

***Business Perspective  
on Biofuels:  
Financing Opportunities  
& Challenges***

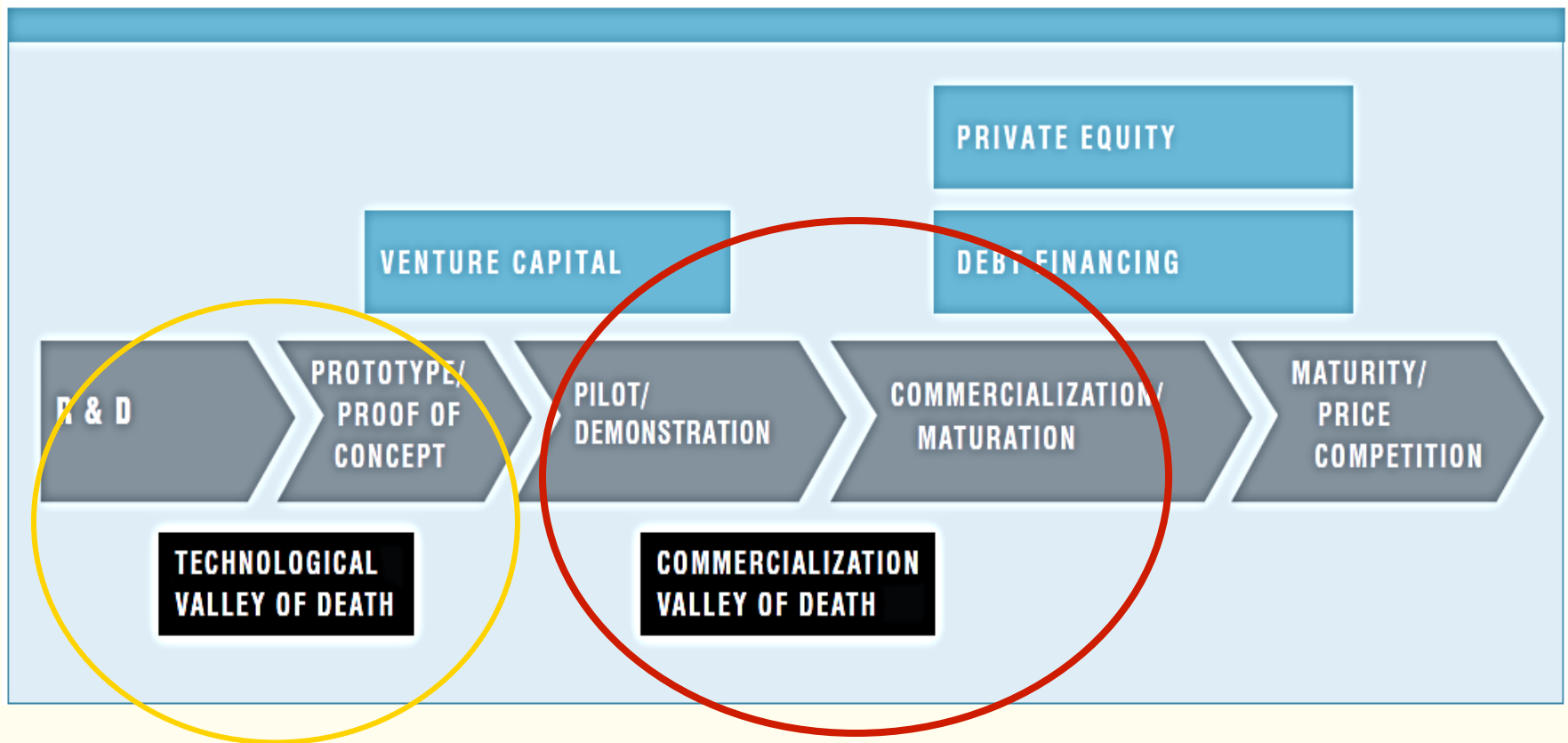
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# Today: Financing Opportunities and Challenges

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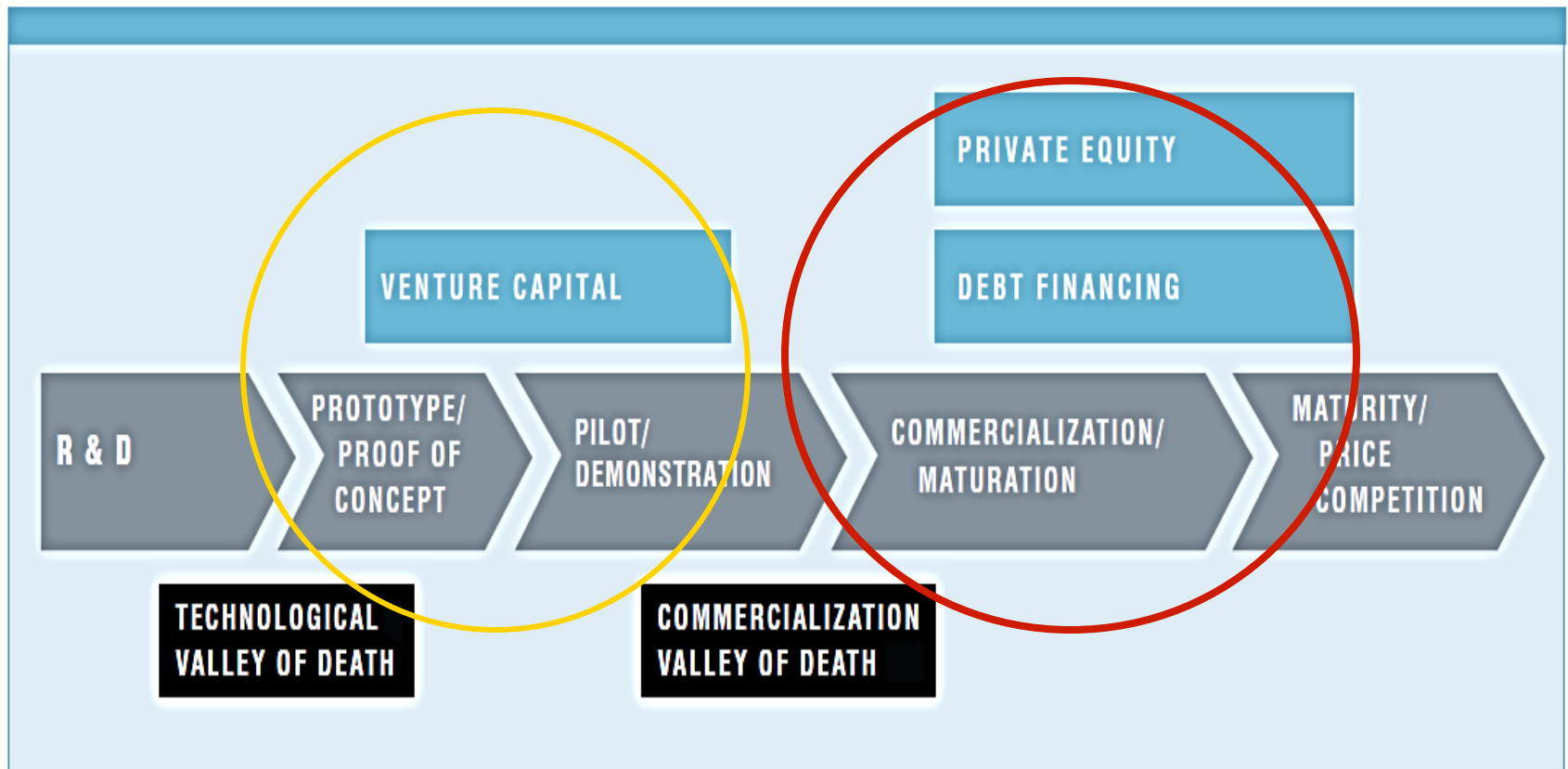
- **Sources of funding and other economic support - challenges**
  - Private
  - Public
- **Issues relating to question of making business case for funding**
- **In class work on your ask presentation for Wed**

# THE ENERGY INNOVATION CYCLE AND THE CLEAN ENERGY VALLEYS OF DEATH



# Private funding

## THE ENERGY INNOVATION CYCLE AND THE CLEAN ENERGY VALLEYS OF DEATH



# Complicated

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- **Groups are dealing with different kinds of firms**
  - Biofuels start ups
  - Large existing oil and chemicals firms with biofuels and bioenergy initiatives
  - Public utilities

# Private equity funding for start ups

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- **Sources of private equity capital**
  - Investors take ownership interest in start ups (pre IPO)
  - Securities not publically traded
    1. Individual (self, family, friends, angel investors)
    2. Institutional
      - Private equity funds
        - Venture Capital
        - General equity funds
      - Corporations (mostly oil, chemical)
      - Joint venture partners

# Costs and trade-offs

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- **Entrepreneur gives up control**

- Investors will demand the opportunity to review and comment on a project's design and engineering, procurement, process engineering licenses and construction agreements etc
- and make changes
  - VCs needs and expectations based on precedent of quick returns in dot.com and social media investments

# Private equity funding for start ups

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- **Later stages when capital needs very high**
  - Private equity
  - IPO (initial public offering)
  - Later stock sales
  - Joint venture partners



# Other Sources of Funding Debt

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- **Limited Recourse Debt to finance projects**
  - Backed by assets and revenues of project itself (e.g. the biorefinery) and assets related to project (land, feedstock etc)
- **Full Recourse Debt – Balance Sheet Financing**
  - Backed by all the borrowers' assets
  - Generally available only to substantial players whose long term unsecured debt is rated at least investment grade by a national rating agency

# Other Sources of Funding Debt

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- **Senior debt**

- Structured in way that requires company to repay lender first if it goes out of business
- Less risky → lower interest rates

- **Subordinated debt (junior, mezzanine)**

- Repaid from project revenues after all project operating costs and senior debt service has been paid.
- Riskier → higher interest rates

# Costs

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- **Have to repay principal and interest**
- **Lenders often demand information about projects and interfere with management**

# Other Sources of funding

## Non-equity funding

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- **Bootstrapping**

- Start up or initiative generates enough revenues to fund its own growth
- “Capital light” strategies (Amyris)
  - Vertical disintegration
    - Bolt project onto another company’s operation
    - Sell intermediate chemical to another company to process into biofuel
    - Sell rights to new technologies
- Patent litigation

# **Other sources of funding**

## **Non-equity private funding**

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- **Public utilities**

- **Rate increases**

- Have to persuade PUC regulators to pass costs through to rate payers
      - Make business case for
      - Show regulatory necessity (meet RPS and other standards)
      - Show environmental and other social benefits?

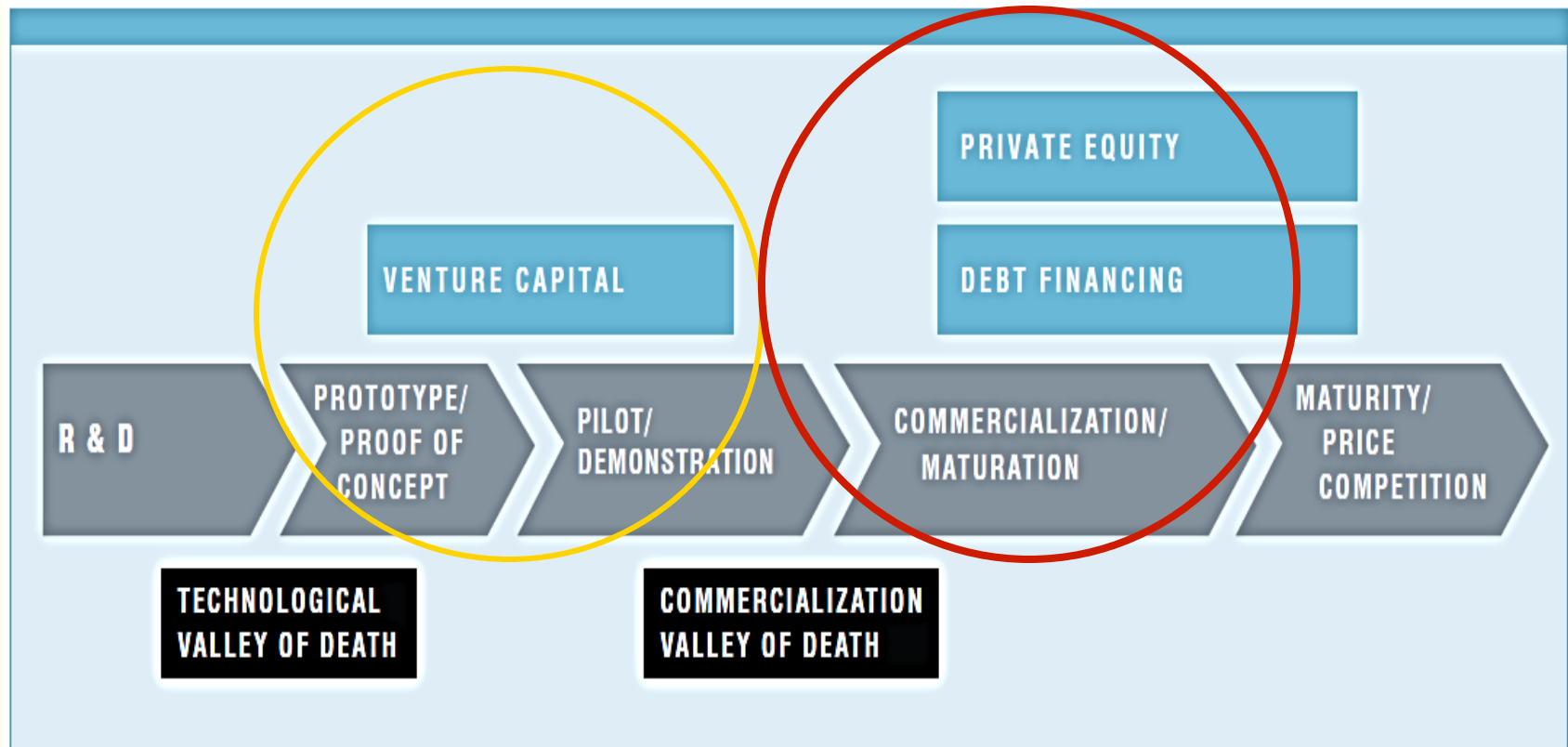
# **Funding for Projects within existing firms**

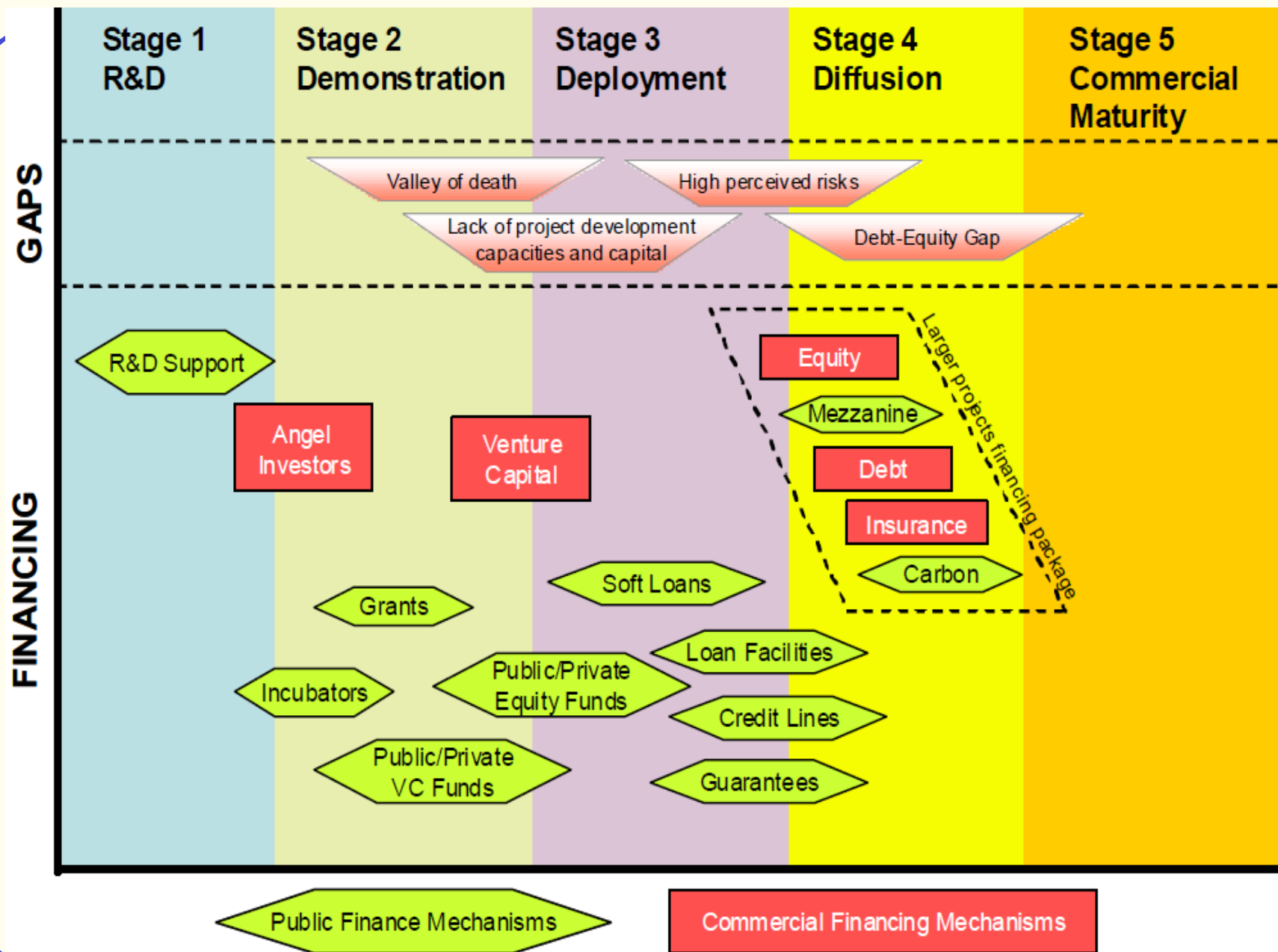
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- **Competing for internal firm resources**
  - **Must go through internal budget request/ allocation processes**
    - May also be permitted to go for government subsidies
    - Firm may need to borrow or enter into joint ventures
    - Public utilities may also need rate increases
- **Importance of management buy in**

# But This is an Over-Simplification

## THE ENERGY INNOVATION CYCLE AND THE CLEAN ENERGY VALLEYS OF DEATH







# **Government funding and other support**

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- **Huge range of public finance mechanisms to**
  - Fill private funding gaps
  - Mobilize and leverage private funding
  - Help firms develop technological and organizational capacities to meet policy goals (climate change, farm sector growth, jobs, etc)

**GAPS**

**FINANCING**

**Stage 1  
R&D**

**Stage 2  
Demonstration**

**Stage 3  
Deployment**

**Stage 4  
Diffusion**

**Stage 5  
Commercial  
Maturity**

Valley of death

High perceived risks

Lack of project development  
capacities and capital

Debt-Equity Gap

R&D Support

Angel  
Investors

Venture  
Capital

Equity

Mezzanine

Debt

Insurance

Carbon

Larger projects financing package

Grants

Soft Loans

Incubators

Public/Private  
Equity Funds

Loan Facilities

Credit Lines

Public/Private  
VC Funds

Guarantees

**Military  
procurement**

Public Finance Mechanisms

Commercial Financing Mechanisms

## **Yacobucci, *Biofuels Incentives: A Summary of Federal Programs* (CBO, 2012)**

Environmental Protection Agency (EPA)—Renewable Fuel Standard .....	1
Internal Revenue Service (IRS) .....	2
Volumetric Ethanol Excise Tax Credit.....	2
Small Ethanol Producer Credit.....	2
Biodiesel Tax Credit .....	3
Small Agri-Biodiesel Producer Credit.....	3
Renewable Diesel Tax Credit .....	4
Credit for Production of Cellulosic Biofuel .....	4
Special Depreciation Allowance for Cellulosic Biofuel Plant Property.....	5
Alternative Fuel Station Credit.....	5
Department of Agriculture (USDA) .....	6
Biorefinery Assistance.....	6
Repowering Assistance.....	6
Bioenergy Program for Advanced Biofuels.....	7
Feedstock Flexibility Program for Producers of Biofuels (Sugar) .....	7
Biomass Crop Assistance Program (BCAP).....	7
Rural Energy for America Program (REAP) .....	8
Biomass Research and Development .....	8
Other USDA Programs .....	9
Department of Energy (DOE).....	9
Biorefinery Project Grants.....	9
Loan Guarantees for Ethanol and Commercial Byproducts from Cellulose, Municipal Solid Waste, and Sugar Cane.....	10
DOE Loan Guarantee Program.....	10
Cellulosic Ethanol Reserve Auction.....	10
U.S. Customs and Border Protection (CBP)—Import Duty for Fuel Ethanol.....	11
Department of Transportation (DOT)—Manufacturing Incentive for Flexible Fuel Vehicles.....	12

# On line search tools

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- **<http://www.c2es.org/us-states-regions/policy-maps/biofuels>**
- **<http://advancedbiofuelsusa.info/resources/funding-opportunities>**

# **For Wed.**

## **“Group Ask” presentation**

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- **Craig Vaughn, Process Technology Advisor at BP – guest speaker**
  - Handout to prepare
- **5 minute presentations, 2-3 ppt slides**

# **Your ask**

## **business case for your project**

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- **Lower costs than rivals**
  - Less expensive feedstocks and other inputs
  - More efficient processes
  - Economies of scale and scope
- **Critically important advance**
  - Technological breakthrough
  - Strategic partnership
- **Other funding, internal revenues etc**

# Business case (continued)

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- **Better product(s) than rivals**
  - Unique qualities that competitors cannot easily imitate
  - And/or lower prices
  - More green
- **Other competitive advantage(s)**
  - Public policy
  - First mover advantage
  - Organization advance
  - Marketing etc.

# In class exercise

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- **Identify your project**
- **Identify a source of funding**
- **Develop your ask**