



Washington State Energy Strategy Advisory Committee

Economic Impact Analysis of the State Energy Strategy

Methodology and Approach Overview

Agenda

FTI Consulting

- Overview of firm and services
- Our role in this project

Economic impact modeling

- Energy models compared to economic impact models
- Integrating energy modeling and economic impact modeling
- **Methodology and approach**
 - IMPLAN
 - REMI
 - Model assumptions and outputs for informing the State Energy Strategy

COVID-19 impacts and economic recovery

- Macroeconomic forecast
- Short-term implications for the State Energy Strategy

FTI Consulting | Economic Impacts Group

FTI CONSULTING OVERVIEW

- FTI is a large management, technical, and economic consulting firm
- Economic Impacts Group is a functional group within FTI that uses quantitative models to answer “What If?” questions about the economy and public policy

ECONOMIC IMPACTS GROUP (“EIG”)

- EIG examines how markets and the economy respond to public policy matters
 - Specific markets (e.g., energy and transportation)
 - Economy (macroeconomic effects)
 - Distributional impacts
 - Demographics

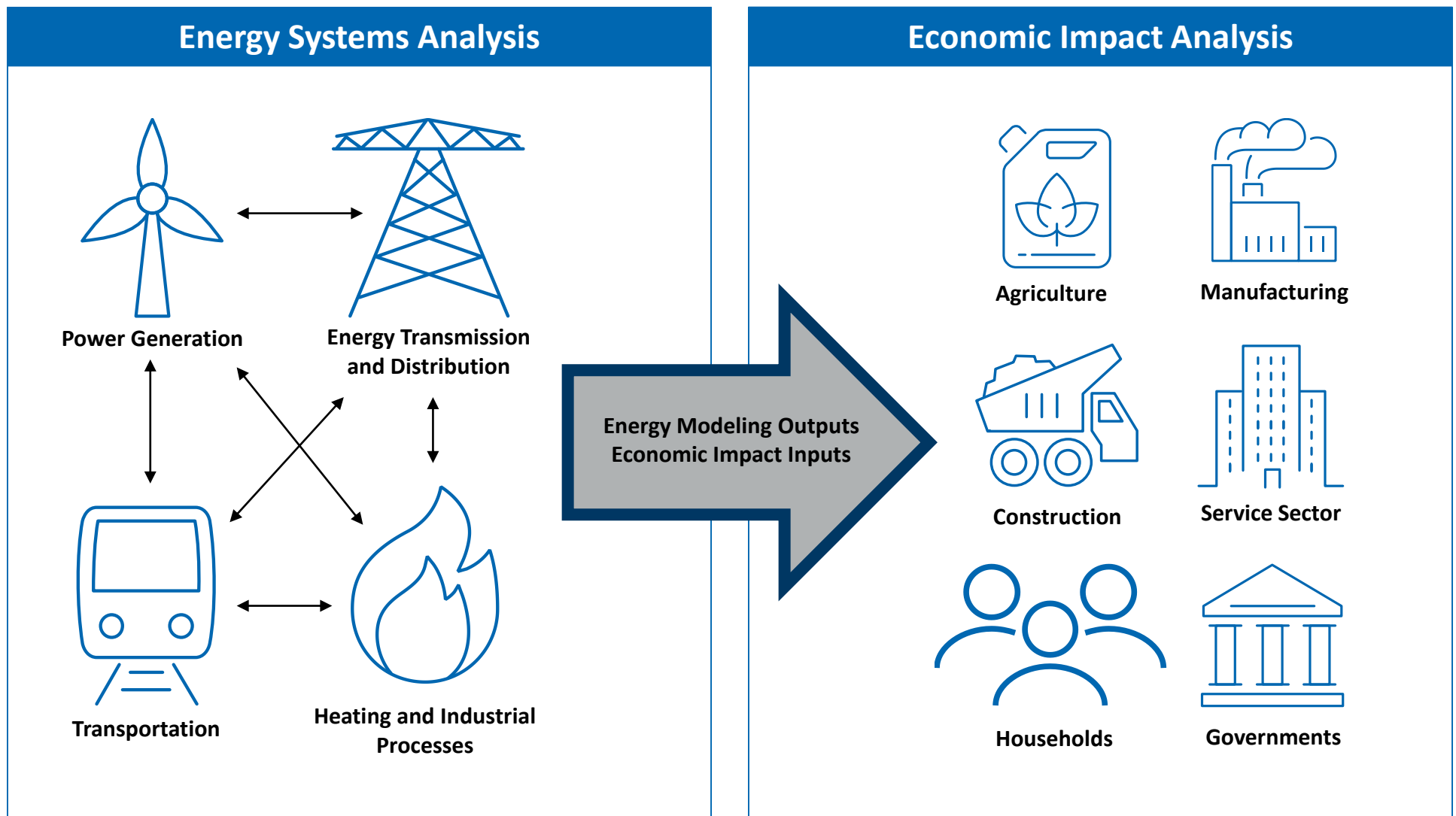
MODELING OVERVIEW

- EIG utilizes a suite a documented, third-party commercial modeling tools
- For this study, we will utilize two modeling platforms
 - IMPLAN
 - REMI

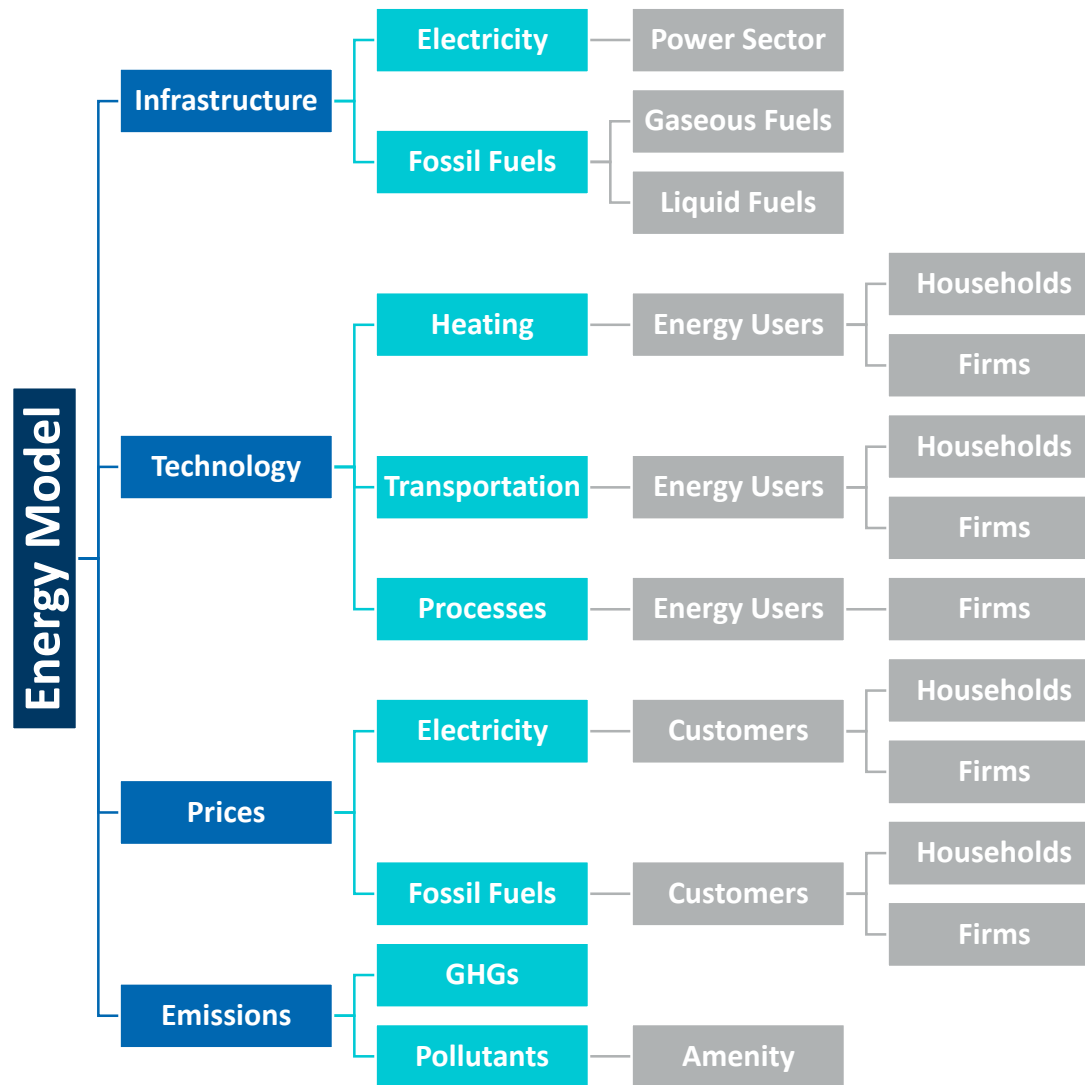
Economic impact analysis

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What is economic impact analysis?



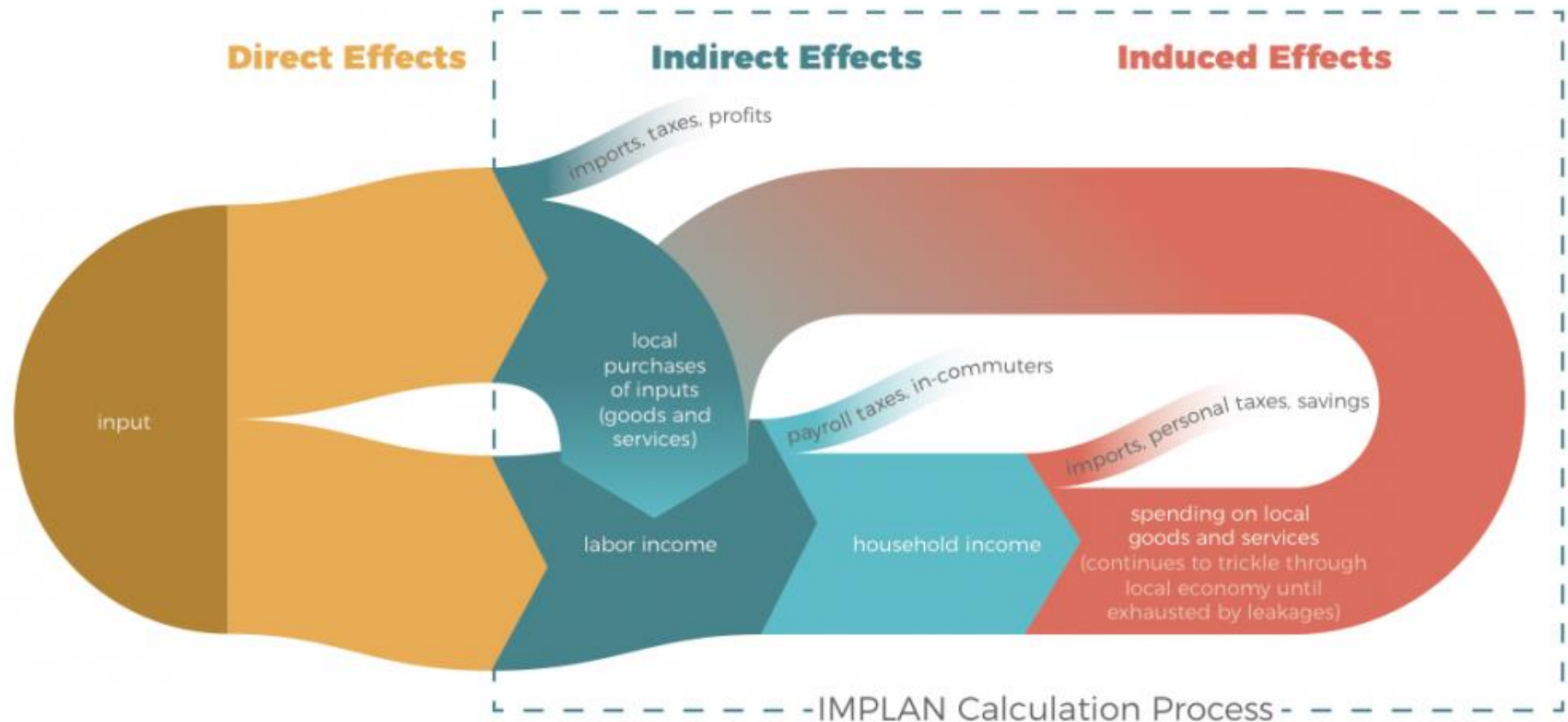
Integrating energy models and economic impacts



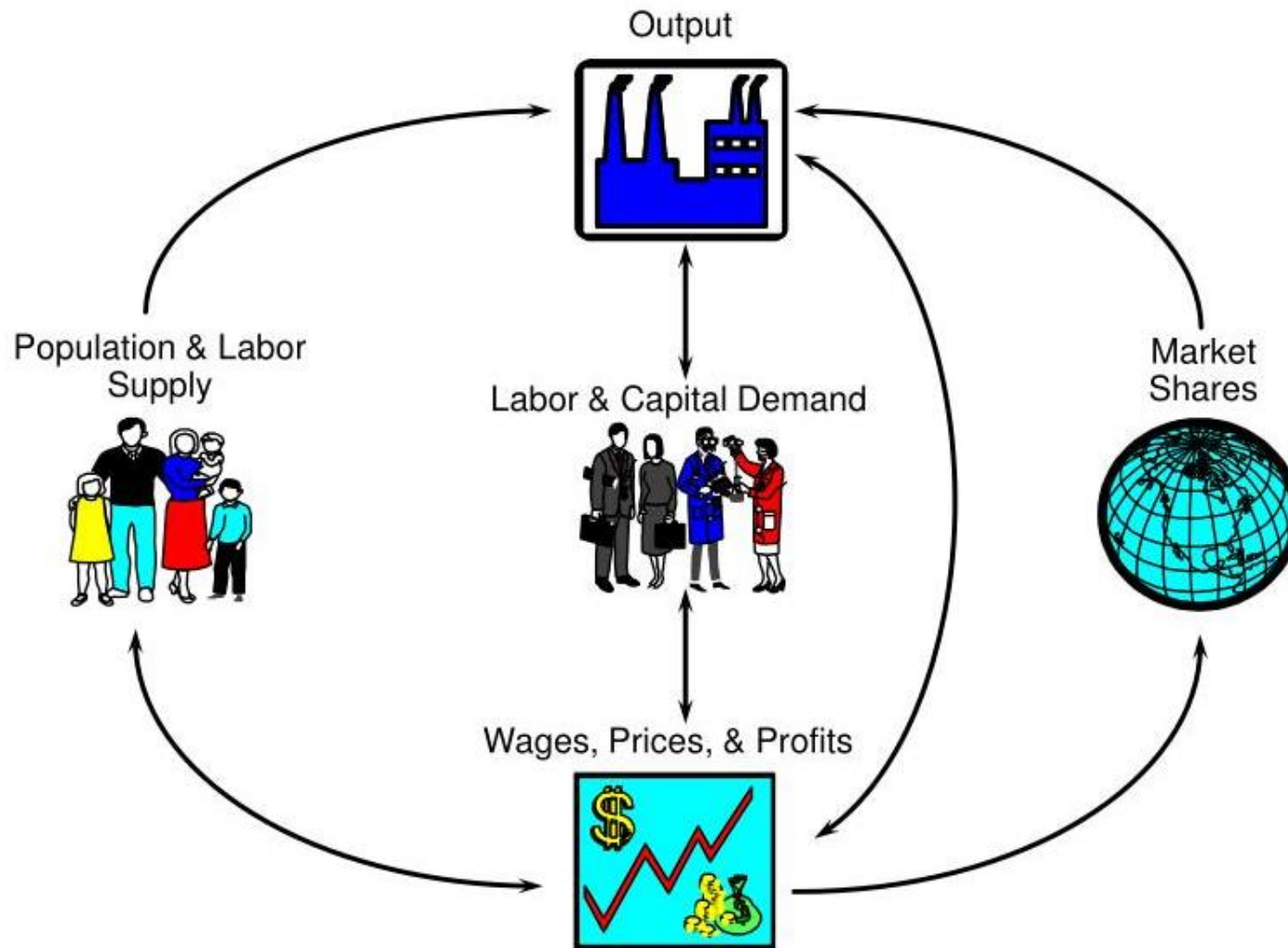
Methodology and approach

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IMPLAN model structure



REMI model structure



Modeling assumptions and results generated

Modeling Assumptions

- **Both IMPLAN and REMI rely on federal economic data**
 - Bureau of Economic Analysis (“BEA”)
 - Bureau of Labor Statistics (“BLS”)
 - U.S. Census Bureau
 - U.S. Energy Information Administration (“EIA”)
- IMPLAN does not have concepts for energy production, distribution, and prices like REMI
- **These concepts in REMI align with the Annual Energy Outlook (“AEO”) and its Reference Case**
 - Produced by EIA
 - Provides the underlying assumptions for the energy market modeling in the project
- REMI macroeconomic forecast
 - **Short term** = University of Michigan
 - **Medium term** = BLS
 - **Long term** = combination of U.S. Census and trend analyses performed by REMI economists


Results Generated

- **IMPLAN and REMI**
 - Employment
 - Business sales
 - Gross domestic product
 - Household income
 - State government revenues
 - Local government revenues
- **REMI only**
 - Year-by-year forecast and results
 - Cost-of-living index
 - Demographics
 - Total population
 - Age, racial/ethnic breakdowns, and sex

Distributional and equity analysis

- What is the impact on different **regions** of the state? On **urban** and **rural** areas?
- How are different **economic sectors** influenced? What about **agriculture** and **manufacturing**?
- What is the impact on different **income strata**?
- How does the scenario affect different **races** and **ethnicities**?
- What is the impact of the scenario on **women and men** compared to each other?
- How does the impact change for different **age groups**?
 - Different age groups now (e.g., young and old, etc.)
 - Short-term impact (e.g., early 2020s) and the long-term impact (e.g., late 2040s)

Economic recovery

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Macroeconomic forecast

According to the University of Michigan's forecast for the U.S. economy, the impact of COVID-19 will peak in 2020 though full recovery to prerecession peaks will take at least a few years

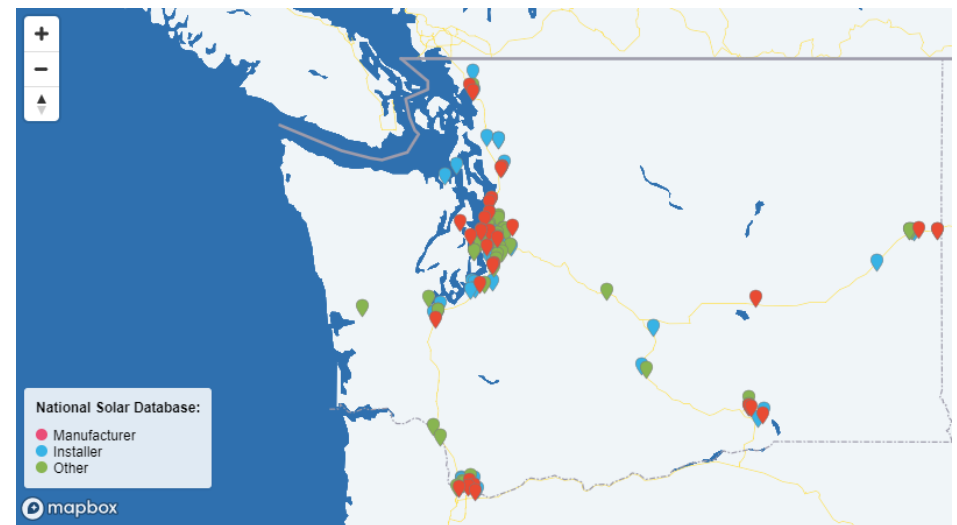
Category	2019	2020	2021	2022
U.S. GDP (2019 \$ trillions)	\$21.29	\$20.44	\$21.12	\$21.59
U.S. GDP Growth Rate	2.3%	-4.0%	3.3%	2.1%
U.S. Unemployment Rate	3.7%	10.5%	7.8%	7.3%
Manufacturing Capacity Utilization Rate	77.8%	72.3%	77.9%	79.3%
Light Vehicle Sales (millions)	16.9	13.3	15.2	15.8
Private Housing Starts (thousands)	1,297.8	1,007.8	1,092.4	1,197.6

What is the situation in the short term?


- Economic recovery is a focus and a policy priority
 - **Federal fiscal and monetary policy** = very accommodative
 - **Interest rates are low** = project capital costs are low
 - **High unemployment rates** = workers are available
 - **Low manufacturing capacity utilization rates** = manufacturers available to produce materials and equipment
 - **Labor, capital, and input costs** = should be at their lowest
- These make conditions for investments favorable in the short term

Solar sector in Washington

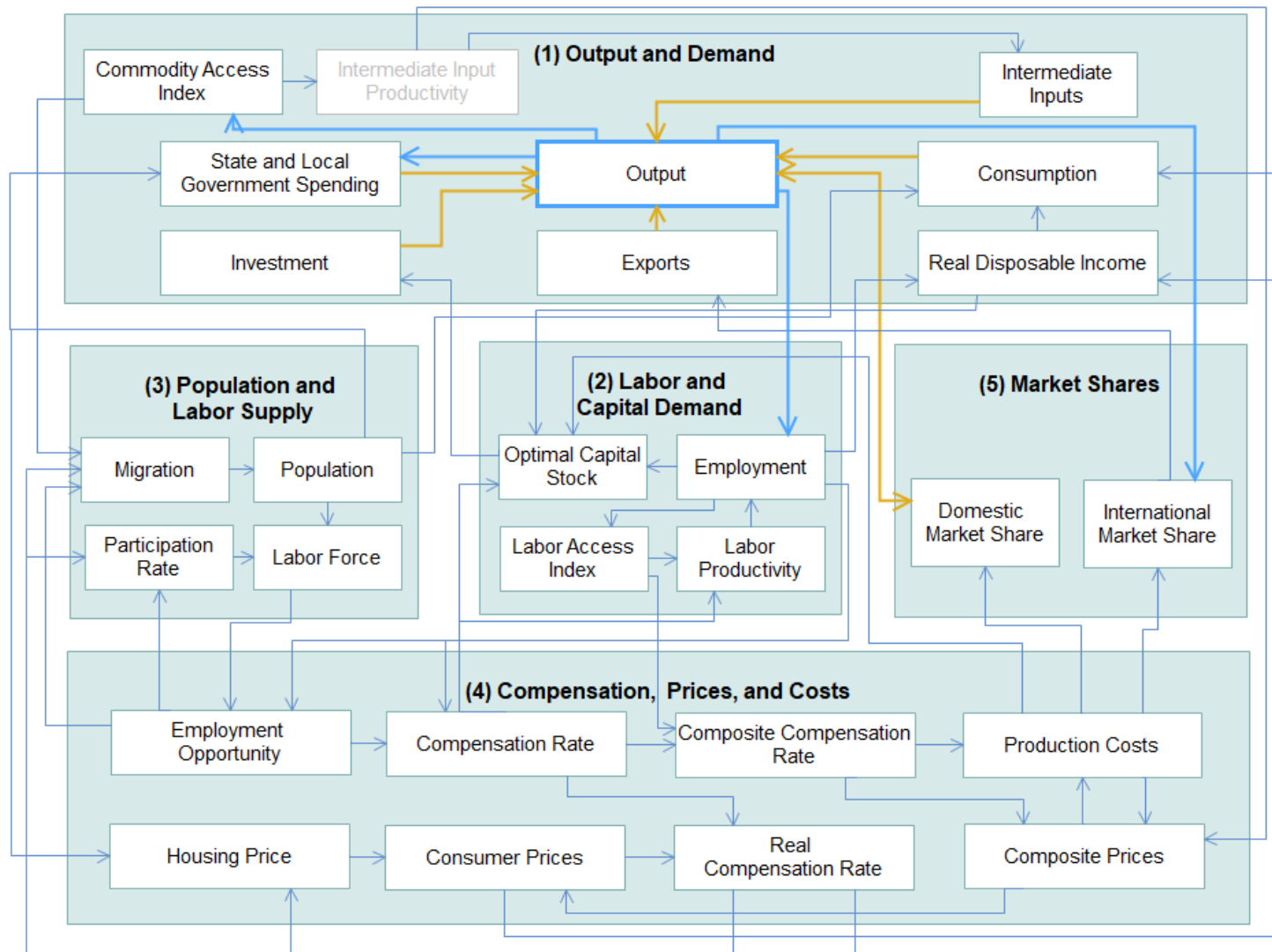
- 213 MW of installed solar capacity
 - 32nd among states in 2020
 - 20th in 2019
 - Enough to power 21,500 homes
- 0.22% of state electricity demand comes from solar generation
- 172 companies
 - 36 manufacturers
 - 71 installers/developers
 - 65 other
- \$650 million in capital investments
 - 2019 state GDP in Washington was \$560 billion (2.6% of U.S. GDP)
 - Projected to add another 801 MW of solar over the next five years



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Detailed REMI model structure



Detailed distributional and equity analysis

The main strengths of IMPLAN and REMI for this analysis is providing quantitative inputs to the equity impact analysis, which we have organized along six dimensions of the models' capabilities

■ Geography

- Run REMI as a 1-region (statewide) model to pick up dynamic responses
- Use IMPLAN data on a county-by-county basis to add geographical data
- The county results will help to determine the urban and rural split in results

■ Economic sectors

- REMI has 70 economic sectors
- These span the economy from natural resources and agriculture, to manufacturers, and to various levels of the service sectors
- IMPLAN has 544 sectors, though with less reliability than REMI's 70 sectors

■ Income strata

- Built upon the labor market impacts

■ Race/ethnicity

- REMI has four major demographic categories
 - Non-Hispanic White
 - Non-Hispanic Black
 - Non-Hispanic Other
 - Hispanic ethnicity (all races)
- Differentiative impacts based on the results of the labor market impacts in the model

■ Sex

- REMI has male and female cohorts
- Differentiative impacts based on the results of the labor market impacts in the model

■ Age

- REMI has one-year age cohorts (Age 0 through Age 100+) to allow for differentiation
- Use labor market results as a basis



Experts with Impact™

Scott Nystrom

Senior Director

+1 (515) 290-6990

Scott.Nystrom@FTIConsulting.com