilities to retool staff

PHASE 2

Progressive Response Planning

- Modify patient waiting areas for staff use – PPE break, etc.
- Installed prescreening triage at all hospital & clinic entrances
- Universal room planning – fast tracked HVAC changes to support inpatient unit needs: gen med to IMC, IMC to ICU, changed positive air flow to negative (University hospital & TAC)
- Planning to convert TAC to a COVID positive hospital
- Planned conversion of sports medicine gym & indoor field to ACF: 90-100 beds
- Off site ACF: 500 beds
- Set up dorms for employees/ providers to self quarantine to protect family & loved ones
- Evaluate central employee and patient testing facility Dane Co.
- Vestibules for donning & doffing

PHASE 3

Essential Services Planning

- New patient arrival process in clinics
- Expansion of patient testing to all inpatient OR
- Expansion of work from home – 30%
- Plan to sunset Admin. Buildings
- Move HVAC changes to normalize inpatient environments

PHASE XX

Coexisting with COVID-19

- Right size facility portfolio
- Drive through immunization and blood draws
- Build/plan pandemic resilience
- Digital health/telehealth infrastructure
- Waiting rooms/staff respite areas
- Flexibility – critical for business resilience
- Mobility

Distributed Model

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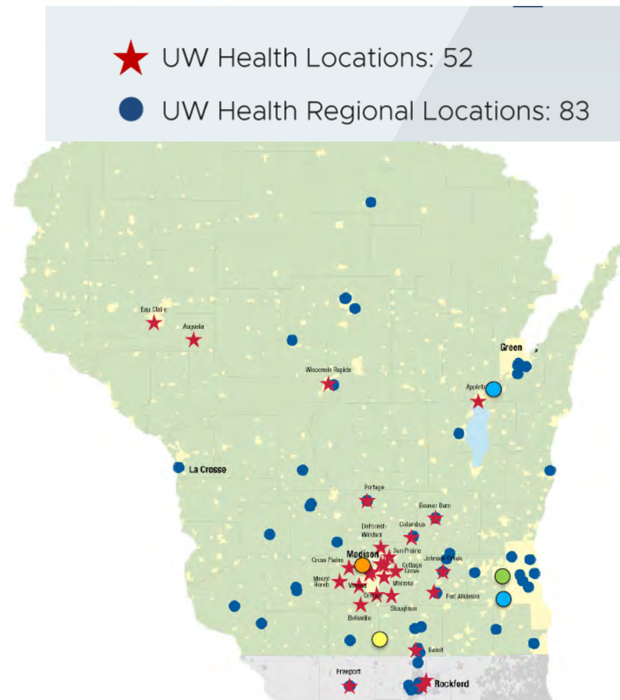
Common Themes from Ambulatory Visioning

1. **Higher Acuity/Quaternary Patients seen at the main hub/hospitals**
2. **Group specialties that are natural partners and share support needs**
3. **Distribution of specialty care clinics based on population, demographics and drive time preferences**
4. **Wide distribution of primary care clinics**



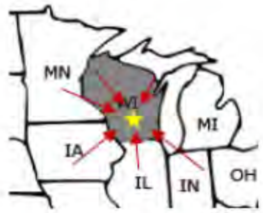
Future State Ambulatory System Level of Care UWHealth

Distinctive Programs

<u>Geographic Reach</u>
- National presence with continued focus on Midwestern states surrounding Wisconsin

<u>Patient Access</u>
- Willing to travel from anywhere in the country for care
- Easy patient access via Dane County Airport and Major Interstates

Single | Dual Hub



<u>Geographic Reach</u>
- Tertiary/Quaternary Care focusing on state of Wisconsin and select major Midwest markets

<u>Patient Access</u>
- Willing to travel beyond 20 miles (30 minutes) for care

Triple Hub

<u>Geographic Reach</u>
- Tertiary/Quaternary Care reach across state of Wisconsin; heavier focus on greater Madison
- Subspecialists at Central Hub and Generalists at Big Box Hubs

<u>Patient Access</u>

Initial Visit to Central Hub
- Willing to travel beyond 20 miles (30 minutes) for care

Multi-specialty Clinic
- Willing to travel 5-15 miles (15-25 minutes) for care

Ability to Provide Telehealth

Distributed "Hubs + Region"

<u>Geographic Reach</u>
- Focus on communities and locatons that are densely populated; considerations for patient origin and places of employment across region

<u>Patient Access</u>

Primary and Urgent Care
- Willing to travel up to 5 miles (up to 15 minutes) for care

Telehealth Access for larger markets outside greater Madison

Future State Ambulatory System Model

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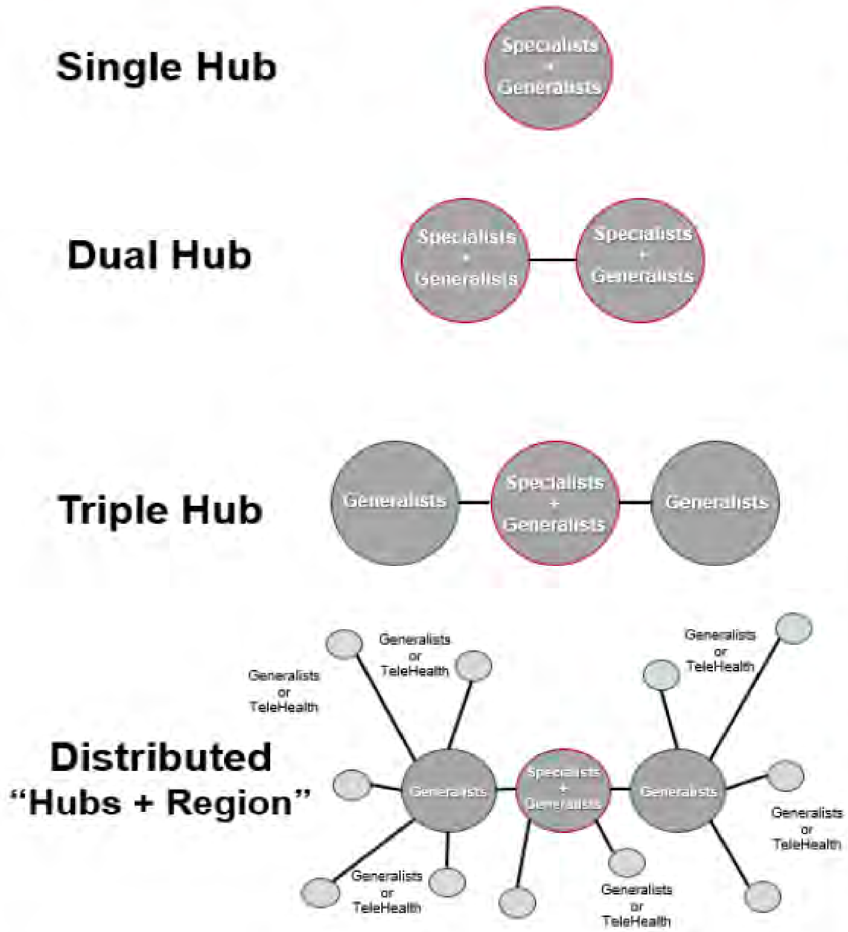


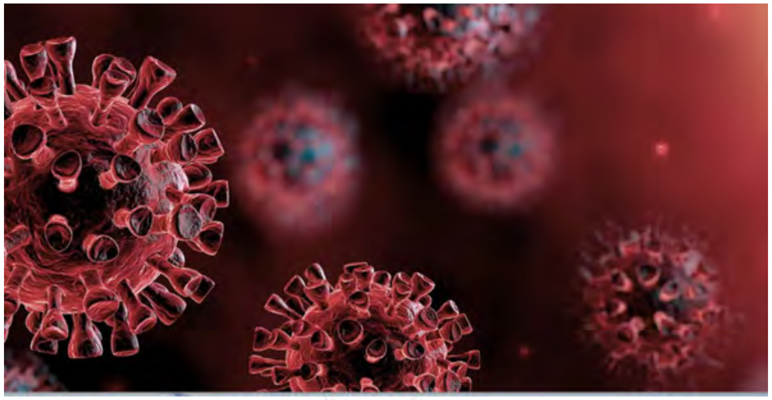
SINGLE HUB
- Multi-D Specialties
- Hematology
- Peds Specialties
- Reproductive Endocrinology
- CT Surgery
- Transplant
- Burn
- Trauma

DUAL HUB
- Neurosurgery
- Geriatrics
- Oncology
- Dialysis

TRIPLE HUB
- Oncology - Infusion
- Ophthalmology
- Cardiology (Higher Acuity)
- Orthopedics
- Behavioral Health (Specialty)
- Dermatology
- OB/GYN
- ENT
- Urology
- Gastroenterology
- Pulmonary
- Neurology
- General Surgery
- Allergy
- Rheumatology
- Plastic Surgery
- Endocrinology/Diabetes
- Vascular
- Internal Medicine

DISTRIBUTED
- Family Medicine
- Internal Medicine
- General Pediatrics
- Behavioral Health (Collaborative Care Model)
- Ophthalmology (general)
- Cardiology (Lower Acuity)
- OB/GYN (general)
- PT/OT/Rehab

Pandemic Response



Ambulatory Consolidation Plan

- All non-essential ambulatory care deferred
- Closed Ambulatory Surgery Center, Digestive Health Center Endoscopy procedural suites
- 179 clinic locations consolidated into 59
- Large shift in care model, essential care transitioned to telehealth and limited face to face encounters
- Focus on progressive planning and inpatient surge-conserve staffing resources, supplies, and operations
- Based on cluster of related services, access to and coordination of care
- Accomplished without facility changes

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Total Benefit – Ambulatory (health outcomes excluded)

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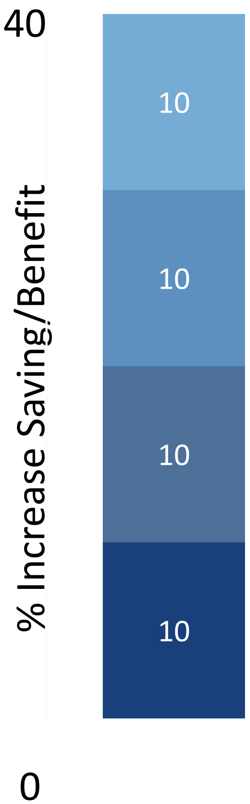

Access

Patient convenience, distributed model
Telehealth
Optimal hours of operation
Market strategy and awareness

Efficiency

Optimal patient flow
Unified provider scheduling and ancillary services
Operating expenses

Wellness

Provider and staff wellbeing
Consistent experience
Patient as partner
Strategic plan for population health and community-based service needs

Space

Align care models and clinical space
Reduce duplication
Minimize redundancy and operational cost
Standardize office space in clinical care

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Administrative Re-Optimization Plan

Vision – improve work environment and conserve resources through hybrid virtual and real spaces

Mission - reorganize and consolidate footprint, implement and facilitate work from home, working analysis of this change

Outcome – model future administrative space for health systems

Master Plan Utilization - Admin

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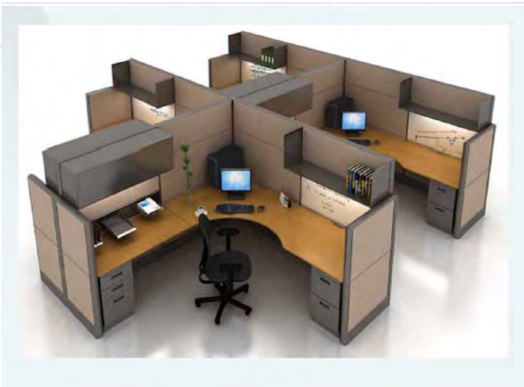
Current State

- 2,272 Administrative FTE's, not including administrative FTE's in the hospitals
- 14 Buildings, assembled over 40 years, in a mix of leased and owned space/buildings
- Inconsistent brand and work-flows
- 605,000 square feet of office space, averaging 266 square feet per FTE
- $6.9M in leases and $4.1M in operating costs, averaging $4,842 per FTE per year
- $4,692 - $5,092 for parking & mileage per FTE per year
- 480 – 720 hours for commuting (to/from/between) per FTE per year



Post Flood / Pandemic Administrative Planning

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- All administrative, non-patient facing, staff sent home

Mobility-Based Workplace

Unassigned "work points" offer flexibility and choice for staff when in the assigned work environment. Often not reservable, but areas/floors could be assigned by department or work group based on synergies and project support. Example: 1212 Deming Way (TTD)

"Hoteling" for visiting staff who can utilize appropriate space as needed to meet the business need, conference room, "haven" or office. Could be reservable or first come first served. Example: open workstations on AOB Fourth Floor or UH H4/8.

Work-From-Home has been utilized by UW Health staff and is supported by UW Health protocols for staff that have been approved to work from home. There have been many lessons learned in recent months from the large number of administrative staff who adopted this work strategy.

Traditional Workplace

Predominate in our administrative space, with offices and work stations (cubes) assigned to specific staff, and areas assigned to specific departments. Some areas also include "assigned" conference spaces, work rooms, breakrooms. Office and cube size reflective of function or status of position.

Listen Learn Unify

Bucket 1: Work Remote/Work from Home (Remote 100% of the time)

Training might be the only exception

Bucket 2: Static (Work in office 100% of the time)

On campus/in a workspace 100% of the time

Bucket 3: Mobile A (split between Work Remote and Static)

Need a workpoint 2 -3 times/week at a specific admin. building within their department's assigned space

Bucket 4: Mobile B (split between Work Remote and Static)

Need a workpoint 1 – 4 times/month at a specific admin. building within their department's assigned space

Bucket 5: Hoteling (split between Work Remote and Static)

Need a workpoint but can use any workpoint at any location at various times/day/month/year

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Consolidation

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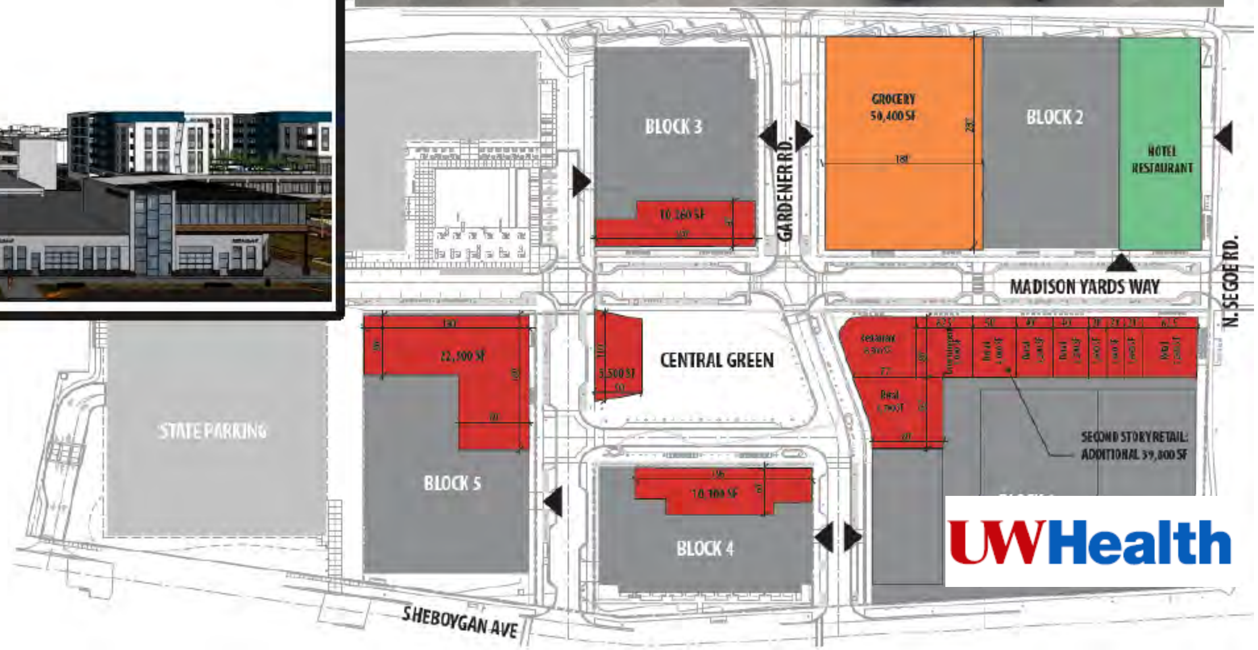
	Current Space 603,435 SF	Reduced Rent Expense ($)	Current Rent Cost $6,929,466
Phase 1			
Move FTE from 2870 University Ave, terminate lease	(2,942)	(52,221)	
Move FTE from 2639 University Ave, terminate lease or sublease	(2,321)	(40,197)	
Move FTE from ASB First Floor, sublease TBD	(16,700)		
Move FTE from 595 Science Dr, terminate lease	(4,563)	(67,313)	
Sub Total Phase 1 Reductions	**Less 26,526 SF**	**Less $159,731**	**$6,769,735**
Phase 2			
Move FTE from PSC, terminate lease	(26,672)	(311,514)	
Move remaining FTE from ASB, terminate lease or sublease	(85,246)	(1,323,159)	
Move FTE from 3330 University Ave, sublease	(4,494)	(66,767)	
Sub Total Phase 2 Reductions	**Less 116,412 SF**	**Less $1,701,440**	**$5,068,295**
Phase 3			
Move FTE from 749 University Row, terminate lease	(20,251)	(475,721)	
Consider disposition of AOB	(200,403)	(2,175,905)	
Move FTE from 448 Science Dr, terminate lease	(14,096)	(325,427)	
Subtotal Phase 3 Reductions	**Less 234,750 SF**	**Less $2,977,053**	**$2,091,242**
Total Remaining Space SF and Rent Cost	319,055 SF		$3,725,915

Consolidation



- Live / Work / Learn / Play
- Sense of Place / Space
- Corporate HQ
- Governance
- Brand / Image

Future State

UWHealth

- 2,272 Administrative FTE's
- Add 469 +/- Administrative FTE's from Hospital
- 2,741 Administrative FTE's
- Now in 4 Buildings
- Brand and work-flows remain a concern
- Support for virtual business platforms (ZOOM, WebEx, et al.)
- 319,000 square feet of office space averaging 116 square feet per FTE
    - Reduced by 150 square feet per FTE — 2,741 staff @ $2,600/year = 7M
- Mix of leased and owned space/buildings
- $3.7M in leases and $3.4M in operating costs, averaging $2,590 per FTE
    - Reduced by $2,252 per FTE
- $825 - $1,658 for parking & mileage per FTE per year
    - Reduced by $3,434 - $3,867 per FTE per year — 2,741 staff @ $3,600/year = 10M
- 96 – 192 hours for commuting (to/from/between) per FTE per year
    - Reduced by 384 – 528 hours per FTE per year — 2741staff x 450hours @ $50/hour = 62M

Total Benefit – Administrative Office

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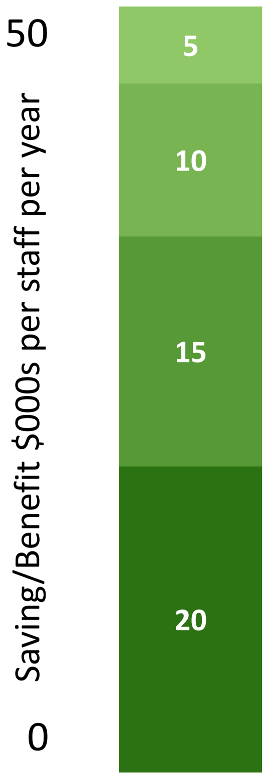

Space/ Access

Reduce from 266 to 116 square foot per staff
Headquarters and office brought together on campus
Parking, grocery, restaurant, retail amenities on campus
Commons building and site

Efficiency

Consolidate from 14 to 4 buildings
Utilization of amenity space
Mileage reduces 5,000 average miles per staff per year
Parking reduce $800 to $1,700 per staff per year

Wellness

Unify brand and workflows
Support virtual business platforms
Learn and play brought on campus
Sense of place and space
Listen to staff before determining workspace

Mobility

Commuting to/from/between work reduces from 480-720 hours per year per staff to 100-200 hour per staff per year

Total Benefit – Mass Timber

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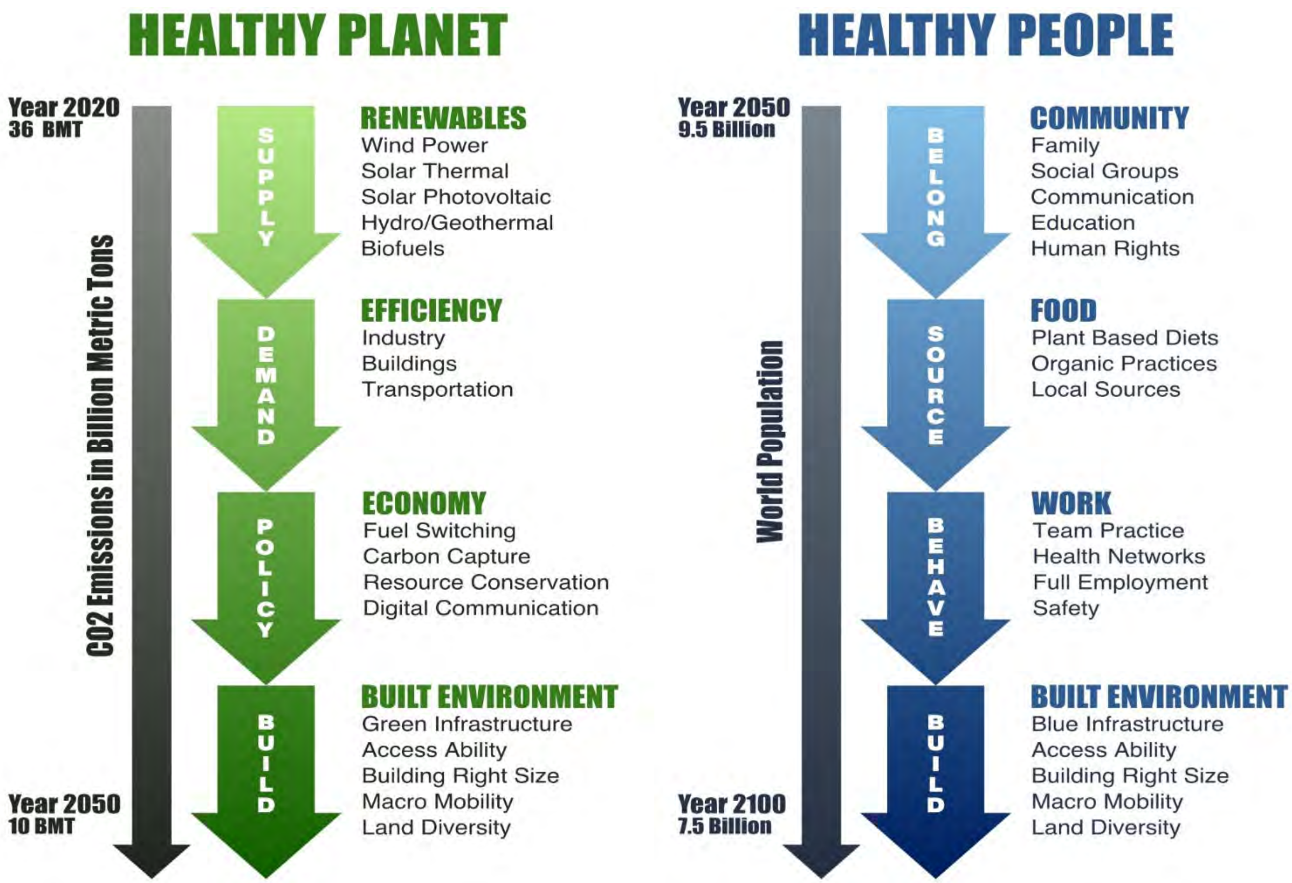

Forest growth can offset liquid fuel transportation emissions medium term

ICI timber/stick construction can grow to equal residential

Urban canopy can comprise a significant share of forest cover

Wood fuels can comprise a significant share of power generation

Mass timber reduces finish cost

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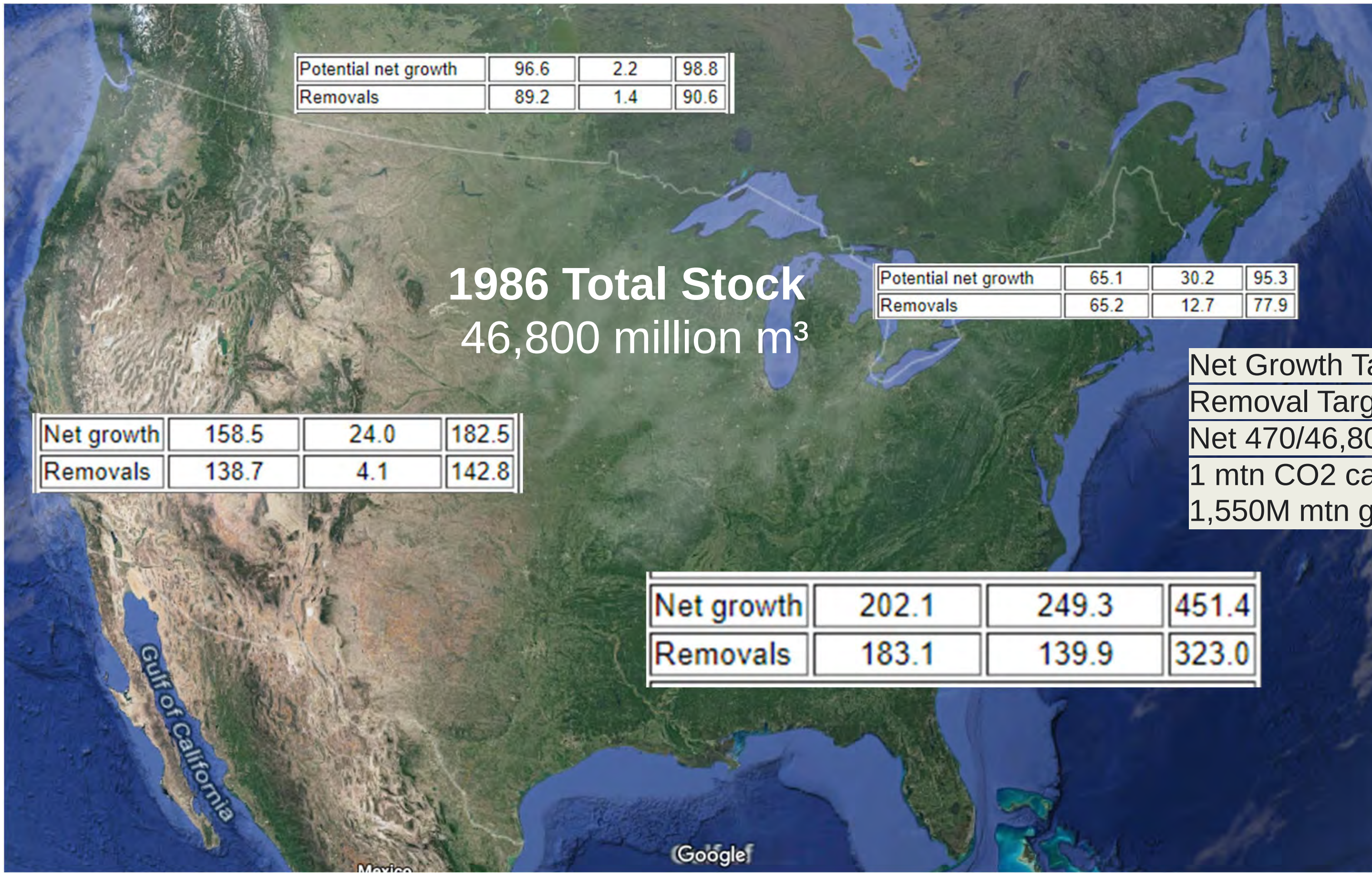

Potential net growth	96.6	2.2	98.8
Removals	89.2	1.4	90.6

Potential net growth	65.1	30.2	95.3
Removals	65.2	12.7	77.9

Net growth	158.5	24.0	182.5
Removals	138.7	4.1	142.8

Net growth	202.1	249.3	451.4
Removals	183.1	139.9	323.0

Net Growth Target 1,470M m3
Removal Target 1,000M m3
Net 470/46,800M m3 = 1% per year
1 mtn CO2 captured per m3 wood
1,550M mtn gas/diesel emissions

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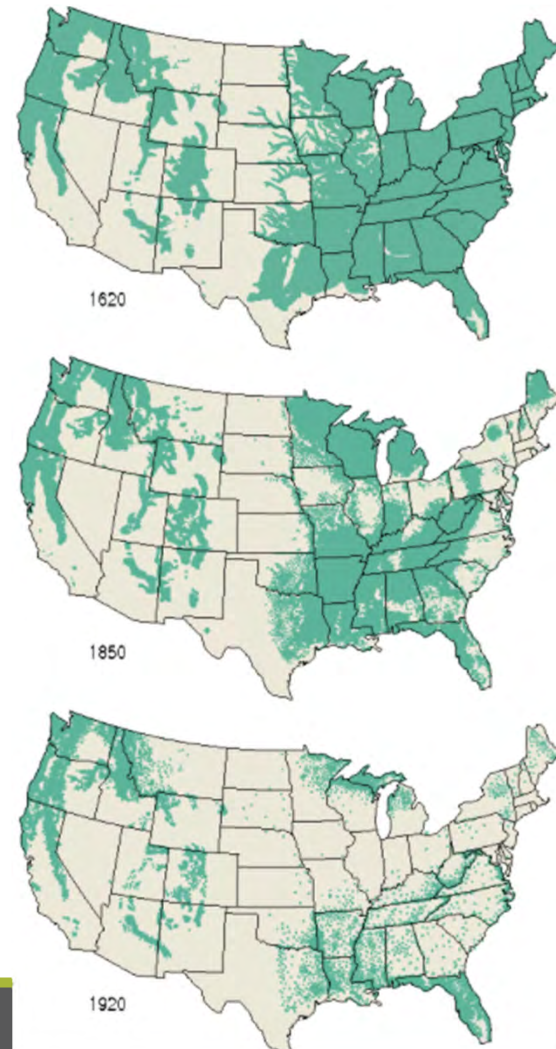
Biofuels
Carbon Capture
Fuel Switching
Conservation
Green Infrastructure
Access Ability
Building Right Size
Land Diversity
Local Sources



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Carbon Capture
Conservation
Land Diversity
Local Sources

- Room to grow
- Affordability
- Aesthetic appeal
- Urban forest canopy
- Uses existing topography
- Increased utilization
- Restores old growth
- Increased area for new growth

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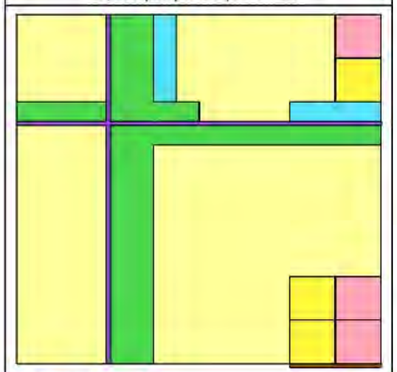
Houston / Atlanta / Ontario

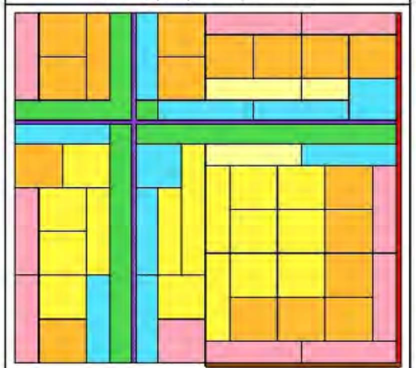
3,200 people / square mile



	Apartment	0%
	Townhouse	5%
	Residence, Detached	69%
	Commercial	5%
	Institutional	3%
	Park	18%
	Parkway	2.50 miles
	Rail Grid	0.00 miles
	Freeway Grid	0.31 miles

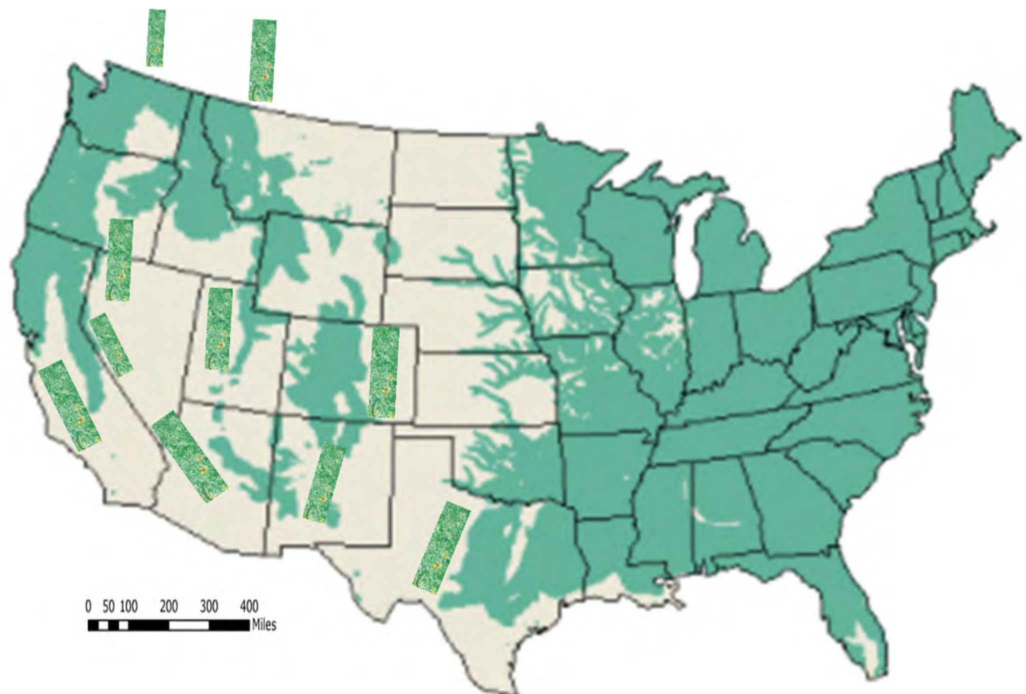
New York City

26,000 people / square mile



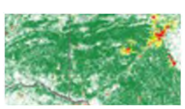
	Apartment	28%
	Townhouse	24%
	Residence, Detached	3%
	Commercial	16%
	Institutional	16%
	Park	13%
	Parkway	1.25 miles
	Rail Grid	2.5 miles
	Freeway Grid	5 miles

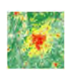
New Urban Canopy



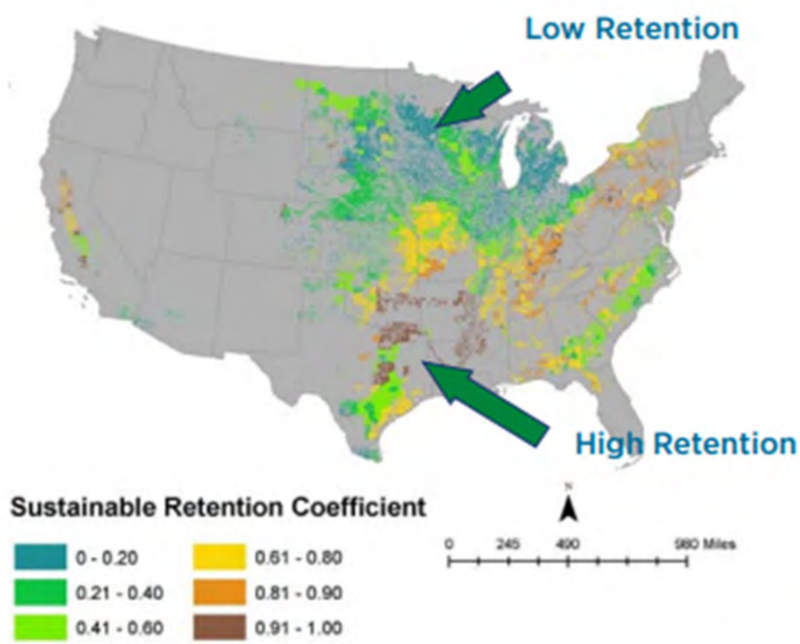
80% Urban Canopy
4k people/mile2

25% Urban Canopy
20k people/mile2

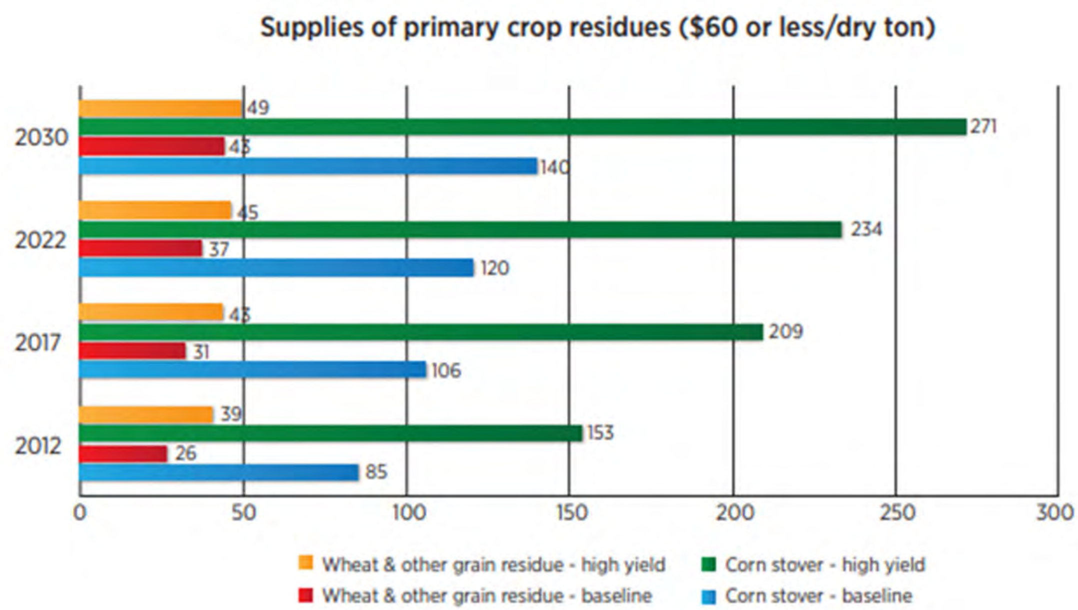


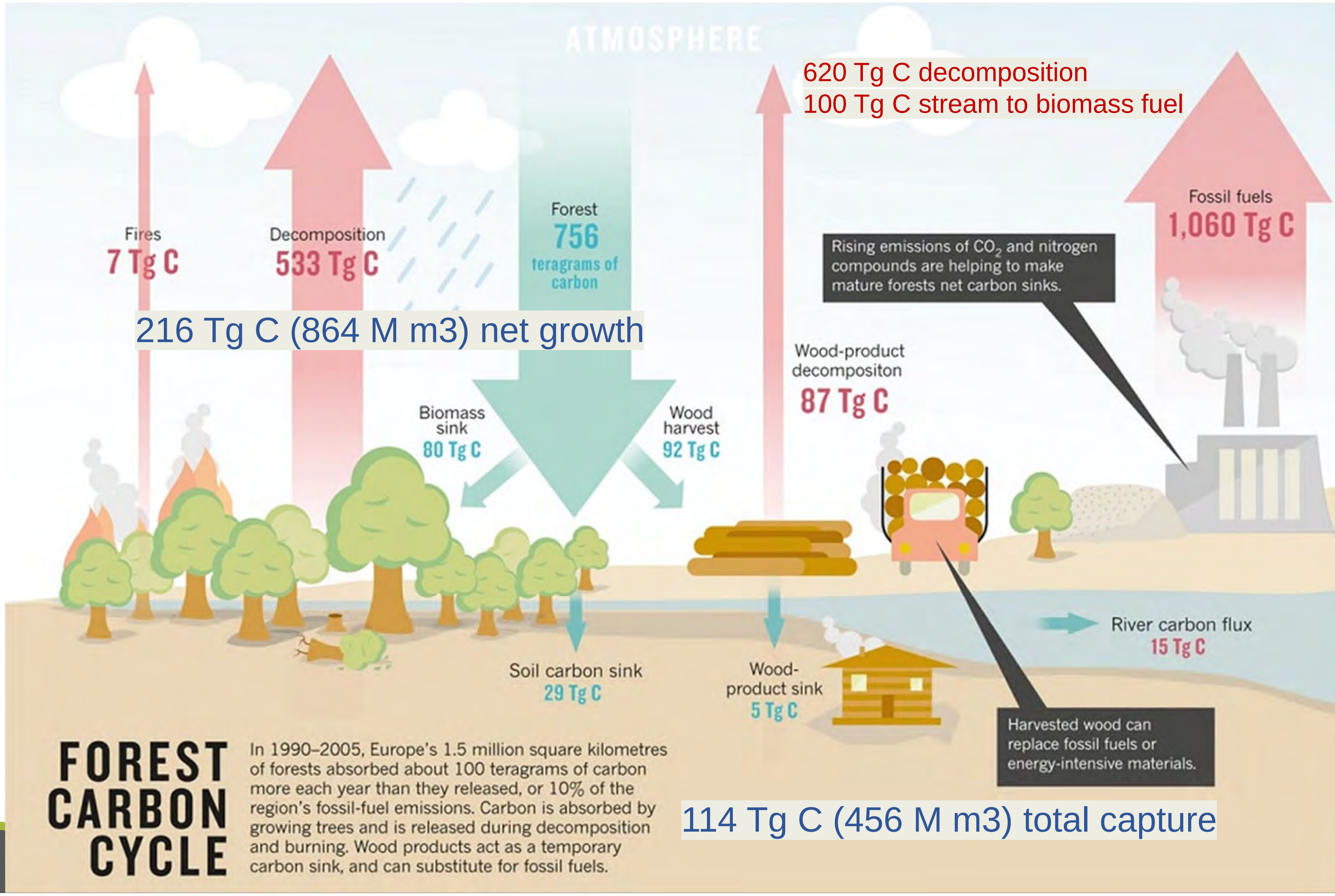


US Population



1 pound of agricultural residue (varying moist.) = 4,300 to 7,300 Btu
1 ton = 6000x2000 = 12m btu
300M tn x 12M btu/tn = 3.6 Q btu





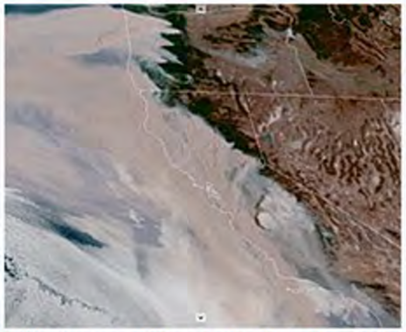
620 Tg C decomposition

100 Tg C stream to biomass fuel

216 Tg C (864 M m3) net growth

114 Tg C (456 M m3) total capture

2020 Western United States wildfire season



Satellite image of the smoke from the wildfires burning in California and Oregon on September 9, 2020

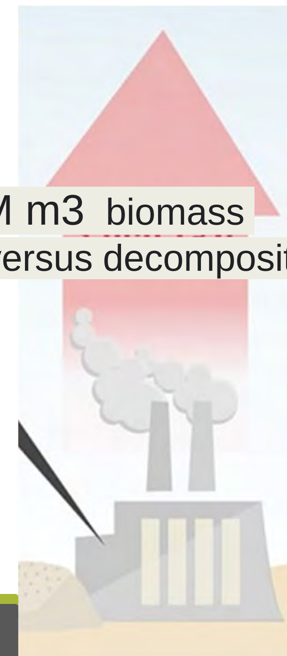
Location	Western United States
Statistics[1]	
Total fires	100+[citation needed]
Total area	10,200,000 acres (4,100,000 ha)[2][3]
Cost	>$19.884 billion (2020 USD)[2][3]
Date(s)	July 24, 2020 – December 31, 2020
Buildings destroyed	13,887[3]
Deaths	46 (32 in California, 11 in Oregon, 1 in Washington, 2 in Colorado)[citation needed]
Non-fatal injuries	Unknown

2020 fires in Oregon may have killed as much as 15 billion board feet (35M m3)

The BLM has completed a review of scientific literature and previously analyzed and implemented actions and found no evidence that salvage harvest at the levels proposed would have a negative effect on forest health. To the contrary, ***removing dead and dying trees can accelerate forest succession and benefit native wildlife species that rely on successional habitat, while reducing the potential for catastrophic wildfires.***

2020 US wildfires cost over $20B

2020 Australia/US wildfires had a measured global cooling effect



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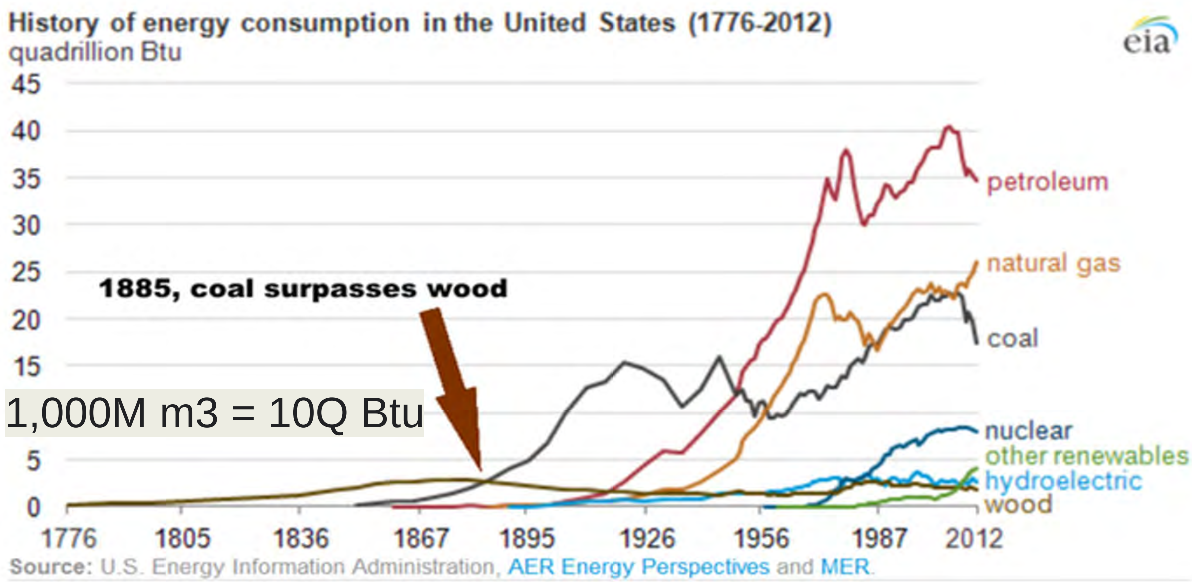
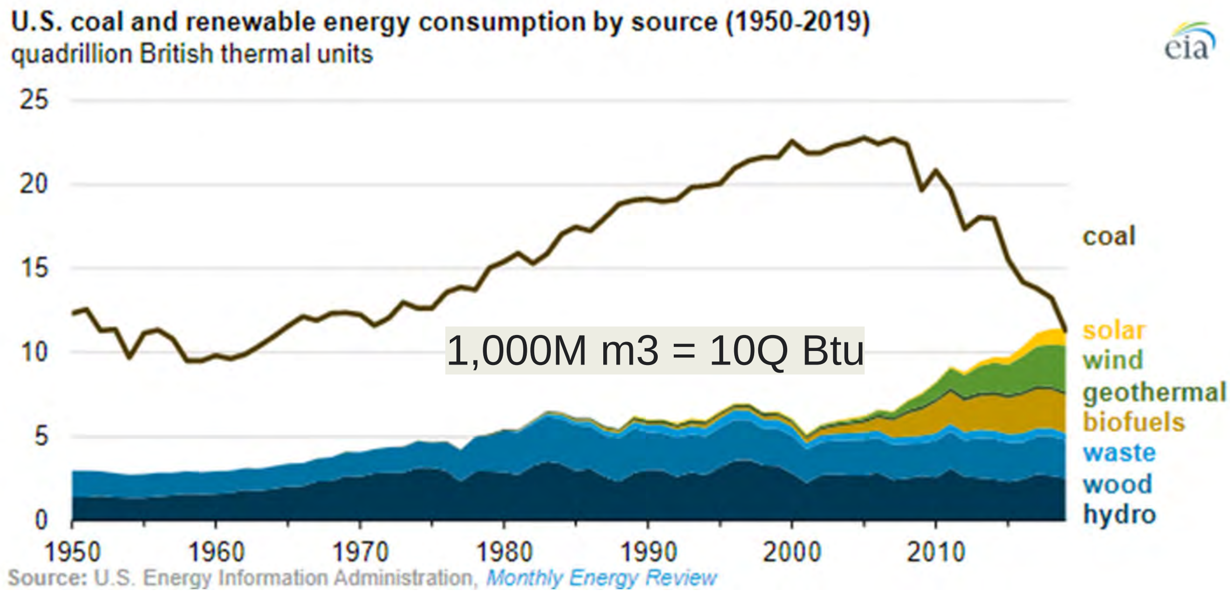


Unit Cost of Energy Contained in Various Heating Fuels

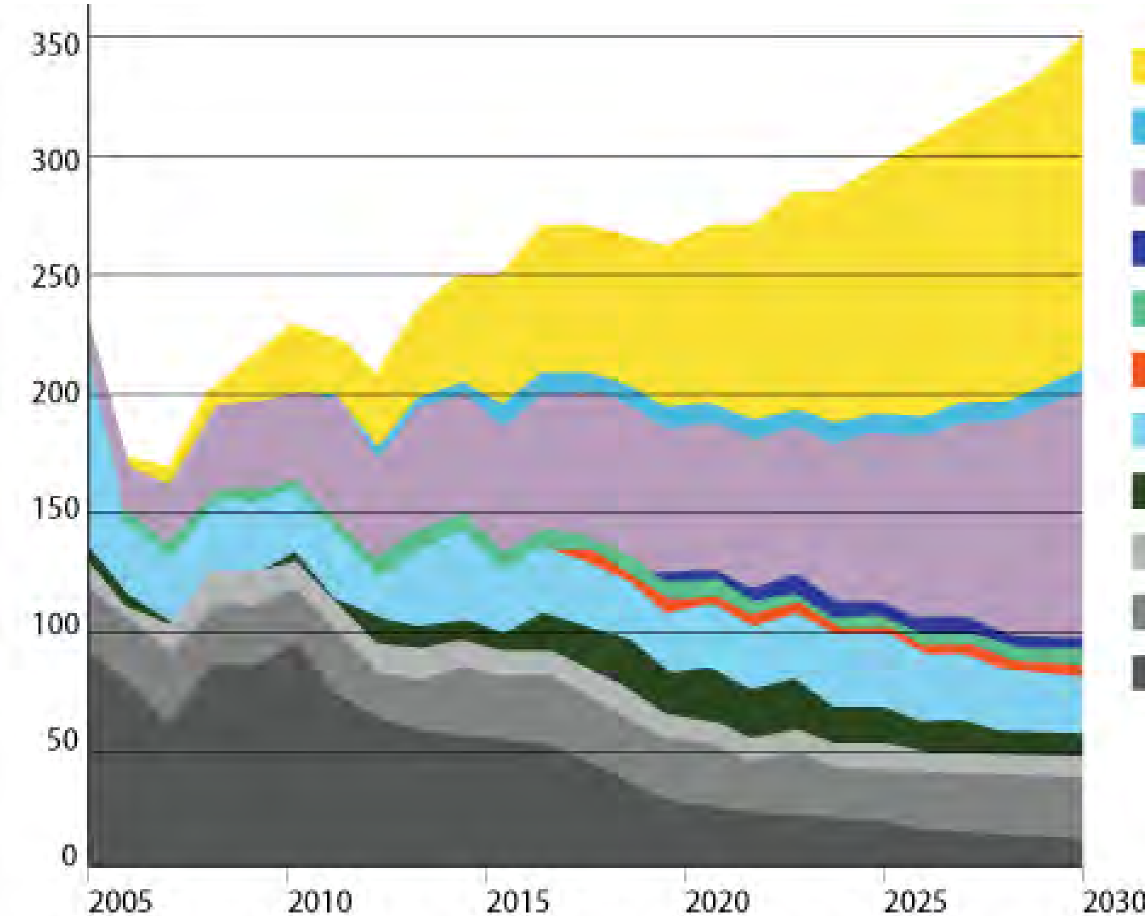
Fuel, unit	40% moisture Wood Chips, ton	Seasoned Cord Wood, cord	Natural Gas, mcf	Wood Pellets, ton	Propane, gallon	Fuel Oil, gallon	Electricity, kWh
mmBtu/unit	10	20	1	16	0.09	0.14	0.003412
Cost/unit	$40.00	$120.00	$7.00	$220.00	$2.00	$3.25	$0.12
Cost/mmBtu	$4.00	$6.00	$7.00	$13.75	$22.22	$23.21	$35.17

1,000M m3 stream decomposition to replace fossil fuels

1,550M m3 wood = 15.5Q btu transportation liquid fuel emissions



Global Energy Supplies



	US 2030 Q Btu	US 2050 Q Btu
Solar	10	30
Offshore Wind		
Wind		
EFW		
Biomass	5	15
Geothermal		
Hydro		
Nuclear	10	20
Oil	30	15
Gas	30	5
Coal	5	0
Capture	-15	-10
Total	85	75

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Optimize ICI Timber/Stick Construction

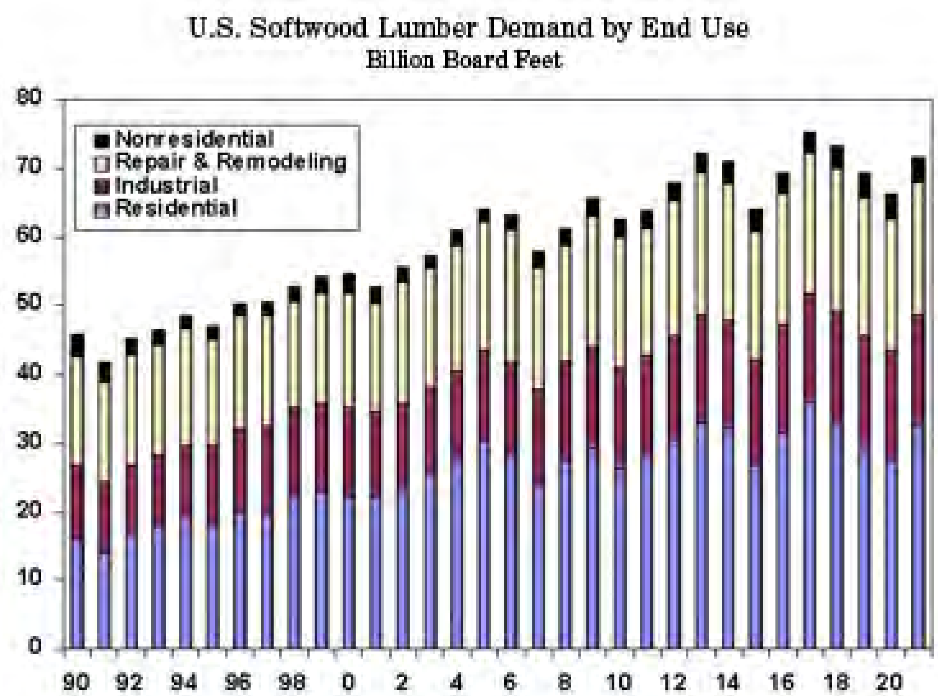
Vision – nature, precision, aesthetics

Mission – carbon sequestration, reduce time / money / energy

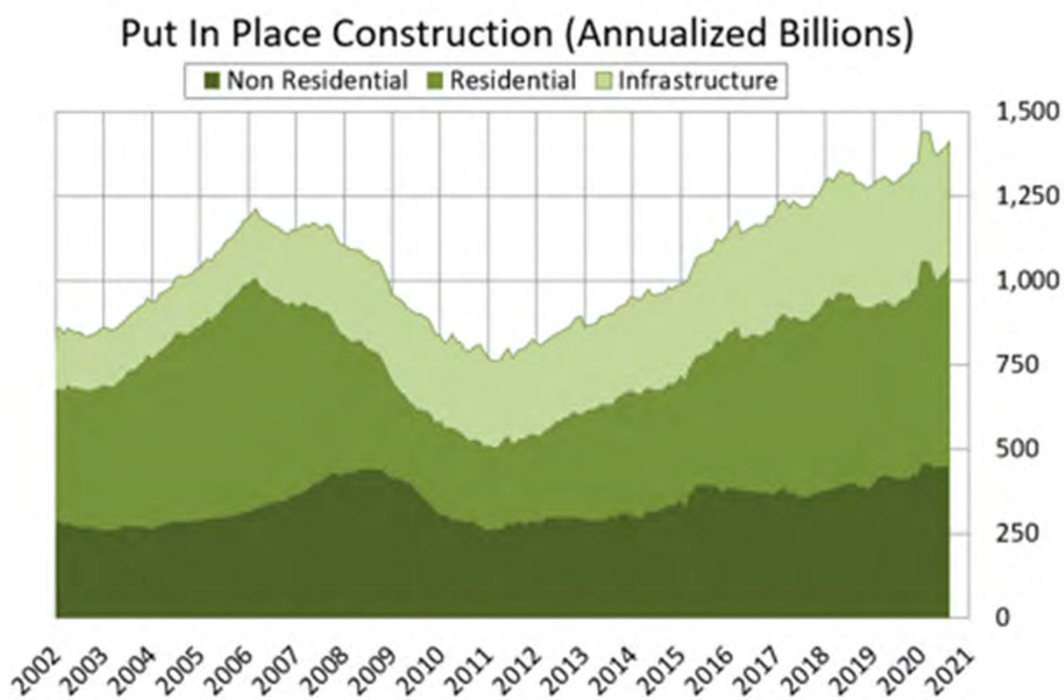
Outcome - Forest growth can offset liquid fuel transportation emissions medium term. ICI timber/stick construction can grow to equal residential. Urban canopy can comprise a significant share of forest cover. Wood fuels can comprise a significant share of power generation. Mass timber reduces finish cost.

VERMEULENS

100M m3 -



"Given the market for new construction, there is enormous potential to use mass timber in non-residential construction," says Kenneth Bland, American Wood Council who estimates that "probably tens of thousands of mass timber buildings," dating back to the mid-1800s, are still in use across the country.



8.1 bf/sf (@.5$/bf = $4.1/sf) =
1% construction cost
$400B x 1% / .5$/bf = 8B bf
10% of softwood lumber

Mass timber represents 1% of lumber consumption

COST/BENEFIT VALUES	$/sf
Wood Look	30-
Elimination of Ceilings	5-
Elimination of Soffits	1-
Sealants, finishes, stain	1+
Projections and Thermal Breaks	1-
Moisture mitigation	1-
Balconies	1-
Efficiencies of Spans	2-
Reduction of Framing	2-
Construction Time	5-
Lower Building Heights	3+/-
Structure vs stick	20+
Structure vs steel	10+
Structure vs concrete	7+

COST/BENEFIT VALUES	$/sf
Temporary protection, cleaning	1+
Swelling and shrinkage	1+
Sound isolation	5+
Sealing and firestopping	1+
Hard piped power vs flex	1+
Insurance	10+
MEP ceiling and wall enclosures	2+
Varying equipment to throw air	2+
Access floor to move air	15+
Access floor to distribute power	10+
Visual face extra	1+

Values approximate for a typical Institutional/Commercial building

40$/sf	SAVING/BENEFIT OPPORTUNITIES
20	Wood Look
5	Elimination of Ceilings
5	Elimination of Soffits
5	Projections and Thermal Breaks
5	Efficiencies of Spans
5	Reduction of Framing
5	Construction Time
10-	Details/Miscellaneous

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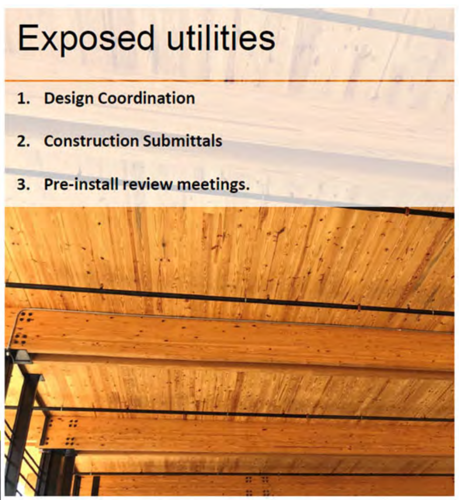
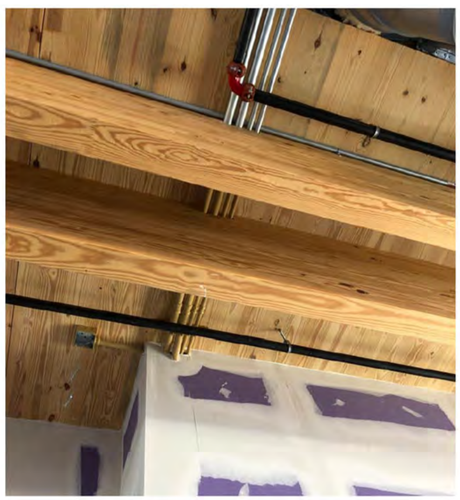
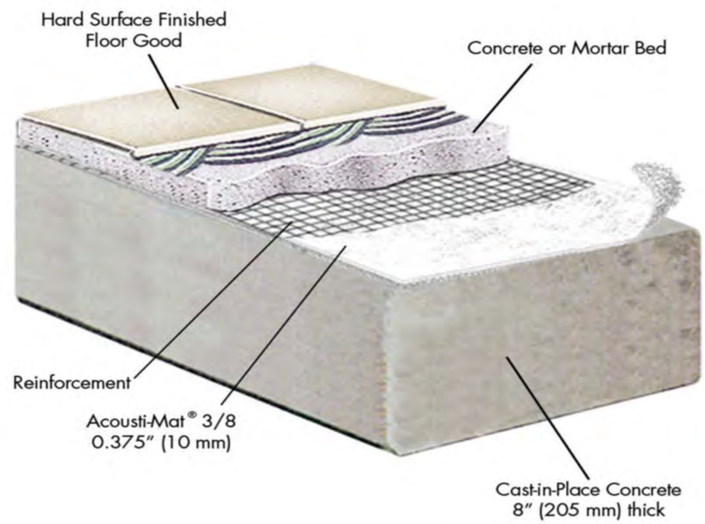
20 Glulam post-beam
12.5 CLT deck
3.5 2” concrete
3.5 acoustic mat
3.5 stain ceiling
43

10 concrete column-beam
22.5 concrete slab 8”
2.5 paint ceiling
35 assembly subtotal
8 aesthetic break-even
43

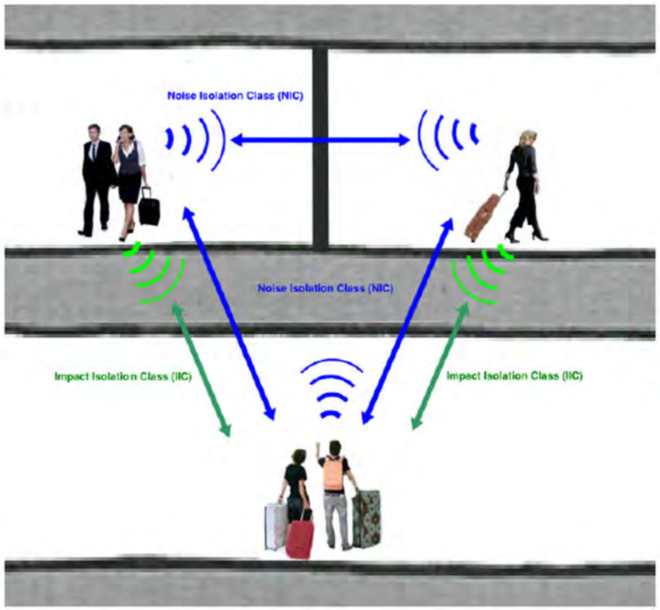






Key Issues in Timber Assemblies

VERMEULENS



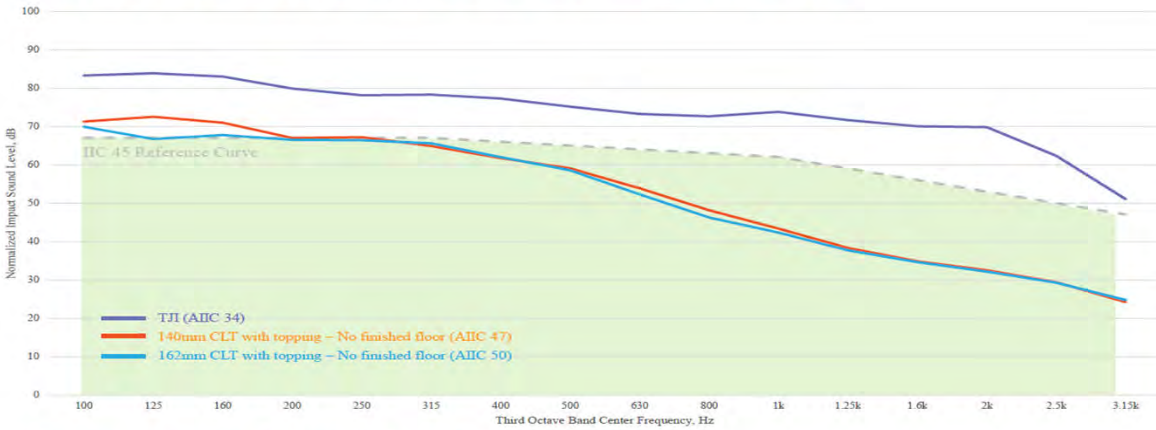
- Sound isolation rating systems:
  - Airborne sound isolation (STC, Sound Transmission Class).
  - Impact sound isolation (IIC, Impact Isolation Class)
- Architectural aesthetics vs sound isolation
- Flanking conditions (junction detailing) – implications for stability, mass, and complexity

The 2015 International Building Code (IBC) requires per Section 1207.2 and Section 1207.3:

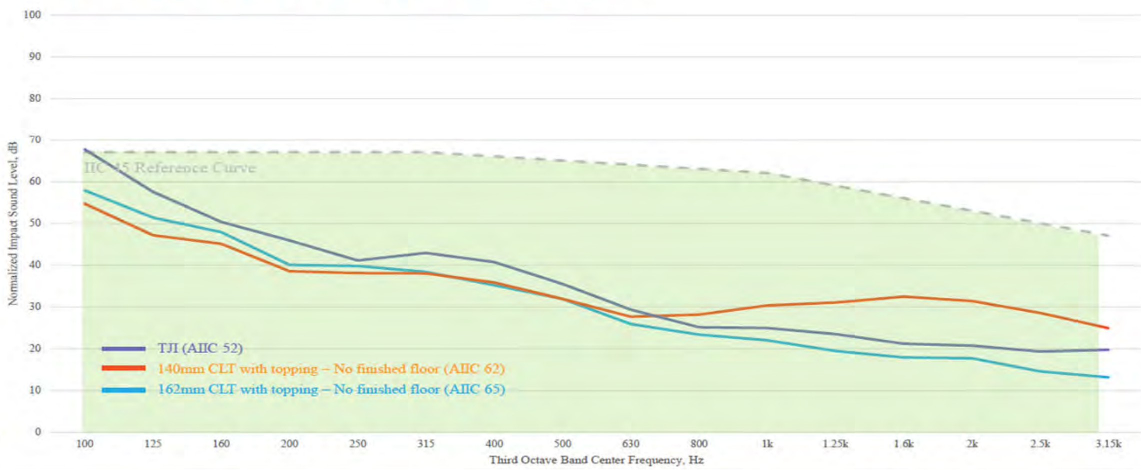
STC 50 airborne sound separation (45 in the field, minimum)

IIC 50 impact isolation class (45 in the field, minimum)

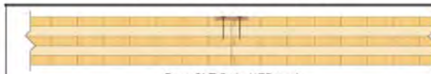
Impact Sound Level Results – No Finished Floors

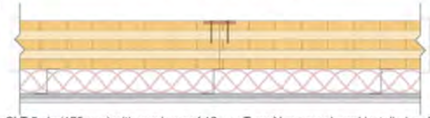


Impact Sound Level Results – Carpet

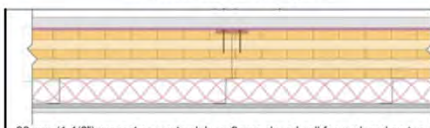


VERMEULENS

Sketch and Short Description	STC Rating	IIC Rating
 Bare CLT 5 ply (175 mm)	42	26

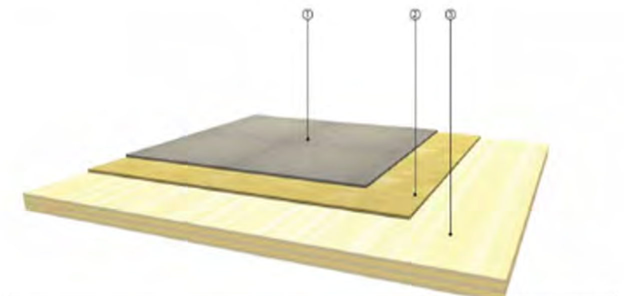
Sketch and Short Description	STC Rating	IIC Rating
 CLT 5 ply (175 mm) with one layer of 16 mm Type X gypsum board installed on Z channels	62	48

Sketch and Short Description	STC Rating	IIC Rating
 38 mm (1-1/2") precast concrete slab on 13 mm (1/2") rubber membrane placed on top of a CLT 5 ply (175 mm).	56	48

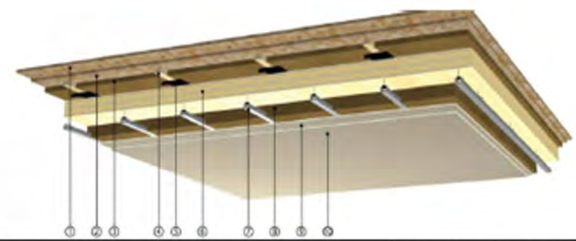
Sketch and Short Description	STC Rating	IIC Rating
 38 mm (1-1/2") precast concrete slab on 9 mm closed cell foam placed on top of a CLT 5 ply (175 mm) with one layer of 16 mm Type X gypsum board installed on Z channels.	70	56

Double Panel Acoustic Concept Sketch

- Construction: Finish material and backer affixed to the CLT panel base by sleepers or studs across an airspace filled with sound absorbing material.
- Airborne Isolation: Relies on absorption from a porous absorbing material and the size of the airspace
- Impact Isolation: Relies on decoupling of finish material and backers from the CLT panel



Floor Composition	Airborne (STC) dB	Impact (IIC) dB
1 Gypsum fibre board FERMACELL 25 mm 2 Sub-floor ISOVER EP3 20 mm 3 5-layer CLT panel 135 mm	≤ 53	≤ 49



Floor Composition	Airborne (STC) dB	Impact (IIC) dB
1 Particleboard panel 22 mm 2 Particleboard panel 22 mm 3 Sound insulation material (≈ 40 mm) 4 Lumber sleepers 5 REGUPOL underlayment 6 5-layer CLT panel 146 mm 7 Resilient supports and rails (100 mm) 8 Sound insulation material (100 mm) 9 Gypsum board 13 mm 10 Gypsum board 13 mm	67	≥ 62

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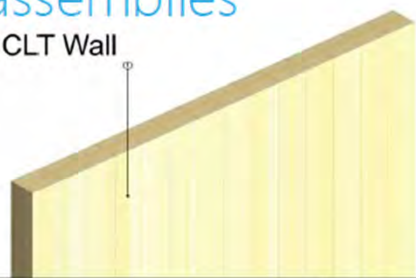
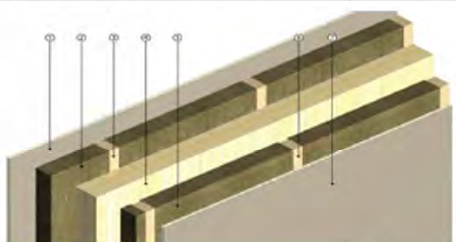
wall assemblies

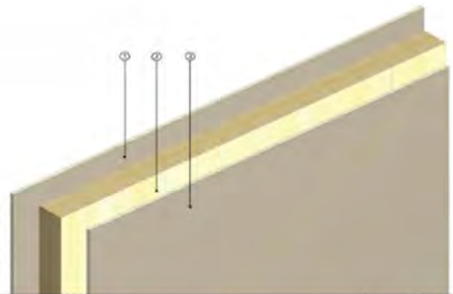
Bare CLT Wall



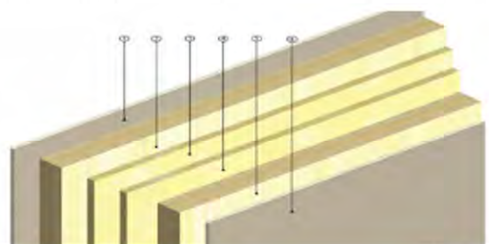
Wall Composition		Airborne (STC) dB
1	3-layer CLT panel (95 mm ~ 115 mm)	≤ 32~34



Wall Composition		Airborne (STC) dB
1	Gypsum board 15 mm	≤ 58
2	Mineral wool (~ 60 mm)	
3	Lumber studs (38 mm x 63 mm)	
4	3-layer CLT panel (95 mm ~ 115 mm)	
5	Mineral wool (~ 60 mm)	
6	Lumber studs (38 mm x 63 mm)	
7	Gypsum board 15 mm	



Wall Composition		Airborne (STC) dB
1	Gypsum board 15 mm	≤ 36~38
2	3-layer CLT panel (95 mm ~ 115 mm)	
3	Gypsum board 15 mm	



Wall Composition		Airborne (STC) dB
1	Gypsum board 15 mm	≤ 60
2	3-layer CLT panel (95 mm ~ 115 mm)	
3	Sound insulation material (rock wool) (~ 30 mm)	
4	Sound insulation material (rock wool) (~ 30 mm)	
5	3-layer CLT panel (95 mm ~ 115 mm)	
6	Gypsum board 15 mm	

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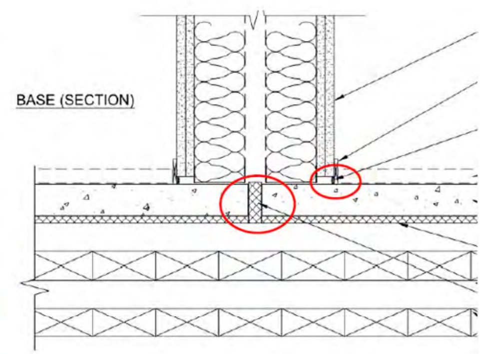
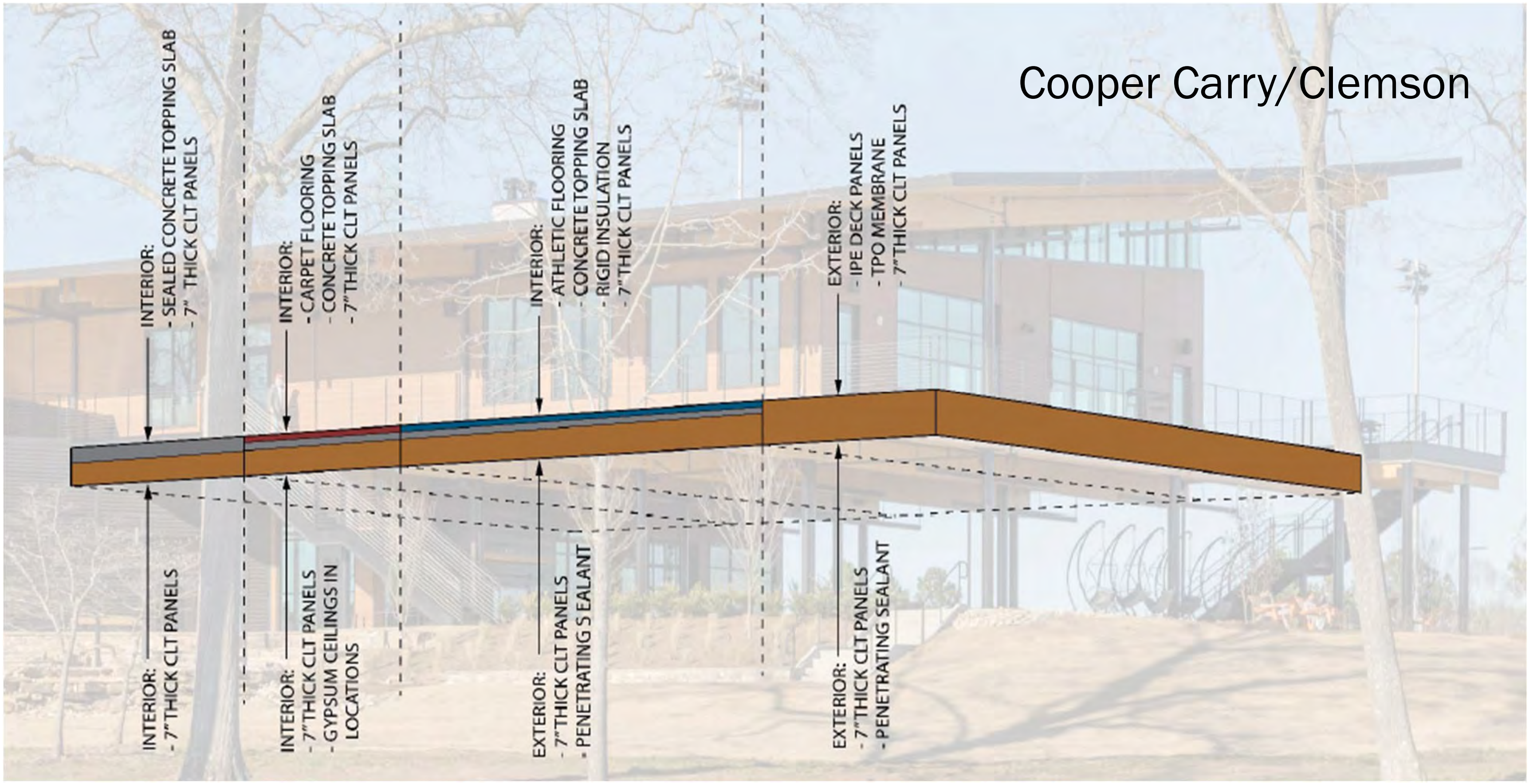
Flanking Control

- Decoupling of floor screed from CLT
- Decoupling walls from space below
- Acoustic sealant at partition joints



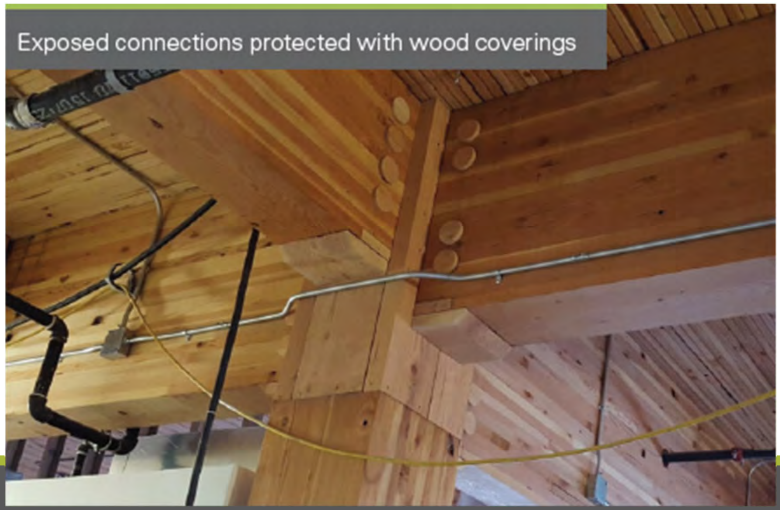
VERMEULENS


Cooper Carry/Clemson
INTERIOR:
- SEALED CONCRETE TOPPING SLAB
- 7" THICK CLT PANELS
INTERIOR:
- CARPET FLOORING
- CONCRETE TOPPING SLAB
- 7"THICK CLT PANELS
INTERIOR:
- ATHLETIC FLOORING
- CONCRETE TOPPING SLAB
- RIGID INSULATION
- 7"THICK CLT PANELS
EXTERIOR:
- IPE DECK PANELS
- TPO MEMBRANE
- 7"THICK CLT PANELS
INTERIOR:
- 7"THICK CLT PANELS
INTERIOR:
- 7"THICK CLT PANELS
- GYPSUM CEILINGS IN LOCATIONS
EXTERIOR:
- 7"THICK CLT PANELS
- PENETRATING S EALANT
EXTERIOR:
- 7"THICK CLT PANELS
- PENETRATING SEALANT

Unprotected exposed connections

Connection protected and approved using other means acceptable to the jurisdiction

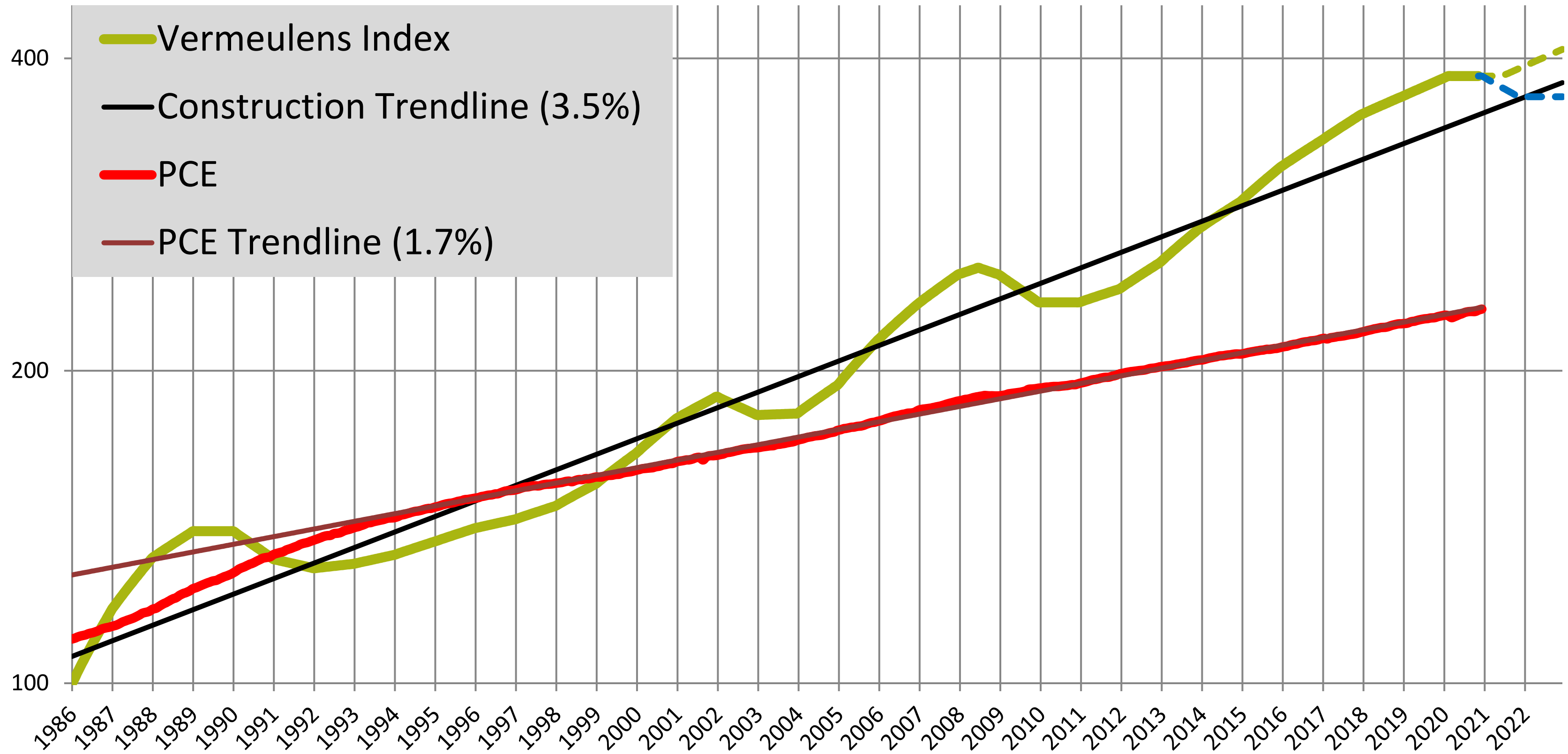
VERMEULENS



Exposed connections protected with wood coverings

Exposed side of an assembly prior to a fire test

Forecast



Vermeulens Index
Construction Trendline (3.5%)
PCE
PCE Trendline (1.7%)
400
200
100
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
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2007
2008
2009
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2014
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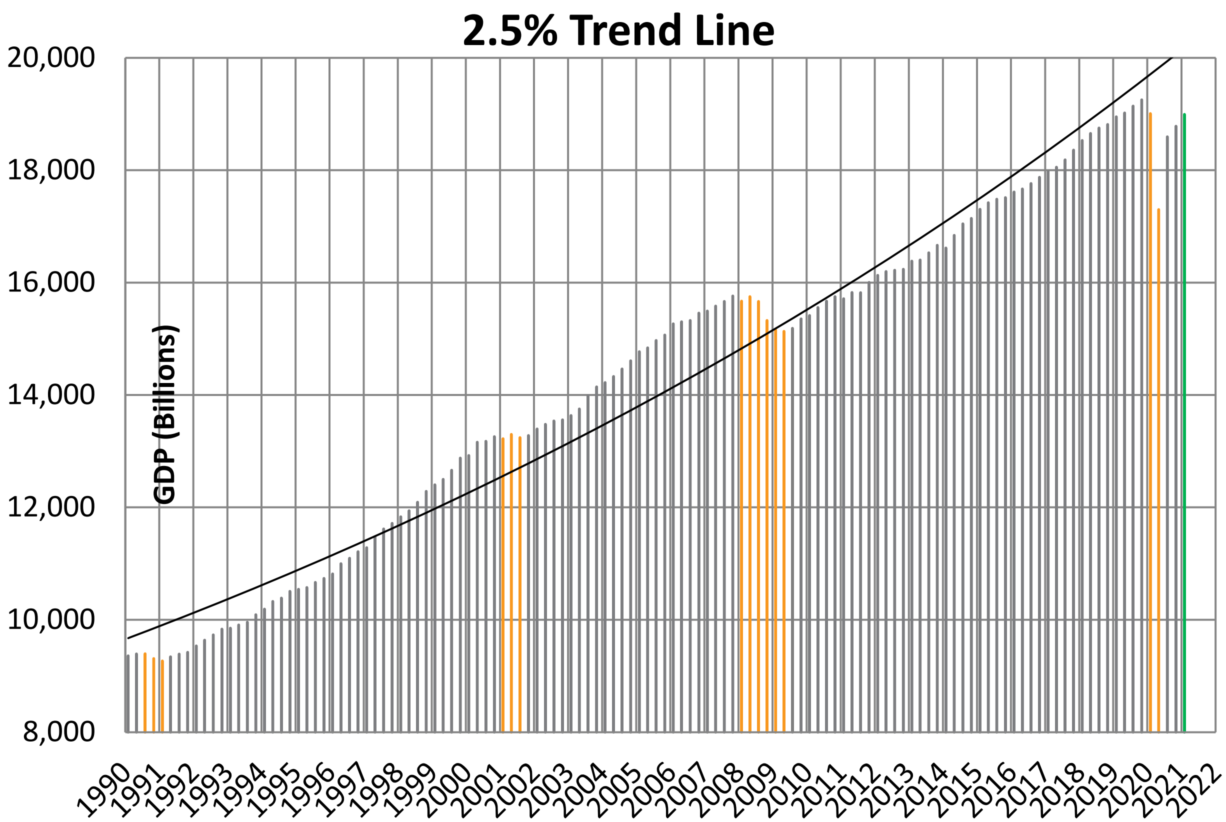
2016
2017
2018
2019
2020
2021
2022



High/Low
-4.0%

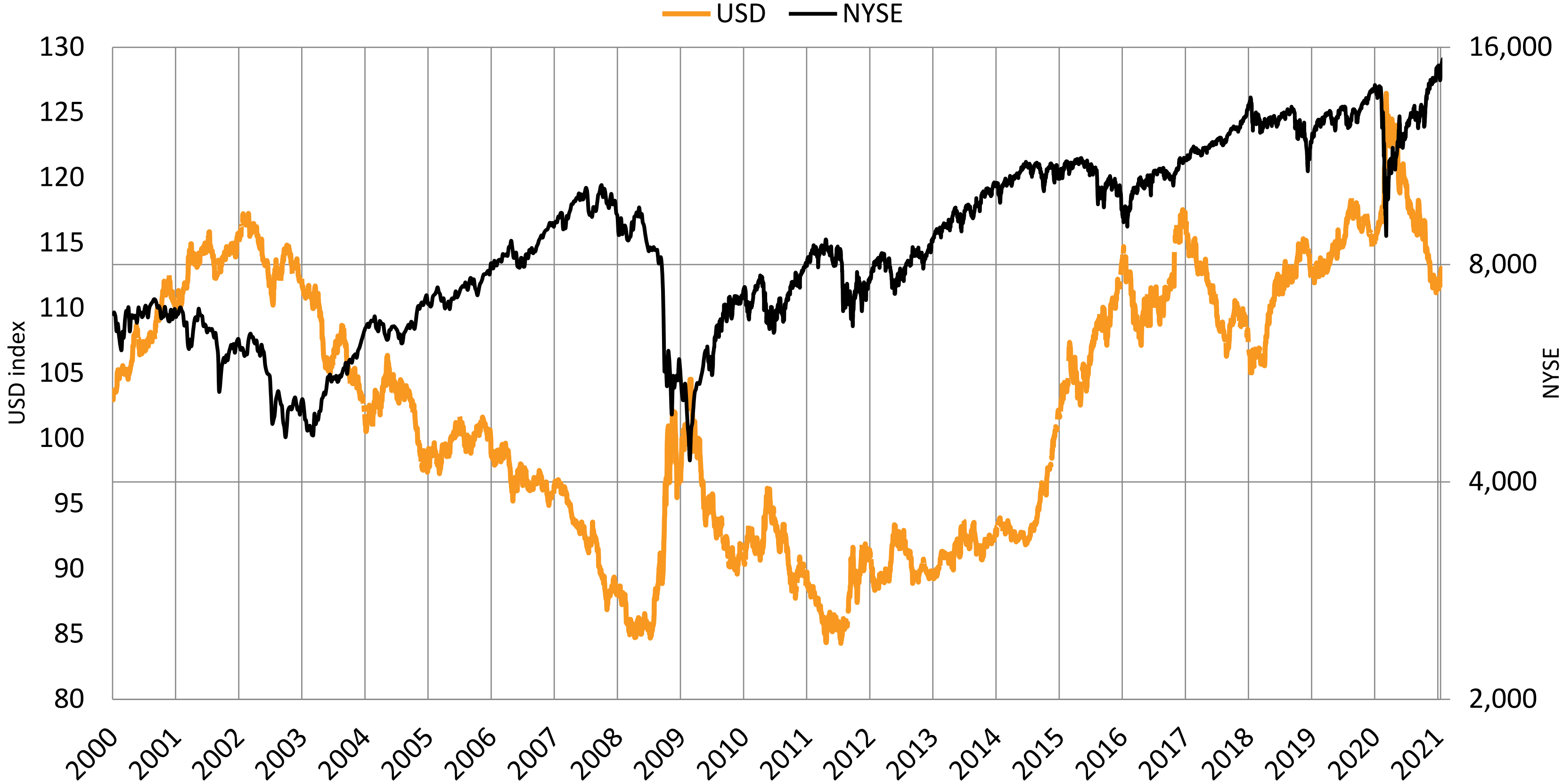
Low/Current
+24.1%

Compound Growth Rate of 1.94% since 2009

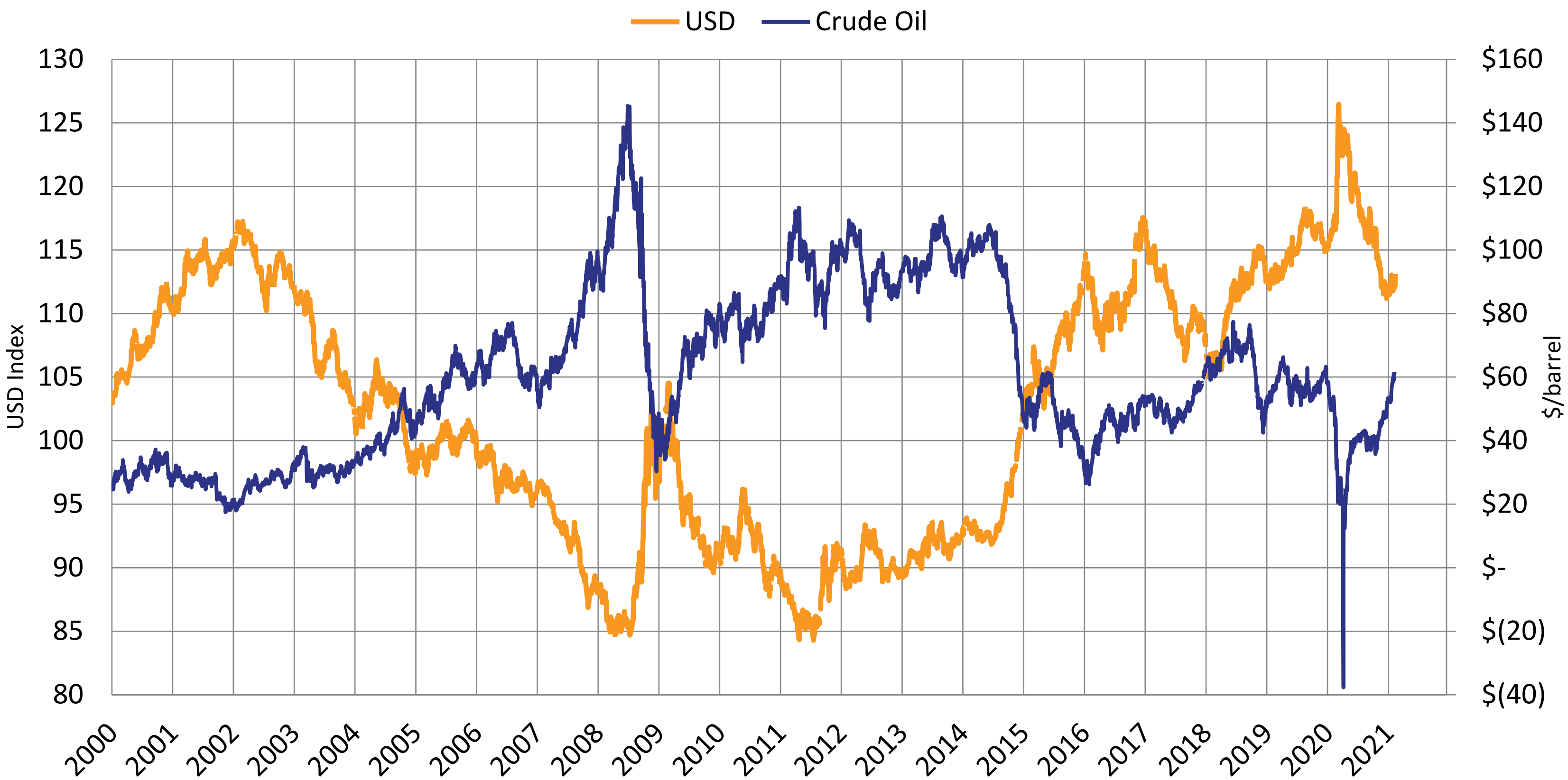
3.3% growth rate coming out of 2001/2002

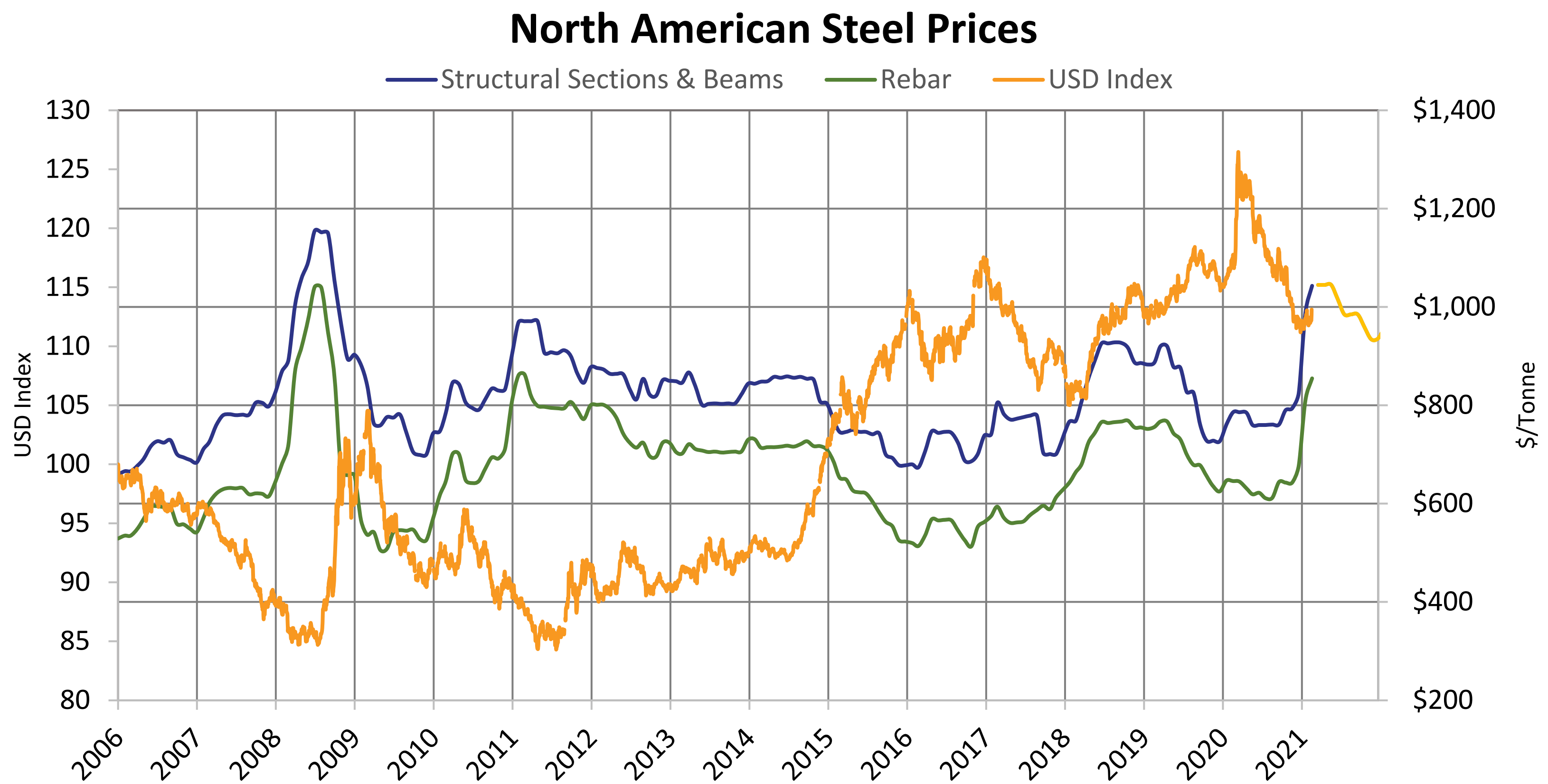
2.3% growth rate coming out of 2009/2010

US Dollar and NYSE



US Dollar Impact on Crude Oil




North American Steel Prices
Structural Sections & Beams
Rebar
USD Index
USD Index
$/Tonne
130
125
120
115
110
105
100
95
90
85
80
$1,400
$1,200
$1,000
$800
$600
$400
$200
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021

Subcontractor Insight

- DSI’s **manhours** have increased almost 45%.
- DSI’s labor headcount has increased over 20+%
- **Premium time** is required on most all bids or budgets for 2021.
- **PVC** Material-16-20% since December 2020
- **Copper** tube- 30% since Sept/Oct 2020 and up 15% since the start of 2021
- **Carbon Steel** coils- up 10% since Feb 1 and up 30% since Sept/ Oct 2020
- Strut/ hanger material- up 18-20% since Oct 2020
- **Stainless Steel** raw materials up 25% in last 3 months….increasing cost about 15%-18%
- **Valves**- up 5-15% depending on type of valves and internal parts

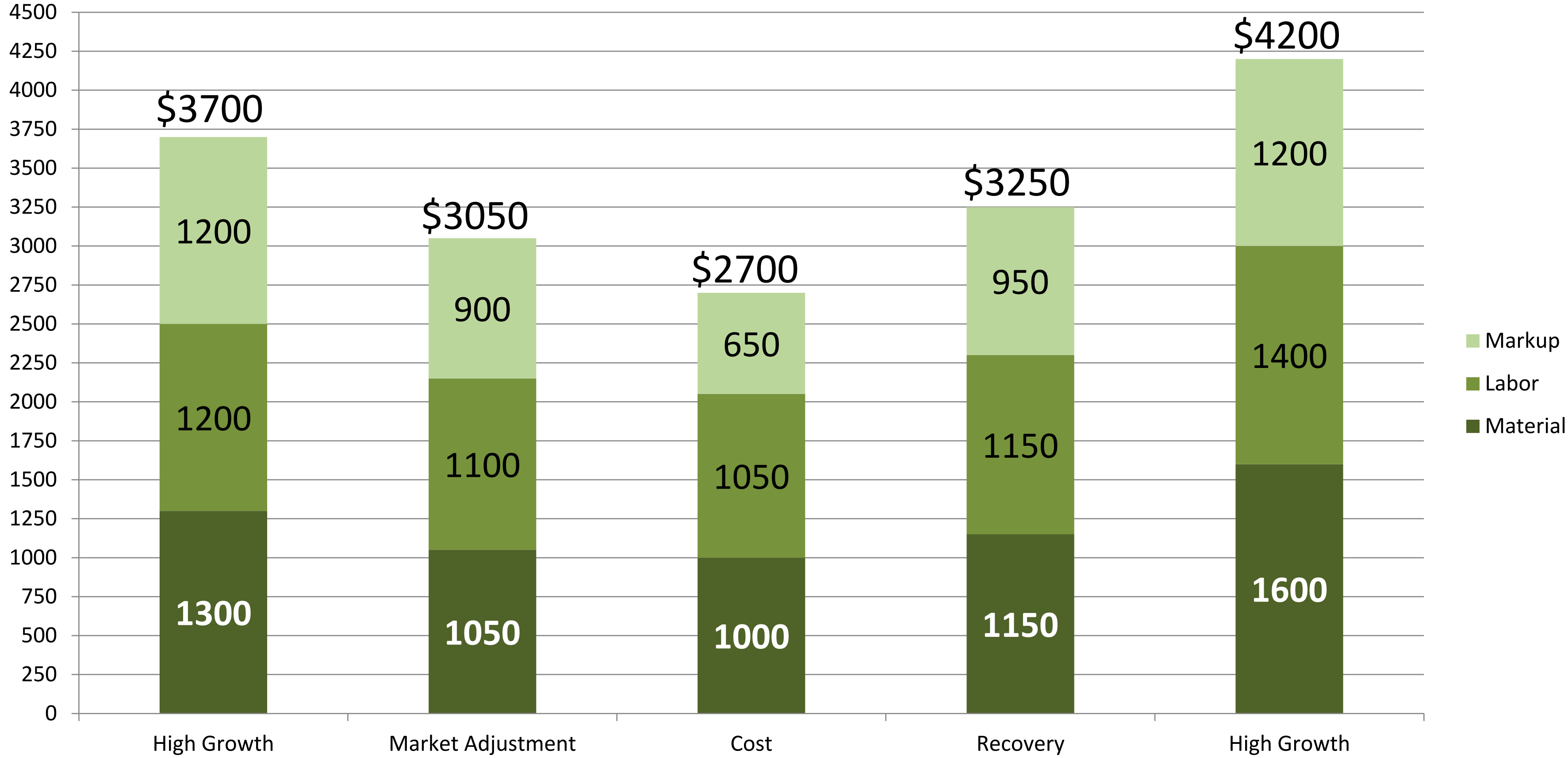
Subcontractor Insight

1) **Manpower shortage** is huge issue in Central Texas. (Mission Critical, Distribution, and Manufacturing)
2) Austin striving to become 5th largest city in US by 2050
3) **PVC** shortages (Need to allow multiple manufacturers on each project) 4”PVC price increase of 250% since Q2 of 2020
4) **Copper** is over $4.00 a pound. (Need to allow multiple manufacturers on each project)
5) **Steel** increasing electrical conduit / fittings 50% (Need to allow multiple manufacturers on each project)
6) **Price guarantees of 5 days** from certain manufacturers

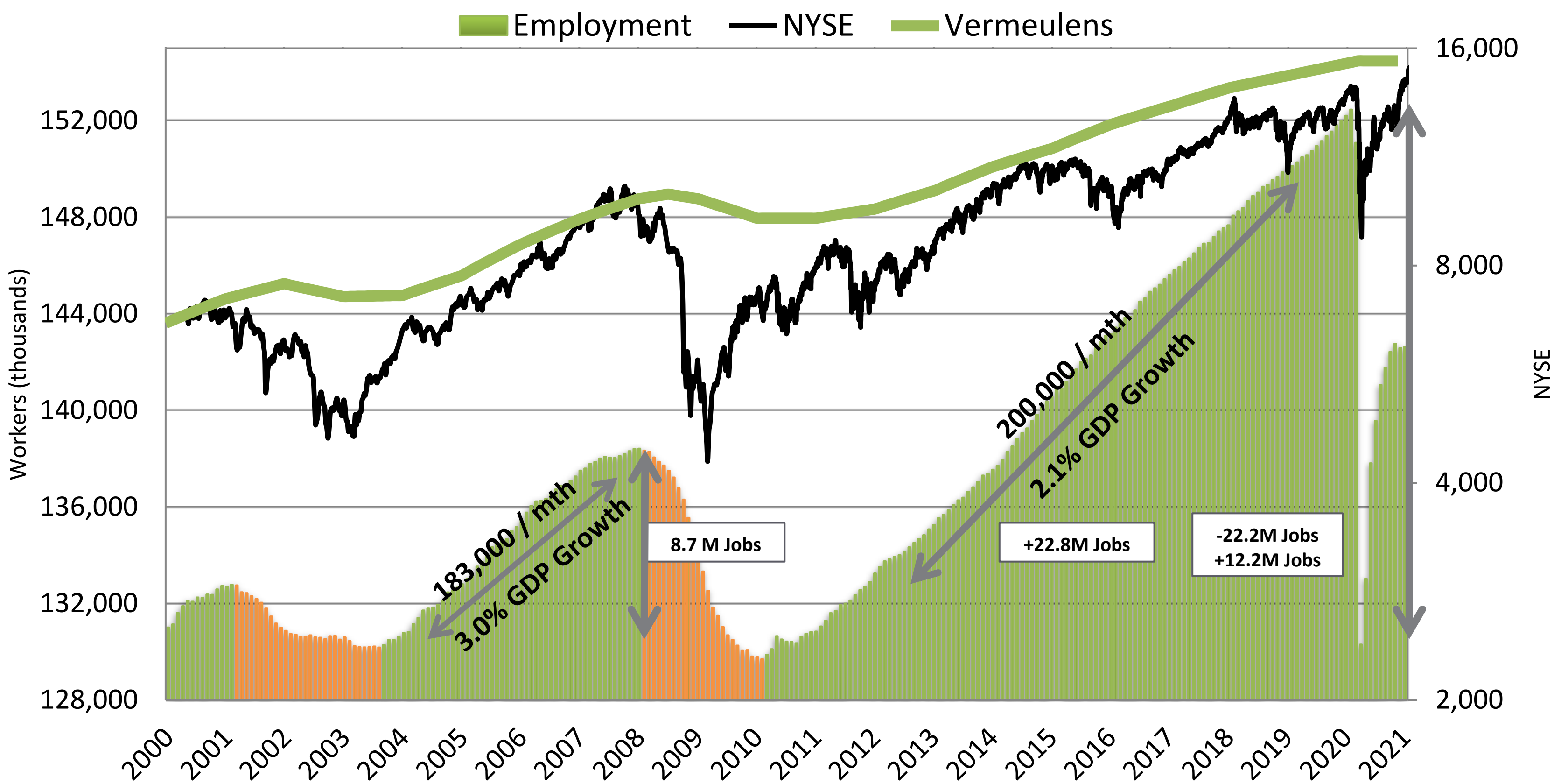
7) Items to consider
    a) Fiberglass conduit underground
    b) Aluminum feeders
    c) Aluminum EMT conduit

BIG STATE ELECTRIC LTD.

Structural Steel Pricing

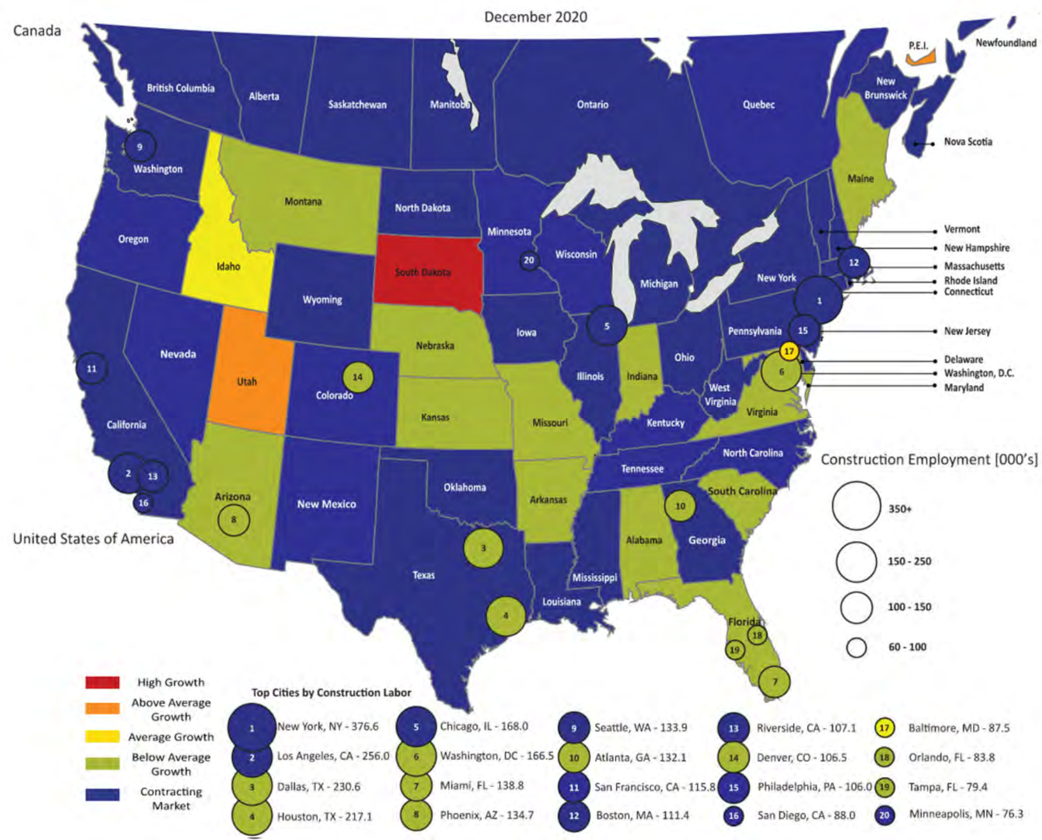


US Employment (In Thousands)

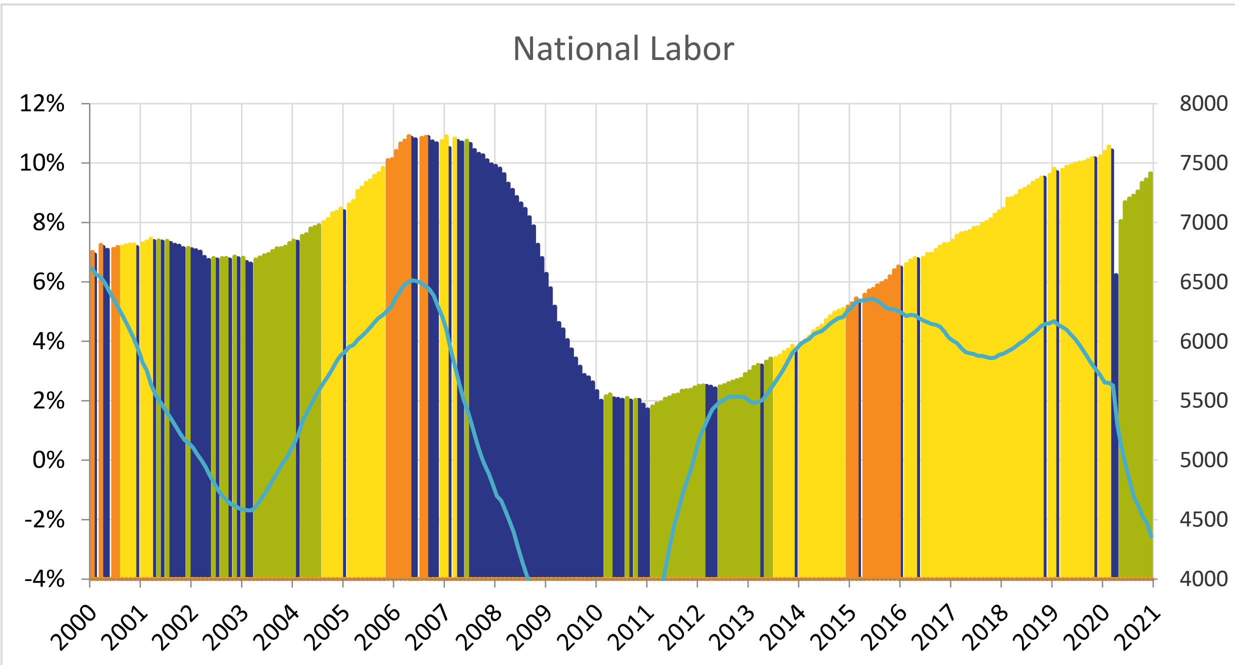


US Employment (millions)							
	Jan-08	Feb-10	Feb-10 to Feb-20	Feb-20	Apr-20	Feb-21	Feb-20 to Feb-21
Total nonfarm	138.4	129.7	22.7	152.4	130.4	143	-9.4
Total private	116.0	107.3	22.4	129.7	108.6	121.6	-8.1
Goods-producing	21.9	17.6	3.6	21.2	18.7	20.2	-1
Mining & logging	0.7	0.7	0.0	0.7	0.7	0.6	-0.1
Construction	7.5	5.5	2.1	7.6	6.6	7.3	-0.3
Manufacturing	13.7	11.5	1.4	12.9	11.5	12.2	-0.6
Private service-providing	94.1	89.6	18.9	108.5	89.9	101.4	-7.1
Trade, transportation, and utilities	26.7	24.5	3.3	27.8	24.5	27.1	-0.7
Business	29.3	27.0	6.3	33.3	30.4	32.1	-1.1
Education and health services	19.0	19.8	4.8	24.6	21.8	23.3	-1.3
Leisure and hospitality	13.5	12.9	4.0	16.9	8.6	13.5	-3.4
Other services	5.5	5.3	0.6	5.9	4.6	5.5	-0.4
Government	22.4	22.5	0.2	22.7	21.8	21.4	-1.3

Year-Over-Year Construction Labor Growth



May - National Construction Labor (Thousands)



Year-Over-Year Growth

- High Growth
- Above Average Growth
- Average Growth
- Below Average Growth
- Contracting Market

Market Expansion

National

(-3%)

December 2020 State Construction YOY Growth

Rank		Feb-10	Feb-20	Dec-20	Job Losses	% Lost
1	California	604.5	875.7	879.1	3.4	0.4%
2	Texas	585.2	793.8	760.9	-32.9	-4.1%
3	Florida	383.1	580.2	566.5	-13.7	-2.4%
4	New York	319.3	379.1	370.5	-8.6	-3.5%
5	Pennsylvania	219.8	245.1	247.8	2.7	1.0%
6	North Carolina	187.3	227.1	226.1	-1.0	-1.6%
7	Washington	154.2	220.3	221.2	0.9	-1.5%
8	Ohio	176.8	207.5	208.6	1.1	-1.3%
9	Georgia	161.2	203.4	202.9	-0.5	-0.4%
10	Illinois	211.8	197.8	214.6	16.8	5.1%
11	Virginia	186.7	197.7	212.4	14.7	6.5%
12	Arizona	122.9	174.4	170.9	-3.5	-2.0%
13	Colorado	126.8	172.1	172.6	0.5	-1.3%
14	Maryland	149.9	168.1	174.7	6.6	3.7%
15	Michigan	124.8	165.3	168.2	2.9	1.8%
16	New Jersey	135.7	154.5	149.4	-5.1	-5.3%
17	Massachusetts	109.4	149.3	148.6	-0.7	-1.4%
18	Indiana	117.8	140.5	152.2	11.7	7.9%
19	Louisiana	127.8	139.4	129.6	-9.8	-7.0%
20	Tennessee	103.4	125.6	126.9	1.3	-0.5%

Year-Over-Year Growth

- High Growth
- Above Average Growth
- Average Growth
- Below Average Growth
- Contracting Market

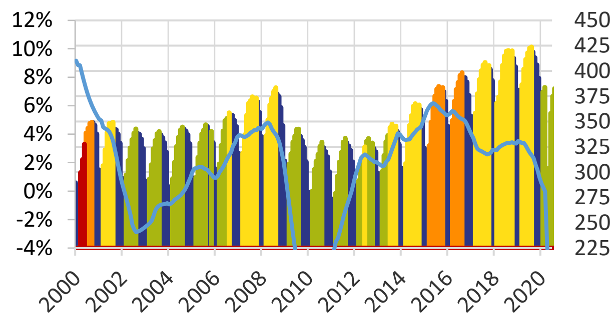
Market Expansion

National

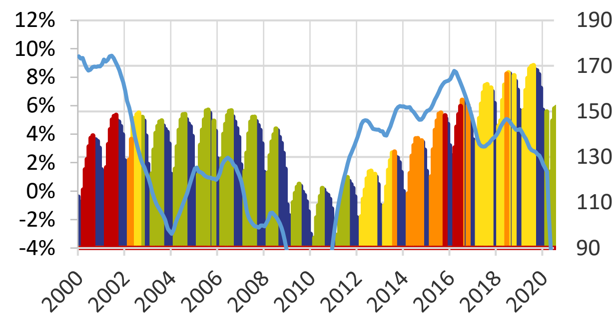
(+41% -3%)

May - State Construction Labor (Thousands)

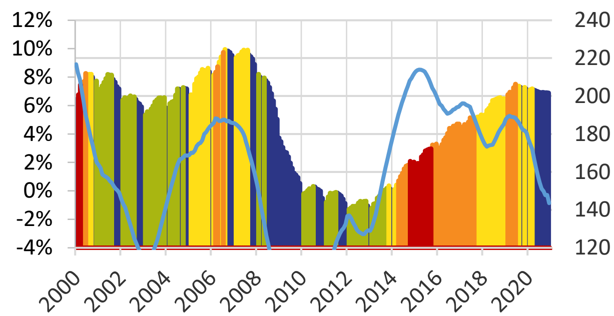
New York



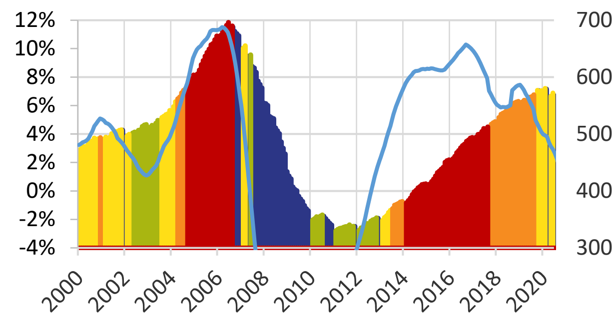
Massachusetts



Georgia



Florida



__Year-Over-Year Growth__

- High Growth
- Above Average Growth
- Average Growth
- Below Average Growth
- Contracting Market

__Market Expansion__

New York (-3%)

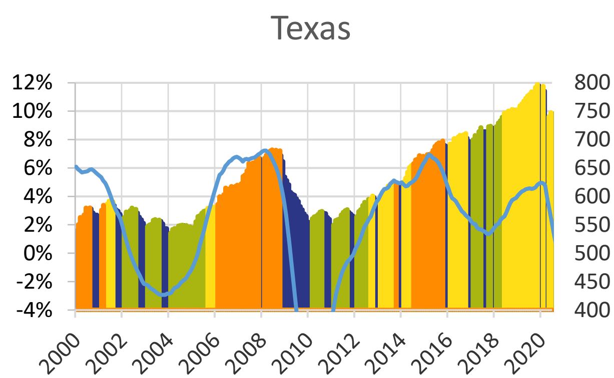
Massachusetts (-1%)

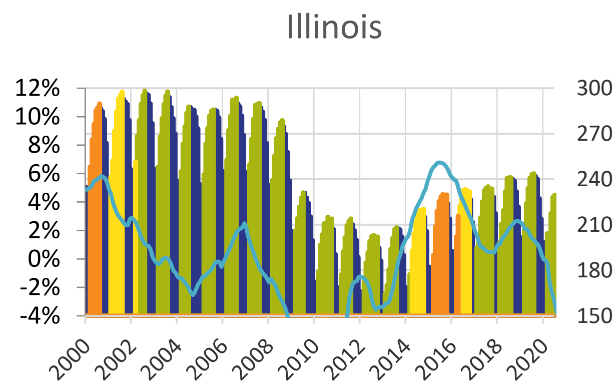
Georgia (0%)

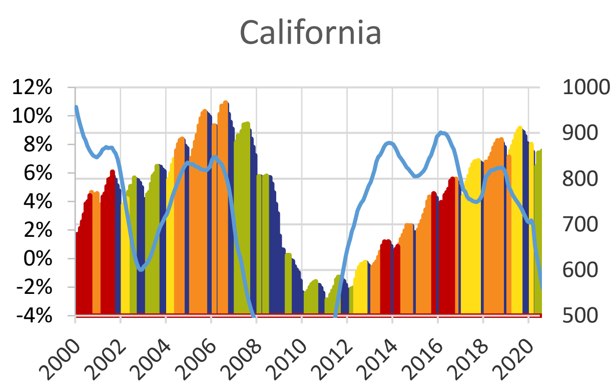
Florida (-2%)

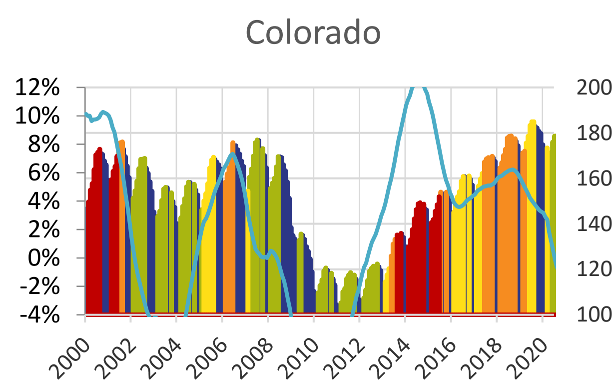
National (-3%)

May - State Construction Labor (Thousands)









Year-Over-Year Growth

- High Growth
- Above Average Growth
- Average Growth
- Below Average Growth
- Contracting Market

Market Expansion

Texas
(-4%)
Illinois
(+5%)
California
(0%)
Colorado
(-1%)
National
(-3%)

December 2020 City Construction YOY Growth

Rank		Feb-10	Feb-20	Dec-20	Job Losses	% Lost
1	New York	322.2	395.3	376.6	-18.7	-5.9%
2	Los Angeles	185.7	258.0	256.0	-2.0	-0.8%
3	Dallas/Fort Worth	167.4	235.7	230.6	-5.1	-2.2%
4	Houston	180.7	244.2	217.1	-27.1	-11.1%
5	Chicago	158.1	161.0	168.0	7.0	2.3%
6	Washington D.C.	146.2	163.6	166.5	2.9	1.7%
7	Miami	98.5	141.5	138.8	-2.7	-2.2%
8	Phoenix	91.5	137.6	134.7	-2.9	-2.1%
9	Seattle	90.4	131.6	133.9	2.3	0.5%
10	Atlanta	98.6	129.7	132.1	2.4	1.9%
11	San Francisco	85.4	123.6	115.8	-7.8	-6.3%
12	Boston	79.9	113.6	111.4	-2.2	-2.9%
13	Riverside	65.8	106.4	107.1	0.7	0.7%
14	Denver	74.6	108.9	106.5	-2.4	-3.5%
15	Philadelphia	101.7	112.5	106.0	-6.5	-6.7%
16	San Diego	59.6	83.6	88.0	4.4	5.3%
17	Baltimore	70.4	81.9	87.5	5.6	6.2%
18	Orlando	52.2	90.3	83.8	-6.5	-7.2%
19	Tampa Bay	57.8	82.3	79.4	-2.9	-4.3%
20	Minneapolis	58.6	73.8	76.3	2.5	1.5%

Year-Over-Year Growth

- High Growth
- Above Average Growth
- Average Growth
- Below Average Growth
- Contracting Market

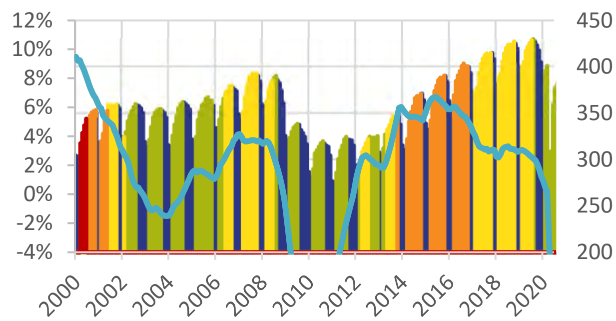
Market Expansion

National

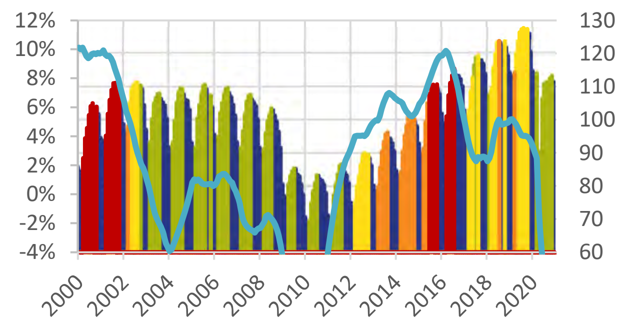
(+41% -3%)

May - City Construction Labor (Thousands)

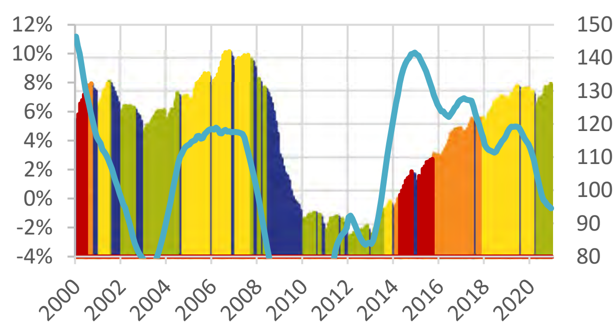
New York City



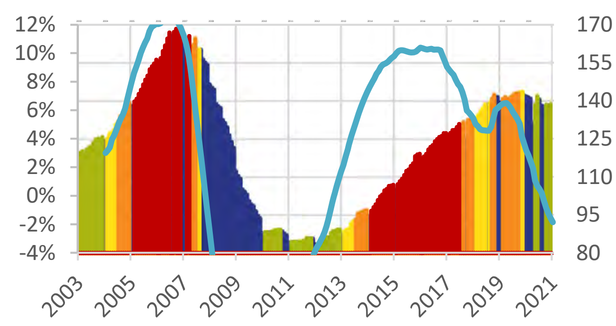
Boston



Atlanta



Miami



Year-Over-Year Growth

- High Growth
- Above Average Growth
- Average Growth
- Below Average Growth
- Contracting Market

Market Expansion

New York City (-6%)

Boston (-3%)

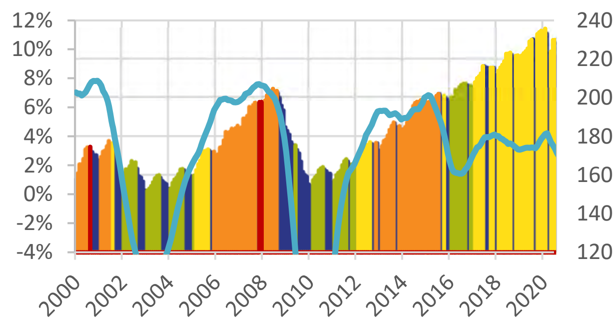
Atlanta (2%)

Miami (-2%)

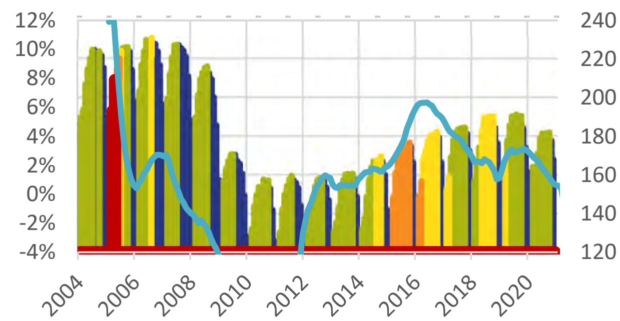
National (-3%)

May - City Construction Labor (Thousands)

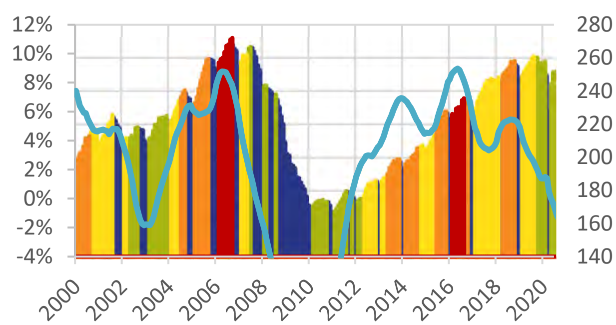
Dallas/Fort Worth



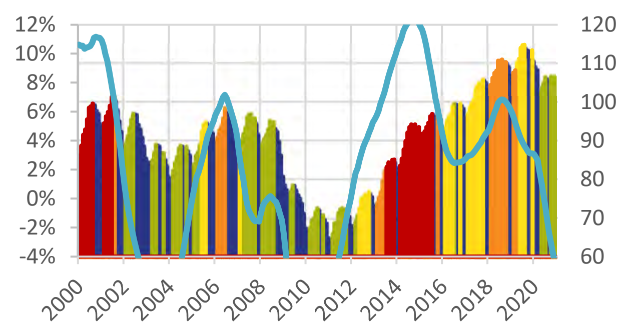
Chicago



Los Angeles



Denver

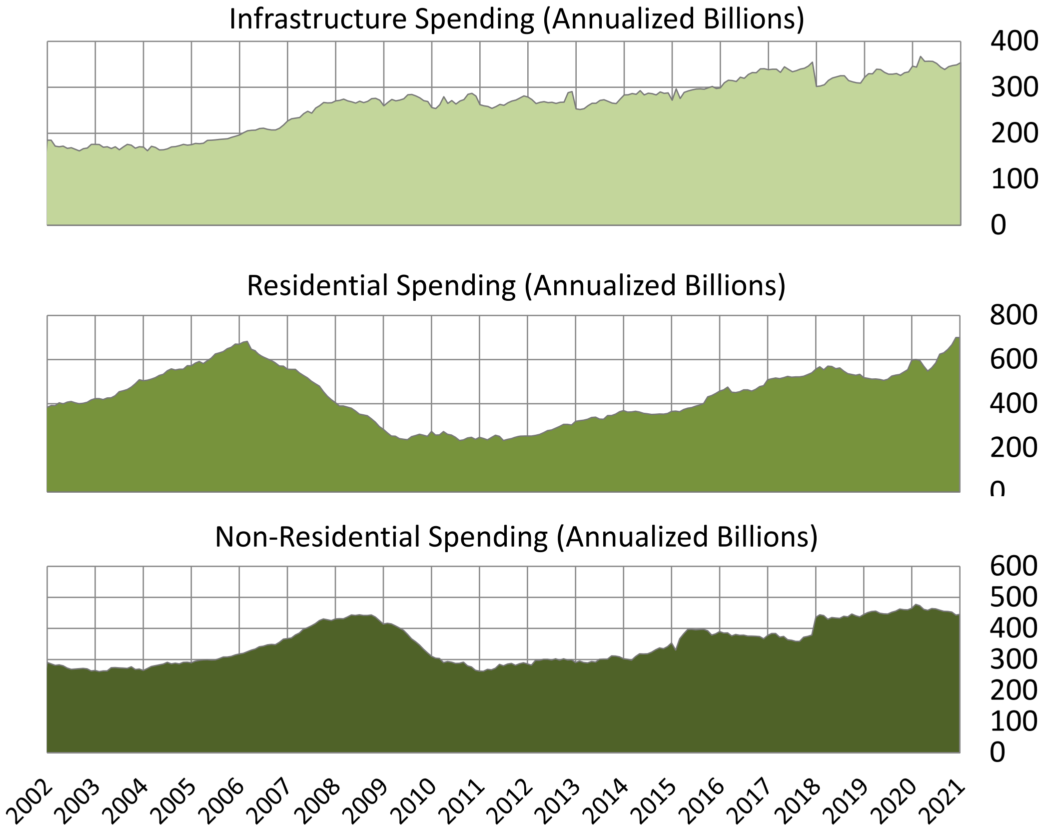


Year-Over-Year Growth

- High Growth
- Above Average Growth
- Average Growth
- Below Average Growth
- Contracting Market

Market Expansion

Dallas
(-2%)
Chicago
(+2%)
Los Angeles
(-1%)
Denver
(-4%)
National
(-3%)



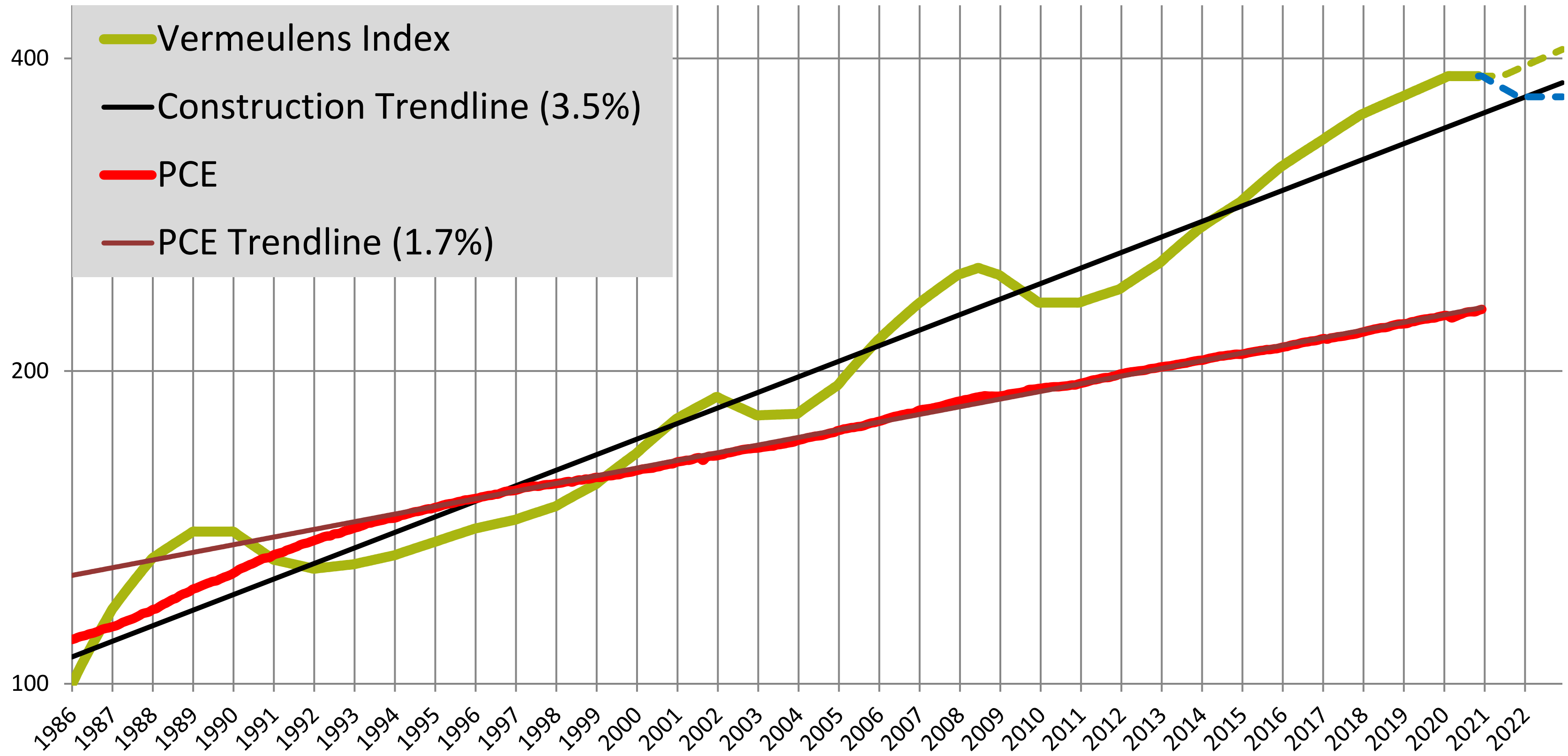
Low to Current

Total	+100%
Infra	+41%
Res	+201%
Non Res	+70%

Peak to Low

Total	-37%
Infra	-12%
Res	-66%
Non Res	-41%

Forecast



Vermeulens Index
Construction Trendline (3.5%)
PCE
PCE Trendline (1.7%)
400
200
100
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022